TOTEM®

High Performance Cutting Tools

EDITION
2025

Forbes Precision Tools and Machine Parts Limited

Material details

Material Group		Material Description	Content	Tensile Strength RM (MPa)*	Hardness (HB)	Hard-ness (HRC)	Torque Constant (Kc) N/mm²
Steel	P0	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	—	2000
	P1	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	—	2100
	P2	Medium- and High-Carbon Steels	C >0,25%	<530	<220	<25	2200
	P3	Alloy Steels and Tool Steels	C >0,25%	600-850	<330	<35	2400
	P4	Alloy Steels and Tool Steels	C >0,25%	850-1400	340–450	35-48	2500
	P5	Ferritic, Martensitic, and PH Stainless Steels	—	600-900	<330	<35	—
	P6	High-Strength Ferritic, Martensitic, and PH Stainless Steels	—	900-1350	350–450	35-48	2600
Stainless Steel	M1	Austenitic Stainless Steel	—	<600	130-200	-	2300
	M2	High-Strength Austenitic Stainless and Cast Stainless Steels	—	600-800	150–230	<25	2600
	M3	Duplex Stainless Steel	—	<800	135–275	<30	3000
Cast Iron	K1	Grey Cast Iron	—	125-500	120–290	<32	1600
	K2	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	—	<600	130–260	<28	1700
	K3	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	—	>600	180–350	<43	2000
Non-Ferrous	N1	Wrought Aluminium	—	—	—	—	700
	N2	Low-Silicon Aluminium Alloys and Magnesium Alloys	Si <12,2%	—	—	—	800
	N3	High-Silicon Aluminium Alloys and Magnesium Alloys	Si > 12,2%	—	—	—	1000
	N4	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	—	—	—	—	800
	N5	Nylon, Plastics, Rubbers, Phenolics, Resins, Fibreglass	—	—	—	—	—
	N6	Carbon, Graphite Composites, CFRP	—	—	—	—	—
	N7	Metal Matrix Composites (MMC)	—	—	—	—	—
Special Alloys	S1	Iron-Based, Heat-Resistant Alloys	—	500-1200	160-260	25-48	—
	S2	Cobalt-Based, Heat-Resistant Alloys	—	1000-1500	250-450	25-48	—
	S3	Nickel-Based, Heat-Resistant Alloys	—	600-1700	160-450	<48	2000
	S4	Titanium and Titanium Alloys	—	900-1600	300-400	33-48	2300
Hardened Steel	H1	Hardened Materials	—	—	—	44-48	2600
	H2	Hardened Materials	—	—	—	48-55	2900
	H3	Hardened Materials	—	—	—	56-60	2900
	H4	Hardened Materials	—	—	—	>60	—

TOTEM®

High Performance Cutting Tools

PRODUCT CATALOGUE

▪ 2025 ▪

Forbes Precision Tools and Machine Parts Limited

ABOUT US

Forbes Precision Tools and Machine Parts Limited manufacturers both carbide and high-speed steel round cutting tools under the brand 'TOTEM'.

Totem offers complete tooling solutions in Internal & External Threading, Drilling, Milling, Deburring and Reaming and as on date has over.

60 years of expertise of manufacturing high precision round cutting tools These tools are manufactured in a state-of-the-art manufacturing facility at Aurangabad India.

FPTMPL provides tooling solutions for a wide variety of industry sectors, including automotive, oil & gas, aerospace, defence, valve & pump, mold & die, heavy engineering, and electrical & electronics. These solutions are designed with material-specific geometries to optimize tool performance, ensuring maximum efficiency and longevity for the end-user.

Our range of products include HSS Hand and Machine Taps, Carbide Thread Mills and Taps, Solid Carbide Endmills and Drills, Tungsten Carbide Rotary Burrs, HSS Drills, Carbon Steel Taps, HSS and Carbon Steel Round and Hexagonal Dies. We are also the largest manufacturer of Spring lock washers in India serving major auto and transmission segments.

TOTEM®

High Performance Cutting Tools

FORBES PRECISION TOOLS AND MACHINE PARTS LIMITED

VISION

To be a market leader by empowering customers with innovative solutions in precision cutting tools and machine parts through world-class practices.

MISSION

- To inculcate innovation led organizational culture to be a front runner in the field of technology
- To add value to the customer's business while adhering to our core value of QPD: Quality, Price, Delivery and 5C's: Convenience, Comfort, Care, Commitment and Customer Satisfaction (Customer Delight)
- To develop a strong inhouse Design and Development skill set to enhance the Quality of Solutions
- To establish the cost leadership through World Class Manufacturing and Operational Excellence
- To be accountable towards the interest of all stakeholders, environment and society at large through all our actions and decisions.

TOTEM®

High Performance Cutting Tools

FORBES PRECISION TOOLS AND MACHINE PARTS LIMITED

QUALITY POLICY

We will continue to delight our customers by delivering high quality, innovative products and solutions through excellent manufacturing practises, its effective monitoring, sustenance, and further continual improvements of all business processes by active participation of all our associates.

We will remain committed towards Safety, Environment and Statutory Compliance.

CONTENTS

HSS TAPS

PRODUCTS	DESCRIPTION	PAGE
HSS SPIRAL POINT TAPS	HSS-E / PM Machine Taps Through Hole Application	1.001
HSS SPIRAL FLUTE TAPS	HSS-E / PM Machine Taps Blind Hole Application	1.035
HSS STRAIGHT FLUTE TAPS	HSS-E / PM Machine Taps Through & Blind Hole Application	1.073
HSS FORMING TAPS	HSS-E / PM Machine Taps Cold Forming Application	1.091
CARBIDE TAPS	Carbide Taps	1.104
NIB TAPS	Standard and Coupler Type NIB Taps	1.109
HSS HAND TAPS	HSS Hand Taps General Purpose	1.111

CARBIDE END MILLS

PRODUCTS	DESCRIPTION	PAGE
HIGH PERFORMANCE END MILLS	End mills for hardened steels from 55-70 HRc / 45-70 HRc / Micro / Exotic materials / Composites- Synthetics / Graphite	2.001
GENERAL PURPOSE & ECONOMY SERIES END MILLS	Solid Carbide End Mills and Ball Nose End Mills for General Purpose Application	2.163

THREAD MILLS

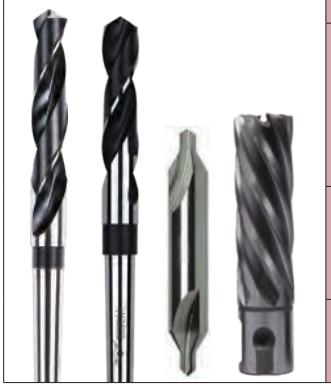
PRODUCTS	DESCRIPTION	PAGE
THREAD MILLS	Single Tooth Partial Profile, Multi Tooth 2D, Multi Tooth 3D, Multi Tooth 4D, Multi Tooth 2D For Hard Part, Multi Tooth 3D For Hard Part, Regular Helical Flute Solid, Regular Helical Flute Taper Solid, Regular Helical Flute Coolant, Regular Helical Flute Taper Coolant, Regular Straight Flute Solid, Regular Straight Flute Taper Solid, Angle 90 Short Tool, Angle 90 Long Tool	3.001

CONTENTS

CARBIDE DRILLS & REAMERS

PRODUCTS	DESCRIPTION	PAGE
SOLID CARBIDE DRILLS	3X, 5X, 7X, 12X, 15X and 20X Solid & Coolant Feed Drills	4.001
CARBIDE SPOTTING DRILLS	60°/90°/120° Point Angle	4.043
CARBIDE CENTRE DRILLS	LH and RH Cut, Form A and Form B	4.044
CARBIDE CHAMFER TOOLS	60°and 90° Point Angle	4.047
SOLID CARBIDE REAMERS	TMRT Helical / Straight	4.050

HSS DRILLS / HSS CENTRE DRILLS / ANNULAR CUTTERS



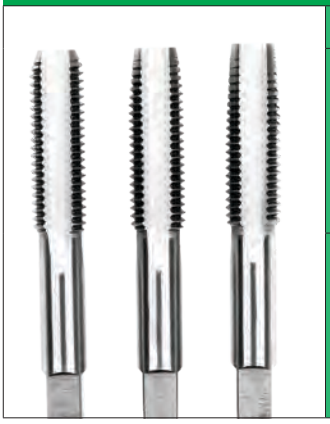
PRODUCTS	DESCRIPTION	PAGE
HIGH SPEED STEEL DRILLS	Parallel Shank, Taper Shank, Reduced Shank, Long Drills and Case Sets	5.001
CENTRE DRILLS	HSS Centre Drills	5.020
ANNULAR CUTTERS	HSS & TCT Annular Cutters with Weldon Shank	5.022

CARBIDE BURRS

PRODUCTS	DESCRIPTION	PAGE
TUNGSTEN CARBIDE ROTARY BURRS	Deburring Application	6.001

CONTENTS

CARBON STEEL TAPS



PRODUCTS	DESCRIPTION	PAGE
CARBON STEEL HAND TAPS	General Purpose Application	7.001
CASE SET	Set Of Tap, Die, Tap Wrench & Die Holder	7.025

DIES

PRODUCTS	DESCRIPTION	PAGE
ROUND SPLIT DIES	HSS & Carbon Steel Round Dies External Threading Application	8.004
ROUND SOLID DIES	HSS Round Solid Dies External Threading Application	8.024
HEXAGONAL DIES	HSS & Carbon Steel Hexagonal Dies External Threading Application	8.028

ICON GALLERY

TOOL SUBSTRATE

- CS — High Carbon Steel
- HSS — High Speed Steel M2 Grade
- HSS-E — High Speed Steel 5% Cobalt
- HSS-E PM — High Speed Steel Powder Metallurgy
- Carbide — Carbide
- TCT — Tungsten Carbide Tipped

HELIX ANGLE

End Mills/ Taps/ Reamers

0° 15° 18° 20° 25° 30° 35° 35/38° 38° 45° VARI 60° 15° LH

Drill

30°

POINT ANGLE

- 118° — 118 Degree
- 135° — 135 Degree
- 120° — 120 Degree
- 142° — 142 Degree

CHAMFER

- B/4-4.5P — 4 to 4.5 Chamfer
- C/2-3P — 2 to 3 Chamfer
- E/1.5-2P — 1.5 to 2 Chamfer
- T / B — Pair of Taper & Bottom Hand Tap
- T / S / B — Set of Taper, Second & Bottom Hand Tap
- T — Taper Tap
- S — Second Tap
- B — Bottom Tap

NUMBER OF FLUTES

- 2 Flutes
- 3 Flutes
- 4 Flutes
- 5 Flutes
- 6 Flutes
- 2-3 — 2 to 3 Flutes
- 2-3-4 — Optimum Flutes
- 6-16 — 6 to 16 Flutes
- 6-8 — 6 to 8 Flutes
- 4-5 — 4 to 5 Flutes
- 4-6 — 4 to 6 Flutes
- 4-7 — 4 to 7 Flutes
- 7 — 7 Flutes

HOLE TYPE

- Through Hole
- Blind Hole

STANDARD

- DIN 338 — DIN338
- DIN 340 — DIN340
- DIN 345 — DIN345
- DIN 371 — DIN371
- DIN 374 — DIN374
- DIN 376 — DIN376
- DIN 1897 — DIN1897
- DIN 2174 — DIN2174
- DIN 6535 — DIN6535
- DIN 6537 — DIN6537
- ISO 529 — ISO 529
- ISO 2284 — ISO 2284
- ISO 2283 — ISO 2283
- ISO 235 — ISO 235
- IS 494 — IS494
- IS 5100 — IS5100
- IS 5101 — IS5101
- IS 5102 — IS5102
- IS 5103 — IS5103
- BS 949 — BS949: 1951
- BS 1127 — BS1127: 1974
- BS 328 — BS328
- ANSI 94.9 — ANSI 94.9

CLASS OF THREAD

- 6H — 6H
- 6HX — 6HX
- 6G — 6G
- ZONE 5 — ZONE 5
- 2B — 2B
- 2BX — 2BX
- 2A — 2A

MACHINING STRATEGIES

- HSM — High Speed Machining
- HVM — High Volume Machining
- HPM — High Performance Machining

CORNER STYLE

- Square End
- Ball Nose
- Corner Chamfer
- 0.1X45° — Corner Reinforcement
- Corner Radius

DRILL LENGTH

- 3X — 3X Length
- 5X — 5X Length
- 7X — 7X Length
- 12X — 12X Length
- 15X — 15X Length
- 20X — 20X Length

FEATURE

- Solid
- Coolant Feed

CUTTING TYPE

- Center Cutting

HAND OF TOOL

- RH — Right Hand

ICON GALLERY

SURFACE TREATMENT

- BF — Bright Finish
- TiN — Titanium Nitride Coating
- TiAlN — Titanium Aluminium Nitride Coating
- TiCN — Titanium Carbonitride Coating
- AlCrN — Aluminium Chromium Nitride Coating
- TiAlN WC/C — Titanium Aluminium Nitride Tungsten Carbide/Carbon
- Proton Plus — Proton Plus Coating
- Cr Base — Chromium Based Coating
- Diamond Tipped
- D — Diamond Coating
- ST — Steam Tempered
- B&G — Black & Gold
- BL — Blackened Finish

WORKING MATERIAL

- P — Steel
- K — Cast Iron
- S — Super Alloys
- M — Stainless Steel
- N — Non Ferrous
- H — Hard Part

TOLERANCES

- e8 — Cutting Dia Tolerances
- H7 — Cutting Dia Tolerances
- g7 — Cutting Dia Tolerances
- FHC — Cutting Dia Tolerances
- 0 - 0.1 — Cutting Dia Tolerances
- h5 — Shank Tolerances
- h8 — Shank Tolerances

TYPE OF POINT

- S — Split Point
- N — Normal Point

STARTEGY

- Trochoidal Milling

DRILLING APPLICATIONS

- DHD — Deep Hole Drilling

CUTTING DIRECTION

- LH — Left Hand
- RH — Right Hand

FLUTE STYLE

- H — Helical
- S — Straight

WORKPIECE HARDNESS

- Above 45 HRC — Hardness above 45 HRc
- 30 - 45 HRC — Hardness from 30-45 HRc
- 30 - 50 HRC — Hardness from 30-50 HRc
- 55-70 HRC — Hardness from 55-70 HRc
- 45-70 HRC — Hardness from 45-70 HRc

SHANK TYPE

- 6535 HA — Round Shank
- 6535 HB — Weldon Shank

MILLING APPLICATIONS

- Plunge Milling
- Ramping Blank
- Slotting: Ball Nose
- Slotting: Square End
- Side Milling/Shoulder Milling: Ball Nose
- Side Milling/Shoulder Milling: Square End
- Side Milling/ Shoulder Milling: Roughing
- Side Milling/ Shoulder Milling: Roughing
- 3D Profiling

END MILLS LENGTH

- STUB — Stub Length
- REG — Regular / Standard Length
- LONG — Long Length
- EXTRA LONG — Extra Long Length
- LONG REACH — Long Reach Length

THREAD FORM DETAIL

- M — Metric Screw Thread Series
- MF — Metric Fine Screw Thread Series
- UNC — Unified Coarse Thread Series
- UNEF — Unified Extra Fine Thread Series
- UNF — Unified Fine Thread Series
- NPT — American National Standard Taper Pipe Thread
- NPTF — Dryseal American National Standard Taper Pipe Thread
- BSPT — British Standard Taper Pipe Thread
- BSF — British Standard Fine Thread Series
- BSP — British Standard Pipe
- BSW — British Standard Whitworth Coarse Thread Series

LENGTH

- SHORT — Short
- LONG — Long

ICON GALLERY

TOOL TYPE

- CT — Chamfer Tool
- TM — Thread Mill
- TP — Taper Preperation

DESIGN TYPE

- STP 60 — Single Tooth Partial Profile
- MT 2D — Multi Tooth 2D
- MT 3D — Multi Tooth 3D
- MT 4D — Multi Tooth 4D
- MTH 2D — Multi Tooth 2D For Hard Part
- MTH 3D — Multi Tooth 3D For Hard Part
- RHS — Regular Helical Flute Solid
- RHTS — Regular Helical Flute Taper Solid
- RHC — Regular Helical Flute Coolant
- RHTC — Regular Helical Flute Taper Coolant
- RSS — Regular Straight Flute Solid
- RSTS — Regular Straight Flute Taper Solid
- A90S — Angle 90 Short Tool
- A90L — Angle 90 Long Tool

OPERATION TYPE

- ICP — Internal Conic Prep
- ECP — External Conic Prep
- IT — Internal Threading
- ET — External Threading
- EC — External Chamfer
- IC — Internal Chamfer

THREAD FORM

- ISO — ISO
- UNIFIED — Unified
- NPT — National Pipe Thread Pipe Thread
- BS — British Standard

FORM

- FORM A — Form A
- FORM AD — Form AD
- FORM AD/B — Form AD/B

APPLICATION

- 62 HRc — For materials upto 62 HRc
- For arospace application

USE YOUR TAPS SELECTOR

Select execution of tool considering blind or through hole **B**

Select thread form and find page number, select from DIN/ISO/JIS standard length **C**

Select your work piece material from this table with desired Vc **A**

DIN 371 / DIN 376 / DIN 374 / ISO 529 / JIS

Page No.:DIN / ISO / JIS													
	M	5 / 18 / 31	5 / 18	5 / 18 / 31	36 / 52 / 67	36 / 52	36 / 52 / 67	90	6 / 19	6 / 19	6 / 19	9 / 22	9 / 22
	MF	10 / 23	10 / 23	10 / 23	41 / 57	41 / 57	41 / 57	94	11 / 24	11 / 24	11 / 24	-	-
	UNC	14 / 27	14 / 27	14 / 27	46 / 61	46 / 61	-	-	-	-	-	-	-
	UNF	16 / 29	16 / 29	16 / 29	49 / 64	49 / 64	-	-	-	-	-	-	-
Series		SA1	SA3	SA4	SB1	SB3	SB4	SD4	SAF3	SAF5	SAF7	SAF5	SAF7
Execution		Spiral Point	Spiral Point	Spiral Point	Spiral Flute	Spiral Flute	Spiral Flute	Forming	Spiral Point	Spiral Point	Spiral Point	Spiral Point	Spiral Point
Tool Material		HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE-PM	HSSE-PM
Helix		-	-	-	35	35	35	-	-	-	-	-	-
Coating		Bright	TiN	TiAlN	Bright	TiN	TiAlN	TiAlN	TiN	TiCN	AlCrN	TiCN	AlCrN
Chamfer		B/ 4-4.5P	B/ 4-4.5P	B/ 4-4.5P	C/2-3P	C/2-3P	C/2-3P	C/ 2-3P	B/ 4-4.5P	B/ 4-4.5P	B/ 4-4.5P	B/ 4-4.5P	B/ 4-4.5P
Hole Type		Through	Through	Through	Blind/ Through	Blind/ Through	Blind/ Through	Through / Blind	Through	Through	Through	Through	Through
Coolent Feed		No	No	No	No	No	No	No	No	No	No	No	No
Oil Groove		-	-	-	-	-	-	Yes	-	-	-	-	-
P0		10-12	15-20	20-25	8-12								
P1			15-20	15-20	8-12	10-15	15-20	15-20	15-20	15-25			
P2				15-20		8-15	10-18	12-15	15-20	15-25	15-25	25-30	25-30
P3				8-12						15-20	15-20	20-25	20-25
P4													12-16
P5													
P6													
M1													
M2													
M3													
K1				30-35			10-20						
K2			15-20	20-25		8-12	8-12						
K3			12-15										
N1		15-20			15-25								
N2		15-20			15-25								
N3						15-20							
N4		25-30				20-25							
S1													
S2													
S3													
S4													

SB DIN

HSS TAPS

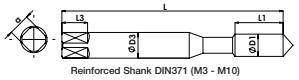
Go to desired page number find your tool on the page **D**

TOTEM Silver cut **Spiral Flute Taps**

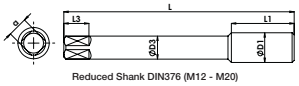
M Metric coarse threads

HOLE TYPE

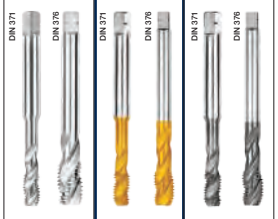
HSS-E | DIN 371/376 | 6HX | C/2-3P | 35°



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12 - M20)



								Series	SB1	SB3	SB4
								Material - 1st choice	P0-P1	P1-P2	P1-P2
								Material - 2nd choice	N1-N2	K2, N3-N4	K1-K2
DIN 371								Coating	Bright	TiN	TiAlN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 3	0.5	56	6	3.5	2.7	6	2.5	FAB0203197	FAB0203207	FAB0204334	
M 3.5	0.6	56	7	4	3	6	2.9	FAB0204328	FAB0204331	FAB0204335	
M 4	0.7	63	8	4.5	3.4	6	3.3	FAB0203198	FAB0203208	FAB0200968	
M 5	0.8	70	8	6	4.9	8	4.2	FAB0203199	FAB0203209	FAB0203685	
M 6	1	80	10	6	4.9	8	5	FAB0203200	FAB0203210	FAB0203686	
M 7	1	80	10	7	5.5	8	6	FAB0203201	FAB0203211	FAB0204336	
M 8	1.25	90	13	8	6.2	9	6.8	FAB0203202	FAB0203212	FAB0203687	
M 10	1.5	100	15	10	8	11	8.5	FAB0203203	FAB0203213	FAB0203688	

Select the size of nominal diameter required **E**

* For best result use Totem range of pre tapping drills

USE YOUR ENDMILLS SELECTOR

Select length of tool **D**

Select HP/GP (High Performance / General Performance) **A**

Select corner style **C**

Select your work piece material from this table **B**

	For 45 - 58 HRc Proton Plus						For 30- 45 HRc High Speed Machining			
Description	4 flute end mill regular length	4 flute end mill long length	4 flute end mill long reach length	ball nose 2 flute regular length	ball nose 2 flute long length	ball nose 2 flute long reach length	4 flute end mill regular length	2 flute end mill regular length	Ball Nose 4 flute regular length	Ball Nose 2 flute regular length
Page No.	107	109	111	112	113	114	116	117	118	119
Length	Reg	Long Length	Long Reach	Reg	Long Length	Long Reach	Reg	Reg	Reg	Reg
Dia Range Std	3.0-16.0	3.0-16.0	6.0-12.0	1.0-12.0	1.0-12.0	6.0-12.0	3.0-20.0	3.0-20.0	3.0-20.0	3.0-20.0
Dia Range Spl	2.0-25.4	2.0-20.0	2.0-20.0	1.0-20.0	1.0-20.0	1.0-20.0	3.0-20.0	3.0-20.0	3.0-20.0	3.0-20.0
Length of Cut (Ap Max)	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD
No of Flutes	4	4	4	2	2	2	4	2	4	2
Helix	30°	30°	30°	30°	30°	30°	30°	30°	30°	30°
Coating	Proton Plus	Proton Plus	Proton Plus	Proton Plus	Proton Plus	Proton Plus	TiAlN	TiAlN	TiAlN	TiAlN
Shank										
Square End	√	√	√				√	√		
Ball Nose				√	√	√			√	√
Corner Radius	√	√	√				Custom Solution	Custom Solution		
Corner Chamfer										
Center Cutting	√	√	√	√	√	√	√	√	√	√
Chip Breaker										
Neck Type										
P0										
P1										
P2							•	•	•	•
P3							•	•	•	•
P4							•	•	•	•
P5										
P6										
M1										
M2										
M3										
K1										
K2										
K3										
N1										
N2										
N3										
N4										
N5										
N6										
N7										
S1										
S2										
S3										
S4										
H1	•	•	•	•	•	•				
H2	•	•	•	•	•	•				
H3	•	•	•	•	•	•				
H4										
Periphery Milling	√	√	√	√	√	√	√	√	√	√
Slotting							√	√	√	√
Ramping	√	√	√	√	√	√	√	√	√	√
Profiling	√	√	√	√	√	√	√	√	√	√

Find your tool on the page **E**

TOTEM® Solid Carbide End Mills

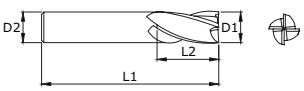
HSM Series

END MILLS

4 Flute Centre cutting HSM end mill for 30-45 HRc steel

Carbide | REG | 30° | 6535 HA | 30 - 45 HRC | TiAlN

P2-P4



Unit : mm

Diameter ØD1	EDP No	Flute Length L2	Overall Length L1	Shank Diameter ØD2
3	FBK0501200	12	38	3
4	FBK0501974	14	51	4
5	FBK0501326	20	51	5
6	FBK0501366	20	64	6
8	FBK0501975	20	64	8
10	FBK0500846	25	70	10
12	FBK0500942	25	76	12
14	FBK0501017	30	89	14
16	FBK0501048	30	89	16
20	FBK0501125	38	102	20

Select tool diameter **F**

*Custom Solution possible Refer page 2.171

TOTEM®

High Performance Cutting Tools

HIGH SPEED STEEL TAPS

TAP SELECTION GUIDE

TOTEM®

DIN 371 / DIN 376 / DIN 374 / ISO 529 / JIS													
Page No:DIN / ISO / JIS	M	5 / 18 / 31	5 / 18	5 / 18 / 31	36 / 52 / 67	36 / 52	36 / 52 / 67	90	6 / 19	6 / 19	9/22	9 / 22	37 / 53
	MF	10 / 23 / 31	10 / 23	10 / 23 / 31	41 / 57 / 67	41 / 57	41 / 57 / 67	94	11 / 24	11 / 24	-	-	42 / 58
	UNC	14 / 27	14 / 27	14 / 27	46 / 61	46 / 61	-	-	-	-	-	-	-
	UNF	16 / 29	16 / 29	16 / 29	49 / 64	49 / 64	-	-	-	-	-	-	-
Series		SA1	SA3	SA4	SB1	SB3	SB4	SD4	SAF3	SAF5	SAH4	SAF5	SBF3
Execution		Spiral Point	Spiral Point	Spiral Point	Spiral Flute	Spiral Flute	Spiral Flute	Forming	Spiral Point	Spiral Point	Straight Flute	Spiral Point	Spiral Flute
Tool Material		HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE-PM	HSSE-PM	HSSE
Helix		-	-	-	35	35	35	-	-	-	-	-	15
Coating		Bright	TiN	TiAlN	Bright	TiN	TiAlN	TiAlN	TiN	TiCN	TiAlN	TiCN	TiN
Chamfer		B/ 4-4.5P	B/ 4-4.5P	B/ 4-4.5P	C/2-3P	C/2-3P	C/2-3P	C/ 2-3P	B/ 4-4.5P	B/ 4-4.5P	C/4-4.5P	B/ 4-4.5P	C/2-3P
Hole Type		Through	Through	Through	Blind/ Through	Blind/ Through	Blind/ Through	Through / Blind	Through	Through	Blind/Through	Through	Blind/ Through
Coolent Feed		No	No	No	No	No	No	No	No	No	No	No	No
Oil Groove		-	-	-	-	-	-	Yes	-	-	-	-	-
Steel	P0	10-12	15-20	20-25	8-12								
	P1		15-20	15-20	8-12	10-15	15-20	15-20	15-20	15-25			
	P2			15-20		8-15	10-18	12-15	15-20	15-25	15-25	25-30	18-22
	P3			8-12						15-20	15-20	20-25	
	P4												
	P5												
	P6												
Stainless Steel	M1												
	M2												
	M3												
Cast Iron	K1			30-35			10-20						
	K2		15-20	20-25		8-12	8-12						
	K3		12-15										
Non-Ferrous	N1	15-20			15-25								
	N2	15-20			15-25								
	N3					15-20							
	N4	25-30				20-25							
Special Alloys	S1												
	S2												
	S3												
	S4												

TAP SELECTION GUIDE

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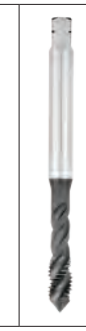
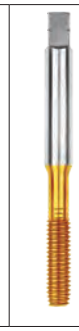
													
DIN 371 / DIN 376 / DIN 374 / ISO 529 / JIS													
Page No:DIN / ISO / JIS	M	37 / 53	37	40	73 / 80	92 / 96	7 / 20	7 / 20	7 / 20	40/56	40/56	38 / 54	38 / 54
	MF	42 / 58	42	45	76 / 83	- / 98	12 / 25	12 /25	12 / 25	45/59	45/59	43 / 59	43 / -
	UNC	-	-	-	-	-	15 / 28	15 / 28	15 / 28	47/62	62	47 / 62	-
	UNF	-	-	-	-	-	17 / 30	17 / 30	17 / 30	50/65	65	50 / 65	-
Series		SBF5	SBF5 P3	SBF5 P3 TC	SCF5	SDF5	SAS3	SAS5	SAS6	SBU3	SBU5	SBS5	SBS6
Execution		Spiral Flute	Spiral Flute	Spiral Flute	Straight Flute	Forming	Spiral Point	Spiral Point	Spiral Point	Spiral Flute	Spiral Flute	Spiral Flute	Spiral Flute
Tool Material		HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE
Helix		15	15°	15°	-	-	-	-	-	40	40	45	45
Coating		TiCN	TiCN	TiCN	TiCN	TiCN	TiN	TiCN	TiAlN + WC/C	TiN	TiCN	TiCN	TiAlN + WC/C
Chamfer		C/2-3P	C/2-3P	C/2-3P	E/1 -1.5P	C/ 2-3P	B/ 4-4.5P	B/ 4-4.5P	B/ 4-4.5P	C/2-3P	C/2-3P	C/2-3P	C/2-3P
Hole Type		Blind/ Through	Blind/Through	Blind	Through/Blind	Through / Blind	Through	Through	Through	Blind/ Through	Blind/ Through	Blind/ Through	Blind/ Through
Coolent Feed		No	No	Yes	No	No	No	No	No	No	No	No	No
Oil Groove		-	-		-	Yes	-	-	-	-	-	-	-
Steel	P0												
	P1					15-20							
	P2	18-22			10-14	12-16				18-22	18-22		
	P3	16-20	18-22	18-22	8-12					16-20	16-20		
	P4		16-20	16-20									
	P5												
	P6												
Stainless Steel	M1						5-10	5-10	8-14	5-6	8-10	5-8	10-12
	M2							4-6	8-10	5-6	8-10	4-6	8-10
	M3								4-8		6-8		6-8
Cast Iron	K1												
	K2												
	K3												
Non-Ferrous	N1												
	N2												
	N3												
	N4												
Special Alloys	S1												
	S2												
	S3												
	S4												

TAP SELECTION GUIDE

TOTEM®

													
DIN 371 / DIN 376 / DIN 374 / ISO 529 / JIS													
Page No: DIN / ISO / JIS	M	39 / 55	8 / 21	39 / 55	72 / 79 /86	72 / 79 /86	73 / 80	74 / 81	74 / 81	89 / 95 / 99	89 / 95 / 99	91	91
	MF	-	13 / 26	44 / -	75 / 82	75 / 82	76 / 83	-	-	93 / 97 / 99	93 / 97 / 99	-	-
	UNC	48 / 63	-	-	77 / 84	77 / 84	-	-	-	-	-	-	-
	UNF	51 / 66	-	-	78 / 85	78 / 85	-	-	-	-	-	-	-
Series		SBS5	SAI6	SBI6	SC3	SC4	SC4TC	SC4	SC4TC	SD1	SD3	SD1	SD3
Execution		Spiral Flute	Spiral Point	Spiral Flute	Straight Flute	Straight Flute	Straight Flute	Straight Flute	Straight Flute	Forming	Forming	Forming	Forming
Tool Material		HSSE-PM	HSSE-PM	HSSE-PM	HSSE	HSSE	HSSE	HSSE-PM	HSSE-PM	HSSE	HSSE	HSSE	HSSE
Helix		45	-	-	18^0	-	-	-	-	-	-	-	-
Coating		TiCN	TiAlN + WC/C	TiAlN + WC/C	TiN	TiAlN	TiAlN	TiAlN	TiAlN	Bright	TiN	Bright	TiN
Chamfer		C/2-3P	B/ 4-4.5P	C/2-3P	E/1 -1.5P	E/1 -1.5P	E/1 -1.5P	E/1 -1.5P	E/1 -1.5P	C/ 2-3P	C/ 2-3P	C/ 2-3P	C/ 2-3P
Hole Type		Blind/ Through	Through	Blind/ Through	Through/Blind	Through/Blind	Blind	Through/Blind	Blind	Through / Blind	Through / Blind	Through / Blind	Through / Blind
Coolent Feed			No	No	No	No	Yes	No	Yes	No	No	No	No
Oil Groove		-	-	-	-	-	-	-	-	Yes	Yes	-	-
Steel	P0										15-20		20-25
	P1										15-20		25-20
	P2										12-15		15-18
	P3												
	P4												
	P5												
	P6												
Stainless Steel	M1	10-12											
	M2	8-10											
	M3	6-8											
Cast Iron	K1				25-30	30-40	30-40	40-50	40-50				
	K2				15-20	20-25	20-25	30-40	30-40				
	K3					12-15	15-20	25-30	25-30				
Non-Ferrous	N1									20-25	25-30	20-25	25-30
	N2				25-30					20-25	25-30	20-25	25-30
	N3				20-25						20-25		20-25
	N4												
Special Alloys	S1		10-15	6-10									
	S2		6-12	5-8									
	S3		8-12	6-8									
	S4		4-6	3-5									

TOTEM®

High Performance Cutting Tools

SPIRAL POINT TAPS

SA SERIES

CONTENTS

TOTEM®

SPIRAL POINT TAPS

SERIES	THREAD FORM	LENGTH STANDARD	WORKPIECE MATERIAL	1ST CHOICE	2ND CHOICE	TOOL MATERIAL	COATING	PAGE
SA1	M	DIN 371/ DIN 376	Steel	P0, N4	N1, N2	HSSE	Bright	1.005
SA3	M	DIN 371/ DIN 376	Steel	P0, P1	K2, K3	HSSE	TiN	
SA4	M	DIN 371/ DIN 376	Steel	P0-P3	K1,K2	HSSE	TiAlN	
SAF3	M	DIN 371/ DIN 376	Forged Steel	P1 P2	-	HSSE	TiN	1.006
SAF5	M	DIN 371/ DIN 376	Forged Steel	P1- P3	-	HSSE	TiCN	
SAS3	M	DIN 371/ DIN 376	Stainless Steel	M1	-	HSSE	TiN	1.007
SAS5	M	DIN 371/ DIN 376	Stainless Steel	M1, M2	-	HSSE	TiCN	
SAS6	M	DIN 371/ DIN 376	Stainless Steel	M1- M3	-	HSSE	TiAlN+WC/C	
SAI6	M	DIN 371/ DIN 376	Super Alloys	S1- S4	-	HSSE-PM	TiAlN+WC/C	1.008
SAF5	M	DIN 371/ DIN 376	Forged Steel	P2-P3	-	HSSE-PM	TiCN	1.009
SAH4	M	DIN 371/ DIN 376	Forged Steel	P3-P5	-	HSSE-PM	TiAlN	1.010
SA1	MF	DIN 374	Steel	P0, N4	N1, N2	HSSE	Bright	1.011
SA3	MF	DIN 374	Steel	P0, P1	K2, K3	HSSE	TiN	
SA4	MF	DIN 374	Steel	P0-P3	K1,K2	HSSE	TiAlN	
SAF3	MF	DIN 374	Forged Steel	P1 P2	-	HSSE	TiN	1.012
SAF5	MF	DIN 374	Forged Steel	P1- P3	-	HSSE	TiCN	
SAS3	MF	DIN 374	Stainless Steel	M1	-	HSSE	TiN	1.013
SAS5	MF	DIN 374	Stainless Steel	M1, M2	-	HSSE	TiCN	
SAS6	MF	DIN 374	Stainless Steel	M1- M3	-	HSSE	TiAlN+WC/C	
SAI6	MF	DIN 374	Super Alloy	S1- S4	-	HSSE-PM	TiAlN+WC/C	1.014
SA1	UNC	DIN 371/ DIN 376	Steel	P0, N4	N1, N2	HSSE	Bright	1.015
SA3	UNC	DIN 371/ DIN 376	Steel	P0, P1	K2, K3	HSSE	TiN	
SA4	UNC	DIN 371/ DIN 376	Steel	P0-P3	K1,K2	HSSE	TiAlN	
SAS3	UNC	DIN 371/ DIN 376	Stainless Steel	M1	-	HSSE	TiN	1.016
SAS5	UNC	DIN 371/ DIN 376	Stainless Steel	M1, M2	-	HSSE	TiCN	
SAS6	UNC	DIN 371/ DIN 376	Stainless Steel	M1- M3	-	HSSE	TiAlN+WC/C	

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CONTENTS

TOTEM®

SPIRAL POINT TAPS

SERIES	THREAD FORM	LENGTH STANDARD	WORKPIECE MATERIAL	1ST CHOICE	2ND CHOICE	TOOL MATERIAL	COATING	PAGE
SA1	UNF	DIN 374	Steel	P0, N4	N1, N2	HSSE	Bright	1.017
SA3	UNF	DIN 374	Steel	P0, P1	K2, K3	HSSE	TiN	
SA4	UNF	DIN 374	Steel	P0-P3	K1,K2	HSSE	TiAlN	
SAS3	UNF	DIN 374	Stainless Steel	M1	-	HSSE	TiN	1.018
SAS5	UNF	DIN 374	Stainless Steel	M1, M2	-	HSSE	TiCN	
SAS6	UNF	DIN 374	Stainless Steel	M1- M3	-	HSSE	TiAlN+WC/C	
SA1	M	ISO 529	Steel	P0, N4	N1, N2	HSSE	Bright	1.019
SA3	M	ISO 529	Steel	P0, P1	K2, K3	HSSE	TiN	
SA4	M	ISO 529	Steel	P0-P3	K1,K2	HSSE	TiAlN	
SAF3	M	ISO 529	Forged Steel	P1 P2	-	HSSE	TiN	1.020
SAF5	M	ISO 529	Forged Steel	P1- P3	-	HSSE	TiCN	
SAS3	M	ISO 529	Stainless Steel	M1	-	HSSE	TiN	1.021
SAS5	M	ISO 529	Stainless Steel	M1, M2	-	HSSE	TiCN	
SAS6	M	ISO 529	Stainless Steel	M1- M3	-	HSSE	TiAlN+WC/C	
SAI6	M	ISO 529	Super Alloys	S1- S4	-	HSSE-PM	TiAlN+WC/C	1.022
SAF5	M	ISO 529	Forged Steel	P2-P3	-	HSSE-PM	TiCN	1.023
SAH4	M	ISO 529	Forged Steel	P3-P5	-	HSSE-PM	TiAlN	1.024
SA1	MF	ISO 529	Steel	P0, N4	N1, N2	HSSE	Bright	1.025
SA3	MF	ISO 529	Steel	P0, P1	K2, K3	HSSE	TiN	
SA4	MF	ISO 529	Steel	P0-P3	K1,K2	HSSE	TiAlN	
SAF3	MF	ISO 529	Forged Steel	P1 P2	-	HSSE	TiN	1.026
SAF5	MF	ISO 529	Forged Steel	P1- P3	-	HSSE	TiCN	
SAS3	MF	ISO 529	Stainless Steel	M1	-	HSSE	TiN	1.027
SAS5	MF	ISO 529	Stainless Steel	M1, M2	-	HSSE	TiCN	
SAS6	MF	ISO 529	Stainless Steel	M1- M3	-	HSSE	TiAlN+WC/C	
SAI6	MF	ISO 529	Super Alloy	S1- S4	-	HSSE-PM	TiAlN+WC/C	1.028

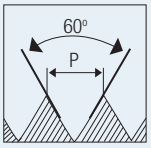
CONTENTS

SPIRAL POINT TAPS

SERIES	THREAD FORM	LENGTH STANDARD	WORKPIECE MATERIAL	1ST CHOICE	2ND CHOICE	TOOL MATERIAL	COATING	PAGE
SA1	UNC	ISO 529	Steel	P0, N4	N1, N2	HSSE	Bright	1.029
SA3	UNC	ISO 529	Steel	P0, P1	K2, K3	HSSE	TiN	
SA4	UNC	ISO 529	Steel	P0-P3	K1,K2	HSSE	TiAlN	
SAS3	UNC	ISO 529	Stainless Steel	M1	-	HSSE	TiN	1.030
SAS5	UNC	ISO 529	Stainless Steel	M1, M2	-	HSSE	TiCN	
SAS6	UNC	ISO 529	Stainless Steel	M1- M3	-	HSSE	TiAlN+WC/C	
SA1	UNF	ISO 529	Steel	P0, N4	N1, N2	HSSE	Bright	1.031
SA3	UNF	ISO 529	Steel	P0, P1	K2, K3	HSSE	TiN	
SA4	UNF	ISO 529	Steel	P0-P3	K1,K2	HSSE	TiAlN	
SAS3	UNF	ISO 529	Stainless Steel	M1	-	HSSE	TiN	1.032
SAS5	UNF	ISO 529	Stainless Steel	M1, M2	-	HSSE	TiCN	
SAS6	UNF	ISO 529	Stainless Steel	M1- M3	-	HSSE	TiAlN+WC/C	
SA1	M	JIS	Steel	P0, N4	N1-N2	HSSE	Bright	1.033
SA4	M	JIS	Steel	P0-P3	K1-K2	HSSE	TiAlN	
SPPT	M	ISO 529	General	-	-	HSS	Bright	1.034
SPPT	M	ISO 529	General	-	-	HSS	TiN	

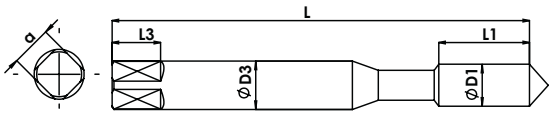
TOTEM® Silver cut **Spiral Point Taps**

M Metric coarse threads

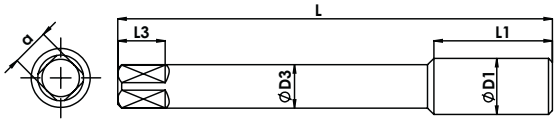


HOLE TYPE

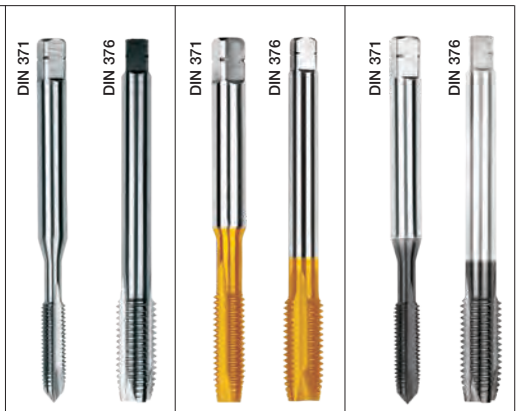
HSS-E | DIN 371/376 | 6HX | B/4-4.5P



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12 - M20)

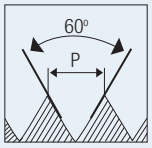


							Series		SA1	SA3	SA4
							Material - 1st choice		P0, N4	P0-P1	P0-P3
							Material - 2nd choice		N1-N2	K2-K3	K1-K2
DIN 371							Coating		**Bright**	**TiN**	**TiAlN**
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 3	0.5	56	11	3.5	2.7	6	2.5	3	FAB0203112	FAB0203123	FAB0204205
M 3.5	0.6	56	12	4	3	6	2.9	3	FAB0203113	FAB0203124	FAB0204206
M 4	0.7	63	13	4.5	3.4	6	3.3	3	FAB0203114	FAB0203125	FAB0204207
M 5	0.8	70	16	6	4.9	7	4.2	3	FAB0203115	FAB0203126	FAB0204208
M 6	1	80	19	6	4.9	7	5	3	FAB0203116	FAB0203127	FAB0204209
M 8	1.25	90	22	8	6.2	9	6.8	3	FAB0203118	FAB0203129	FAB0204210
M 10	1.5	100	24	10	8	11	8.5	3	FAB0203119	FAB0203130	FAB0204211
DIN 376											
M 12	1.75	110	28	9	7	10	10.2	3	FAB0203120	FAB0203131	FAB0204212
M 14	2	110	30	11	9	12	12	3	FAB0203121	FAB0203132	FAB0204213
M 16	2	110	32	12	9	12	14	3	FAB0203122	FAB0203133	FAB0204214
M 18	2.5	125	34	14	11	14	15.5	4	FAB0204201	FAB0204203	FAB0204215
M 20	2.5	140	34	16	12	15	17.5	4	FAB0204202	FAB0204204	FAB0204216

Unit : mm

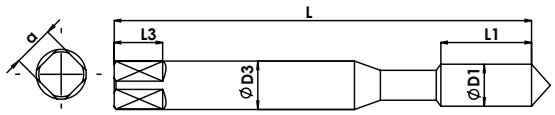
TOTEM® Silver cut **Spiral Point Taps**

M Metric coarse threads

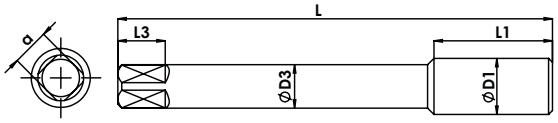


HOLE TYPE

HSS-E | DIN 371/376 | 6HX | B/4-4.5P



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12 - M20)

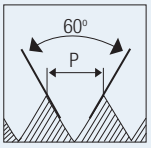
Series	SAF3	SAF5
Material - 1st choice	P1-P2	P1-P3
Material - 2nd choice	-	-
Coating	TiN	TiCN

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
DIN 371										
M 3	0.5	56	11	3.5	2.7	6	2.5	3	FAB0204217	FAB0204229
M 3.5	0.6	56	12	4	3	6	2.9	3	FAB0204218	FAB0204230
M 4	0.7	63	13	4.5	3.4	6	3.3	3	FAB0204219	FAB0204231
M 5	0.8	70	16	6	4.9	7	4.2	3	FAB0204220	FAB0204232
M 6	1	80	19	6	4.9	7	5	3	FAB0204221	FAB0204233
M 8	1.25	90	22	8	6.2	9	6.8	3	FAB0204222	FAB0204234
M 10	1.5	100	24	10	8	11	8.5	3	FAB0204223	FAB0204235
DIN 376										
M 12	1.75	110	28	9	7	10	10.2	3	FAB0204224	FAB0204236
M 14	2	110	30	11	9	12	12	4	FAB0204225	FAB0204237
M 16	2	110	32	12	9	12	14	4	FAB0204226	FAB0204238
M 18	2.5	125	34	14	11	14	15.5	4	FAB0204227	FAB0204239
M 20	2.5	140	34	16	12	15	17.5	4	FAB0204228	FAB0204240

Unit : mm

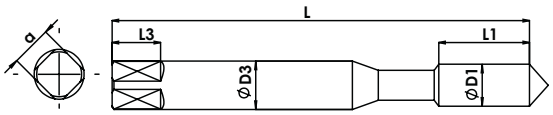
TOTEM® Silver cut **Spiral Point Taps**

M Metric coarse threads

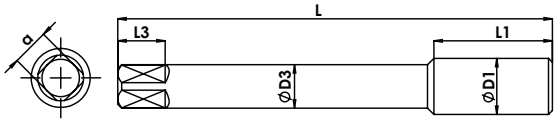


HOLE TYPE

HSS-E | DIN 371/376 | 6HX | B/4-4.5P



Reinforced Shank DIN371 (M3 - M10)



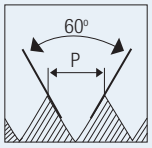
Reduced Shank DIN376 (M12 - M20)

							Series		SAS3	SAS5	SAS6
							Material - 1st choice		M1	M1-M2	M1-M3
							Material - 2nd choice		-	-	-
DIN 371							Coating		TiN	TiCN	TiAlN + WC/C
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M3	0.5	56	11	3.5	2.7	6	2.5	3	FAB0204675	FAB0204665	FAB0204778
M 4	0.7	63	13	4.5	3.4	6	3.3	3	FAB0204676	FAB0204666	FAB0204779
M 5	0.8	70	16	6	4.9	7	4.2	3	FAB0204677	FAB0204667	FAB0204780
M 6	1	80	19	6	4.9	7	5	3	FAB0204678	FAB0204668	FAB0204781
M 8	1.25	90	22	8	6.2	9	6.8	3	FAB0204679	FAB0204669	FAB0204782
M 10	1.5	100	24	10	8	11	8.5	3	FAB0204680	FAB0204670	FAB0204783
DIN 376											
M 12	1.75	110	28	9	7	10	10.2	4	FAB0204681	FAB0204671	FAB0204784
M 14	2	110	30	11	9	12	12	4	FAB0204682	FAB0204672	FAB0204785
M 16	2	110	32	12	9	12	14	4	FAB0204683	FAB0204673	FAB0204786
M 18	2.5	125	34	14	11	14	15.5	4	FAB0205281	FAB0205282	FAB0205283
M 20	2.5	140	34	16	12	15	17.5	4	FAB0204684	FAB0204674	FAB0204897

Unit : mm

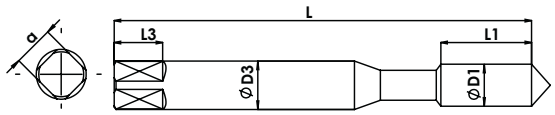
TOTEM® Silver cut **Spiral Point Taps**

M Metric coarse threads

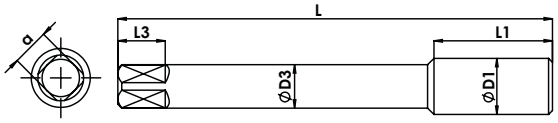


HOLE TYPE

HSS-E PM | DIN 371/376 | 6HX | B/4-4.5P



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12)

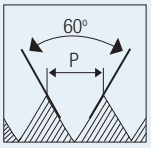
Series	SAI6
Material - 1st choice	S1-S4
Material - 2nd choice	-
Coating	TiAlN + WC/C

DIN 371									
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 3	0.5	56	11	3.5	2.7	6	2.5	3	FAB0204694
M 4	0.7	63	13	4.5	3.4	6	3.3	3	FAB0204695
M 5	0.8	70	16	6	4.9	7	4.2	3	FAB0204696
M 6	1	80	19	6	4.9	7	5	3	FAB0204697
M 8	1.25	90	22	8	6.2	9	6.8	3	FAB0204698
M 10	1.5	100	24	10	8	11	8.5	3	FAB0204699
DIN 376									
M 12	1.75	110	28	9	7	10	10.2	3	FAB0204700

Unit : mm

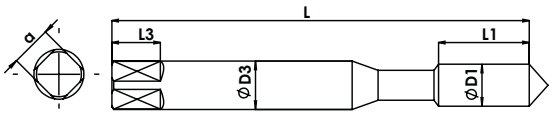
TOTEM® Silver cut **Spiral Point Taps**

M Metric coarse threads

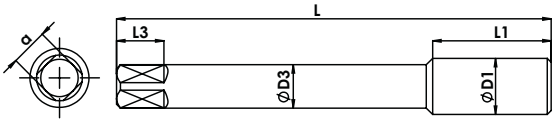


HOLE TYPE

HSS-E PM | DIN 371/376 | 6HX | B/4-4.5P



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12 - M16)

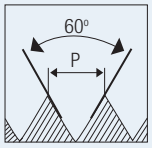
Series	SAF5
Material - 1st choice	P2-P3
Material - 2nd choice	-
Coating	TiCN

DIN 371									
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 3	0.5	56	11	3.5	2.7	6	2.5	3	FAB0205284
M 4	0.7	63	13	4.5	3.4	6	3.3	3	FAB0205285
M 5	0.8	70	16	6	4.9	7	4.2	3	FAB0205286
M 6	1	80	19	6	4.9	7	5	3	FAB0205287
M 8	1.25	90	22	8	6.2	9	6.8	3	FAB0205288
M 10	1.5	100	24	10	8	11	8.5	3	FAB0205289
DIN 376									
M 12	1.75	110	28	9	7	10	10.2	4	FAB0205290
M 14	2	110	30	11	9	12	12	4	FAB0205291
M 16	2	110	32	12	9	12	14	4	FAB0205292

Unit : mm

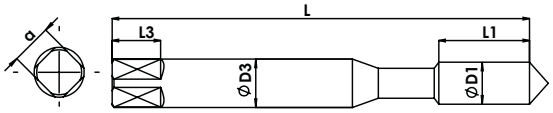
TOTEM® Silver cut Spiral Point Taps

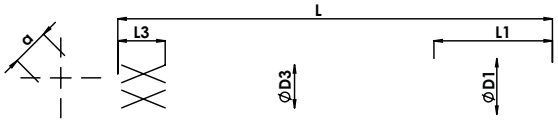
M Metric coarse threads



HOLE TYPE

DIN 371/376 | 6HX | B/4-4.5P





Series	SAH4
Material - 1st choice	P2-P6
Material - 2nd choice	-
Coating	TiAlN

DIN 371

Nominal Diameter ØD1	Pitch p	Overall Length L	Thread Length L1	Shank Diameter ØD3	Square Size a	Square Length L3	Tapping Drill Diameter Ød1	No of Flute	EDP No.
M 3	0.5	56	11	3.5	2.7	6	2.5	3	FAB0208988
M 4	0.7	63	13	4.5	3.4	6	3.3	3	FAB0208989
M 5	0.8	70	16	6	4.9	7	4.2	3	FAB0208990
M 6	1	80	19	6	4.9	7	5	3	FAB0208991
M 8	1.25	90	22	8	6.2	9	6.8	3	FAB0208992
M 10	1.5	100	24	10	8	11	8.5	3	FAB0208993

DIN 376

M 12	1.75	110	28	9	7	10	10.2	3	FAB0208994
M 14	2	110	30	11	9	12	12	3	FAB0208995
M 16	2	110	32	12	9	12	14	4	FAB0208996

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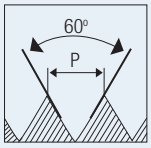
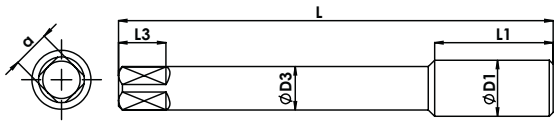
TOTEM® Silver cut **Spiral Point Taps**

MF Metric fine threads

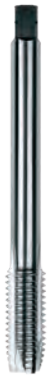


HOLE TYPE

HSS-E | DIN 374 | 6HX | B/4-4.5P



Male Centre (M6 - M10)
Female Centre (M12 - M20)

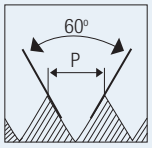


							Series		SA1	SA3	SA4
							Material - 1st choice		P0, N4	P0-P1	P0-P3
							Material - 2nd choice		N1-N2	K2-K3	K1-K2
DIN 374							Coating		Bright	TiN	TiAlN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 6	0.75	80	14	4.5	3.4	6	5.2	3	FAB0204241	FAB0204252	FAB0204263
M 8	1	90	18	6	4.9	7	7	3	FAB0204242	FAB0204253	FAB0204264
M 10	1.25	100	22	7	5.5	8	8.8	3	FAB0204243	FAB0204254	FAB0204265
M 10	1	90	18	7	5.5	8	9	3	FAB0204244	FAB0204255	FAB0204266
M 12	1.5	100	22	9	7	10	10.5	3	FAB0204245	FAB0204256	FAB0204267
M 12	1.25	100	22	9	7	10	10.8	3	FAB0204246	FAB0204257	FAB0204268
M 14	1.5	100	22	11	9	12	12.5	3	FAB0204247	FAB0204258	FAB0204269
M 14	1.25	100	22	11	9	12	12.8	3	FAB0204248	FAB0204259	FAB0204270
M 16	1.5	100	22	12	9	12	14.5	3	FAB0204249	FAB0204260	FAB0204271
M 18	1.5	110	25	14	11	14	16.5	4	FAB0204250	FAB0204261	FAB0204272
M 20	1.5	125	25	16	12	15	18.5	4	FAB0204251	FAB0204262	FAB0204273

Unit : mm

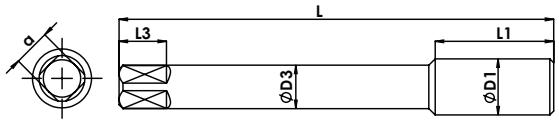
TOTEM® Silver cut **Spiral Point Taps**

MF Metric fine threads



HOLE TYPE

HSS-E | DIN 374 | 6HX | B/4-4.5P



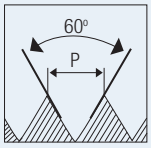
Male Centre (M8 - M10)
Female Centre (M12 - M20)

							Series		SAF3	SAF5
							Material - 1st choice		P1-P2	P1-P3
							Material - 2nd choice		-	-
DIN 374							Coating		TiN	TiCN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 8	1	90	18	6	4.9	7	7	3	FAB0204544	FAB0204550
M 10	1.25	100	22	7	5.5	8	8.8	3	FAB0204545	FAB0204551
M 10	1	90	18	7	5.5	8	9	3	FAB0204903	FAB0204929
M 12	1.5	100	22	9	7	10	10.5	4	FAB0204547	FAB0204553
M 12	1.25	100	22	9	7	10	10.8	4	FAB0204546	FAB0204552
M 14	1.5	100	22	11	9	12	12.5	4	FAB0204548	FAB0203818
M 16	1.5	100	22	12	9	12	14.5	4	FAB0204549	FAB0204555
M 18	1.5	110	25	14	11	14	16.5	4	FAB0204904	FAB0204930
M 20	1.5	125	25	16	12	15	18.5	4	FAB0204905	FAB0204931

Unit : mm

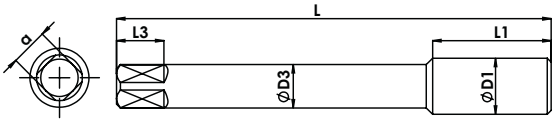
TOTEM® Silver cut **Spiral Point Taps**

MF Metric fine threads



HOLE TYPE

HSS-E | DIN 374 | 6HX | B/4-4.5P



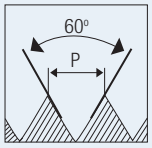
Male Centre (M8 - M10)
Female Centre (M12 - M20)

							Series	SAS3	SAS5	SAS6
							Material - 1st choice	M1	M1-M2	M1-M3
							Material - 2nd choice	-	-	-
DIN 374							Coating	TiN	TiCN	TiAlN + WC/C
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 8	1	90	18	6	4.9	7	7	3	FAB0204832	FAB0204858	FAB0204787
M 10	1.25	100	22	7	5.5	8	8.8	3	FAB0204834	FAB0204860	FAB0204788
M 10	1	90	18	7	5.5	8	9	3	FAB0204833	FAB0204859	FAB0204789
M 12	1.5	100	22	9	7	10	10.5	3	FAB0204836	FAB0204862	FAB0204790
M 12	1.25	100	22	9	7	10	10.8	4	FAB0204835	FAB0204861	FAB0204791
M 14	1.5	100	22	11	9	12	12.5	4	FAB0204837	FAB0204863	FAB0204792
M 16	1.5	100	22	12	9	12	14.5	4	FAB0204838	FAB0204864	FAB0204793
M 18	1.5	110	25	14	11	14	16.5	4	FAB0205302	FAB0205304	FAB0205306
M 20	1.5	125	25	16	12	15	18.5	4	FAB0205303	FAB0205305	FAB0205307

Unit : mm

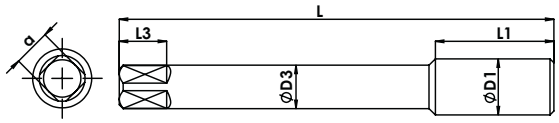
TOTEM® Silver cut **Spiral Point Taps**

MF Metric fine threads



HOLE TYPE

HSS-E PM | DIN 374 | 6HX | B/4-4.5P



Male Centre (M8 - M10)
Female Centre (M12)

Series	SAI6
Material - 1st choice	S1-S4
Material - 2nd choice	-
Coating	TiAlN + WC/C

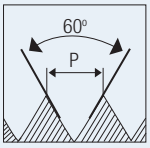
DIN 374

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 8	1	90	18	6	4.9	7	7	3	FAB0204810
M 10	1.25	100	22	7	5.5	8	8.8	3	FAB0204811
M 10	1	90	18	7	5.5	8	9	3	FAB0204812
M 12	1.25	100	22	9	7	10	10.8	3	FAB0204815
M 12	1.5	100	22	9	7	10	10.5	3	FAB0204816

Unit : mm

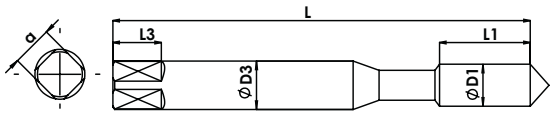
TOTEM® Silver cut **Spiral Point Taps**

UNC Unified coarse threads

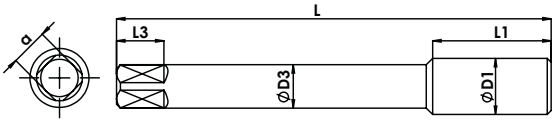


HOLE TYPE

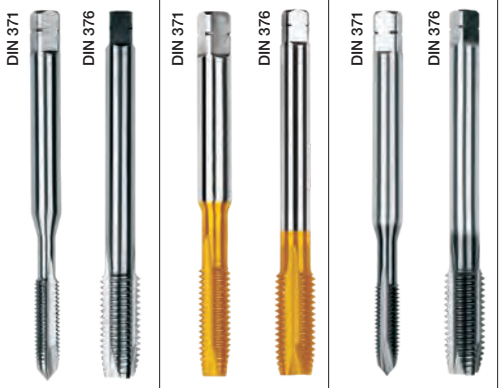
HSS-E | DIN 371/376 | 2B | B/4-4.5P



Reinforced Shank DIN371 (1/4" - 3/8")



Reduced Shank DIN376 (7/16" - 1")

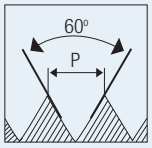


							Series		SA1	SA3	SA4
							Material - 1st choice		P0, N4	P0-P1	P0-P3
							Material - 2nd choice		N1-N2	K2-K3	K1-K2
DIN 371							Coating		**Bright**	**TiN**	**TiAlN**
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/4"	20	80	19	7	5.5	8	5.1	3	FAB0204274	FAB0204283	FAB0204292
5/16"	18	90	22	8	6.2	9	6.6	3	FAB0204275	FAB0204284	FAB0204293
3/8"	16	100	24	10	8	11	8	3	FAB0204276	FAB0204285	FAB0204294
DIN 376											
7/16"	14	100	24	8	6.2	9	9.4	3	FAB0204277	FAB0204286	FAB0204295
1/2"	13	110	28	9	7	10	10.8	3	FAB0204278	FAB0204287	FAB0204296
5/8"	11	110	32	12	9	12	13.5	3	FAB0204279	FAB0204288	FAB0204297
3/4"	10	125	34	14	11	14	16.5	4	FAB0204280	FAB0204289	FAB0204298
7/8"	9	140	34	18	14.5	17	19.5	4	FAB0204281	FAB0204290	FAB0204299
1"	8	160	38	18	14.5	17	22.25	4	FAB0204282	FAB0204291	FAB0204300

Unit : mm

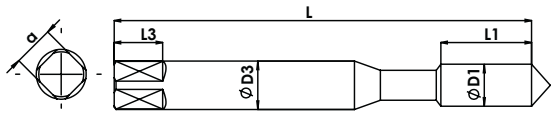
TOTEM® Silver cut **Spiral Point Taps**

UNC Unified coarse threads

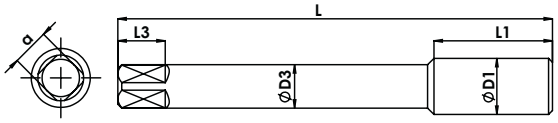


HOLE TYPE

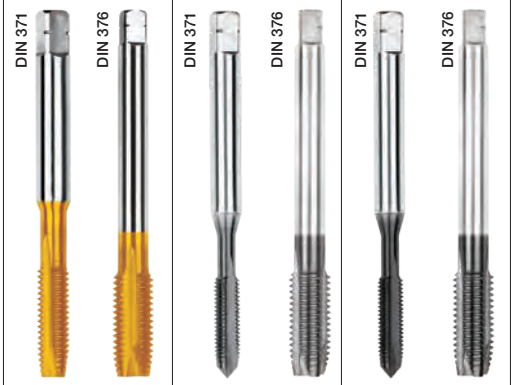
HSS-E | DIN 371/376 | 2B | B/4-4.5P



Reinforced Shank DIN371 (1/4" - 3/8")



Reduced Shank DIN376 (7/16" - 1")

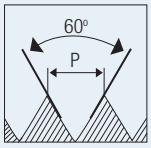


							Series		SAS3	SAS5	SAS6
							Material - 1st choice		M1	M1-M2	M1-M3
							Material - 2nd choice		-	-	-
DIN 371							Coating		TiN	TiCN	TiAlN + WC/C
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/4"	20	80	19	7	5.5	8	5.1	3	FAB0205308	FAB0205317	FAB0205326
5/16"	18	90	22	8	6.2	9	6.6	3	FAB0205309	FAB0205318	FAB0205327
3/8"	16	100	24	10	8	11	8	3	FAB0205310	FAB0205319	FAB0205328
DIN 376											
7/16"	14	110	24	8	6.2	9	9.4	3	FAB0205311	FAB0205320	FAB0205329
1/2"	13	110	28	9	7	10	10.8	4	FAB0205312	FAB0205321	FAB0205330
5/8"	11	110	32	12	9	12	13.6	4	FAB0205313	FAB0205322	FAB0205331
3/4"	10	125	34	14	11	14	16.5	4	FAB0205314	FAB0205323	FAB0205332
7/8"	9	140	34	18	14.5	17	19.6	4	FAB0205315	FAB0205324	FAB0205333
1"	8	160	38	18	14.5	17	22.3	4	FAB0205316	FAB0205325	FAB0205334

Unit : mm

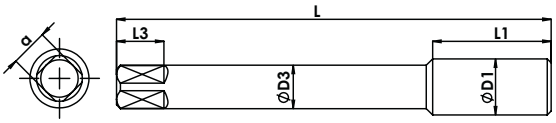
TOTEM® Silver cut **Spiral Point Taps**

UNF Unified fine threads



HOLE TYPE

HSS-E | DIN 374 | 2B | B/4-4.5P



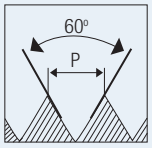
Male Centre (1/4" - 3/8")
Female Centre (7/16" - 1")

							Series		SA1	SA3	SA4
							Material - 1st choice		P0, N4	P0-P1	P0-P3
							Material - 2nd choice		N1-N2	K2-K3	K1-K2
DIN 374							Coating		Bright	TiN	TiAlN
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/4"	28	80	19	4.5	3.4	6	5.5	3	FAB0204301	FAB0204310	FAB0204319
5/16"	24	90	22	6	4.9	8	6.9	3	FAB0204302	FAB0204311	FAB0204320
3/8"	24	90	20	7	5.5	8	8.5	3	FAB0204303	FAB0204312	FAB0204321
7/16"	20	90	20	8	6.2	9	9.9	3	FAB0204304	FAB0204313	FAB0204322
1/2"	20	100	22	9	7	10	11.5	3	FAB0204305	FAB0204314	FAB0204323
5/8"	18	100	22	12	9	12	14.5	3	FAB0204306	FAB0204315	FAB0204324
3/4"	16	110	25	14	11	14	17.5	4	FAB0204307	FAB0204316	FAB0204325
7/8"	14	125	25	18	14.5	17	20.5	4	FAB0204308	FAB0204317	FAB0204326
1"	12	140	28	18	14.5	17	23.3	4	FAB0204309	FAB0204318	FAB0204327

Unit : mm

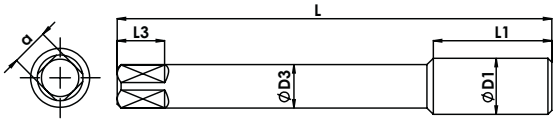
TOTEM® Silver cut **Spiral Point Taps**

UNF Unified fine threads



HOLE TYPE

HSS-E | DIN 374 | 2B | B/4-4.5P



Male Centre (1/4" - 3/8")
Female Centre (7/16" - 1")

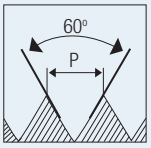
Series	SAS3	SAS5	SAS6
Material - 1st choice	M1	M1-M2	M1-M3
Material - 2nd choice	-	-	-
Coating	TiN	TiCN	TiAlN + WC/C

DIN 374											
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/4"	28	80	19	4.5	3.4	6	5.5	3	FAB0205335	FAB0205344	FAB0205353
5/16"	24	90	22	6	4.9	8	6.9	3	FAB0205336	FAB0205345	FAB0205354
3/8"	24	90	20	7	5.5	8	8.5	3	FAB0205337	FAB0205346	FAB0205355
7/16"	20	90	20	8	6.2	9	9.9	3	FAB0205338	FAB0205347	FAB0205356
1/2"	20	100	22	9	7	10	11.5	4	FAB0205339	FAB0205348	FAB0205357
5/8"	18	100	22	12	9	12	14.5	4	FAB0205340	FAB0205349	FAB0205358
3/4"	16	110	25	14	11	14	17.5	4	FAB0205341	FAB0205350	FAB0205359
7/8"	14	125	25	18	14.5	17	20.5	4	FAB0205342	FAB0205351	FAB0205360
1"	12	140	28	18	14.5	17	23.3	4	FAB0205343	FAB0205352	FAB0205361

Unit : mm

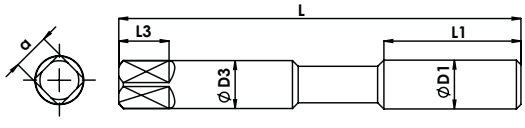
TOTEM® Silver cut **Spiral Point Taps**

M Metric coarse threads

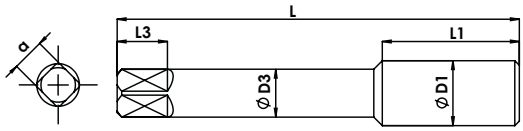


HOLE TYPE

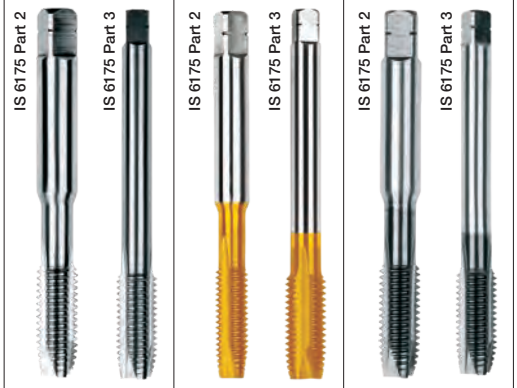
HSS-E | ISO 529 | 6HX | B/4-4.5P



Reinforced Shank (M3 - M10)
Male Centre upto M5



Reduced Shank (M12 - M20)



Series	SA1	SA3	SA4
Material - 1st choice	P0, N4	P0-P1	P0-P3
Material - 2nd choice	N1-N2	K2-K3	K1-K2
Coating	Bright	TiN	TiAlN

ISO529 / IS 6175 Part 2

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 3	0.5	48	11	3.15	2.5	5	2.5	3	FAB0200647	FAB0200648	FAB0203044
M 3.5	0.6	50	13	3.55	2.8	5	2.9	3	FAB0200653	FAB0200654	FAB0203045
M 4	0.7	53	13	4	3.15	6	3.3	3	FAB0200659	FAB0200661	FAB0200662
M 5	0.8	58	16	5	4	7	4.2	3	FAB0200671	FAB0200673	FAB0203046
M 6	1	66	19	6.3	5	8	5	3	FAB0200682	FAB0200684	FAB0200685
M 7	1	66	19	7.1	5.6	8	6	3	FAB0203033	FAB0203040	FAB0203047
M 8	1.25	72	22	8	6.3	9	6.8	3	FAB0200694	FAB0200696	FAB0200697
M 10	1.5	80	24	10	8	11	8.5	3	FAB0200718	FAB0200720	FAB0200721

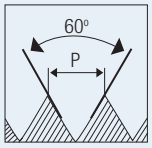
ISO529 / IS 6175 Part 3

M 12	1.75	89	29	9	7.1	10	10.2	3	FAB0200749	FAB0200751	FAB0203052
M 14	2	95	30	11.2	9	12	12	3	FAB0200778	FAB0200780	FAB0203054
M 16	2	102	32	12.5	10	13	14	3	FAB0200799	FAB0200801	FAB0203055
M 18	2.5	112	37	14	11.2	14	15.5	4	FAB0203037	FAB0203043	FAB0203057
M 20	2.5	112	37	14	11.2	14	17.5	4	FAB0203039	FAB0200810	FAB0203059

Unit : mm

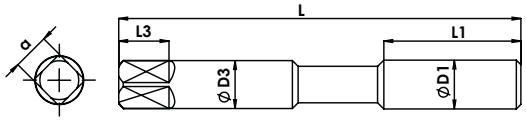
TOTEM® Silver cut **Spiral Point Taps**

M Metric coarse threads

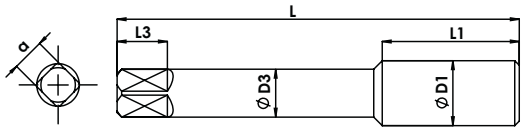


HOLE TYPE

HSS-E | ISO 529 | 6HX | B/4-4.5P



Reinforced Shank (M3 - M10)
Male Centre upto M5



Reduced Shank (M12 - M20)

Series	SAF3	SAF5
Material - 1st choice	P1-P2	P1-P3
Material - 2nd choice	-	-
Coating	TiN	TiCN

ISO529 / IS 6175 Part 2

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	48	11	3.15	2.5	5	2.5	3	FAB0203060	FAB0203077
M 3.5	0.6	50	13	3.55	2.8	5	2.9	3	FAB0205116	FAB0205120
M 4	0.7	53	13	4	3.15	6	3.3	3	FAB0203061	FAB0203078
M 5	0.8	58	16	5	4	7	4.2	3	FAB0203062	FAB0203079
M 6	1	66	19	6.3	5	8	5	3	FAB0203063	FAB0203080
M 7	1	66	19	7.1	5.6	8	6	3	FAB0205117	FAB0205121
M 8	1.25	72	22	8	6.3	9	6.8	3	FAB0203065	FAB0203082
M 10	1.5	80	24	10	8	11	8.5	3	FAB0203068	FAB0203085

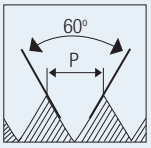
ISO529 / IS 6175 Part 3

M 12	1.75	89	29	9	7.1	10	10.2	4	FAB0203070	FAB0203087
M 14	2	95	30	11.2	9	12	12	4	FAB0203072	FAB0203089
M 16	2	102	32	12.5	10	13	14	4	FAB0203074	FAB0203091
M 18	2.5	112	37	14	11.2	14	15.5	4	FAB0205118	FAB0205122
M 20	2.5	112	37	14	11.2	14	17.5	4	FAB0205119	FAB0205123

Unit : mm

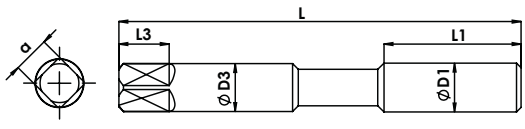
TOTEM® Silver cut **Spiral Point Taps**

M Metric coarse threads

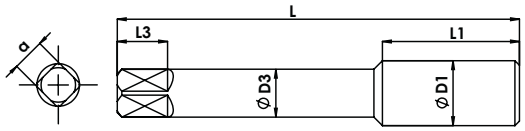


HOLE TYPE

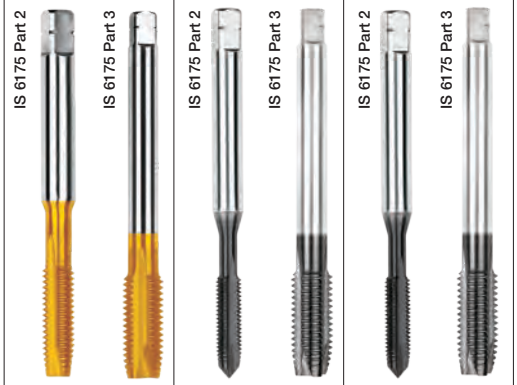
HSS-E | ISO 529 | 6HX | g/4-4.5P



Reinforced Shank (M3 - M10)
Male Centre upto M5



Reduced Shank (M12 - M16)



Series	SAS3	SAS5	SAS6
Material - 1st choice	M1	M1-M2	M1-M3
Material - 2nd choice	-	-	-
Coating	TiN	TiCN	TiAlN + WC/C

ISO529 / IS 6175 Part 2

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 3	0.5	48	11	3.15	2.5	5	2.5	3	FAB0203094	FAB0203103	FAB0205137
M 4	0.7	53	13	4	3.15	6	3.3	3	FAB0203095	FAB0203104	FAB0205138
M 5	0.8	58	16	5	4	7	4.2	3	FAB0203096	FAB0203105	FAB0205139
M 6	1	66	19	6.3	5	8	5	3	FAB0203097	FAB0203106	FAB0205140
M 8	1.25	72	22	8	6.3	9	6.8	3	FAB0203098	FAB0203107	FAB0205141
M 10	1.5	80	24	10	8	11	8.5	3	FAB0203099	FAB0203108	FAB0205142

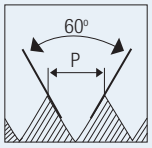
ISO529 / IS 6175 Part 3

M 12	1.75	89	29	9	7.1	10	10.2	4	FAB0203100	FAB0203109	FAB0205143
M 14	2	95	30	11.2	9	12	12	4	FAB0203101	FAB0203110	FAB0205144
M 16	2	102	32	12.5	10	13	14	4	FAB0203102	FAB0203111	FAB0205145

Unit : mm

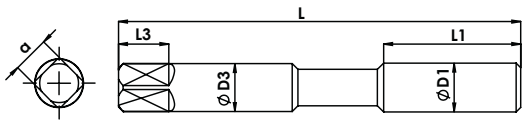
TOTEM® Silver cut **Spiral Point Taps**

M Metric coarse threads

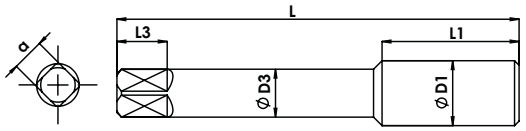


HOLE TYPE

HSS-E PM | ISO 529 | 6HX | B/4-4.5P



Reinforced Shank (M3 - M10)
Male Centre upto M5



Reduced Shank (M12 - M16)

Series	SAI6
Material - 1st choice	S1-S4
Material - 2nd choice	-
Coating	TiAlN + WC/C

ISO529 / IS 6175 Part 2

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 3	0.5	48	11	3.15	2.5	5	2.5	3	FAB0204712
M 4	0.7	53	13	4	3.15	6	3.3	3	FAB0204713
M 5	0.8	58	16	5	4	7	4.2	3	FAB0204714
M 6	1	66	19	6.3	5	8	5	3	FAB0204715
M 8	1.25	72	22	8	6.3	9	6.8	3	FAB0204716
M 10	1.5	80	24	10	8	11	8.5	3	FAB0204717

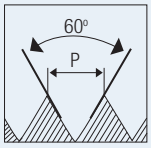
ISO529 / IS 6175 Part 3

M 12	1.75	89	29	9	7.1	10	10.2	3	FAB0204718
M 14	2	95	30	11.2	9	12	12	3	FAB0204719
M 16	2	102	32	12.5	10	13	14	3	FAB0204720

Unit : mm

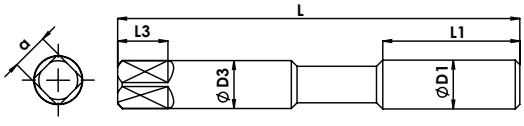
TOTEM® Silver cut **Spiral Point Taps**

M Metric coarse threads

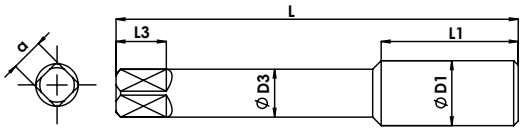


HOLE TYPE

HSS-E PM | ISO 529 | 6HX | B/4-4.5P



Reinforced Shank (M3 - M10)
Male Centre upto M5



Reduced Shank (M12 - M16)

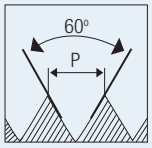
Series	SAF5
Material - 1st choice	P2-P3
Material - 2nd choice	-
Coating	TiCN

ISO529 / IS 6175 Part 2									
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 3	0.5	48	11	3.15	2.5	5	2.5	3	FAB0205146
M 4	0.7	53	13	4	3.15	6	3.3	3	FAB0205147
M 5	0.8	58	16	5	4	7	4.2	3	FAB0205148
M 6	1	66	19	6.3	5	8	5	3	FAB0205149
M 8	1.25	72	22	8	6.3	9	6.8	3	FAB0205150
M 10	1.5	80	24	10	8	11	8.5	3	FAB0205151
ISO529 / IS 6175 Part 3									
M 12	1.75	89	29	9	7.1	10	10.2	4	FAB0205152
M 14	2	95	30	11.2	9	12	12	4	FAB0205153
M 16	2	102	32	12.5	10	13	14	4	FAB0205154

Unit : mm

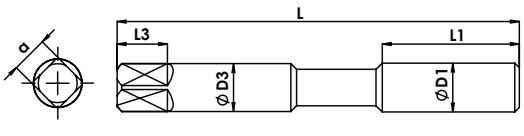
TOTEM® Silver cut **Spiral Point Taps**

M Metric coarse threads

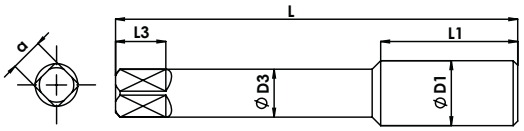


HOLE TYPE

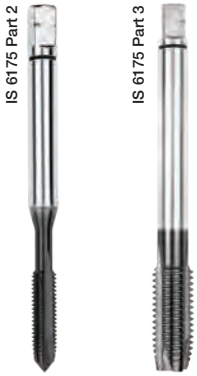
HSS-E PM | ISO 529 | 6HX | B/4-4.5P



Reinforced Shank (M3 - M10)
Male Centre upto M5



Reduced Shank (M12 - M16)



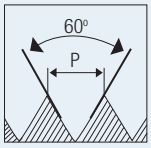
Series	SAH4
Material - 1st choice	P3-P5
Material - 2nd choice	-
Coating	TiAlN

Nominal Diameter ØD1	Pitch p	Overall Length L	Thread Length L1	Shank Diameter ØD3	Square Size a	Square Length L3	Tapping Drill Diameter Ød1	No of Flute	EDP No.
ISO529 / IS 6175 Part 2									
M 3	0.5	48	11	3.15	2.5	5	2.5	3	FAB0208997
M 4	0.7	53	13	4	3.15	6	3.3	3	FAB0208998
M 5	0.8	58	16	5	4	7	4.2	3	FAB0208999
M 6	1	66	19	6.3	5	8	5	3	FAB0209000
M 8	1.25	72	22	8	6.3	9	6.8	3	FAB0209001
M 10	1.5	80	24	10	8	11	8.5	3	FAB0209002
ISO529 / IS 6175 Part 3									
M 12	1.75	89	29	9	7.1	10	10.2	4	FAB0209003
M 14	2	95	30	11.2	9	12	12	4	FAB0209004
M 16	2	102	32	12.5	10	13	14	4	FAB0209005

Unit : mm

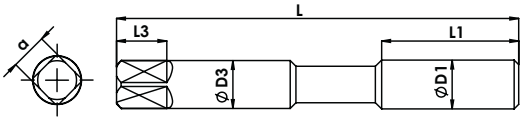
TOTEM® Silver cut **Spiral Point Taps**

MF Metric fine threads

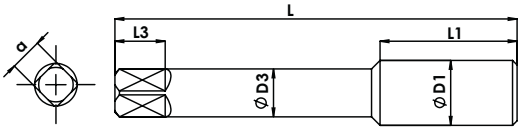


HOLE TYPE

HSS-E | ISO 529 | 6HX | B/4-4.5P



Reinforced Shank (M8 - M10)



Reduced Shank (M12 - M20)

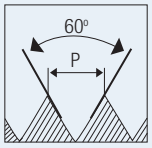
Series	SA1	SA3	SA4
Material - 1st choice	P0, N4	P0-P1	P0-P3
Material - 2nd choice	N1-N2	K2-K3	K1-K2
Coating	Bright	TiN	TiAlN

Nominal Diameter ØD1	Pitch p	Overall Length L	Thread Length L1	Shank Diameter ØD3	Square Size a	Square Length L3	Tapping Drill Diameter Ød1	No. of Flutes	EDP No.	EDP No.	EDP No.
ISO529 / IS 6175 Part 2											
M 8	1	69	19	8	6.3	9	7	3	FAB0203034	FAB0203041	FAB0203048
M 10	1	76	20	10	8	11	9	3	FAB0203035	FAB0200702	FAB0203049
M 10	1.25	76	20	10	8	11	8.8	3	FAB0200708	FAB0200710	FAB0203050
ISO529 / IS 6175 Part 3											
M 12	1.5	89	29	9	7.1	10	10.5	3	FAB0200738	FAB0200740	FAB0203051
M 14	1.5	95	30	11.2	9	12	12.5	3	FAB0200769	FAB0200771	FAB0203053
M 16	1.5	102	32	12.5	10	13	14.5	3	FAB0200787	FAB0200789	FAB0200790
M 18	1.5	104	29	14	11.2	14	16.5	4	FAB0203036	FAB0203042	FAB0203056
M 20	1.5	104	29	14	11.2	14	18.5	4	FAB0203038	FAB0200807	FAB0203058

Unit : mm

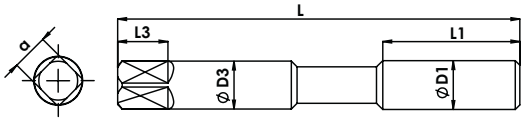
TOTEM® Silver cut Spiral Point Taps

MF Metric fine threads

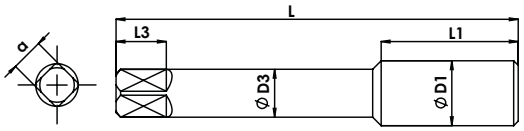


HOLE TYPE

HSS-E | ISO 529 | 6HX | B/4-4.5P



Reinforced Shank (M8 - M10)



Reduced Shank (M12 - M20)

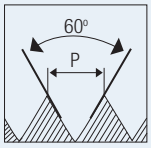
Series	SAF3	SAF5
Material - 1st choice	P1-P2	P1-P3
Material - 2nd choice	-	-
Coating	TiN	TiCN

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
ISO529 / IS 6175 Part 2										
M 8	1	69	19	8	6.3	9	7	3	FAB0203064	FAB0203081
M 10	1	76	20	10	8	11	9	3	FAB0203066	FAB0203083
M 10	1.25	76	20	10	8	11	8.8	3	FAB0203067	FAB0203084
ISO529 / IS 6175 Part 3										
M 12	1.5	89	29	9	7.1	10	10.5	4	FAB0203069	FAB0203086
M 14	1.5	95	30	11.2	9	12	12.5	4	FAB0203071	FAB0203088
M 16	1.5	102	32	12.5	10	13	14.5	4	FAB0203073	FAB0203090
M 18	1.5	104	29	14	11.2	14	16.5	4	FAB0203075	FAB0203092
M 20	1.5	104	29	14	11.2	14	18.5	4	FAB0203076	FAB0203093

Unit : mm

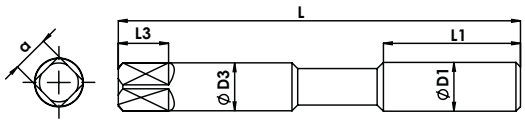
TOTEM® Silver cut **Spiral Point Taps**

MF Metric fine threads

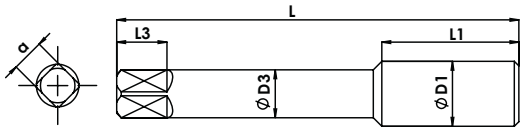


HOLE TYPE

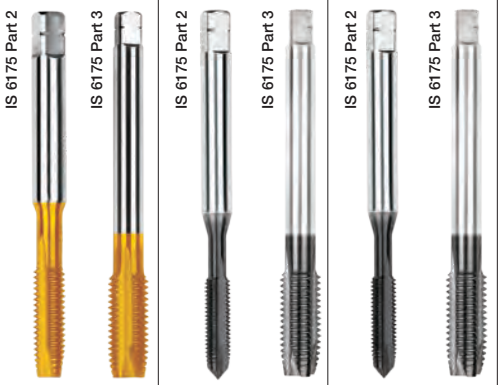
HSS-E | ISO 529 | 6HX | B/4-4.5P



Reinforced Shank (M8 - M10)



Reduced Shank (M12 - M20)



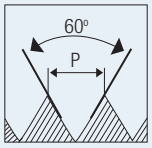
Series	SAS3	SAS5	SAS6
Material - 1st choice	M1	M1-M2	M1-M3
Material - 2nd choice	-	-	-
Coating	TiN	TiCN	TiAlN + WC/C

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
ISO529 / IS 6175 Part 2											
M 8	1	69	19	8	6.3	9	7	3	FAB0205172	FAB0205180	FAB0205585
M 10	1	76	20	10	8	11	9	3	FAB0205173	FAB0205181	FAB0205586
M 10	1.25	76	20	10	8	11	8.8	3	FAB0205174	FAB0205182	FAB0205587
ISO529 / IS 6175 Part 3											
M 12	1.5	89	29	9	7.1	10	10.5	4	FAB0205175	FAB0205183	FAB0205588
M 14	1.5	95	30	11.2	9	12	12.5	4	FAB0205176	FAB0205184	FAB0205589
M 16	1.5	102	32	12.5	10	13	14.5	4	FAB0205177	FAB0205185	FAB0205590
M 18	1.5	104	29	14	11.2	14	16.5	4	FAB0205178	FAB0205186	FAB0205591
M 20	1.5	104	29	14	11.2	14	18.5	4	FAB0205179	FAB0205187	FAB0205592

Unit : mm

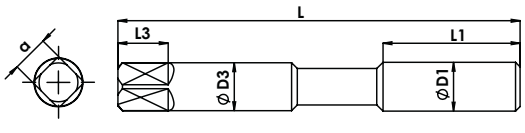
TOTEM® Silver cut **Spiral Point Taps**

MF Metric fine threads

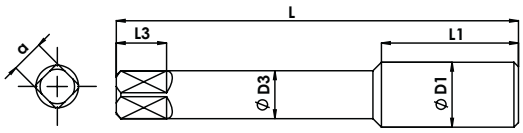


HOLE TYPE

HSS-E PM | ISO 529 | 6HX | B/4-4.5P



Reinforced Shank (M8 - M10)



Reduced Shank (M12 - M20)

Series	SAI6
Material - 1st choice	S1-S4
Material - 2nd choice	-
Coating	TiAlN + WC/C

ISO529 / IS 6175 Part 2

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 8	1	69	19	8	6.3	9	7	3	FAB0205188
M 10	1	76	20	10	8	11	9	3	FAB0205189
M 10	1.25	76	20	10	8	11	8.8	3	FAB0205190

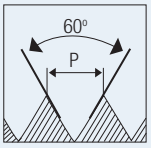
ISO529 / IS 6175 Part 3

M 12	1.5	89	29	9	7.1	10	10.5	3	FAB0205191
M 14	1.5	95	30	11.2	9	12	12.5	3	FAB0205192
M 16	1.5	102	32	12.5	10	13	14.5	3	FAB0205193
M 18	1.5	104	29	14	11.2	14	16.5	4	FAB0205194
M 20	1.5	104	29	14	11.2	14	18.5	4	FAB0205195

Unit : mm

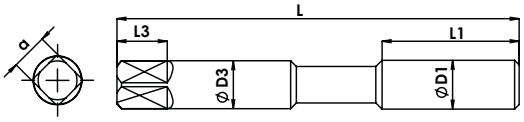
TOTEM® Silver cut **Spiral Point Taps**

UNC Unified coarse threads

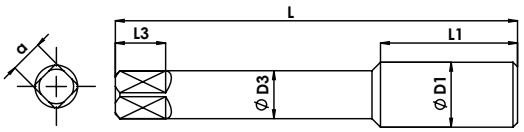


HOLE TYPE

HSS-E | ISO 529 | 2B | B/4-4.5P



Reinforced Shank (1/4" - 3/8")



Reduced Shank (7/16" - 3/4")

Series	SA1	SA3	SA4
Material - 1st choice	P0, N4	P0-P1	P0-P3
Material - 2nd choice	N1-N2	K2-K3	K1-K2
Coating	Bright	TiN	TiAlN

ISO529 / IS 6175 Part 2

Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/4"	20	66	19	6.3	5	8	5.1	3	FAB0200573	FAB0200575	FAB0205196
5/16"	18	72	22	8	6.3	9	6.6	3	FAB0200582	FAB0200584	FAB0205197
3/8"	16	80	24	10	8	11	8	3	FAB0200593	FAB0200595	FAB0205198

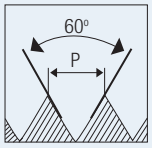
ISO529 / IS 6175 Part 3

7/16"	14	85	25	8	6.3	9	9.4	3	FAB0200603	FAB0200605	FAB0205199
1/2"	13	89	29	9	7.1	10	10.8	3	FAB0200614	FAB0200616	FAB0205200
5/8"	11	102	32	12.5	10	13	13.5	3	FAB0200627	FAB0200629	FAB0200630
3/4"	10	112	37	14	11.2	14	16.5	4	FAB0200638	FAB0200640	FAB0205202

Unit : mm

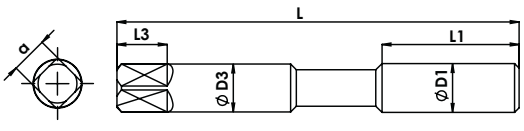
TOTEM® Silver cut **Spiral Point Taps**

UNC Unified coarse threads

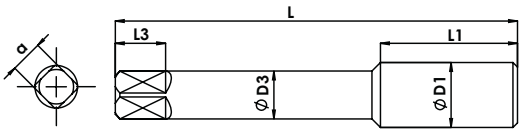


HOLE TYPE

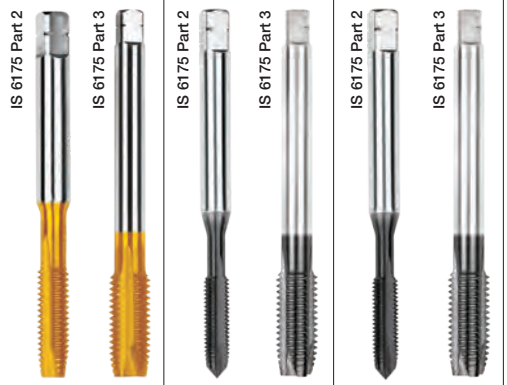
HSS-E | ISO 529 | 2B | B/4-4.5P



Reinforced Shank (1/4" - 3/8")



Reduced Shank (7/16" - 3/4")



Series	SAS3	SAS5	SAS6
Material - 1st choice	M1	M1-M2	M1-M3
Material - 2nd choice	-	-	-
Coating	TiN	TiCN	TiAlN + WC/C

ISO529 / IS 6175 Part 2

Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/4"	20	66	19	6.3	5	8	5.1	3	FAB0205217	FAB0205224	FAB0205231
5/16"	18	72	22	8	6.3	9	6.6	3	FAB0205218	FAB0205225	FAB0205232
3/8"	16	80	24	10	8	11	8	3	FAB0205219	FAB0205226	FAB0205233

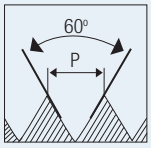
ISO529 / IS 6175 Part 3

7/16"	14	85	25	8	6.3	9	9.4	3	FAB0205220	FAB0205227	FAB0205234
1/2"	13	89	29	9	7.1	10	10.8	4	FAB0205221	FAB0205228	FAB0205235
5/8"	11	102	32	12.5	10	13	13.5	4	FAB0205222	FAB0205229	FAB0205236
3/4"	10	112	37	14	11.2	14	16.5	4	FAB0205223	FAB0205230	FAB0205237

Unit : mm

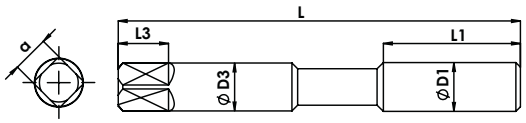
TOTEM® Silver cut **Spiral Point Taps**

UNF Unified fine threads

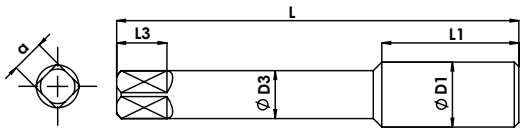


HOLE TYPE

HSS-E | ISO 529 | 2B | B/4-4.5P



Reinforced Shank (1/4" - 3/8")



Reduced Shank (7/16 " - 3/4")

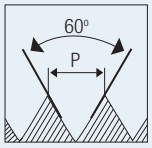
Series	SA1	SA3	SA4
Material - 1st choice	P0, N4	P0-P1	P0-P3
Material - 2nd choice	N1-N2	K2-K3	K1-K2
Coating	Bright	TiN	TiAlN

Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flutes	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
ISO529 / IS 6175 Part 2											
1/4"	28	66	19	6.3	5	8	5.5	3	FAB0200497	FAB0200499	FAB0205238
5/16"	24	69	19	8	6.3	9	6.9	3	FAB0200506	FAB0200508	FAB0205239
3/8"	24	76	20	10	8	11	8.5	3	FAB0200517	FAB0200519	FAB0205240
ISO529 / IS 6175 Part 3											
7/16"	20	82	22	8	6.3	9	9.9	3	FAB0200528	FAB0200530	FAB0205241
1/2"	20	84	24	9	7.1	10	11.5	3	FAB0200539	FAB0200541	FAB0205242
5/8"	18	95	25	12.5	10	13	14.5	3	FAB0200552	FAB0200554	FAB0205243
3/4"	16	104	29	14	11.2	14	17.5	4	FAB0200563	FAB0200565	FAB0205244

Unit : mm

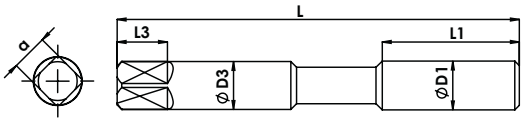
TOTEM® Silver cut Spiral Point Taps

UNF Unified fine threads

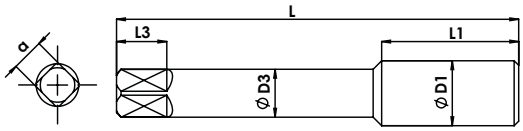


HOLE TYPE

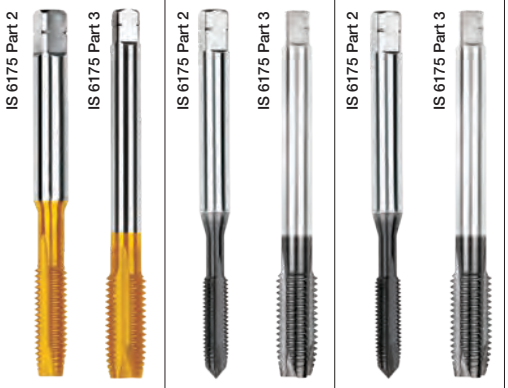
HSS-E | ISO 529 | 2B | B/4-4.5P



Reinforced Shank (1/4" - 3/8")



Reduced Shank (7/16 " - 3/4")



Series	SAS3	SAS5	SAS6
Material - 1st choice	M1	M1-M2	M1-M3
Material - 2nd choice	-	-	-
Coating	TiN	TiCN	TiAlN + WC/C

ISO529 / IS 6175 Part 2

Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flutes	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/4"	28	66	19	6.3	5	8	5.5	3	FAB0205259	FAB0205266	FAB0205273
5/16"	24	69	19	8	6.3	9	6.9	3	FAB0205260	FAB0205267	FAB0205274
3/8"	24	76	20	10	8	11	8.5	3	FAB0205261	FAB0205268	FAB0205275

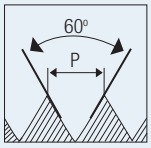
ISO529 / IS 6175 Part 3

7/16"	20	82	22	8	6.3	9	9.9	3	FAB0205262	FAB0205269	FAB0205276
1/2"	20	84	24	9	7.1	10	11.5	4	FAB0205263	FAB0205270	FAB0205277
5/8"	18	95	25	12.5	10	13	14.5	4	FAB0205264	FAB0205271	FAB0205278
3/4"	16	104	29	14	11.2	14	17.5	4	FAB0205265	FAB0205272	FAB0205279

Unit : mm

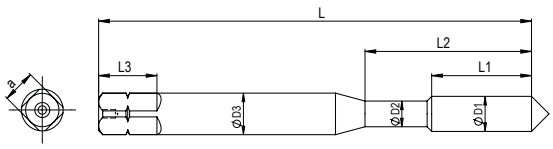
TOTEM® Silver cut **Spiral Point Taps**

M/MF Metric coarse & fine threads

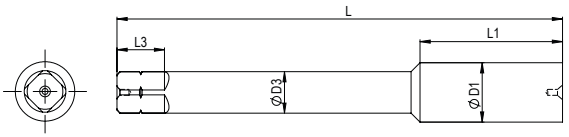


HOLE TYPE

HSS-E | JIS | 6HX | B/4-4.5P



Reinforced Shank (M3 - M6)
Male Centre upto M6



Reduced Shank (M8- M20)

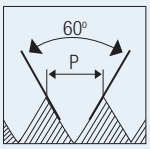
Series	SA1	SA4
Material - 1st choice	P0, N4	P0-P3
Material - 2nd choice	N1-N2	K1-K2
Coating	Bright	TiAlN

JIS									
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 3	0.5	46	11	4	3.2	6	2.5	FAB0205072	FAB0205683
M 4	0.7	52	13	5	4	7	3.3	FAB0205073	FAB0205614
M 5	0.8	60	16	5.5	4.5	7	4.2	FAB0205074	FAB0205615
M 6	1	62	19	6	4.5	7	5	FAB0205075	FAB0205616
M 8	1.25	70	22	6.2	5	8	6.8	FAB0205076	FAB0205617
M 8	1	70	22	6.2	5	8	7	FAB0205627	FAB0205618
M 10	1.5	75	24	7	5.5	8	8.5	FAB0205077	FAB0205619
M 10	1.25	75	24	7	5.5	8	8.8	FAB0206285	FAB0205620
M 12	1.75	82	29	8.5	6.5	9	10.3	FAB0205078	FAB0205621
M 12	1.5	82	29	8.5	6.5	9	10.5	FAB0205629	FAB0205622
M 14	2	88	30	10.5	8	11	12	FAB0205630	FAB0205623
M 16	2	95	32	12.5	10	13	14	FAB0205631	FAB0205624
M 18	2.5	100	37	14	11	14	15.5	FAB0205632	FAB0205625
M 20	2.5	105	37	15	12	15	17.5	FAB0205633	FAB0205626

Unit : mm

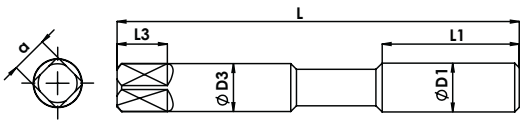
TOTEM® Spiral Point Taps

M Metric coarse threads

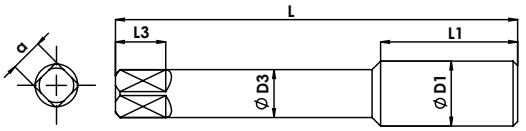


HOLE TYPE

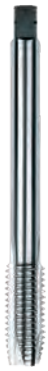
HSS | 6H | ISO 529 | B/4-4.5P



Reinforced Shank (M3 - M10)
Male Centre upto M5



Reduced Shank (M12 - M20)



							Coating		Bright	TiN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	48	11	3.15	2.5	5	2.5	2	FAA0201810	FAB0200135
M 3.5	0.6	50	13	3.55	2.8	5	2.9	2	FAA0201841	FAB0200139
M 4	0.7	53	13	4	3.15	6	3.3	2	FAA0201872	FAB0200145
M 5	0.8	58	16	5	4	7	4.2	2	FAA0201922	FAB0200154
M 6	1	66	19	6.3	5	8	5	2	FAA0201965	FAB0200163
M 7	1	66	19	7.1	5.6	8	6	3	FAA0201998	FAB0200167
M 8	1.25	72	22	8	6.3	9	6.8	3	FAA0202028	FAB0200173
M 10	1.5	80	24	10	8	11	8.5	3	FAA0202101	FAB0200186
M 12	1.75	89	29	9	7.1	10	10.2	3	FAA0202163	FAB0200200
M 14	2	95	30	11.2	9	12	12	3	FAA0202193	FAB0200207
M 16	2	102	32	12.5	10	13	14	3	FAA0202225	FAB0200216
M 18	2.5	112	37	14	11.2	14	15.5	4	FAA0202259	FAB0206711
M 20	2.5	112	37	14	11.2	14	17.5	4	FAA0202286	FAB0200225
M 24	3	130	45	18	14	18	21	4	FAA0202345	FAB0200234
M 27	3	135	45	20	16	20	24	4	FAA0202373	FAB0200238
M 30	3.5	138	48	20	16	20	26.5	4	FAA0202397	FAB0201224
M 36	4	162	57	25	20	24	32	4	FAA0202433	FAB0206712

Unit : mm

TOTEM®

High Performance Cutting Tools

SPIRAL FLUTE TAPS

SB SERIES

CONTENTS

TOTEM®

SPIRAL FLUTE TAPS

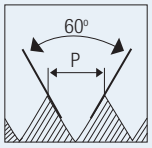
SERIES	THREAD FORM	BLANK STANDARD	WORKPIECE MATERIAL	1ST CHOICE	2ND CHOICE	TOOL MATERIAL	COATING	PAGE
SB1	M	DIN 371/ DIN 376	Steel	P0-P1	N1 N2	HSSE	Bright	1.038
SB3	M	DIN 371/ DIN 376	Steel	P1-P2	K2, N3, N4	HSSE	TiN	
SB4	M	DIN 371/ DIN 376	Steel	P1-P2	K1-K2	HSSE	TiAlN	
SBF3	M	DIN 371/ DIN 376	Forged Steel	P2	-	HSSE	TiN	1.039
SBF5	M	DIN 371/ DIN 376	Forged Steel	P2-P3	-	HSSE	TiCN	
SBF5 P3	M	DIN 371/ DIN 376	Forged Steel	P3-P4	-	HSSE	TiCN	
SBS5	M	DIN 371/ DIN 376	Stainless Steel	M1 M2	-	HSSE	TiCN	1.040
SBS6	M	DIN 371/ DIN 376	Stainless Steel	M1-M3	-	HSSE	TiAlN + WC/C	
SBS5	M	DIN 371/ DIN 376	Stainless Steel	M1-M3	-	HSSE-PM	TiCN	1.041
SBI6	M	DIN 371/ DIN 376	Super Alloys	S1-S4	-	HSSE-PM	TiAlN + WC/C	
SBF5 P3TC	M	DIN 371/ DIN 376	Forged Steel	P3-P4	-	HSSE	TiCN	1.042
SBU3	M	DIN 371/ DIN 376	Forged Steel	P1-P2	-	HSSE	TiN	
SBU5	M	DIN 371/ DIN 376	Forged Steel	P1-P2	-	HSSE	TiCN	
SB1	MF	DIN 374	Steel	P0-P1	N1 N2	HSSE	Bright	1.043
SB3	MF	DIN 374	Steel	P1-P2	K2, N3, N4	HSSE	TiN	
SB4	MF	DIN 374	Steel	P1-P2	K1-K2	HSSE	TiAlN	
SBF3	MF	DIN 374	Forged Steel	P2	-	HSSE	TiN	1.044
SBF5	MF	DIN 374	Forged Steel	P2-P3	-	HSSE	TiCN	
SBF5 P3	MF	DIN 374	Forged Steel	P3-P4	-	HSSE	TiCN	
SBS5	MF	DIN 374	Stainless Steel	M1-M2	-	HSSE	TiCN	1.045
SBS6	MF	DIN 374	Stainless Steel	M1-M3	-	HSSE	TiAlN + WC/C	
SBI6	MF	DIN 374	Super Alloys	S1-S4	-	HSSE-PM	TiAlN + WC/C	1.046
SBF7TC	MF	DIN 374	Forged Steel	P2-P4	-	HSSE	AlCrN	1.047
SBU3	MF	DIN 374	Forged Steel	P1-P2	-	HSSE	TiN	
SBU5	MF	DIN 374	Forged Steel	P1-P2	-	HSSE	TiCN	
SB1	UNC	DIN 371/ DIN 376	Steel	P0-P1	N1 N2	HSSE	Bright	1.048
SB3	UNC	DIN 371/ DIN 376	Steel	P1-P2	K2, N3, N4	HSSE	TiN	
SBU3	UNC	DIN 371/ DIN 376	Stainless Steel	P1-P2	-	HSSE	TiN	1.049
SBS5	UNC	DIN 371/ DIN 376	Stainless Steel	P1-P2	-	HSSE	TiCN	
SBS5	UNC	DIN 371/ DIN 376	Stainless Steel	M1-M3	-	HSSE-PM	TiCN	1.050
SB1	UNF	DIN 374	Steel	P0-P1	N1 N2	HSSE	Bright	1.051
SB3	UNF	DIN 374	Steel	P1-P2	K2, N3, N4	HSSE	TiN	
SBU3	UNF	DIN 374	Stainless Steel	P1-P2	-	HSSE	TiN	1.052
SBS5	UNF	DIN 374	Stainless Steel	M1 M2	-	HSSE	TiCN	
SBS5	UNF	DIN 374	Stainless Steel	M1-M3	-	HSSE-PM	TiCN	1.053

SPIRAL FLUTE TAPS

SERIES	THREAD FORM	BLANK STANDARD	WORKPIECE MATERIAL	1ST CHOICE	2ND CHOICE	TOOL MATERIAL	COATING	PAGE
SB1	M	ISO 529	Steel	P0-P1	N1 N2	HSSE	Bright	1.054
SB3	M	ISO 529	Steel	P1-P2	K2, N3, N4	HSSE	TiN	
SB4	M	ISO 529	Steel	P1-P2	K1-K2	HSSE	TiAlN	
SBF3	M	ISO 529	Forged Steel	P2	-	HSSE	TiN	1.055
SBF5	M	ISO 529	Forged Steel	P2-P3	-	HSSE	TiCN	
SBS5	M	ISO 529	Stainless Steel	M1 M2	-	HSSE	TiCN	1.056
SBS6	M	ISO 529	Stainless Steel	M1-M3	-	HSSE	TiAlN + WC/C	
SBS5	M	ISO 529	Stainless Steel	M1-M3	-	HSSE-PM	TiCN	1.057
SBI6	M	ISO 529	Super Alloys	S1-S4	-	HSSE-PM	TiAlN + WC/C	
SBU3	M	ISO 529	Forged Steel	P1-P2	-	HSSE	TiN	1.058
SBU5	M	ISO 529	Forged Steel	P1-P2	-	HSSE	TiN	
SB1	MF	ISO 529	Steel	P0-P1	N1 N2	HSSE	Bright	1.059
SB3	MF	ISO 529	Steel	P1-P2	K2, N3, N4	HSSE	TiN	
SB4	MF	ISO 529	Steel	P1-P2	K1-K2	HSSE	TiAlN	
SBF3	MF	ISO 529	Forged Steel	P2	-	HSSE	TiN	1.060
SBF5	MF	ISO 529	Forged Steel	P2-P3	-	HSSE	TiCN	
SBS5	MF	ISO 529	Stainless Steel	M1 M2	-	HSSE	TiCN	1.061
SBU3	MF	ISO 529	Stainless Steel	P1-P2	-	HSSE	TiN	1.062
SBU5	MF	ISO 529	Stainless Steel	P1-P2	-	HSSE	TiCN	
SB1	UNC	ISO 529	Steel	P0-P1	N1 N2	HSSE	Bright	1.063
SB3	UNC	ISO 529	Steel	P1-P2	K2, N3, N4	HSSE	TiN	
SBU3	UNC	ISO 529	Stainless Steel	P1-P2	-	HSSE	TiN	1.064
SBU5	UNC	ISO 529	Stainless Steel	P1-P2	-	HSSE	TiCN	
SBS5	UNC	ISO 529	Stainless Steel	M1-M3	-	HSSE-PM	TiCN	1.065
SB1	UNF	ISO 529	Steel	P0-P1	N1 N2	HSSE	Bright	1.066
SB3	UNF	ISO 529	Steel	P1-P2	K2, N3, N4	HSSE	TiN	
SBU3	UNF	ISO 529	Stainless Steel	P1-P2	-	HSSE	TiN	1.067
SBU5	UNF	ISO 529	Stainless Steel	P1-P2	-	HSSE	TiCN	
SBS5	UNF	ISO 529	Stainless Steel	M1-M3	-	HSSE-PM	TiCN	1.068
SB1	M	JIS	Steel	P0-P1	N1-N2	HSSE	Bright	1.069
SB4	M	JIS	Steel	P1-P2	K1-K2	HSSE	TiAlN	
Spirex	M	ISO 529	General	-	-	HSSE	Bright	1.070
Spirex	M	ISO 529	General	-	-	HSSE	TiN	
								1.071

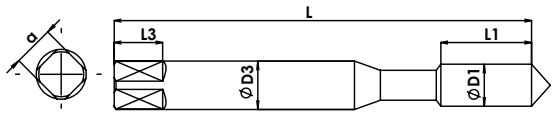
TOTEM® Silver cut — Spiral Flute Taps

M Metric coarse threads

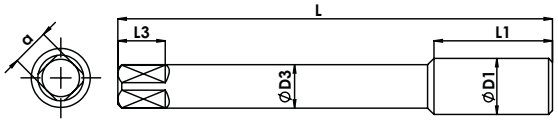


HOLE TYPE

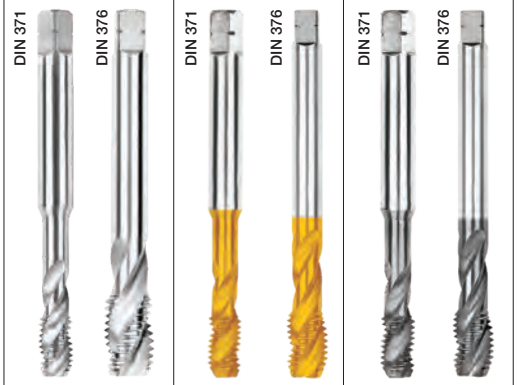
HSS-E | DIN 371/376 | 6HX | C/2-3P | 35°



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12 - M20)

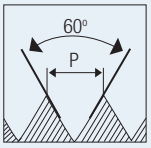


							Series		SB1	SB3	SB4
							Material - 1st choice		P0-P1	P1-P2	P1-P2
							Material - 2nd choice		N1-N2	K2, N3-N4	K1-K2
DIN 371							Coating		Bright	TiN	TiAlN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flutes	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 3	0.5	56	6	3.5	2.7	6	2.5	3	FAB0203197	FAB0203207	FAB0204334
M 3.5	0.6	56	6.5	4	3	6	2.9	3	FAB0204328	FAB0204331	FAB0204335
M 4	0.7	63	7	4.5	3.4	6	3.3	3	FAB0203198	FAB0203208	FAB0200968
M 5	0.8	70	8	6	4.9	8	4.2	3	FAB0203199	FAB0203209	FAB0203685
M 6	1	80	10	6	4.9	8	5	3	FAB0203200	FAB0203210	FAB0203686
M 7	1	80	10	7	5.5	8	6	3	FAB0203201	FAB0203211	FAB0204336
M 8	1.25	90	12	8	6.2	9	6.8	3	FAB0203202	FAB0203212	FAB0203687
M 10	1.5	100	15	10	8	11	8.5	3	FAB0203203	FAB0203213	FAB0203688
DIN 376											
M 12	1.75	110	18	9	7	10	10.2	3	FAB0203204	FAB0203684	FAB0203689
M 14	2	110	20	11	9	12	12	3	FAB0203205	FAB0203215	FAB0204337
M 16	2	110	20	12	9	12	14	3	FAB0203206	FAB0203216	FAB0204338
M 18	2.5	125	25	14	11	14	15.5	4	FAB0204329	FAB0204332	FAB0204339
M 20	2.5	140	25	16	12	15	17.5	4	FAB0204330	FAB0204333	FAB0204340

Unit : mm

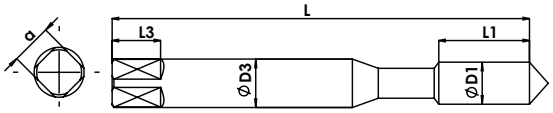
TOTEM® Silver cut **Spiral Flute Taps**

M Metric coarse threads

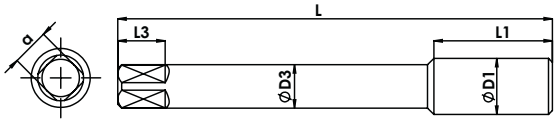


HOLE TYPE

HSS-E | DIN 371/376 | 6HX | C/2-3P | 15°



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12 - M20)

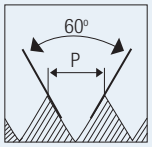
Series	SBF3	SBF5	SBF5 P3
Material - 1st choice	P2	P2-P3	P3-P4
Material - 2nd choice	-	-	-
Coating	TiN	TiCN	TiCN

DIN 371											
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flutes	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 3	0.5	56	6	3.5	2.7	6	2.5	3	FAB0204556	FAB0204341	FAB0209006
M 3.5	0.6	56	6.5	4	3	6	2.9	3	FAB0205535	FAB0204342	-
M 4	0.7	63	7	4.5	3.4	6	3.3	3	FAB0204557	FAB0204343	FAB0209007
M 5	0.8	70	8	6	4.9	8	4.2	3	FAB0204558	FAB0204344	FAB0209008
M 6	1	80	10	6	4.9	8	5	3	FAB0204559	FAB0204345	FAB0209009
M 7	1	80	10	7	5.5	8	6	3	FAB0205536	FAB0204346	-
M 8	1.25	90	12	8	6.2	9	6.8	3	FAB0204560	FAB0204347	FAB0208758
M 10	1.5	100	15	10	8	11	8.5	3	FAB0204561	FAB0204348	FAB0209010
DIN 376											
M 12	1.75	110	18	9	7	10	10.2	3	FAB0204562	FAB0204349	FAB0209011
M 14	2	110	20	11	9	12	12	4	FAB0204563	FAB0204350	FAB0209012
M 16	2	110	20	12	9	12	14	4	FAB0204564	FAB0204351	FAB0208760
M 18	2.5	125	25	14	11	14	15.5	4	FAB0204908	FAB0204352	FAB0209013
M 20	2.5	140	25	16	12	15	17.5	4	FAB0204120	FAB0204353	FAB0209014

Unit : mm

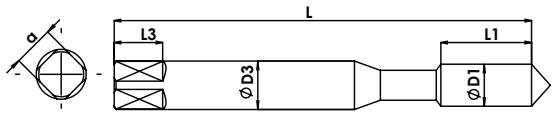
TOTEM® Silver cut — Spiral Flute Taps

M Metric coarse threads

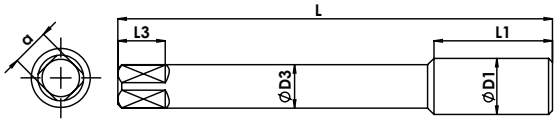


HOLE TYPE

HSS-E | DIN 371/376 | 6HX | C/2-3P | 45°



Reinforced Shank DIN371 (M3 - M10)



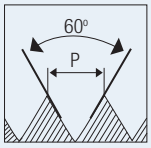
Reduced Shank DIN376 (M12 - M20)

							Series		SBS5	SBS6
							Material - 1st choice		M1-M2	M1-M3
							Material - 2nd choice		-	-
DIN 371							Coating		**TiCN**	**TiAlN + WC/C**
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	56	6	3.5	2.7	6	2.5	3	FAB0204655	FAB0204794
M 4	0.7	63	7	4.5	3.4	6	3.3	3	FAB0204656	FAB0204795
M 5	0.8	70	8	6	4.9	8	4.2	3	FAB0204657	FAB0204796
M 6	1	80	10	6	4.9	8	5	3	FAB0204658	FAB0204797
M 8	1.25	90	12	8	6.2	9	6.8	3	FAB0204659	FAB0204798
M 10	1.5	100	15	10	8	11	8.5	3	FAB0204660	FAB0204799
DIN 376										
M 12	1.75	110	18	9	7	10	10.2	4	FAB0204661	FAB0204800
M 14	2	110	20	11	9	12	12	4	FAB0204662	FAB0204801
M 16	2	110	20	12	9	12	14	4	FAB0204663	FAB0204802
M 18	2.5	125	25	14	11	14	15.5	4	-	-
M 20	2.5	140	25	16	12	15	17.5	4	FAB0204664	FAB0205601

Unit : mm

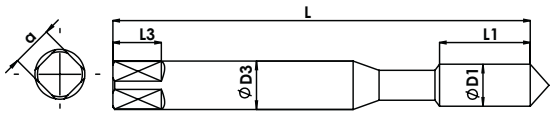
TOTEM® Silver cut **Spiral Flute Taps**

M Metric coarse threads

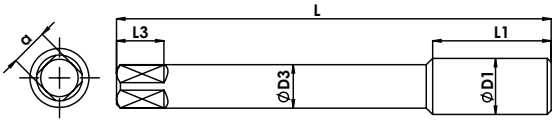


HOLE TYPE

HSS-E PM | DIN 371/376 | 6HX | C/2-3P | 45° | 18°



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12 - M16)

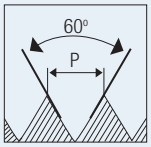
Series	SBS5	SBI6
Material - 1st choice	M1-M3	S1-S4
Material - 2nd choice	-	-
Coating	TiCN	TiAlN + WC/C

DIN 371										
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	56	6	3.5	2.7	6	2.5	3	FAB0205539	FAB0204703
M 4	0.7	63	7	4.5	3.4	6	3.3	3	FAB0205540	FAB0204704
M 5	0.8	70	8	6	4.9	8	4.2	3	FAB0205541	FAB0204705
M 6	1	80	10	6	4.9	8	5	3	FAB0205542	FAB0204706
M 8	1.25	90	12	8	6.2	9	6.8	3	FAB0205543	FAB0204707
M 10	1.5	100	15	10	8	11	8.5	3	FAB0205544	FAB0204708
DIN 376										
M 12	1.75	110	18	9	7	10	10.2	4 I 3	FAB0205545	FAB0204709
M 14	2	110	20	11	9	12	12	4 I 3	FAB0205546	FAB0204710
M 16	2	110	20	12	9	12	14	4 I 3	FAB0205547	FAB0204711

Unit : mm

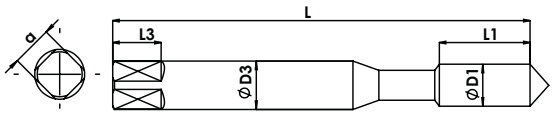
TOTEM® Silver cut — Spiral Flute Taps

M Metric coarse threads

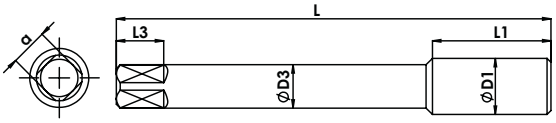


HOLE TYPE

HSS-E | DIN 371/376 | 6HX | C/2-3P | 15°



Reinforced Shank DIN371 (M5 - M10)



Reduced Shank DIN376 (M12 - M20)

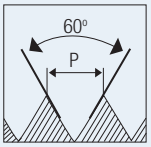
Series	SBF5 P3TC	SBU3	SBU5
Material - 1st choice	P3-P4	P1-P2, M1-M2	P1-P2, M1-M3
Material - 2nd choice			-
Coating	TiCN	TiN	TiCN

DIN 371									EDP No.	EDP No.	EDP No.
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes			
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 3	0.5	56	6	3.5	2.7	6	2.5	3	-	FAB0208045	FAB0208059
M 4	0.7	63	7	4.5	3.4	6	3.3	3	-	FAB0207885	FAB0208060
M 5	0.8	70	8	6	4.9	8	4.2	3	-	FAB0208046	FAB0208061
M 6	1	80	10	6	4.9	8	5	3	FAB0209015	FAB0208047	FAB0208062
M 8	1.25	90	12	8	6.2	9	6.8	3	FAB0209016	FAB0208048	FAB0208063
M 10	1.5	100	15	10	8	11	8.5	3	FAB0209017	FAB0207818	FAB0206986
DIN 376											
M 12	1.75	110	18	9	7	10	10.2	3	FAB0208919	FAB0208049	FAB0206993
M 14	2	110	20	11	9	12	12	3	FAB0209018	FAB0208050	FAB0208064
M 16	2	110	20	12	9	12	14	3	FAB0208759	FAB0208051	FAB0208065
M 18	2.5	125	25	14	11	14	15.5	4	FAB0209019	FAB0209021	FAB0209023
M 20	2.5	140	25	16	12	15	17.5	4	FAB0209020	FAB0209022	FAB0209024

Unit : mm

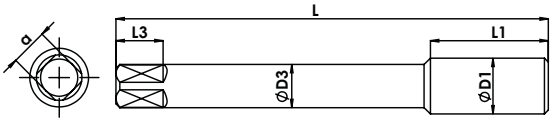
TOTEM® Silver cut **Spiral Flute Taps**

MF Metric fine threads



HOLE TYPE

HSS-E | DIN 374 | 6HX | C/2-3P | 35°



Male centre (M6 - M10)
Female centre (M12 - M20)

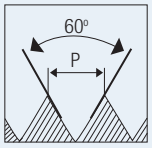
Series	SB1	SB3	SB4
Material - 1st choice	P0-P1	P1-P2	P1-P2
Material - 2nd choice	N1-N2	K2, N3-N4	K1-K2
Coating	Bright	TiN	TiAlN

DIN 374											
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 6	0.75	80	10	4.5	3.4	6	5.2	3	FAB0204354	FAB0204365	FAB0204375
M 8	1	90	13	6	4.9	8	7	3	FAB0204355	FAB0203297	FAB0204376
M 10	1.25	100	15	7	5.5	8	8.8	3	FAB0204356	FAB0204366	FAB0204377
M 10	1	90	15	7	5.5	8	9	3	FAB0204357	FAB0204367	FAB0204378
M 12	1.5	100	18	9	7	10	10.5	3	FAB0204358	FAB0204368	FAB0204379
M 12	1.25	100	18	9	7	10	10.8	3	FAB0204359	FAB0204369	FAB0204380
M 14	1.5	100	20	11	9	12	12.5	3	FAB0204360	FAB0204370	FAB0204381
M 16	1.5	100	20	12	9	12	14.5	3	FAB0204362	FAB0204372	FAB0204383
M 18	1.5	110	25	14	11	14	16.5	4	FAB0204363	FAB0204373	FAB0204384
M 20	1.5	125	25	16	12	15	18.5	4	FAB0204364	FAB0204374	FAB0204385

Unit : mm

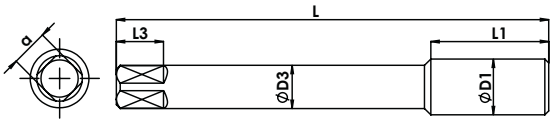
TOTEM® Silver cut Spiral Flute Taps

MF Metric fine threads



HOLE TYPE

HSS-E | DIN 374 | 6HX | C/2-3P | 15°



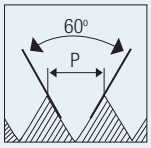
Male centre (M6 - M10)
Female centre (M12 - M20)

							Series		SBF3	SBF5	SBF5 P3
							Material - 1st choice		P2	P2-P3	P3-P4
							Material - 2nd choice		-	-	-
DIN 374							Coating		TiN	TiCN	TiCN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 6	0.75	80	10	4.5	3.4	6	5.2	3	FAB0205548	FAB0204386	-
M 8	1	90	13	6	4.9	8	7	3	FAB0204565	FAB0204387	FAB0209025
M 10	1.25	100	15	7	5.5	8	8.8	3	FAB0204566	FAB0204388	FAB0209026
M 10	1	90	15	7	5.5	8	9	3	FAB0204737	FAB0204389	FAB0209027
M 12	1.5	100	18	9	7	10	10.5	3	FAB0204568	FAB0204390	FAB0209028
M 12	1.25	100	18	9	7	10	10.8	3	FAB0204567	FAB0204391	FAB0209029
M 14	1.5	100	20	11	9	12	12.5	4	FAB0204569	FAB0204392	FAB0209030
M 16	1.5	100	20	12	9	12	14.5	4	FAB0204570	FAB0204394	FAB0208810
M 18	1.5	110	25	14	11	14	16.5	4	FAB0204912	FAB0204395	FAB0209031
M 20	1.5	125	25	16	12	15	18.5	4	FAB0204913	FAB0204396	FAB0209032

Unit : mm

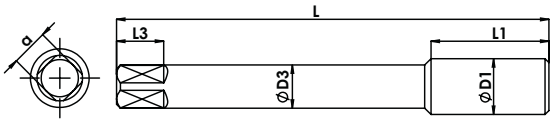
TOTEM® Silver cut **Spiral Flute Taps**

MF Metric fine threads



HOLE TYPE

HSS-E | DIN 374 | 6HX | C/2-3P | 45°



Male centre (M8 - M10)
Female centre (M12 - M16)

Series	SBS5	SBS6
Material - 1st choice	M1-M2	M1-M3
Material - 2nd choice	-	-
Coating	TiCN	TiAlN + WC/C

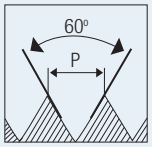
DIN 374

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 8	1	90	13	6	4.9	8	7	3	FAB0204839	FAB0204803
M 10	1.25	100	15	7	5.5	8	8.8	3	FAB0204840	FAB0204804
M 10	1	90	15	7	5.5	8	9	3	FAB0204841	FAB0204805
M 12	1.5	100	18	9	7	10	10.5	4	FAB0204842	FAB0204806
M 12	1.25	100	18	9	7	10	10.8	4	FAB0204843	FAB0204807
M 14	1.5	100	20	11	9	12	12.5	4	FAB0204844	FAB0204808
M 16	1.5	100	20	12	9	12	14.5	4	FAB0204845	FAB0204809
M 18	1.5	110	25	14	11	14	16.5	4	-	-
M 20	1.5	125	25	16	12	15	18.5	4	-	-

Unit : mm

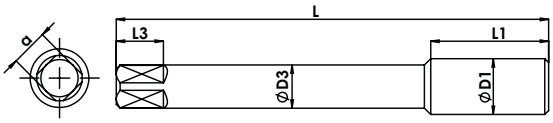
TOTEM® Silver cut — Spiral Flute Taps

MF Metric fine threads



HOLE TYPE

HSS-E PM | DIN 374 | 6HX | C/2-3P | 18°



Male centre (M8 - M10)
Female centre (M12)

Series	SBI6
Material - 1st choice	S1-S4
Material - 2nd choice	-
Coating	TiAlN + WC/C

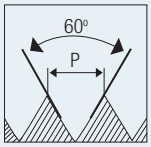
DIN 374

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 8	1	90	13	6	4.9	8	7	3	FAB0204738
M 10	1.25	100	15	7	5.5	8	8.8	3	FAB0204813
M 10	1	90	15	7	5.5	8	9	3	FAB0204814
M 12	1.5	100	18	9	7	10	10.5	3	FAB0204739
M 12	1.25	100	18	9	7	10	10.8	3	FAB0204898

Unit : mm

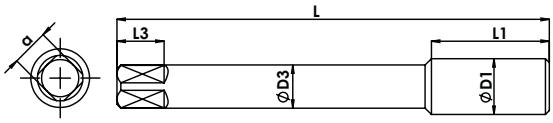
TOTEM® Silver cut **Spiral Flute Taps**

MF Metric fine threads



HOLE TYPE

HSS-E | DIN 374 | 6HX | C/2-3P | 15°



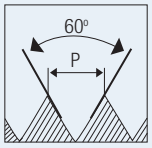
Male centre (M8 - M10)
Female centre (M12)

							Series		SBF5 P3TC	SBU3	SBU5
							Material - 1st choice		P3-P4	P1-P2, M1-M2	P1-P2, M1-M3
							Material - 2nd choice		-	-	-
DIN 374							Coating		TiCN	TiN	TiCN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 8	1	90	13	6	4.9	8	7	3	FAB0209033	FAB0208052	FAB0208066
M 10	1.25	100	15	7	5.5	8	8.8	3	FAB0209034	FAB0208054	FAB0208068
M 10	1	90	15	7	5.5	8	9	3	FAB0209035	FAB0208053	FAB0208067
M 12	1.5	100	18	9	7	10	10.5	3	FAB0209036	FAB0208056	FAB0208070
M 12	1.25	100	18	9	7	10	10.8	3	FAB0209037	FAB0208055	FAB0208069
M 14	1.5	100	20	11	9	12	12.5	3	FAB0209038	FAB0208057	FAB0208071
M 16	1.5	100	20	12	9	12	14.5	3	FAB0209039	FAB0208058	FAB0208072
M 18	1.5	110	25	14	11	14	16.5	4	FAB0209040	FAB0204165	FAB0209042
M 20	1.5	125	25	16	12	15	18.5	4	FAB0209041	FAB0204166	FAB0209043

Unit : mm

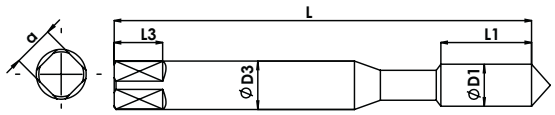
TOTEM® Silver cut — Spiral Flute Taps

UNC Unified coarse threads

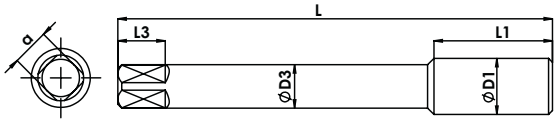


HOLE TYPE

HSS-E | DIN 371/376 | 2B | C/2-3P | 35°



Reinforced Shank DIN371 (1/4" - 3/8")



Reduced Shank DIN 376 (7/16" - 1")

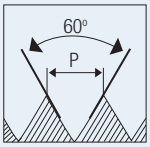
Series	SB1	SB3
Material - 1st choice	P0-P1	P1-P2
Material - 2nd choice	N1-N2	K2, N3-N4
Coating	Bright	TiN

DIN 371										
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/4"	20	80	10	7	5.5	8	5.1	3	FAB0204397	FAB0204406
5/16"	18	90	13	8	6.2	9	6.6	3	FAB0204398	FAB0204407
3/8"	16	100	15	9	7	10	8	3	FAB0204399	FAB0204408
DIN 376										
7/16"	14	100	18	8	6.2	9	9.4	3	FAB0204400	FAB0204409
1/2"	13	110	18	9	7	10	10.8	3	FAB0204401	FAB0204410
5/8"	11	110	20	12	9	12	13.5	3	FAB0204402	FAB0204411
3/4"	10	125	25	14	11	14	16.5	4	FAB0204403	FAB0204412
7/8"	9	140	25	18	14.5	17	19.5	4	FAB0204404	FAB0204413
1"	8	160	30	18	14.5	17	22.25	4	FAB0204405	FAB0204414

Unit : mm

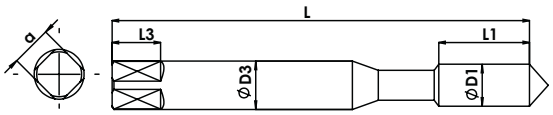
TOTEM® Silver cut **Spiral Flute Taps**

UNC Unified coarse threads

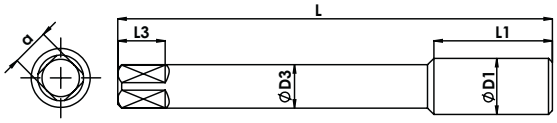


HOLE TYPE

HSS-E | DIN 371/376 | 2B | C/2-3P | 45°



Reinforced Shank DIN371 (1/4" - 3/8")



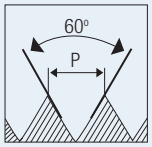
Reduced Shank DIN376 (7/16" - 1")

							Series		SBU3	SBS5
							Material - 1st choice		P1-P2, M1-M2	M1-M2
							Material - 2nd choice		-	-
DIN 371							Coating		**TiN**	**TiCN**
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/4"	20	80	10	7	5.5	8	5.	3	FAB0209044	FAB0205549
5/16"	18	90	13	8	6.2	9	6.6	3	FAB0209045	FAB0205550
3/8"	16	100	15	9	7	10	8	3	FAB0209046	FAB0205551
DIN 376										
7/16"	14	100	18	8	6.2	9	9.4	3	FAB0209047	FAB0205552
1/2"	13	110	18	9	7	10	10.8	3 I 4	FAB0209048	FAB0205553
5/8"	11	110	20	12	9	12	13.5	3 I 4	FAB0209049	FAB0205554
3/4"	10	125	25	14	11	14	16.5	4	FAB0209050	FAB0205555
7/8"	9	140	25	18	14.5	17	19.5	4	FAB0208738	FAB0205556
1"	8	160	30	18	14.5	17	22.25	4	FAB0209051	FAB0205557

Unit : mm

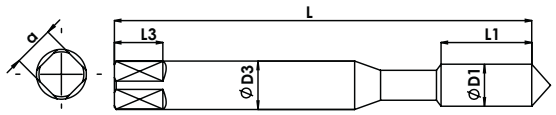
TOTEM® Silver cut — Spiral Flute Taps

UNC Unified coarse threads

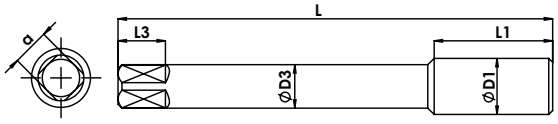


HOLE TYPE

HSS-E PM | DIN 371/376 | 2B | C/2-3P | 45°



Reinforced Shank DIN371 (1/4" - 3/8")



Reduced Shank DIN376 (7/16" - 1")

Series	SBS5
Material - 1st choice	M1-M3
Material - 2nd choice	-
Coating	TiCN

DIN 371

Nominal Diameter ØD1	TPI p	Overall Length L	Thread Length L1	Shank Diameter ØD3	Square Size a	Square Length L3	Tapping Drill Diameter Ød1	No of Flutes	EDP No.
1/4"	20	80	10	7	5.5	8	5.1	3	FAB0205558
5/16"	18	90	13	8	6.2	9	6.6	3	FAB0205559
3/8"	16	100	15	9	7	10	8	3	FAB0205560

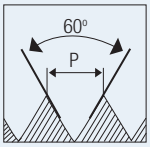
DIN 376

7/16"	14	100	18	8	6.2	9	9.4	3	FAB0205561
1/2"	13	110	18	9	7	10	10.8	4	FAB0205562
5/8"	11	110	20	12	9	12	13.5	4	FAB0205563
3/4"	10	125	25	14	11	14	16.5	4	FAB0205564
7/8"	9	140	25	18	14.5	17	19.5	4	FAB0205565
1"	8	160	30	18	14.5	17	22.25	4	FAB0205566

Unit : mm

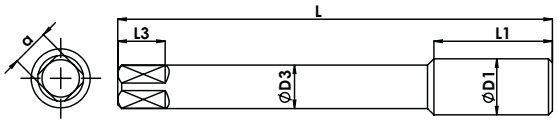
TOTEM® Silver cut **Spiral Flute Taps**

UNF Unified fine threads



HOLE TYPE

HSS-E | DIN 374 | 2B | C/2-3P | 35°



Male centre (1/4" - 3/8")
Female centre (7/16" - 1")

Series	SB1	SB3
Material - 1st choice	P0-P1	P1-P2
Material - 2nd choice	N1-N2	K2, N3-N4
Coating	**Bright**	**TiN**

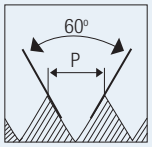
DIN 374

Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/4"	28	80	10	7	5.5	8	5.5	3	FAB0204415	FAB0204424
5/16"	24	90	13	8	6.2	9	6.9	3	FAB0204416	FAB0204425
3/8"	24	100	15	9	7	10	8.5	3	FAB0204417	FAB0204426
7/16"	20	100	18	8	6.2	9	9.9	3	FAB0204418	FAB0204427
1/2"	20	100	18	9	7	10	11.5	3	FAB0204419	FAB0204428
5/8"	18	100	20	12	9	12	14.5	3	FAB0204420	FAB0204429
3/4"	16	110	25	14	11	14	17.5	4	FAB0204421	FAB0204430
7/8"	14	125	25	18	14.5	17	20.5	4	FAB0204422	FAB0204431
1"	12	140	30	18	14.5	17	23.3	4	FAB0204423	FAB0204432

Unit : mm

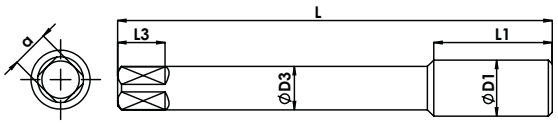
TOTEM® Silver cut — Spiral Flute Taps

UNF Unified fine threads



HOLE TYPE

HSS-E | DIN 374 | 2B | C/2-3P | 45°



Male centre (1/4" - 3/8")
Female centre (7/16" - 1")

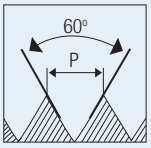
Series	SBU3	SBS5
Material - 1st choice	P1-P2, M1-M2	M1-M2
Material - 2nd choice	-	-
Coating	TiN	TiCN

DIN 374										
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/4"	28	80	10	7	5.5	8	5.5	3	FAB0209052	FAB0205567
5/16"	24	90	13	8	6.2	9	6.9	3	FAB0209053	FAB0205568
3/8"	24	100	15	9	7	10	8.5	3	FAB0209054	FAB0205569
7/16"	20	100	18	8	6.2	9	9.9	3	FAB0209055	FAB0205570
1/2"	20	100	18	9	7	10	11.5	3 I 4	FAB0209056	FAB0205571
5/8"	18	100	20	12	9	12	14.5	3 I 4	FAB0209057	FAB0205572
3/4"	16	110	25	14	11	14	17.5	4	FAB0209058	FAB0205573
7/8"	14	125	25	18	14.5	17	20.5	4	FAB0209059	FAB0205574
1"	12	140	30	18	14.5	17	23.3	4	FAB0209060	FAB0205575

Unit : mm

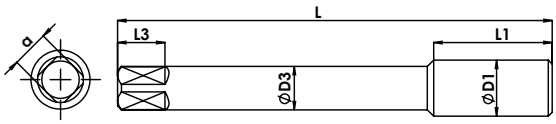
TOTEM® Silver cut **Spiral Flute Taps**

UNF Unified fine threads



HOLE TYPE

HSS-E PM | DIN 374 | 2B | C/2-3P | 45°



Male centre (1/4" - 3/8")
Female centre (7/16" - 1")

Series	SBS5
Material - 1st choice	M1-M3
Material - 2nd choice	-
Coating	TiCN

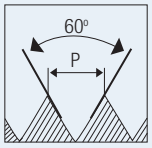
DIN 374

Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flutes	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
1/4"	28	80	10	7	5.5	8	5.5	3	FAB0205576
5/16"	24	90	13	8	6.2	9	6.9	3	FAB0205577
3/8"	24	100	15	9	7	10	8.5	3	FAB0205578
7/16"	20	100	18	8	6.2	9	9.9	3	FAB0205579
1/2"	20	100	18	9	7	10	11.5	3	FAB0205580
5/8"	18	100	20	12	9	12	14.5	3	FAB0205581
3/4"	16	110	25	14	11	14	17.5	4	FAB0205582
7/8"	14	125	25	18	14.5	17	20.5	4	FAB0205583
1"	12	140	30	18	14.5	17	23.3	4	FAB0205584

Unit : mm

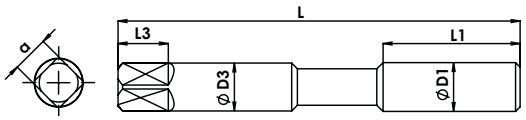
TOTEM® Silver cut **Spiral Flute Taps**

M Metric coarse threads

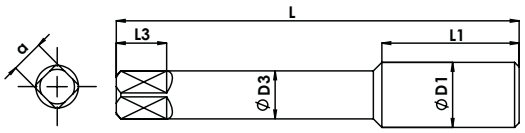


HOLE TYPE

HSS-E | ISO 529 | 6HX | C/2-3P | 35°



Reinforced Shank (M3 - M10)
Male centre upto M5



Reduced Shank (M12 - M20)

Series	SB1	SB3	SB4
Material - 1st choice	P0-P1	P1-P2	P1-P2
Material - 2nd choice	N1-N2	K2, N3-N4	K1-K2
Coating	Bright	TiN	TiAlN

ISO 529 / IS 6175 Part 2

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 3	0.5	48	5	3.15	2.5	5	2.5	3	FAB0200649	FAB0200650	FAB0203145
M 3.5	0.6	50	6	3.55	2.8	5	2.9	3	FAB0203134	FAB0203142	FAB0203146
M 4	0.7	53	7	4	3.15	6	3.3	3	FAB0200663	FAB0200665	FAB0200666
M 5	0.8	58	8	5	4	7	4.2	3	FAB0200674	FAB0200676	FAB0200677
M 6	1	66	10	6.3	5	8	5	3	FAB0200686	FAB0200688	FAB0200689
M 7	1	66	10	7.1	5.6	8	6	3	FAB0203135	FAB0203143	FAB0203147
M 8	1.25	72	13	8	6.3	9	6.8	3	FAB0200698	FAB0200700	FAB0200701
M 10	1.5	80	15	10	8	11	8.5	3	FAB0200722	FAB0200724	FAB0200725

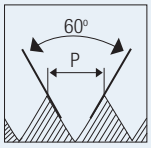
ISO 529 / IS 6175 Part 3

M 12	1.75	89	18	9	7.1	10	10.2	3	FAB0200752	FAB0200754	FAB0200755
M 14	2	95	20	11.2	9	12	12	3	FAB0200781	FAB0200782	FAB0203152
M 16	2	102	20	12.5	10	13	14	3	FAB0200802	FAB0200804	FAB0203153
M 18	2.5	112	25	14	11.2	14	15.5	4	FAB0203139	FAB0202155	FAB0203155
M 20	2.5	112	25	14	11.2	14	17.5	4	FAB0203141	FAB0200812	FAB0203157

Unit : mm

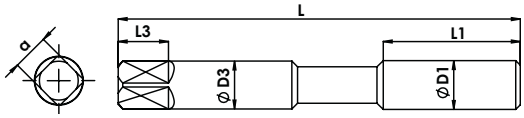
TOTEM® Silver cut **Spiral Flute Taps**

M Metric coarse threads

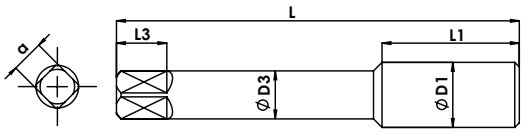


HOLE TYPE

HSS-E | ISO 529 | 6HX | C/2-3P | 15°



Reinforced Shank (M3 - M10)
Male centre upto M5



Reduced Shank (M12 - M20)

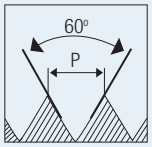
Series	SBF3	SBF5
Material - 1st choice	P2	P2-P3
Material - 2nd choice	-	-
Coating	TiN	TiCN

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
ISO 529 / IS 6175 Part 2										
M 3	0.5	48	5	3.15	2.5	5	2.5	3	FAB0204636	FAB0203158
M 3.5	0.6	50	6	3.55	2.8	5	2.9	3	FAB0205427	FAB0205431
M 4	0.7	53	7	4	3.15	6	3.3	3	FAB0204637	FAB0203159
M 5	0.8	58	8	5	4	7	4.2	3	FAB0204638	FAB0203160
M 6	1	66	10	6.3	5	8	5	3	FAB0204639	FAB0203161
M 7	1	66	10	7.1	5.6	8	6	3	FAB0205428	FAB0205432
M 8	1.25	72	13	8	6.3	9	6.8	3	FAB0204640	FAB0203163
M 10	1.5	80	15	10	8	11	8.5	3	FAB0204641	FAB0203166
ISO 529 / IS 6175 Part 3										
M 12	1.75	89	18	9	7.1	10	10.2	3	FAB0204642	FAB0203169
M 14	2	95	20	11.2	9	12	12	4	FAB0204643	FAB0203171
M 16	2	102	20	12.5	10	13	14	4	FAB0204644	FAB0203173
M 18	2.5	112	25	14	11.2	14	15.5	4	FAB0205429	FAB0205433
M 20	2.5	112	25	14	11.2	14	17.5	4	FAB0205430	FAB0203176

Unit : mm

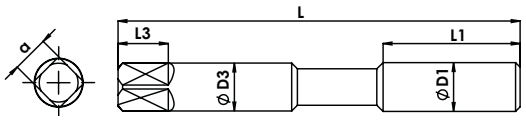
TOTEM® Silver cut **Spiral Flute Taps**

M Metric coarse threads

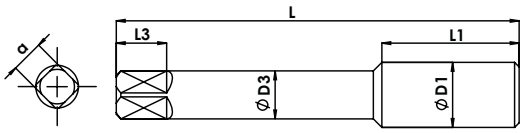


HOLE TYPE

HSS-E | ISO 529 | 6HX | C/2-3P | 45°



Reinforced Shank (M3 - M10)
Male centre upto M5



Reduced Shank (M12 - M20)

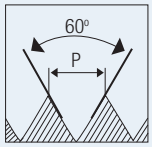
Series	SBS5	SBS6
Material - 1st choice	M1-M2	M1-M3
Material - 2nd choice	-	-
Coating	TiCN	TiAlN + WC/C

ISO 529 / IS 6175 Part 2										
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	48	5	3.15	2.5	5	2.5	3	FAB0203187	FAB0205447
M 4	0.7	53	7	4	3.15	6	3.3	3	FAB0203188	FAB0205448
M 5	0.8	58	8	5	4	7	4.2	3	FAB0203189	FAB0205449
M 6	1	66	10	6.3	5	8	5	3	FAB0203190	FAB0205450
M 8	1.25	72	13	8	6.3	9	6.8	3	FAB0203191	FAB0205451
M 10	1.5	80	15	10	8	11	8.5	3	FAB0203192	FAB0205452
ISO 529 / IS 6175 Part 3										
M 12	1.75	89	18	9	7.1	10	10.2	4	FAB0203193	FAB0205453
M 14	2	95	20	11.2	9	12	12	4	FAB0203194	FAB0205454
M 16	2	102	20	12.5	10	13	14	4	FAB0203195	FAB0205455
M 20	2.5	112	25	14	11.2	14	17.5	4	FAB0203196	FAB0205456

Unit : mm

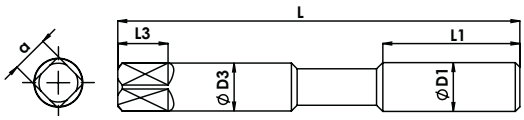
TOTEM® Silver cut **Spiral Flute Taps**

M Metric coarse threads

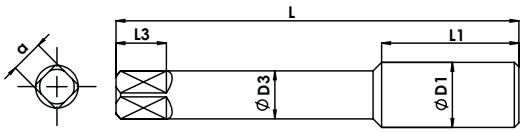


HOLE TYPE

HSS-E PM | ISO 529 | 6HX | C/2-3P | 45° | 18°



Reinforced Shank (M3 - M10)
Male centre upto M5



Reduced Shank (M12 - M16)

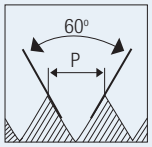
Series	SBS5	SBI6
Material - 1st choice	M1-M3	S1-S4
Material - 2nd choice	-	-
Coating	TiCN	TiAlN + WC/C

ISO 529 / IS 6175 Part 2										
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	48	5	3.15	2.5	5	2.5	3	FAB0205457	FAB0204721
M 4	0.7	53	7	4	3.15	6	3.3	3	FAB0205458	FAB0204722
M 5	0.8	58	8	5	4	7	4.2	3	FAB0205459	FAB0204723
M 6	1	66	10	6.3	5	8	5	3	FAB0205460	FAB0204724
M 8	1.25	72	13	8	6.3	9	6.8	3	FAB0205461	FAB0204725
M 10	1.5	80	15	10	8	11	8.5	3	FAB0205462	FAB0204726
ISO 529 / IS 6175 Part 3										
M 12	1.75	89	18	9	7.1	10	10.2	4	FAB0205463	FAB0204727
M 14	2	95	20	11.2	9	12	12	4	FAB0205464	FAB0204728
M 16	2	102	20	12.5	10	13	14	4	FAB0205465	FAB0204729

Unit : mm

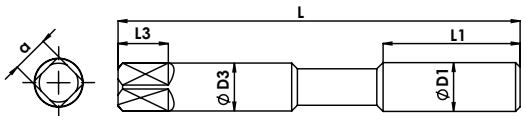
TOTEM® Silver cut **Spiral Flute Taps**

M Metric coarse threads

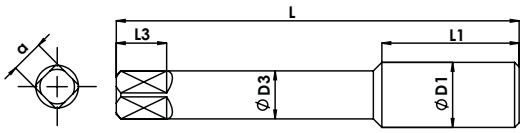


HOLE TYPE

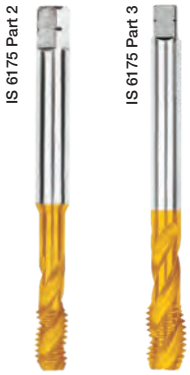
HSS-E | ISO 529 | 6HX | C/2-3P | 40°



Reinforced Shank (M3 - M10)
Male centre upto M5



Reduced Shank (M12 - M20)



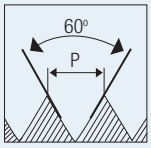
Series	SBU3	SBU5
Material - 1st choice	P1-P2, M1-M2	P1-P2, M1-M3
Material - 2nd choice	-	-
Coating	TiN	TiCN

ISO 529 / IS 6175 Part 2										
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	48	5	3.15	2.5	5	2.5	3	FAB0208015	FAB0207340
M 4	0.7	53	7	4	3.15	6	3.3	3	FAB0208016	FAB0208030
M 5	0.8	58	8	5	4	7	4.2	3	FAB0208017	FAB0208031
M 6	1	66	10	6.3	5	8	5	3	FAB0208018	FAB0208032
M 8	1.25	72	13	8	6.3	9	6.8	3	FAB0208019	FAB0208033
M 10	1.5	80	15	10	8	11	8.5	3	FAB0208020	FAB0208034
ISO 529 / IS 6175 Part 3										
M 12	1.75	89	18	9	7.1	10	10.2	3	FAB0208021	FAB0208035
M 14	2	95	20	11.2	9	12	12	3	FAB0208022	FAB0208036
M 16	2	102	20	12.5	10	13	14	3	FAB0208023	FAB0208037
M 20	2.5	112	25	14	11.2	14	17.5	4	FAB0208977	-

Unit : mm

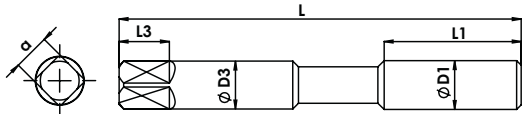
TOTEM® Silver cut **Spiral Flute Taps**

MF Metric fine threads

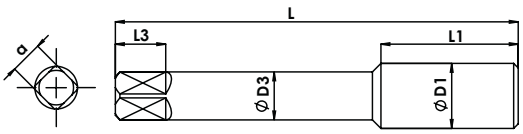


HOLE TYPE

HSS-E | ISO 529 | 6HX | C/2-3P | 35°



Reinforced Shank (M3 - M10)
Male centre upto M5



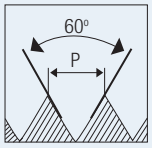
Reduced Shank (M12 - M20)

							Series		SB1	SB3	SB4
							Material - 1st choice		P0-P1	P1-P2	P1-P2
							Material - 2nd choice		N1-N2	K2, N3-N4	K1-K2
ISO 529 / IS 6175 Part 2							Coating		Bright	TiN	TiAlN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 8	1	72	13	8	6.3	9	7	3	FAB0203136	FAB0202157	FAB0203148
M 10	1	80	15	10	8	11	9	3	FAB0203137	FAB0200703	FAB0203149
M 10	1.25	80	15	10	8	11	8.8	3	FAB0200711	FAB0200713	FAB0203150
ISO 529 / IS 6175 Part 3											
M 12	1.25	89	18	9	7.1	10	10.75	3	FAB0200732	FAB0200733	FAB0204653
M 12	1.5	89	18	9	7.1	10	10.5	3	FAB0200741	FAB0200743	FAB0200744
M 14	1.5	95	20	11.2	9	12	12.5	3	FAB0200772	FAB0200774	FAB0203151
M 16	1.5	102	20	12.5	10	13	14.5	3	FAB0200791	FAB0200793	FAB0200794
M 18	1.5	112	25	14	11.2	14	16.5	4	FAB0203138	FAB0203144	FAB0203154
M 20	1.5	112	25	14	11.2	14	18.5	4	FAB0203140	FAB0200808	FAB0203156

Unit : mm

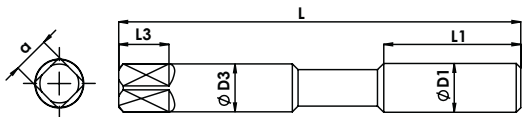
TOTEM® Silver cut **Spiral Flute Taps**

MF Metric fine threads

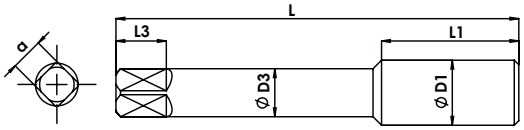


HOLE TYPE

HSS-E | ISO 529 | 6HX | C/2-3P | 15°



Reinforced Shank (M8 - M10)



Reduced Shank (M12 - M20)

Series	SBF3	SBF5
Material - 1st choice	P2	P2-P3
Material - 2nd choice	-	-
Coating	TiN	TiCN

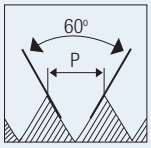
ISO 529 / IS 6175 Part 2										
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 8	1	72	13	8	6.3	9	7	3	FAB0204645	FAB0203162
M 10	1	80	15	10	8	11	9	3	FAB0205477	FAB0203164
M 10	1.25	80	15	10	8	11	8.8	3	FAB0204646	FAB0203165

ISO 529 / IS 6175 Part 3										
M 12	1.5	89	18	9	7.1	10	10.5	3	FAB0204648	FAB0203168
M 12	1.25	89	18	9	7.1	10	10.8	3	FAB0204647	FAB0203167
M 14	1.5	95	20	11.2	9	12	12.5	4	FAB0204649	FAB0203170
M 16	1.5	102	20	12.5	10	13	14.5	4	FAB0204650	FAB0203172
M 18	1.5	112	25	14	11.2	14	16.5	4	FAB0205478	FAB0203174
M 20	1.5	112	25	14	11.2	14	18.5	4	FAB0205479	FAB0203175

Unit : mm

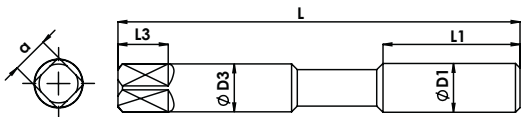
TOTEM® Silver cut **Spiral Flute Taps**

MF Metric fine threads

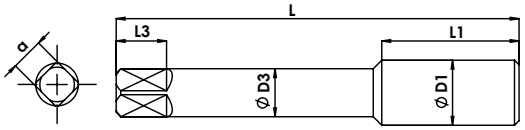


HOLE TYPE

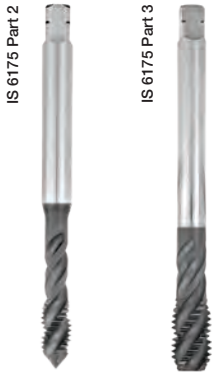
HSS-E | ISO 529 | 6HX | C/2-3P | 45°



Reinforced Shank (M8 - M10)



Reduced Shank (M12 - M20)



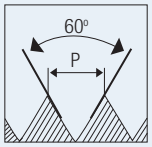
Series	SBS5
Material - 1st choice	M1-M2
Material - 2nd choice	-
Coating	TiCN

ISO 529 / IS 6175 Part 2									
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 8	1	72	13	8	6.3	9	7	3	FAB0205489
M 10	1	80	15	10	8	11	9	3	FAB0205490
M 10	1.25	80	15	10	8	11	8.8	3	FAB0205491
ISO 529 / IS 6175 Part 3									
M 12	1.5	89	18	9	7.1	10	10.5	4	FAB0205492
M 12	1.25	89	18	9	7.1	10	10.8	4	FAB0205493
M 14	1.5	95	20	11.2	9	12	12.5	4	FAB0205494
M 16	1.5	102	20	12.5	10	13	14.5	4	FAB0205495
M 18	1.5	112	25	14	11.2	14	16.5	4	FAB0205496
M 20	1.5	112	25	14	11.2	14	18.5	4	FAB0205497

Unit : mm

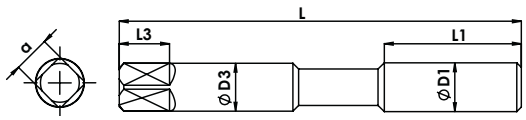
TOTEM® Silver cut **Spiral Flute Taps**

MF Metric fine threads

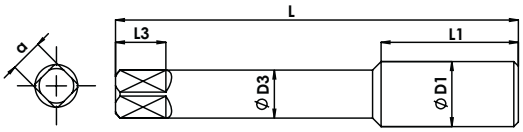


HOLE TYPE

HSS-E | ISO 529 | 6HX | C/2-3P | 45°



Reinforced Shank (M8 - M10)



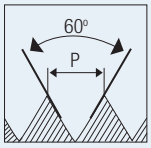
Reduced Shank (M12 - M20)

							Series		SBU3	SBU5
							Material - 1st choice		P1-P2, M1-M2	P1-P2, M1-M3
							Material - 2nd choice			-
ISO 529 / IS 6175 Part 2							Coating		TiN	TiCN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 8	1	72	13	8	6.3	9	7	3	FAB0208024	FAB0208038
M 10	1	80	15	10	8	11	9	3	FAB0208026	FAB0208040
M 10	1.25	80	15	10	8	11	8.8	3	FAB0208025	FAB0208039
ISO 529 / IS 6175 Part 3										
M 12	1.5	89	18	9	7.1	10	10.5	3	FAB0208028	FAB0208042
M 12	1.25	89	18	9	7.1	10	10.8	3	FAB0208027	FAB0208041
M 14	1.5	95	20	11.2	9	12	12.5	3	FAB0209061	FAB0208043
M 16	1.5	102	20	12.5	10	13	14.5	3	FAB0208029	FAB0208044
M 18	1.5	112	25	14	11.2	14	16.5	4	FAB0208620	FAB0209063
M 20	1.5	112	25	14	11.2	14	18.5	4	FAB0209062	FAB0209064

Unit : mm

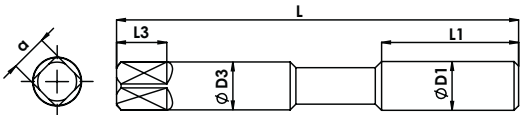
TOTEM® Silver cut **Spiral Flute Taps**

UNC Unified coarse threads

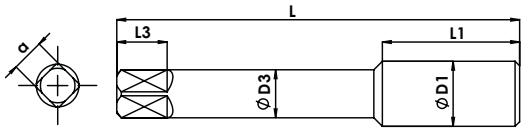


HOLE TYPE

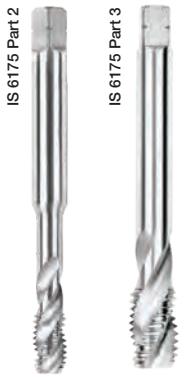
HSS-E | ISO 529 | 2B | C/2-3P | 35°

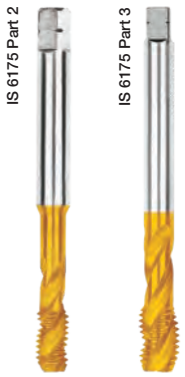


Reinforced Shank (1/4" - 3/8")



Reduced Shank (7/16" - 3/4")



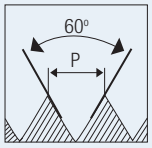


							Series		SB1	SB3
							Material - 1st choice		P0-P1	P1-P2
							Material - 2nd choice		N1-N2	K2, N3-N4
ISO 529 / IS 6175 Part 2							Coating		**Bright**	**TiN**
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/4"	20	66	10	6.3	5	8	5.5	3	FAB0200576	FAB0200578
5/16"	18	72	13	8	6.3	9	6.9	3	FAB0200585	FAB0200587
3/8"	16	80	15	10	8	11	8.5	3	FAB0200596	FAB0200598
ISO 529 / IS 6175 Part 3										
7/16"	14	85	19	8	6.3	9	9.2	3	FAB0200606	FAB0200608
1/2"	13	89	18	9	7.1	10	11.5	3	FAB0200617	FAB0200619
5/8"	11	102	20	12.5	10	13	14.5	3	FAB0200631	FAB0200633
3/4"	10	112	25	14	11.2	14	17.5	4	FAB0200641	FAB0200643

Unit : mm

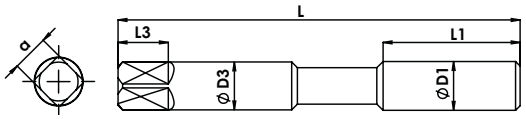
TOTEM® Silver cut **Spiral Flute Taps**

UNC Unified coarse threads

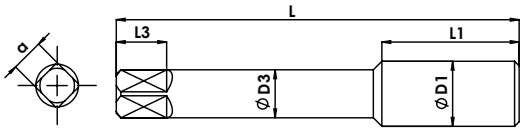


HOLE TYPE

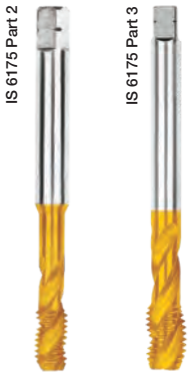
HSS-E | ISO 529 | 2B | C/2-3P | 45°



Reinforced Shank (1/4" - 3/8")



Reduced Shank (7/16" - 3/4")



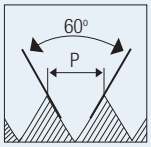
Series	SBU3	SBU5
Material - 1st choice	P1-P2 M1-M2	P1-P2 M1-M3
Material - 2nd choice	-	-
Coating	TiN	TiCN

ISO 529 / IS 6175 Part 2										
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/4"	20	66	10	6.3	5	8	5.5	3	FAB0208967	FAB0209068
5/16"	18	72	13	8	6.3	9	6.9	3	FAB0209065	FAB0209069
3/8"	16	80	15	10	8	11	8.5	3	FAB0209066	FAB0209070
ISO 529 / IS 6175 Part 3										
7/16"	14	85	19	8	6.3	9	9.2	3	FAB0209067	FAB0209071
1/2"	13	89	19	9	7.1	10	11.5	3	FAB0208968	FAB0209072
5/8"	11	102	20	12.5	10	13	14.5	3	FAB0208969	FAB0209073
3/4"	10	112	25	14	11.2	14	17.5	4	FAB0208970	FAB0209074
7/8"	9	118	30	16	22.5	16	19.5	4	FAB0207817	FAB0209075
1"	8	130	32	18	14	18	22.25	4	FAB0208868	FAB0209076

Unit : mm

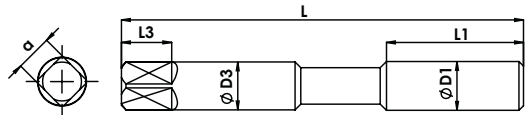
TOTEM® Silver cut **Spiral Flute Taps**

UNC Unified coarse threads

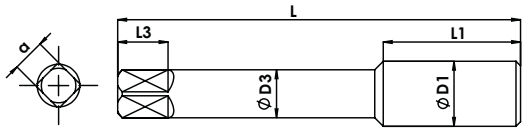


HOLE TYPE

HSS-E PM | ISO 529 | 2B | C/2-3P | 45°



Reinforced Shank (1/4" - 3/8")



Reduced Shank (7/16" - 3/4")

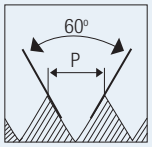
Series	SBS5
Material - 1st choice	M1-M3
Material - 2nd choice	-
Coating	TiCN

Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
ISO 529 / IS 6175 Part 2									
1/4"	20	66	10	6.3	5	8	5.5	3	FAB0205514
5/16"	18	72	13	8	6.3	9	6.9	3	FAB0205515
3/8"	16	80	15	10	8	11	8.5	3	FAB0205516
ISO 529 / IS 6175 Part 3									
7/16"	14	85	19	8	6.3	9	9.2	3	FAB0205517
1/2"	13	89	19	9	7.1	10	11.5	4	FAB0205518
5/8"	11	102	20	12.5	10	13	14.5	4	FAB0205519
3/4"	10	112	25	14	11.2	14	17.5	4	FAB0205520

Unit : mm

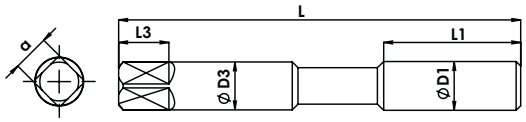
TOTEM® Silver cut **Spiral Flute Taps**

UNF Unified fine threads

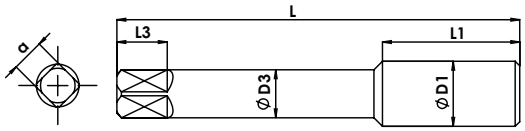


HOLE TYPE

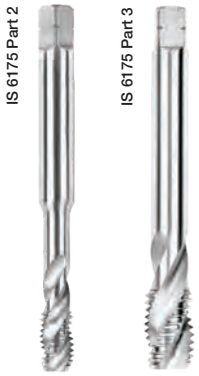
HSS-E | ISO 529 | 2B | C/2-3P | 35°

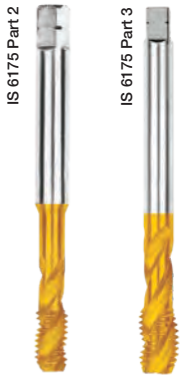


Reinforced Shank (1/4" - 3/8")



Reduced Shank (7/16" - 3/4")





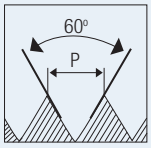
Series	SB1	SB3
Material - 1st choice	P0-P1	P1-P2
Material - 2nd choice	N1-N2	K2, N3-N4
Coating	Bright	TiN

ISO 529 / IS 6175 Part 2										
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/4"	28	66	10	6.3	5	8	5.5	3	FAB0200500	FAB0200501
5/16"	24	69	13	8	6.3	9	6.9	3	FAB0200510	FAB0200512
3/8"	24	76	15	10	8	11	8.5	3	FAB0200520	FAB0200522
ISO 529 / IS 6175 Part 3										
7/16"	20	82	19	8	6.3	9	9.9	3	FAB0200531	FAB0200533
1/2"	20	84	19	9	7.1	10	11.5	3	FAB0200542	FAB0200544
5/8"	18	95	20	12.5	10	13	14.5	3	FAB0200555	FAB0200557
3/4"	16	104	25	14	11.2	14	17.5	4	FAB0200566	FAB0200568

Unit : mm

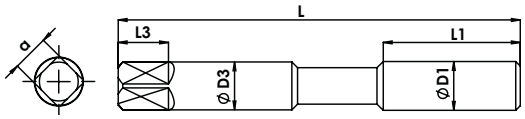
TOTEM® Silver cut **Spiral Flute Taps**

UNF Unified fine threads

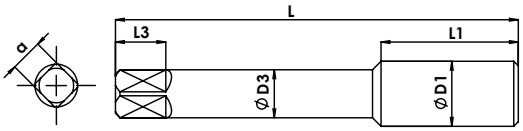


HOLE TYPE

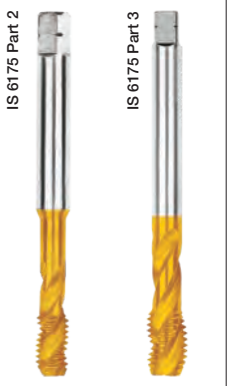
HSS-E | ISO 529 | 2B | C/2-3P | 45°

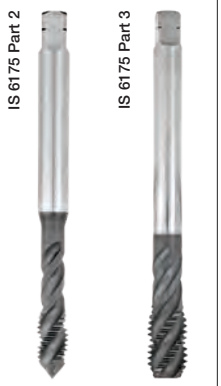


Reinforced Shank (1/4" - 3/8")



Reduced Shank (7/16" - 3/4")





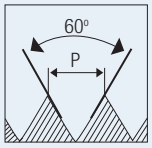
Series	SBU3	SBU5
Material - 1st choice	P1-P2, M1-M2	P1-P2, M1-M3
Material - 2nd choice	-	-
Coating	TiN	TiCN

ISO 529 / IS 6175 Part 2										
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/4"	28	66	10	6.3	5	8	5.5	3	FAB0209077	FAB0209086
5/16"	24	69	13	8	6.3	9	6.9	3	FAB0209078	FAB0209087
3/8"	24	76	15	10	8	11	8.5	3	FAB0209079	FAB0209088
ISO 529 / IS 6175 Part 3										
7/16"	20	82	19	8	6.3	9	9.9	3	FAB0209080	FAB0209089
1/2"	20	84	19	9	7.1	10	11.5	3	FAB0209081	FAB0209090
5/8"	18	95	20	12.5	10	13	14.5	3	FAB0209082	FAB0209091
3/4"	16	104	25	14	11.2	14	17.5	4	FAB0209083	FAB0209092
7/8"	14	113	20	16	12.5	16	20.4	4	FAB0209084	FAB0209093
1"	12	120	22	18	14	18	23.25	4	FAB0209085	FAB0209094

Unit : mm

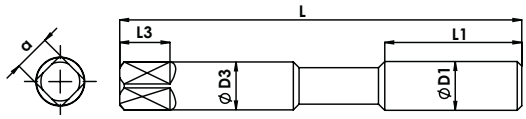
TOTEM® Silver cut **Spiral Flute Taps**

UNF Unified fine threads

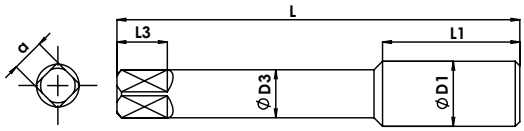


HOLE TYPE

HSS-E PM | ISO 529 | 2B | C/2-3P | 45°



Reinforced Shank (1/4" - 3/8")



Reduced Shank (7/16" - 3/4")

Series	SBS5
Material - 1st choice	M1-M3
Material - 2nd choice	-
Coating	TiCN

ISO 529 / IS 6175 Part 2

Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
1/4"	28	66	10	6.3	5	8	5.5	3	FAB0205528
5/16"	24	69	13	8	6.3	9	6.9	3	FAB0205529
3/8"	24	76	15	10	8	11	8.5	3	FAB0205530

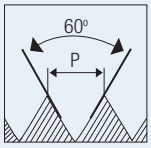
ISO 529 / IS 6175 Part 3

7/16"	20	82	19	8	6.3	9	9.9	3	FAB0205531
1/2"	20	84	19	9	7.1	10	11.5	4	FAB0205532
5/8"	18	95	20	12.5	10	13	14.5	4	FAB0205533
3/4"	16	104	25	14	11.2	14	17.5	4	FAB0205534

Unit : mm

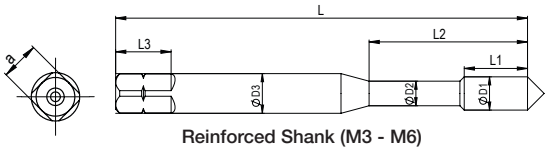
TOTEM® Silver cut **Spiral Flute Taps**

M/MF Metric coarse & fine threads

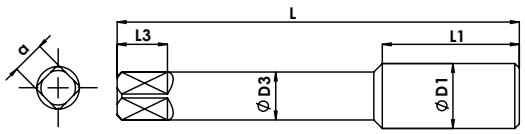


HOLE TYPE

HSS-E | JIS | 6HX | C/2-3P | 35°



Reinforced Shank (M3 - M6)
Male Centre upto M6



Reduced Shank (M8- M20)

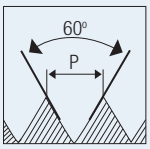
Series	SB1	SB4
Material - 1st choice	P0-P1	P1-P2
Material - 2nd choice	N1-N2	K1-K2
Coating	**Bright**	**TiAlN**

JIS									
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 3	0.5	46	11	4	3.2	6	2.5	FAB0205079	FAB0205674
M 4	0.7	52	13	5	4	7	3.3	FAB0205080	FAB0205675
M 5	0.8	60	16	5.5	4.5	7	4.2	FAB0205081	FAB0205676
M 6	1	62	19	6	4.5	7	5	FAB0205082	FAB0205677
M 8	1.25	70	22	6.2	5	8	6.8	FAB0205083	FAB0205678
M 8	1	70	22	6.2	5	8	7	FAB0206328	-
M 10	1.5	75	24	7	5.5	8	8.5	FAB0205084	FAB0205680
M 10	1.25	75	24	7	5.5	8	8.8	FAB0206286	-
M 12	1.75	82	29	8.5	6.5	9	10.3	FAB0205085	FAB0205682
M 12	1.5	82	29	8.5	6.5	9	10.5	FAB0205609	FAB0205602
M 14	2	88	30	10.5	8	11	12	FAB0205610	FAB0205603
M 16	2	95	32	12.5	10	13	14	FAB0205611	FAB0205604
M 18	2.5	100	37	14	11	14	15.5	FAB0205612	FAB0205605
M 20	2.5	105	37	15	12	15	17.5	FAB0205613	FAB0205606

Unit : mm

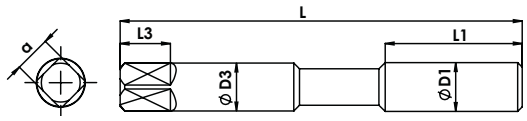
TOTEM® Spiral Flute Taps

M Metric coarse threads

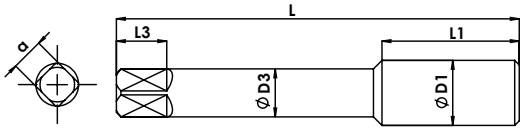


HOLE TYPE

HSSE | 6H | ISO 529 | 35° | C/2-3P



Reinforced Shank (M3 - M10)
Male centre upto M5



Reduced Shank (M12 - M20)

							Coating	Bright	TiN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 3	0.5	48	5	3.15	2.5	5	2.5	FAB0201290	FAB0201292
M 3.5	0.6	50	6	3.55	2.8	5	2.9	FAB0201293	FAB0206709
M 4	0.7	53	7	4	3.15	6	3.3	FAB0201295	FAB0201296
M 5	0.8	58	8	5	4	7	4.2	FAB0201299	FAB0201300
M 6	1	66	10	6.3	5	8	5	FAB0201303	FAB0201304
M 7	1	66	10	7.1	5.6	8	6	FAB0201310	FAB0201311
M 8	1.25	72	13	8	6.3	9	6.8	FAB0201314	FAB0201315
M 10	1.5	80	15	10	8	11	8.5	FAB0201324	FAB0201325
M 12	1.75	89	18	9	7.1	10	10.2	FAB0201334	FAB0201335
M 14	2	95	20	11.2	9	12	12	FAB0201341	FAB0201342
M 16	2	102	20	12.5	10	13	14	FAB0201347	FAB0201348
M 18	2.5	112	25	14	11.2	14	15.5	FAB0201351	FAB0201352
M 20	2.5	112	25	14	11.2	14	17.5	FAB0201355	FAB0201356
M 24	3	130	30	18	14	18	21	FAB0201360	FAB0201362
M 27	3	135	30	20	16	20	24	FAB0201365	FAB0206710
M 30	3.5	138	35	20	16	20	26.5	FAB0201366	FAB0204001
M 36	4	162	40	25	20	24	32	FAB0201368	FAB0202149

Unit : mm

TOTEM®

High Performance Cutting Tools

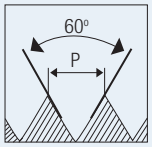
BLU SERIES TAPS

HSS SPIRAL FLUTED TAPS

- MANUFACTURED FROM HIGH GRADE HSS STEEL
- SPECIAL BLU COATING FOR HIGHER LIFE
- SUITABLE FOR GENERAL APPLICATION

TOTEM® Silver cut **Spiral Flute Taps**

M/MF Metric coarse & fine threads



HOLE TYPE

HSS | BLD | ISO 529 | 6HX | C/2-3P | 40°

Series	
Material - 1st choice	
Material - 2nd choice	
Coating	

ISO 529 / IS 6175 Part 2

Nominal Diameter ØD1	Pitch p	Overall Length L	Thread Length L1	Shank Diameter ØD3	Square Size a	Square Length L3	Tapping Drill Diameter Ød1	No. of Flutes	EDP No.
M3	0.5	48	5	3.15	2.5	5	2.5	3	FAB0209314
M4	0.7	53	7	4	3.15	6	3.3	3	FAB0209315
M5	0.8	58	8	5	4	7	4.2	3	FAB0209316
M6	1	66	10	6.3	5	8	5	3	FAB0209317
M8	1.25	72	13	8	6.3	9	6.8	3	FAB0209318
M10	1.5	80	15	10	8	11	8.5	3	FAB0209319

ISO 529 / IS 6175 Part 3

M12	1.75	89	18	9	7.1	10	10.2	3	FAB0209320
M14	2	95	20	11.2	9	12	12	3	FAB0209321
M16	2	102	20	12.5	10	13	14	3	FAB0209322
M18	2.5	112	25	14	11.2	14	15.5	4	FAB0209323
M20	2.5	112	25	14	11.2	14	17.5	4	FAB0209324
M22	2.5	115	25	16	12.5	16	19.5	4	FAB0209325
M24	3	130	30	18	14	18	21	4	FAB0209326

ISO 529 / IS 6175 Part 2

MF6	0.75	66	8	6.3	5	8	5.25	3	FAB0209327
MF8	1	72	13	8	6.3	9	7	3	FAB0209328
MF10	1.25	80	15	10	8	11	8.8	3	FAB0209329

ISO 529 / IS 6175 Part 3

MF12	1.25	89	18	9	7.1	10	10.75	3	FAB0209330
MF12	1.5	89	18	9	7.1	10	10.5	3	FAB0209331
MF14	1.5	95	20	11.2	9	12	12.5	3	FAB0209332
MF16	1.5	102	20	12.5	10	13	14.5	3	FAB0209333
M18	1.5	112	25	14	11.2	14	16.5	4	FAB0209334
M20	1.5	112	25	14	11.2	14	18.5	4	FAB0209335

TOTEM®

High Performance Cutting Tools

STRAIGHT FLUTE TAPS

SC SERIES

STRAIGHT FLUTE TAPS

SERIES	THREAD FORM	LENGTH STANDARD	WORKPIECE MATERIAL	1ST CHOICE	2ND CHOICE	TOOL MATERIAL	COATING	PAGE
SC3	M	DIN 371/DIN 376	Cast Iron	K1,K2	N2,N3	HSSE	TiN	1.076
SC4	M	DIN 371/DIN 376	Cast Iron	K1-K3	-	HSSE	TiAlN	
SCF5	M	DIN 371/DIN 376	Steel	P2-P3	-	HSSE	TiCN	1.077
SC4TC	M	DIN 371/DIN 376	Cast Iron	K1-K3	-	HSSE	TiAlN	
SC4	M	DIN 371/DIN 376	Cast Iron	K1-K3	-	HSSE PM	TiAlN	1.078
SC4TC	M	DIN 371/DIN 376	Cast Iron	K1-K3	-	HSSE PM	TiAlN	
SC3	MF	DIN 374	Cast Iron	K1,K2	N2,N3	HSSE	TiN	1.079
SC4	MF	DIN 374	Cast Iron	K1-K3	-	HSSE	TiAlN	
SCF5	MF	DIN 374	Steel	P2-P3	-	HSSE	TiCN	1.080
SC4TC	MF	DIN 374	Cast Iron	K1-K3	-	HSSE	TiAlN	
SC3	UNC	DIN 371/DIN 376	Cast Iron	K1-K2	N2,N3	HSSE	TiN	1.081
SC4	UNC	DIN 371/DIN 376	Cast Iron	K1,K3	-	HSSE	TiAlN	
SC3	UNF	DIN 374	Cast Iron	K1,K2	N2,N3	HSSE	TiN	1.082
SC4	UNF	DIN 374	Cast Iron	K1,K3	-	HSSE	TiAlN	
SC3	M	ISO 529	Cast Iron	K1,K2	N2,N3	HSSE	TiN	1.083
SC4	M	ISO 529	Cast Iron	K1-K3	-	HSSE	TiAlN	

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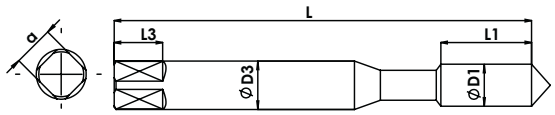
STRAIGHT FLUTE TAPS

SERIES	THREAD FORM	LENGTH STANDARD	WORKPIECE MATERIAL	1ST CHOICE	2ND CHOICE	TOOL MATERIAL	COATING	PAGE
SCF5	M	ISO 529	Steel	P2-P3	-	HSSE	TiCN	1.084
SC4TC	M	ISO 529	Cast Iron	K1-K3	-	HSSE	TiAlN	
SC4	M	ISO 529	Cast Iron	K1-K3	-	HSSE PM	TiAlN	1.085
SC4TC	M	ISO 529	Cast Iron	K1-K3	-	HSSE PM	TiAlN	
SC3	MF	ISO 529	Cast Iron	K1,K2	N2,N3	HSSE	TiN	1.086
SC4	MF	ISO 529	Cast Iron	K1-K3	-	HSSE	TiAlN	
SCF5	MF	ISO 529	Steel	P2-P3	-	HSSE	TiCN	1.087
SC4TC	MF	ISO 529	Cast Iron	K1-K3	-	HSSE	TiAlN	
SC3	UNC	ISO 529	Cast Iron	K1,K2	N2,N3	HSSE	TiN	1.088
SC4	UNC	ISO 529	Cast Iron	K1-K3	-	HSSE	TiAlN	
SC3	UNF	ISO 529	Cast Iron	K1,K2	N2,N3	HSSE	TiN	1.089
SC4	UNF	ISO 529	Cast Iron	K1-K3	-	HSSE	TiAlN	
SC3	M	JIS	Cast Iron	K1-K2	N2,N3	HSSE	TiN	1.090
SC4	M	JIS	Cast Iron	K1-K3	-	HSSE	TiAlN	

TOTEM® Silver cut **Straight Flute Tap**

M Metric coarse threads

HSS-E | **DIN 371/376** | **6H**



◊ L3 L1 ØD1

Series	SC3	SC4
Material - 1st choice	K1-K2	K1-K3
Material - 2nd choice	N2-N3	-
Coating	TiN	TiAlN

DIN 371										
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. Of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	56	11	3.5	2.7	6	2.5	3	FAB0204433	FAB0204441
M 4	0.7	63	13	4.5	3.4	6	3.3	3	FAB0204434	FAB0204442
M 5	0.8	70	16	6	4.9	8	4.2	3	FAB0203676	FAB0204443
M 6	1	80	19	6	4.9	8	5	3	FAB0203677	FAB0203679
M 8	1.25	90	22	8	6.2	9	6.8	3	FAB0203678	FAB0203680
M 10	1.5	100	24	10	8	11	8.5	3	FAB0200969	FAB0203682
DIN 376										
M 12	1.75	110	28	9	7	10	10.2	4	FAB0200975	FAB0203683
M 14	2	110	30	11	9	12	12	4	FAB0204437	FAB0204446
M 16	2	110	32	12	9	12	14	4	FAB0204438	FAB0204447
M 18	2.5	125	34	14	11	14	15.5	4	FAB0204439	FAB0204448
M 20	2.5	140	34	16	12	15	17.5	4	FAB0204440	FAB0204449

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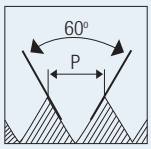
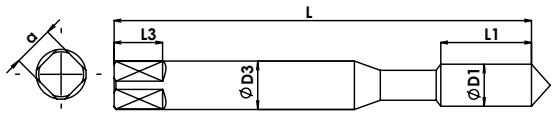
TOTEM® Silver cut **Straight Flute Tap**

M Metric coarse threads

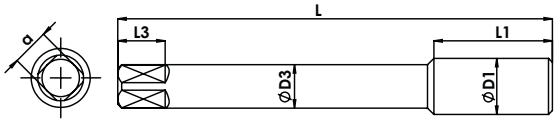


HOLE TYPE

HSS-E | DIN 371/376 | 6HX | E/1.5-2P



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12 - M20)

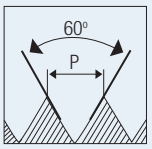
Series	SCF5	SC4TC
Material - 1st choice	P2-P3	K1-K3
Material - 2nd choice	-	-
Coating	TiCN	TiAlN

DIN 371 Nominal Diameter ØD1	Pitch p	Overall Length L	Thread Length L1	Shank Diameter ØD3	Square Size a	Square Length L3	Tapping Drill Diameter Ød1	No. of Flutes	EDP No.	EDP No.
M 3	0.5	56	11	3.5	2.7	6	2.5	3	FAB0204586	FAB0204873
M 4	0.7	63	13	4.5	3.4	6	3.3	3	FAB0204587	FAB0204874
M 5	0.8	70	16	6	4.9	8	4.2	3	FAB0204588	FAB0204875
M 6	1	80	19	6	4.9	8	5	3	FAB0204589	FAB0204876
M 8	1.25	90	22	8	6.2	9	6.8	3	FAB0204590	FAB0204877
M 10	1.5	100	24	10	8	11	8.5	3	FAB0204591	FAB0204878
DIN 376										
M 12	1.75	110	28	9	7	10	10.2	4	FAB0204592	FAB0204879
M 14	2	110	30	11	9	12	12	4	FAB0204593	FAB0204880
M 16	2	110	32	12	9	12	14	4	FAB0204594	FAB0204881
M 18	2.5	125	34	14	11	14	15.5	4	FAB0204939	FAB0204882
M 20	2.5	140	34	16	12	15	17.5	4	FAB0204940	FAB0204883

Unit : mm

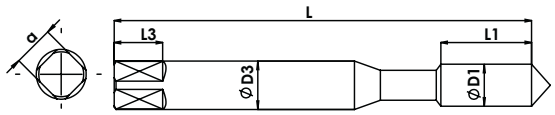
TOTEM® Silver cut — Straight Flute Tap

M Metric coarse threads

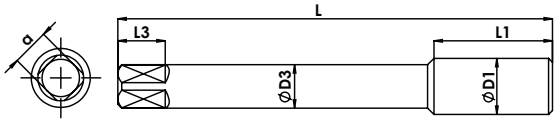


HOLE TYPE

HSS-E PM | DIN 371/376 | 6H | E/1.5-2P



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12 - M20)

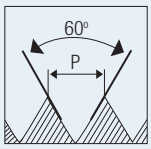
Series	SC4	SC4TC
Material - 1st choice	K1-K3	K1-K3
Material - 2nd choice	-	-
Coating	TiAlN	TiAlN

DIN 371										
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. Of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	56	11	3.5	2.7	6	2.5	3	FAB0205405	FAB0205416
M 4	0.7	63	13	4.5	3.4	6	3.3	3	FAB0205406	FAB0205417
M 5	0.8	70	16	6	4.9	8	4.2	3	FAB0205407	FAB0205418
M 6	1	80	19	6	4.9	8	5	3	FAB0205408	FAB0205419
M 8	1.25	90	22	8	6.2	9	6.8	3	FAB0205409	FAB0205420
M 10	1.5	100	24	10	8	11	8.5	3	FAB0205410	FAB0205421
DIN 376										
M 12	1.75	110	28	9	7	10	10.2	4	FAB0205411	FAB0205422
M 14	2	110	30	11	9	12	12	4	FAB0205412	FAB0205423
M 16	2	110	32	12	9	12	14	4	FAB0205413	FAB0205424
M 18	2.5	125	34	14	11	14	15.5	4	FAB0205414	FAB0205425
M 20	2.5	140	34	16	12	15	17.5	4	FAB0205415	FAB0205426

Unit : mm

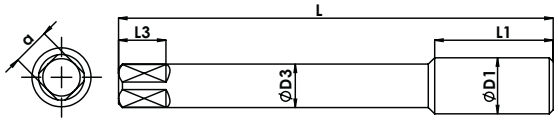
TOTEM® Silver cut **Straight Flute Tap**

MF Metric fine threads



HOLE TYPE

HSS-E | DIN 374 | 6H | E/1.5-2P



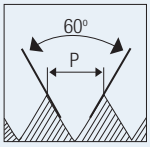
Male centre (M8 - M10)
Female centre (M12 - M20)

							Series		SC3	SC4
							Material - 1st choice		K1-K2	K1-K3
							Material - 2nd choice		N2-N3	-
DIN 374							Coating		TiN	TiAlN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. Of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 8	1	90	22	6	4.9	8	7	3	FAB0204451	FAB0204460
M 10	1.25	100	24	7	5.5	8	8.8	3	FAB0203681	FAB0204461
M 10	1	90	20	7	5.5	8	9	4	FAB0204452	FAB0204462
M12	1.5	100	22	9	7	10	10.5	4	FAB0204453	FAB0204463
M12	1.25	100	22	9	7	10	10.8	4	FAB0204454	FAB0204464
M14	1.5	100	22	11	9	12	12.5	4	FAB0204455	FAB0204465
M16	1.5	100	22	12	9	12	14.5	4	FAB0204456	FAB0204466
M18	1.5	110	25	14	11	14	16.5	4	FAB0204457	FAB0204467
M20	1.5	125	25	16	12	15	18.5	4	FAB0204458	FAB0204468

Unit : mm

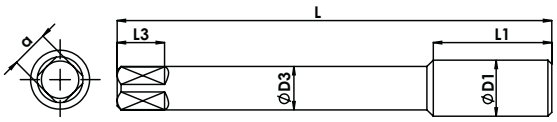
TOTEM® Silver cut **Straight Flute Tap**

MF Metric fine threads



HOLE TYPE

HSS-E | DIN 374 | 6HX | E/1.5-2P



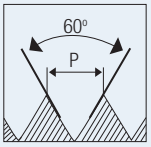
Male centre (M8 - M10)
Female centre (M12 - M20)

							Series		SCF5	SC4TC
							Material - 1st choice		P2-P3	K1-K3
							Material - 2nd choice		-	-
DIN 374							Coating		TiCN	TiAlN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. Of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 8	1	90	22	6	4.9	8	7	3	FAB0204595	FAB0204886
M 10	1.25	100	24	7	5.5	8	8.8	3	FAB0204596	FAB0204888
M 10	1	90	20	7	5.5	8	9	4	FAB0204943	FAB0204887
M 12	1.5	100	22	9	7	10	10.5	4	FAB0204598	FAB0204890
M 12	1.25	100	22	9	7	10	10.8	4	FAB0204597	FAB0204889
M 14	1.5	100	22	11	9	12	12.5	4	FAB0204599	FAB0204891
M 16	1.5	100	22	12	9	12	14.5	4	FAB0204600	FAB0204892
M 18	1.5	110	25	14	11	14	16.5	4	FAB0204944	FAB0204893
M 20	1.5	125	25	16	12	15	18.5	4	FAB0204945	FAB0204894

Unit : mm

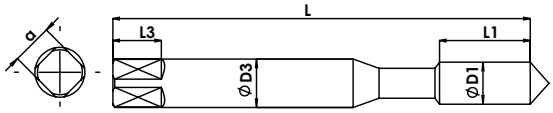
TOTEM® Silver cut **Straight Flute Tap**

UNC Unified coarse threads

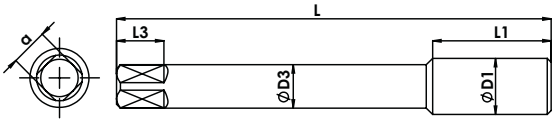


HOLE TYPE

HSS-E | DIN 371/376 | 2B | E/1.5-2P



Reinforced Shank DIN371 (1/4" - 3/8")



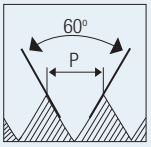
Reduced Shank DIN376 (7/16" - 1")

							Series		SC3	SC4
							Material - 1st choice		K1-K2	K1-K3
							Material - 2nd choice		N2-N3	-
DIN 371							Coating		**TiN**	**TiAlN**
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. Of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/4"	20	80	19	7	5.5	8	5.1	3	FAB0204469	FAB0204478
5/16"	18	90	22	8	6.2	9	6.6	4	FAB0204470	FAB0204479
3/8"	16	100	24	10	8	11	8	4	FAB0204471	FAB0206259
DIN 376										
7/16"	14	110	24	8	6.2	9	9.4	4	FAB0204472	FAB0204481
1/2"	13	110	28	9	7	10	10.8	4	FAB0204473	FAB0206260
5/8"	11	110	32	12	9	12	13.5	4	FAB0204474	FAB0206261
3/4"	10	125	34	14	11	14	16.5	4	FAB0204475	FAB0206262
7/8"	9	140	34	18	14.5	17	19.5	4	FAB0204476	FAB0206263
1"	8	160	38	18	14.5	17.5	22.3	4	FAB0204477	FAB0204486

Unit : mm

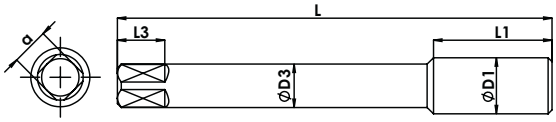
TOTEM® Silver cut **Straight Flute Tap**

UNF Unified fine threads



HOLE TYPE

HSS-E | DIN 374 | 2B | E/1.5-2P



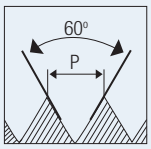
Male centre (1/4" - 3/8")
Female centre (7/16" - 1")

							Series		SC3	SC4
							Material - 1st choice		K1-K2	K1, K3
							Material - 2nd choice		N2-N3	-
DIN 374							Coating		TiN	TiAlN
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. Of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/4"	28	80	19	5.5	4.3	7	5.5	3	FAB0204487	FAB0204496
5/16"	24	90	22	6	4.9	8	6.9	4	FAB0204488	FAB0204497
3/8"	24	100	20	7	5.5	8	8.5	4	FAB0204489	FAB0204498
7/16"	20	100	22	8	6.2	9	9.9	4	FAB0204490	FAB0204499
1/2"	20	100	22	9	7	10	11.5	4	FAB0204491	FAB0204500
5/8"	18	100	22	12	9	12	14.5	4	FAB0204492	FAB0204501
3/4"	16	110	25	14	11	14	17.5	4	FAB0204493	FAB0204502
7/8"	14	125	25	18	14.5	17	20.5	4	FAB0204494	FAB0204503
1"	12	140	28	18	14.5	17	23.25	4	FAB0204495	FAB0204504

Unit : mm

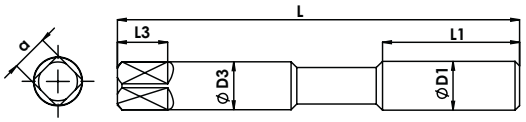
TOTEM® Silver cut **Straight Flute Tap**

M Metric coarse threads

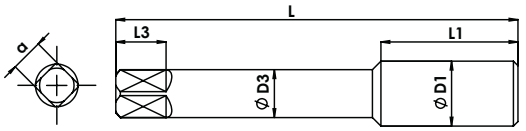


HOLE TYPE

HSS-E | ISO 529 | 6H | E/1.5-2P



Reinforced Shank (M3 - M10)
Male centre upto M5



Reduced Shank (M12 - M20)

Series	SC3	SC4
Material - 1st choice	K1-K2	K1-K3
Material - 2nd choice	N2-N3	-
Coating	TiN	TiAlN

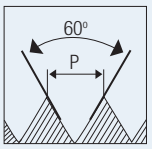
ISO529 / IS 6175 Part 2										
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	48	11	3.15	2.5	5	2.5	3	FAB0200645	FAB0200646
M 3.5	0.6	50	13	3.55	2.8	5	2.9	3	FAB0200652	FAB0203220
M 4	0.7	53	13	4	3.15	6	3.3	3	FAB0200657	FAB0200658
M 5	0.8	58	16	5	4	7	4.2	3	FAB0200669	FAB0200670
M 6	1	66	19	6.3	5	8	5	3	FAB0200680	FAB0200681
M 8	1.25	72	22	8	6.3	9	6.8	4	FAB0200692	FAB0200693
M 10	1.5	80	24	10	8	11	8.5	4	FAB0200716	FAB0200717

ISO529 / IS 6175 Part 3										
M 12	1.75	89	29	9	7.1	10	10.2	4	FAB0200747	FAB0200871
M 14	2	95	30	11.2	9	12	12	4	FAB0200776	FAB0200777
M 16	2	102	32	12.5	10	13	14	4	FAB0200797	FAB0200798
M 20	2.5	112	37	14	11.2	14	17.5	4	FAB0203219	FAB0200809

Unit : mm

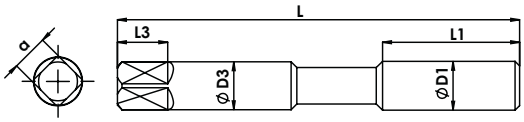
TOTEM® Silver cut **Straight Flute Tap**

M Metric coarse threads

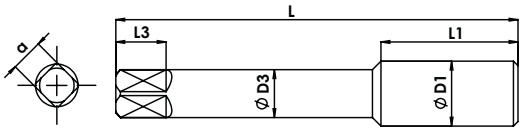


HOLE TYPE

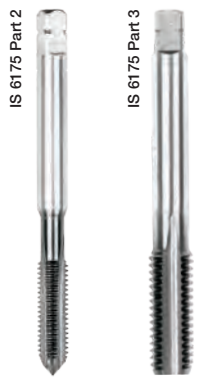
HSS-E | ISO 529 | 6HX | E/1.5-2P

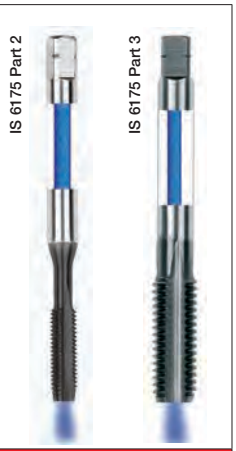


Reinforced Shank (M3 - M10)
Male centre upto M5



Reduced Shank (M12 - M20)





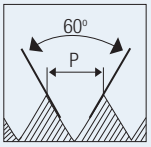
Series	SCF5	SC4TC
Material - 1st choice	P2-P3	K1-K3
Material - 2nd choice	-	-
Coating	TiCN	TiAlN

ISO529 / IS 6175 Part 2										
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	48	11	3.15	2.5	5	2.5	3	FAB0204616	-
M 3.5	0.6	50	13	3.55	2.8	5	2.9	3	-	-
M 4	0.7	53	13	4	3.15	6	3.3	3	FAB0204617	-
M 5	0.8	58	16	5	4	7	4.2	3	FAB0204618	FAB0205365
M 6	1	66	19	6.3	5	8	5	3	FAB0204619	FAB0205366
M 8	1.25	72	22	8	6.3	9	6.8	3	FAB0204620	FAB0205367
M 10	1.5	80	24	10	8	11	8.5	3	FAB0204621	FAB0205368
ISO529 / IS 6175 Part 3										
M 12	1.75	89	29	9	7.1	10	10.2	4	FAB0204622	FAB0205369
M 14	2	95	30	11.2	9	12	12	4	FAB0204623	FAB0205370
M 16	2	102	32	12.5	10	13	14	4	FAB0204624	FAB0205371
M 20	2.5	112	37	14	11.2	14	17.5	4	FAB0205362	FAB0205372

Unit : mm

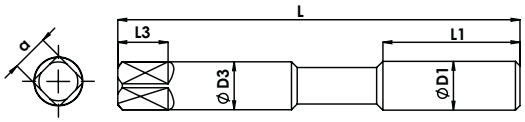
TOTEM® Silver cut **Straight Flute Tap**

M Metric coarse threads

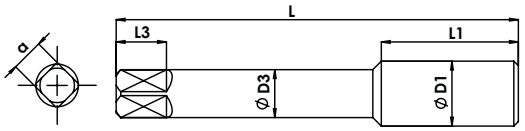


HOLE TYPE

HSS-E PM | ISO 529 | 6H | E/1.5-2P



Reinforced Shank (M3 - M10)
Male centre upto M5



Reduced Shank (M12 - M20)

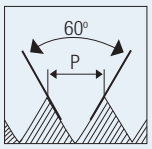
Series	SC4	SC4TC
Material - 1st choice	K1-K3	K1-K3
Material - 2nd choice	-	-
Coating	TiAlN	TiAlN

ISO529 / IS 6175 Part 2										
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	48	11	3.15	2.5	5	2.5	3	FAB0205373	-
M 3	0.6	50	13	3.55	2.8	5	2.9	3	FAB0205374	-
M 4	0.7	53	13	4	3.15	6	3.3	3	FAB0205375	-
M 5	0.8	58	16	5	4	7	4.2	3	FAB0205376	FAB0205387
M 6	1	66	19	6.3	5	8	5	3	FAB0205377	FAB0205388
M 8	1.25	72	22	8	6.3	9	6.8	4	FAB0205378	FAB0205389
M 10	1.5	80	24	10	8	11	8.5	4	FAB0205379	FAB0205390
ISO529 / IS 6175 Part 3										
M 12	1.75	89	29	9	7.1	10	10.2	4	FAB0205380	FAB0205391
M 14	2	95	30	11.2	9	12	12	4	FAB0205381	FAB0205392
M 16	2	102	32	12.5	10	13	14	4	FAB0205382	FAB0205393
M 20	2.5	112	37	14	11.2	14	17.5	4	FAB0205383	FAB0205394

Unit : mm

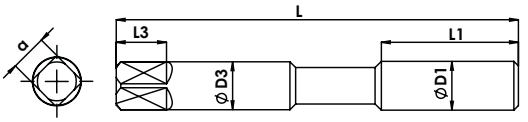
TOTEM® Silver cut **Straight Flute Tap**

MF Metric fine threads

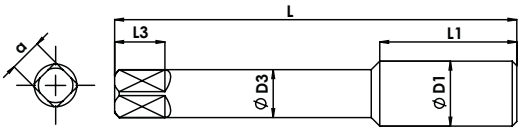


HOLE TYPE

HSS-E | ISO 529 | 6H | E/1.5-2P



Reinforced Shank (M8 - M10)



Reduced Shank (M12 - M20)

Series	SC3	SC4
Material - 1st choice	K1-K2	K1, K3
Material - 2nd choice	N2-N3	-
Coating	TiN	TiAlN

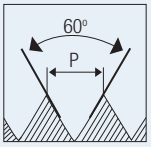
ISO529 / IS 6175 Part 2										
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 8	1	69	19	8	6.3	9	7	4	FAB0202976	FAB0203740
M 10	1.25	76	20	10	8	11	8.8	4	FAB0200706	FAB0200707

ISO529 / IS 6175 Part 3										
M 12	1.25	84	24	9	7.1	10	10.8	4	FAB0200727	FAB0200728
M12	1.5	89	29	9	7.1	10	10.5	4	FAB0200736	FAB0200737
M 14	1.5	95	30	11.2	9	12	12.5	4	FAB0200767	FAB0200768
M 16	1.5	102	32	12.5	10	13	14.5	4	FAB0200785	FAB0200786
M 18	1.5	104	29	14	11.2	14	16.5	4	FAB0203217	FAB0200805
M 20	1.5	104	29	14	11.2	14	18.5	4	FAB0203218	FAB0200806

Unit : mm

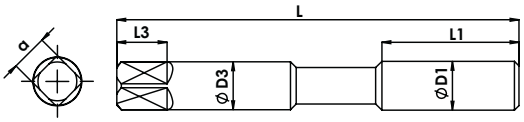
TOTEM® Silver cut **Straight Flute Tap**

MF Metric fine threads

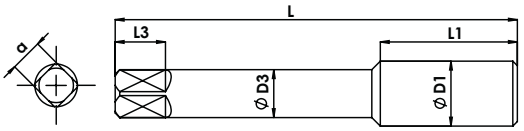


HOLE TYPE

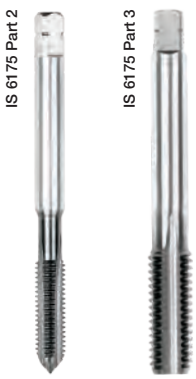
HSS-E | ISO 529 | 6HX | E/1.5-2P



Reinforced Shank (M8 - M10)



Reduced Shank (M12 - M20)



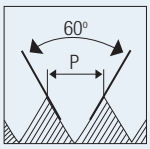
Series	SCF5	SC4TC
Material - 1st choice	P2-P3	K1-K3
Material - 2nd choice	-	-
Coating	TiCN	TiAlN

ISO529 / IS 6175 Part 2 Nominal Diameter ØD1	Pitch p	Overall Length L	Thread Length L1	Shank Diameter ØD3	Square Size a	Square Length L3	Tapping Drill Diameter Ød1	No. of Flutes	EDP No.	EDP No.
M 8	1	69	19	8	6.3	9	7	3	FAB0204625	FAB0205397
M 10	1.25	76	20	10	8	11	8.8	3	FAB0204626	FAB0205398
ISO529 / IS 6175 Part 3										
M 12	1.25	84	24	9	7.1	10	10.8	4	FAB0204627	FAB0205399
M 12	1.5	89	29	9	7.1	10	10.5	4	FAB0204628	FAB0205400
M 14	1.5	95	30	11.2	9	12	12.5	4	FAB0204629	FAB0205401
M 16	1.5	102	32	12.5	10	13	14.5	4	FAB0204630	FAB0205402
M 18	1.5	104	29	14	11.2	14	16.5	4	FAB0205395	FAB0205403
M 20	1.5	104	29	14	11.2	14	18.5	4	FAB0205396	FAB0205404

Unit : mm

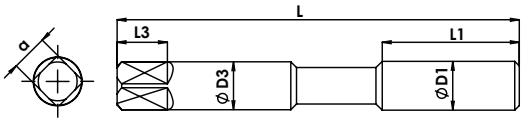
TOTEM® Silver cut **Straight Flute Tap**

UNC Unified coarse threads

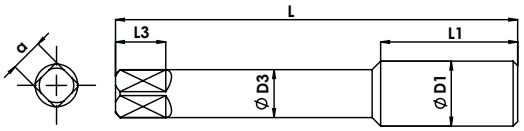


HOLE TYPE

HSS-E | ISO 529 | 2B | E/1.5-2P



Reinforced Shank (1/4" - 3/8")



Reduced Shank (7/16" - 3/4")

Series	SC3	SC4
Material - 1st choice	K1-K2	K1-K3
Material - 2nd choice	N2-N3	-
Coating	TiN	TiAlN

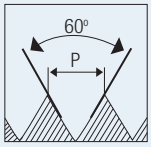
ISO529 / IS 6175 Part 2										
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/4"	20	66	19	6.3	5	8	5,5	3	FAB0200571	FAB0200572
5/16"	18	72	22	8	6.3	9	6.9	4	FAB0200581	FAB0203289
3/8"	16	80	24	10	8	11	8.5	4	FAB0200591	FAB0200592

ISO529 / IS 6175 Part 2										
7/16"	14	85	25	8	6.3	9	9.9	4	FAB0200601	FAB0200602
1/2"	13	89	29	9	7.1	10	11.5	4	FAB0200612	FAB0200613
5/8"	11	102	32	12.5	10	13	14.5	4	FAB0200625	FAB0200626
3/4"	10	112	37	14	11.2	14	17.5	4	FAB0200636	FAB0200637

Unit : mm

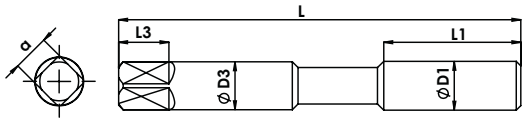
TOTEM® Silver cut **Straight Flute Tap**

UNF Unified fine threads

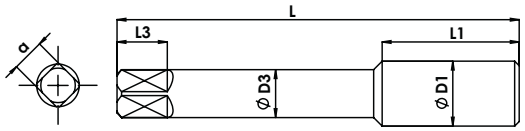


HOLE TYPE

HSS-E | ISO 529 | 2B | E/1.5-2P



Reinforced Shank (1/4" - 3/8")



Reduced Shank (7/16" - 3/4")

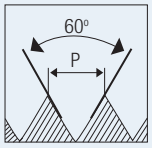
							Series		SC3	SC4
							Material - 1st choice		K1-K2	K1, K3
							Material - 2nd choice		N2-N3	-
ISO529 / IS 6175 Part 2							Coating		TiN	TiAlN
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No. of Flutes	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/4"	28	66	19	6.3	5	8	5.5	3	FAB0200495	FAB0200496
5/16"	24	69	19	8	6.3	9	6.9	4	FAB0200504	FAB0200505
3/8"	24	76	20	10	8	11	8.5	4	FAB0200515	FAB0200516
ISO529 / IS 6175 Part 3										
7/16"	20	82	22	8	6.3	9	9.9	4	FAB0200526	FAB0200527
1/2"	20	84	24	9	7.1	10	11.5	4	FAB0200537	FAB0200538
5/8"	18	95	25	12.5	10	13	14.5	4	FAB0200550	FAB0200551
3/4"	16	104	29	14	11.2	14	17.5	4	FAB0200561	FAB0200562

Unit : mm

TOTEM® Silver cut **Straight Flute Tap**

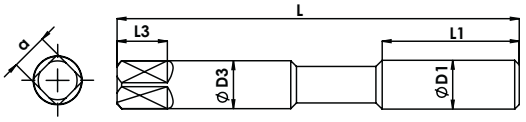
M/MF

Metric coarse & fine threads

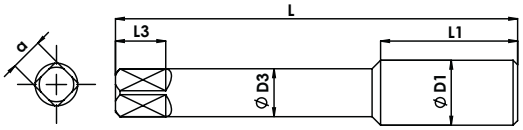


HOLE TYPE

HSS-E | JIS | 6H | B/4-4.5P



Reinforced Shank (M3 - M10)
Male Centre upto M5



Reduced Shank (M12 - M20)

Series	SC3	SC4
Material - 1st choice	P0, N4	P0-P3
Material - 2nd choice	N1-N2	K1-K2
Coating	TiN	TiAlN

JIS									
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 3	0.5	46	11	4	3.2	6	2.5	FAB0205644	FAB0205659
M 4	0.7	52	13	5	4	7	3.3	FAB0205645	FAB0205660
M 5	0.8	60	16	5.5	4.5	7	4.2	FAB0205646	FAB0205661
M 6	1	62	19	6	4.5	7	5	FAB0205647	FAB0205662
M 8	1.25	70	22	6.2	5	8	6.8	FAB0205648	FAB0205663
M 8	1	70	22	6.2	5	8	7	FAB0205649	FAB0205664
M 10	1.5	75	24	7	5.5	8	8.5	FAB0205650	FAB0205665
M 10	1.25	75	24	7	5.5	8	8.8	FAB0205651	FAB0205666
M 12	1.75	82	29	8.5	6.5	9	10.3	FAB0205652	FAB0205667
M 12	1.5	82	29	8.5	6.5	9	10.5	FAB0205653	FAB0205668
M 12	1.25	82	29	8.5	6.5	9	10.8	FAB0205654	FAB0205669
M 14	2	88	30	10.5	8	11	12	FAB0205655	FAB0205670
M 16	2	95	32	12.5	10	13	14	FAB0205656	FAB0205671
M 18	2.5	100	37	14	11	14	15.5	FAB0205657	FAB0205672
M 20	2.5	105	37	15	12	15	17.5	FAB0205658	FAB0205673

Unit : mm

TOTEM®

High Performance Cutting Tools

FORMING TAPS

SD SERIES

CONTENTS

TOTEM®

FORMING TAPS

SERIES	THREAD FORM	BLANK STANDARD	WORKPIECE MATERIAL	1ST CHOICE	2ND CHOICE	TOOL MATERIAL	COATING	PAGE
SD1	M	DIN 371/DIN 376	Non-Ferrous	N1-N2	-	HSSE	Bright	1.093
SD3	M	DIN 371/DIN 376	Non-Ferrous	P0-P2, N1-N3	-	HSSE	TiN	
SD5	M	DIN 371/DIN 376	Steel	P1-P2	-	HSSE	TiAlN	1.094
SD1*	M	DIN 371/DIN 376	Non-Ferrous	N1-N2	-	HSSE	Bright	1.095
SD3*	M	DIN 371/DIN 376	Non-Ferrous	P0-P2	N1-N3	HSSE	TiN	
SDF5	M	DIN 371/DIN 376	Steel	P1-P2	-	HSSE	TiCN	1.096
SD1	MF	DIN 374	Non-Ferrous	N1-N2	-	HSSE	Bright	1.097
SD3	MF	DIN 374	Non-Ferrous	P0-P2, N1-N3	-	HSSE	TiN	
SD4	MF	DIN 374	Steel	P1-P2	-	HSSE	TiAlN	1.098
SD1	M	ISO 529	Non-Ferrous	N1-N2	-	HSSE	Bright	1.099
SD3	M	ISO 529	Non-Ferrous	P0-P2, N1-N3	-	HSSE	TiAlN	
SDF5	M	ISO 529	Steel	P1-P2	-	HSSE	TiCN	1.100
SD1	MF	ISO 529	Non-Ferrous	N1-N2	-	HSSE	Bright	1.101
SD3	MF	ISO 529	Non-Ferrous	P0-P2, N1-N3	-	HSSE	TiN	
SDF5	MF	ISO 529	Steel	P1-P2	-	HSSE	TiAlN	1.102
SD1	M / MF	JIS	Non-Ferrous	N1-N2	-	HSSE	Bright	1.103
SD3	M / MF	JIS	Non-Ferrous	P0-P2, N1-N3	-	HSSE	TiN	

* without oil groove

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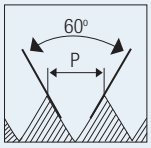
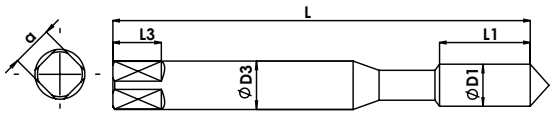
TOTEM® Silver cut **Forming Taps**

M Metric coarse threads

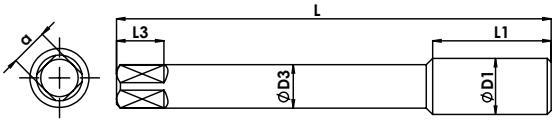


HOLE TYPE

HSS-E | DIN 371/376 | 6HX | C/2-3P



Reinforced Shank DIN371 (M3 - M10)



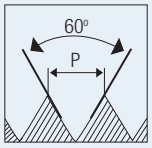
Reduced Shank DIN376 (M12 - M16)

							Series	SD1	SD3
							Material - 1st choice	N1-N2	P0-P2, N1-N3
							Material - 2nd choice	-	-
DIN 371							Coating	**Bright**	**TiN**
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 3	0.5	56	11	3.5	2.7	6	2.8	FAB0200954	FAB0200961
M 3.5	0.6	56	12	4	3	6	3.3	FAB0204505	FAB0204507
M 4	0.7	63	13	4.5	3.4	6	3.7	FAB0200955	FAB0200962
M 5	0.8	70	16	6	4.9	8	4.7	FAB0200956	FAB0200963
M 6	1	80	19	6	4.9	8	5.5	FAB0200957	FAB0200964
M 7	1	80	19	7	5.5	8	6.5	FAB0204506	FAB0204508
M 8	1.25	90	22	8	6.2	9	7.4	FAB0200958	FAB0200965
M 10	1.5	100	24	10	8	11	9.3	FAB0200959	FAB0200966
DIN 376									
M 12	1.75	110	28	9	7	10	11.2	FAB0200960	FAB0200967
M 14	2	110	30	11	9	12	13.1	FAB0203285	FAB0203287
M 16	2	110	32	12	9	12	15.1	FAB0203286	FAB0203288

Unit : mm

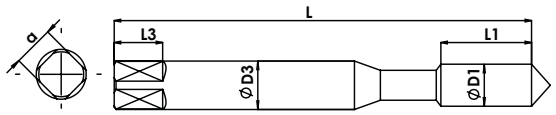
TOTEM® Silver cut Forming Taps

M Metric coarse threads

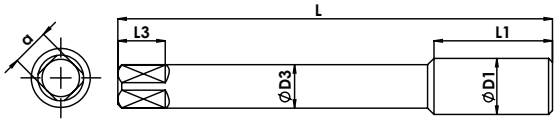


HOLE TYPE

HSS-E | DIN 371/376 | 6HX | C/2-3P



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12 - M16)

Series	SD5
Material - 1st choice	P1-P2
Material - 2nd choice	-
Coating	TiAlN

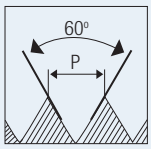
DIN 371								
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 3	0.5	56	11	3.5	2.7	6	2.8	FAB0204509
M 3.5	0.6	56	12	4	3	6	3.3	FAB0204510
M 4	0.7	63	13	4.5	3.4	6	3.7	FAB0204511
M 5	0.8	70	16	6	4.9	8	4.7	FAB0204512
M 6	1	80	19	6	4.9	8	5.5	FAB0204513
M 7	1	80	19	7	5.5	8	6.5	FAB0204514
M 8	1.25	90	22	8	6.2	9	7.4	FAB0204515
M 10	1.5	100	24	10	8	11	9.3	FAB0204516

DIN 376								
M 12	1.75	110	28	9	7	10	11.2	FAB0204517
M 14	2	110	30	11	9	12	13.1	FAB0204518
M 16	2	110	32	12	9	12	15.1	FAB0204519

Unit : mm

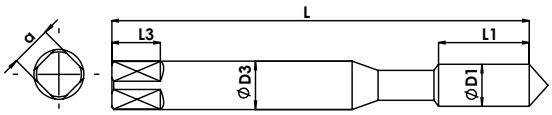
TOTEM® Silver cut **Forming Taps**

M Metric coarse threads (without oil groove)



HOLE TYPE

HSS-E | **DIN 371** | **6HX** | **C/2-3P**



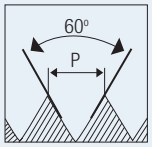
Reinforced Shank DIN371 (M3 - M8)

							Series	SD1	SD3
							Material - 1st choice	N1-N2	P0-P2, N1-N3
							Material - 2nd choice	-	-
DIN 371							Coating	**Bright**	**TiN**
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 3	0.5	56	11	3.5	2.7	6	2.8	FAB0203614	FAB0203619
M 4	0.7	63	13	4.5	3.4	6	3.7	FAB0203615	FAB0203620
M 5	0.8	70	16	6	4.9	8	4.7	FAB0203616	FAB0203621
M 6	1	80	19	6	4.9	8	5.5	FAB0203617	FAB0203622
M 8	1.25	90	22	8	6.2	9	7.4	FAB0203618	FAB0203623

Unit : mm

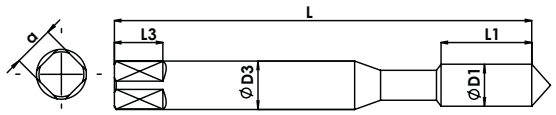
TOTEM® Silver cut Forming Taps

M Metric coarse threads

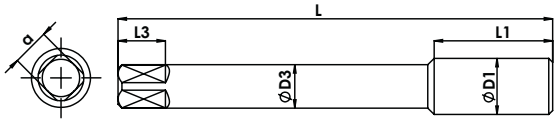


HOLE TYPE

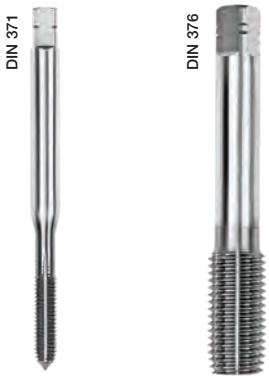
HSS-E | DIN 371/376 | 6HX | C/2-3P



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12 - M16)



Series	SDF5
Material - 1st choice	P1-P3
Material - 2nd choice	
Coating	TiCN

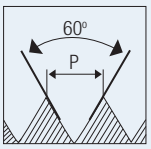
DIN 371								
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 3	0.5	56	11	3.5	2.7	6	2.8	FAB0205097
M 3.5	0.6	56	12	4	3	6	3.3	FAB0205098
M 4	0.7	63	13	4.5	3.4	6	3.7	FAB0205099
M 5	0.8	70	16	6	4.9	8	4.7	FAB0205100
M 6	1	80	19	6	4.9	8	5.5	FAB0205101
M 7	1	80	19	7	5.5	8	6.5	FAB0205102
M 8	1.25	90	22	8	6.2	9	7.4	FAB0205103
M 10	1.5	100	24	10	8	11	9.3	FAB0205104

DIN 376								
M 12	1.75	110	28	9	7	10	11.2	FAB0205105
M 14	2	110	30	11	9	12	13.1	FAB0205106
M 16	2	110	32	12	9	12	15.1	FAB0205107

Unit : mm

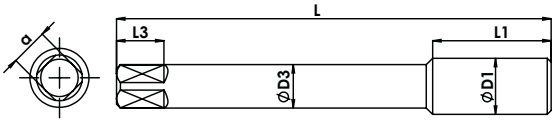
TOTEM® Silver cut **Forming Taps**

MF Metric fine threads



HOLE TYPE

HSS-E | DIN 374 | 6HX | C/2-3P



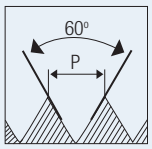
Male Centre (M8 - M10)
Female Centre (M12 - M20)

							Series	SD1	SD3
							Material - 1st choice	N1-N2	N1-N3
							Material - 2nd choice	-	P0-P2
DIN 374							Coating	Bright	TiN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 8	1	90	17	6	4.9	8	7.5	FAB0204520	FAB0204528
M 10	1.25	100	22	7	5.5	8	9.4	FAB0204521	FAB0204529
M 12	1.5	100	22	9	7	10	11.3	FAB0204522	FAB0204530
M 12	1.25	100	22	9	7	10	11.4	FAB0204523	FAB0204531
M 14	1.5	100	22	11	9	12	13.3	FAB0204524	FAB0204532
M 16	1.5	100	22	12	9	12	15.3	FAB0204525	FAB0204533
M 18	1.5	110	25	14	11	14	17.3	FAB0204526	FAB0204534
M 20	1.5	125	25	16	12	15	19.3	FAB0204527	FAB0204535

Unit : mm

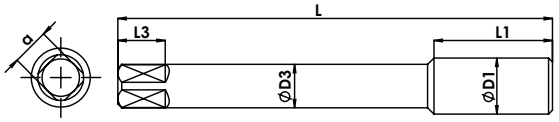
TOTEM® Silver cut Forming Taps

MF Metric fine threads



HOLE TYPE

HSS-E | DIN 374 | 6HX | C/2-3P



Male Centre (M8 - M10)
Female Centre (M12 - M20)

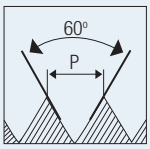
Series	SD4
Material - 1st choice	P1-P2
Material - 2nd choice	-
Coating	TiAlN

DIN 374								
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 8	1	90	17	6	4.9	8	7.5	FAB0204536
M 10	1.25	100	22	7	5.5	8	9.4	FAB0204537
M 12	1.5	100	22	9	7	10	11.3	FAB0204538
M 12	1.25	100	22	9	7	10	11.4	FAB0204539
M 14	1.5	100	22	11	9	12	13.3	FAB0204540
M 16	1.5	100	22	12	9	12	15.3	FAB0204541
M 18	1.5	110	25	14	11	14	17.3	FAB0204542
M 20	1.5	125	25	16	12	15	19.3	FAB0204543

Unit : mm

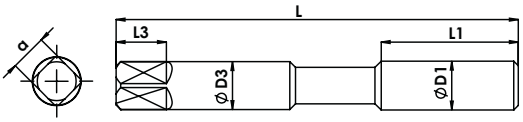
TOTEM® Silver cut **Forming Taps**

M Metric coarse threads

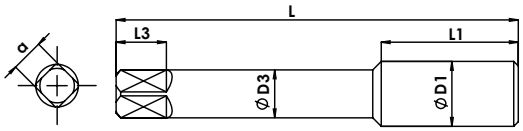


HOLE TYPE

HSS-E | ISO 529 | 6HX | C/2-3P



Reinforced Shank (M3 - M10)
Male Centre upto M5



Reduced Shank (M12 - M16)

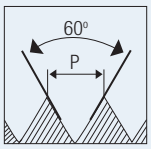
Series	SD1	SD3
Material - 1st choice	N1-N2	N1-N3
Material - 2nd choice	-	P0-P2
Coating	Bright	TiN

ISO 529 / IS 6175 Part 2									
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 3	0.5	48	11	3.15	2.5	5	2.8	FAB0201417	FAB0202740
M 3.5	0.6	50	13	3.55	2.8	5	3.3	FAB0203221	FAB0203231
M 4	0.7	53	13	4	3.15	6	3.7	FAB0201421	FAB0202747
M 5	0.8	58	16	5	4	7	4.7	FAB0201420	FAB0202748
M 6	1	66	19	6.3	5	8	5.5	FAB0201422	FAB0202749
M 7	1	66	19	7.1	5.6	8	6.5	FAB0203222	FAB0203232
M 8	1.25	72	22	8	6.3	9	7.4	FAB0201425	FAB0202750
M 10	1.5	80	24	10	8	9	9.3	FAB0201426	FAB0202751
ISO 529 / IS 6175 Part 3									
M 12	1.75	89	29	9	7.1	10	11.2	FAB0201428	FAB0202752
M 14	2	95	30	11.2	9	12	13.1	FAB0203228	FAB0203238
M 16	2	102	32	12.5	10	13	15.1	FAB0203230	FAB0203240

Unit : mm

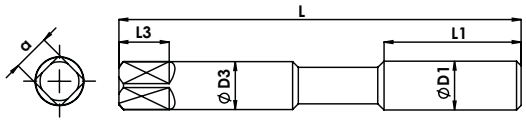
TOTEM® Silver cut Forming Taps

M Metric coarse threads

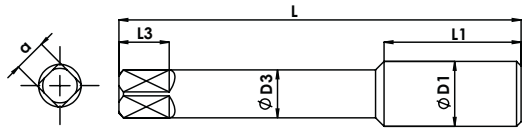


HOLE TYPE

HSS-E | ISO 529 | 6HX | C/2-3P



Reinforced Shank (M3 - M10)
Male Centre upto M5



Reduced Shank (M12 - M16)

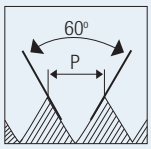
Series	SDF5
Material - 1st choice	P1-P2
Material - 2nd choice	-
Coating	TiCN

ISO 529 / IS 6175 Part 2								
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 3	0.5	48	11	3.15	2.5	5	2.8	FAB0203241
M 4	0.7	53	13	4	3.15	6	3.7	FAB0203242
M 5	0.8	58	16	5	4	7	4.7	FAB0203243
M 6	1	66	19	6.3	5	8	5.5	FAB0203244
M 8	1.25	72	22	8	6.3	9	7.4	FAB0203246
M 10	1.5	80	24	10	8	9	9.3	FAB0203249
ISO 529 / IS 6175 Part 3								
M 12	1.75	89	29	9	7.1	10	11.2	FAB0203251
M 14	2	95	30	11.2	9	12	13.1	FAB0205095
M 16	2	102	32	12.5	10	13	15.1	FAB0205096

Unit : mm

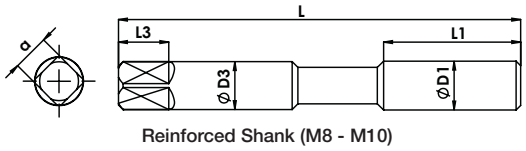
TOTEM® Silver cut Forming Taps

MF Metric fine threads

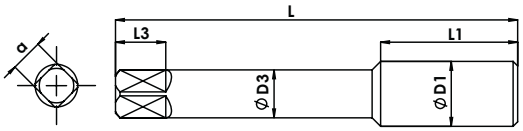


HOLE TYPE

HSS-E | ISO 529 | 6HX | C/2-3P



Reinforced Shank (M8 - M10)



Reduced Shank (M12 - M16)

Series	SD1	SD3
Material - 1st choice	N1-N3	N1-N3
Material - 2nd choice	-	P0-P2
Coating	Bright	TiN

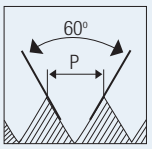
ISO 529 / IS 6175 Part 2

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 8	1	69	19	8	6.3	9	7.5	FAB0203223	FAB0203233
M 10	1	76	20	10	8	11	9.5	FAB0203224	FAB0203234
M 10	1.25	76	20	10	8	11	9.4	FAB0203225	FAB0203235
M 12	1.5	89	29	9	7.1	10	11.3	FAB0203226	FAB0203236
M 14	1.5	95	30	11.2	9	12	13.3	FAB0203227	FAB0203237
M 16	1.5	102	32	12.5	10	13	15.3	FAB0203229	FAB0203239

Unit : mm

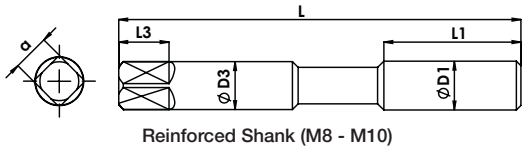
TOTEM® Silver cut Forming Taps

MF Metric fine threads

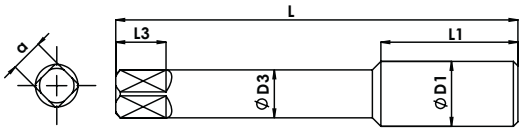


HOLE TYPE

HSS-E | ISO 529 | 6HX | C/2-3P



Reinforced Shank (M8 - M10)



Reduced Shank (M12 - M16)

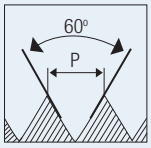
Series	SDF5
Material - 1st choice	P1-P2
Material - 2nd choice	-
Coating	TiCN

ISO 529 / IS 6175 Part 2								
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 8	1	69	19	8	6.3	9	7.5	FAB0203245
M 10	1	76	20	10	8	11	9.5	FAB0203247
M 10	1.25	76	20	10	8	11	9.4	FAB0203248
ISO 529 / IS 6175 Part 3								
M 12	1.5	89	29	9	7.1	10	11.3	FAB0203250
M 14	1.5	95	30	11.2	9	12	13.3	FAB0203252
M 16	1.5	102	32	12.5	10	13	15.3	FAB0203253

Unit : mm

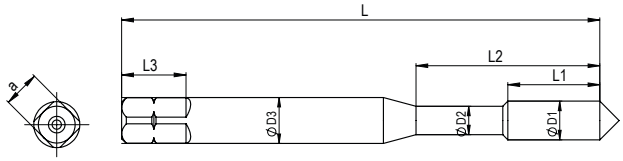
TOTEM® Silver cut **Forming Taps**

M/MF Metric coarse & fine threads

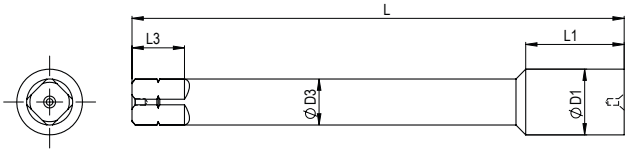


HOLE TYPE

HSS-E | JIS | 6HX | B/4-4.5P



Reinforced Shank (M3 - M6)
Male Centre upto M5



Reduced Shank (M8 - M12)

							Series	SD1	SD3
							Material - 1st choice	N1-N2	P0-P2, N1-N3
							Material - 2nd choice	-	-
JIS							Coating	Bright	TiN
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1		
M 3	0.5	46	11	4	3.2	6	2.8	FAB0205634	FAB0205060
M 4	0.7	52	13	5	4	7	3.7	FAB0205635	FAB0205061
M 5	0.8	60	16	5.5	4.5	7	4.7	FAB0205636	FAB0205062
M 6	1	62	19	6	4.5	7	5.5	FAB0205637	FAB0205063
M 8	1.25	70	22	6.2	5	8	7.4	FAB0205638	FAB0205064
M 8	1	70	22	6.2	5	8	7.5	FAB0205639	FAB0205065
M 10	1.5	75	24	7	5.5	8	9.3	FAB0205640	FAB0205066
M 10	1.25	75	24	7	5.5	8	9.4	FAB0205641	FAB0205067
M 12	1.75	82	29	8.5	6.5	9	11.2	FAB0205642	FAB0205069
M 12	1.5	82	29	8.5	6.5	9	11.3	FAB0205643	FAB0205070

Unit : mm

TOTEM®

High Performance Cutting Tools

CARBIDE TAPS

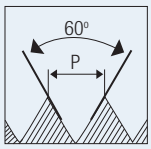
Totem's new range of Solid Carbide Taps suitable for mass production with high wear resistance and extreme toughness.

- Special submicron grade carbide with high TRS state of art carbide grades
- CNC Blank grinder is used to prepare carbide tap blanks to achieve high level of dimensional accuracy as well as surface finish to establish close tolerance control
- Totem Solid carbide taps are manufactured on state of art machines. Special tooling attachments are used to get high accuracy on thread form
- Tap scanning, critical to quality measurements & surface measurements are being done with 3-D scanning equipment
- Ideal for mass production with cutting speeds upto 4X higher compared to HSS-E taps
- Fewer tool changes due to high wear resistance, resulting in optimum machine output and high tool life
- Internal coolant option with radial or axial coolant outlet for improve swarf management and longer tool life

Industry Segment	Automotive
Tap series	SDK1 (Carbide Roll Tap)
Size	M6 X 1 SDK1 DIN 371
Component	Crank Case (Motorbike)
Work material	ADC12 (upto 12% Silicon)
Type of hole	Blind hole / Through hole
Hole dia	5.50 mm
Drill depth	18.0 mm
Tapping depth	14.0 mm
Machine	Vertical Machining Centre
Tapping direction	Vertical
Speed (Vc)	50 m/min
Coolant	Water Soluble Oil (external flood coolant)
Tool Life	8.1 km
Competitor tool life	4.0 km

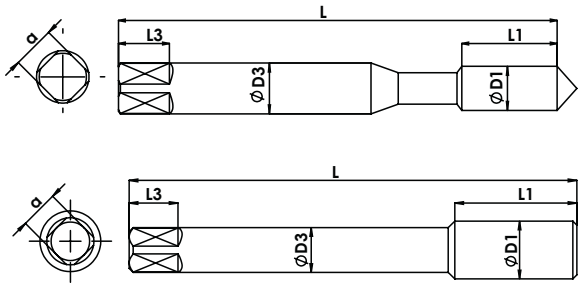
TOTEM® Carbide taps

M Carbide spiral flutes taps



HOLE TYPE

Carbide | DIN 371/376 | 35° | 6HX | C/2-3P



Series	SBK
Material - 1st choice	P2-P3
Material - 2nd choice	-

DIN 371

Nominal Diameter	Pitch	Overall Length	Thread Length	Recess Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.
ØD1	p	L	L1	mm	ØD3	a	L3	Ød1		
M 3	0.5	56	8.0	18.0	3.5	2.7	6.0	2.5	3	FBU0200040
M 4	0.7	63	10.0	21.0	4.5	3.4	6.0	3.3	3	FBU0200041
M 5	0.8	70	10.0	25.0	6	4.9	8.0	4.2	3	FBU0200042
M 6	1	80	12.0	30.0	6	4.9	8.0	5	3	FBU0200043
M 8	1.25	90	16.0	35.0	8	6.2	9.0	6.8	3	FBU0200044
M 10	1.5	100	18.0	39.0	10	8	11.0	8.5	3	FBU0200045

DIN 376

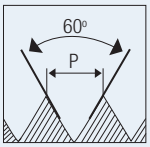
M 12	1.75	110	18	-	9	7	10	10.2	4	FBU0200046
M 14	2	110	20	-	11	9	12	12	4	FBU0200047
M 16	2	110	20	-	12	9	12	14	4	FBU0200048

- New geometry suitable for short and long chipping materials
- Special flute geometry for excellent chip evacuation
- Edge polishing done on cutting edges which avoids chipping off
- Steel - 700 N/mm^2 to 1100 N/mm^2

Note: Also available in TiN/TiCN/TiAlN coatings on request

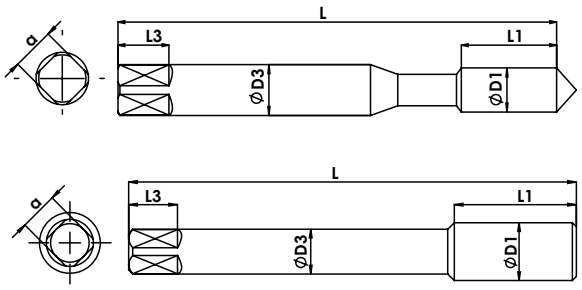
TOTEM® Carbide taps

M Carbide straight flutes tap



HOLE TYPE

Carbide | DIN 371/376 | 6HX | E/1.5-2P



Series	SCK TC*	SCK
Material - 1st choice	P2-P3	P2-P3
Material - 2nd choice	-	-

DIN 371

Nominal Diameter	Pitch	Overall Length	Thread Length	Recess Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.
ØD1	p	L	L1	mm	ØD3	a	L3	Ød1		
M 3	0.5	56	8.0	18.0	3.5	2.7	6.0	2.5	3	FBU0200037
M 4	0.7	63	10.0	21.0	4.5	3.4	6.0	3.3	3	FBU0200017
M 5	0.8	70	10.0	25.0	6	4.9	8.0	4.2	3	FBU0200018
M 6	1	80	12.0	30.0	6	4.9	8.0	5	4	FBU0200019
M 8	1.25	90	16.0	35.0	8	6.2	9.0	6.8	4	FBU0200020
M 10	1.5	100	18.0	39.0	10	8	11.0	8.5	4	FBU0200021

DIN 376

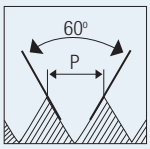
M 12	1.75	110	18	-	9	7	10	10.2	4	FBU0200022
M 14	2	110	20	-	11	9	12	12	4	FBU0200038
M 16	2	110	20	-	12	9	12	14	4	FBU0200039

- This cutting edge geometry produces short chips even in long chipping materials
- High speed & higher productivity results in less CPC
- Also internal through coolant taps available which enables optimum transportation of swarf
- Grey Cast Iron & SG Iron

* SCK TC - Available on request
Note: Also available in TiN/TiCN/TiAlN coatings on request

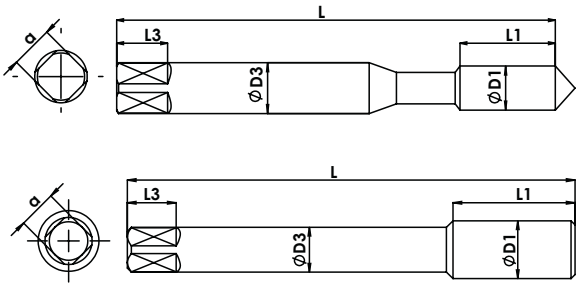
TOTEM® Carbide taps

M Carbide forming taps



HOLE TYPE

Carbide | DIN 371 | 6HX | C/2-3P



Series	SDK
Material - 1st choice	P2-P3
Material - 2nd choice	-

DIN 371

Nominal Diameter	Pitch	Overall Length	Thread Length	Recess Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.
ØD1	p	L	L1	mm	ØD3	a	L3	Ød1		
M 3	0.5	56	6	18.0	3.5	2.7	6.0	2.8		FBU0200049
M 4	0.7	63	7.5	21.0	4.5	3.4	6.0	3.7		FBU0200050
M 5	0.8	70	8.5	25.0	6	4.9	8.0	4.7		FBU0200051
M 6	1	80	11	30.0	6	4.9	8.0	5.5		FBU0200001
M 8	1.25	90	14	35.0	8	6.2	9.0	7.4		FBU0200016
M 10	1.5	100	16	39.0	10	8	11.0	9.3		FBU0200052

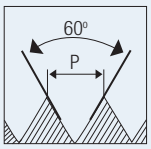
Unit : mm

- New chamfer geometry for uniform load distribution
- Optimised lobe form reduces friction and increases tool life
- High parameters and higher productivity for optimum output
- Aluminium & Aluminium Alloys / Steel

Note: Also available in TiN/TiCN/TiAlN coatings on request

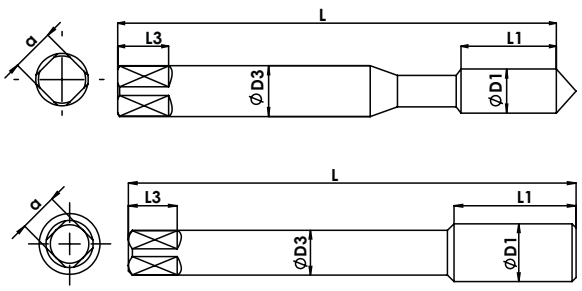
TOTEM® Carbide taps

M Carbide forming taps with internal coolant



HOLE TYPE

DIN 371 | 6HX | C/2-3P



Series	SDK TC
Material - 1st choice	P2-P3
Material - 2nd choice	-

DIN 371

Nominal Diameter	Pitch	Overall Length	Thread Length	Recess Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	No of Flute	EDP No.
ØD1	p	L	L1	mm	ØD3	a	L3	Ød1		
M 3	0.5	56	6	18.0	3.5	2.7	6.0	2.8		FBU0200053
M 4	0.7	63	7.5	21.0	4.5	3.4	6.0	3.7		FBU0200003
M 5	0.8	70	8.5	25.0	6	4.9	8.0	4.7		FBU0200004
M 6	1	80	11	30.0	6	4.9	8.0	5.5		FBU0200005
M 8	1.25	90	14	35.0	8	6.2	9.0	7.4		FBU0200007
M 10	1.5	100	16	39.0	10	8	11.0	9.3		FBU0200054

Unit : mm

✔ Forming taps available in Axial and Radial internal coolant

Note: Also available in TiN/TiCN/TiAlN coatings on request

TOTEM®

High Performance Cutting Tools

NIB TAPS

High Performance Nut Taps for Mild Steel, High Tensile Steel and Stainless Steel

Manufactured from High grade HSSE Steel

Tight thread tolerance for better consistency and higher life

Special treatment for stress relieving

Surface treatment - TiN / TiCN

STANDARD NIB TAPS

This tap can be directly put on the machine or can be connected to bent shank

RANGE

M3 to M30 (Coarse & Fine pitch)

3/16" to 3/4" Imperial sizes
(BSW / UNC / UNF)

COUPLER TYPE NIB TAPS

The tap has got threaded shank & the bent shank can be connected with Coupler

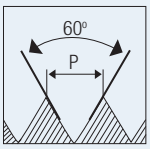
RANGE

M8 to M36 (Coarse & Fine pitch)

5/16" to 1" Imperial sizes
(UNC / UNF)

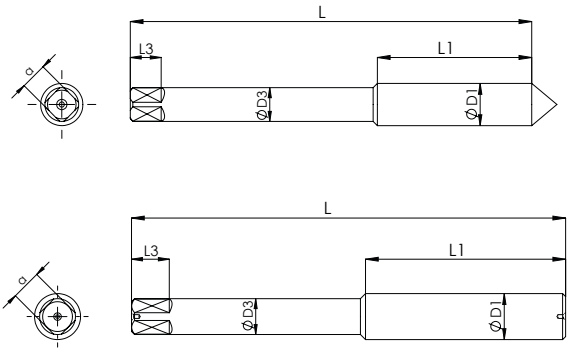
TOTEM® NIB TAPS

M/MF NIB taps for mild steel and high tensile steel



HOLE TYPE

HSS-E 6HX



Series	NIB
Coating	TiN

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	No of Flute	EDP No.
ØD1	p	L	L1	mm	ØD3	a		
M3	0.5	66	15	2.3	1.8	4	3	FAB0206874
M4	0.7	65	21	3	2.5	4	3	FAB0206875
M5	0.8	70	24	3.8	3.15	4	3	FAB0206876
M6	1.0	75	30	4.5	3.55	4	3	FAB0206877
M6	1.0	75	30	4.5	3.55	4	5	FAB0206878
M8	1.0	82	30	6.4	4.9	4	5	FAB0206886
M8	1.25	82	38	6.05	4.9	4	5	FAB0206879
M10	1.0	92	30	8.4	6.3	5	5	FAB0206887
M10	1.3	96	38	8.1	6.3	5	5	FAB0206888
M10	1.5	95	45	7.8	6.3	5	5	FAB0206880
M12	1.3	110	38	10.1	8	6	5	FAB0206889
M12	1.5	110	45	9.8	8	6	5	FAB0206890
M12	1.75	110	53	9.5	8	6	5	FAB0206881
M14	1.5	122	45	11.8	10	7	5	FAB0206891
M14	2.0	122	60	11.2	9	6	5	FAB0206882
M16	1.5	140	45	13.8	11.2	10	5	FAB0206892
M16	2.0	140	60	13.1	10	10	5	FAB0206883
M18	1.5	145	45	15.8	12.5	8	5	FAB0206893
M18	2.5	143	75	14.5	11.2	7	5	FAB0206884
M20	1.5	150	45	17.7	14	14	5	FAB0206894
M20	2.5	150	75	16.5	12.5	14	5	FAB0206885

Coupler type NIB taps

Note: Coupler NIB Taps availabe on request

TOTEM®

High Performance Cutting Tools

HAND TAPS / SHORT MACHINE TAPS

HSS HAND TAPS

These are straight flute general purpose taps which can be used for both machine or hand tapping. They are generally the most economical tool for use on production runs, but are best on materials that produce chips, or where the swarf breaks readily. Where deep holes are to be tapped, in materials which produce stringy swarf, other types of taps may be needed, especially for coarse threads.

Hand taps can be supplied in sets of three; bottom, second and taper leads, or individually.

BOTTOM TAPS have a chamfer (lead) of 1–2 threads, the angle of the lead being around 18 degrees per side. They are used to produce threads close to the bottom of blind holes.

SECOND TAPS have a lead of 3-5 threads at 8 degrees per side. They are the most popular and can be used for through holes, or blind holes where the thread does not need to go right to the bottom.

TAPER TAPS have a lead of 7-10 threads at 5 degrees per side. The taper lead distributes the cutting force over a large area, and the taper shape helps the thread to start. They can therefore be used to start a thread prior to use of second or bottom leads, or for through holes.

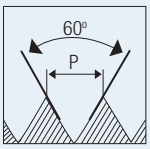
CONTENTS

HSS HAND TAPS

THREAD FORM	BLANK STANDARD	TOLERANCE	LEAD CHAMFER	COATING	PAGE
M	ISO	6H	T/S/B	Bright	1.114
MF	ISO	6H	T/B	Bright	1.116
M	ISO Long Shank	6H	5^0	Bright	1.119
M	ISO Long Shank	6H	10^0	Bright	1.120
M/MF	ISO Long Shank	6H	20^0	Bright	1.121
M/MF	ISO Long Shank	6H	B/4-4.5P	Bright	1.123
M	ISO	6H	Serial Form	Bright	1.124
BSW	ISO	Class 2	T/S/B	Bright	1.125
BSF	ISO	Class 2	T/S/B	Bright	1.126
BA	ISO	Class 2	T/S/B	Bright	1.127
BSB	ISO	Class 2	T/S/B	Bright	1.128
BS Con	ISO	Class 2	T/B	Bright	1.129
ME	ISO	Class 2	T/S/B	Bright	1.130
BSP	ISO 2284	-	T/B	Bright	1.131
BSPT	ISO 2284	-	T/B	Bright	1.132
UNC	ISO	2B	T/S/B	Bright	1.133
UNF	ISO	2B	T/S/B	Bright	1.135
NPT	ANSI	-	T/B	Bright	1.137
NPS	ANSI	-	T/B	Bright	1.138

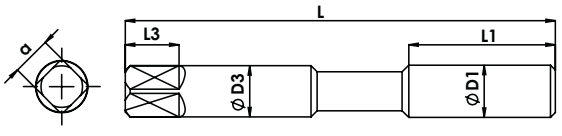
TOTEM® HSS Hand Taps

M Metric coarse threads

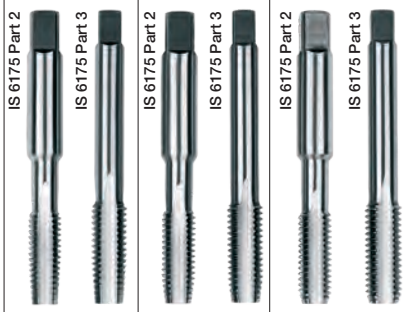


HOLE TYPE

HSS | ISO 529 | 6H



Reinforced Shank (M3 - M10)

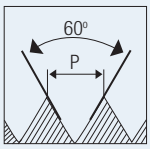


ISO 529 / IS 6175 Part 1							Lead Chamfer	Taper	Second	Bottom	Set
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 1.6	0.35	41	8	2.5	2	4	1.25	FAA0201730	FAA0201731	FAA0201732	FAA0201729
M 2.0	0.4	41	8	2.5	2	4	1.6	FAA0201747	FAA0201750	FAA0201753	FAA0201745
M 2.2	0.45	44.5	9.5	2.8	2.24	5	1.75	FAA0201762	FAA0201763	FAA0201764	FAA0201761
M 2.3	0.4	44.5	9.5	2.8	2.24	5	1.9	FAA0201767	FAA0201768	FAA0201769	FAA0201766
M 2.5	0.45	44.5	9.5	2.8	2.24	5	2.05	FAA0201772	FAA0201773	FAA0201775	FAA0201771
M 2.6	0.45	44.5	9.5	2.8	2.24	5	2.15	FAA0201783	FAA0201784	FAA0201785	FAA0201782
ISO 529 / IS 6175 Part 2											
M 3.0	0.5	48	11	3.15	2.5	5	2.5	FAA0201792	FAA0201798	FAA0201804	FAA0201787
M 3.5	0.6	50	13	3.55	2.8	5	2.9	FAA0201832	FAA0201835	FAA0201838	FAA0201828
M 4.0	0.7	53	13	4	3.15	6	3.3	FAA0201854	FAA0201861	FAA0201866	FAA0201847
M 4.5	0.75	53	13	4.5	3.55	6	3.75	FAA0201892	FAA0201893	FAA0201894	FAA0201889
M 5.0	0.8	58	16	5	4	7	4.2	FAA0201904	FAA0201910	FAA0201917	FAA0201897
M 6.0	1	66	19	6.3	5	8	5	FAA0201947	FAA0201953	FAA0201959	FAA0201939
M 7.0	1	66	19	7.1	5.6	8	6	FAA0201989	FAA0201992	FAA0201995	FAA0201985
M 8.0	1.25	72	22	8	6.3	9	6.75	FAA0202009	FAA0202014	FAA0202020	FAA0202003
M 9.0	1.25	72	22	9	7.1	10	7.75	FAA0202055	FAA0202059	FAA0202063	FAA0202051
M 10.0	1.5	80	24	10	8	11	8.5	FAA0202080	FAA0202086	FAA0202093	FAA0202072

Unit : mm

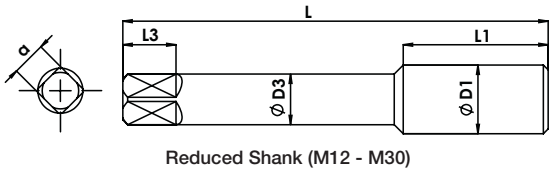
TOTEM® HSS Hand Taps

M Metric coarse threads



HOLE TYPE

HSS | ISO 529 | 6H



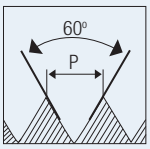
Reduced Shank (M12 - M30)

ISO 529 / IS 6175 Part 3							Lead Chamfer	Taper	Second	Bottom	Set
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 11.0	1.5	85	25	8	6.3	9	9.5	FAA0202127	FAA0202131	FAA0202136	FAA0202123
M 12.0	1.75	89	29	9	7.1	10	10.25	FAA0202147	FAA0202153	FAA0202157	FAA0202141
M 14	2	95	30	11.2	9	12	12	FAA0202181	FAA0202185	FAA0202189	FAA0202177
M 16	2	102	32	12.5	10	13	14	FAA0202209	FAA0202214	FAA0202219	FAA0202204
M 18	2.5	112	37	14	11.2	14	15.5	FAA0202251	FAA0202253	FAA0202256	FAA0202247
M 20	2.5	112	37	14	11.2	14	17.5	FAA0202271	FAA0202276	FAA0202281	FAA0202265
M 22	2.5	118	38	16	12.5	16	19.5	FAA0202306	FAA0202310	FAA0202314	FAA0202302
M 24	3	130	45	18	14	18	21	FAA0202330	FAA0202335	FAA0202340	FAA0202325
M 27	3	135	45	20	16	20	24	FAA0202364	FAA0202367	FAA0202370	FAA0202360
M 30	3.5	138	48	20	16	20	26.5	FAA0202385	FAA0202389	FAA0202393	FAA0202381
M 33	3.5	151	51	22.4	18	22	29.5	FAA0202408	FAA0202409	FAA0202410	FAA0202405
M 36	4	162	57	25	20	24	32	FAA0202421	FAA0202425	FAA0202429	FAA0202418
M 39	4	170	60	28	22.4	26	35	FAA0202443	FAA0202444	FAA0202445	FAA0202440
M 42	4.5	170	60	28	22.4	26	37.5	FAA0202452	FAA0202454	FAA0202455	FAA0202449
M 45	4.5	187	67	31.5	25	28	40.5	FAA0202462	FAA0202463	FAA0202464	FAA0202459
M 48	5	187	67	31.5	25	28	43	FAA0202471	FAA0202472	FAA0202473	FAA0202468
M 52	5	200	70	35.5	28	31	47	FAA0202478	FAA0202479	FAA0202480	FAA0202477
M 56	5.5	200	70	35.5	28	31	50.5	FAA0202482	FAA0202483	FAA0202484	FAA0202481

Unit : mm

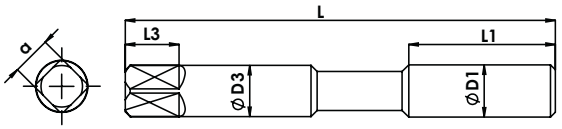
TOTEM® HSS Hand Taps

MF Metric fine threads

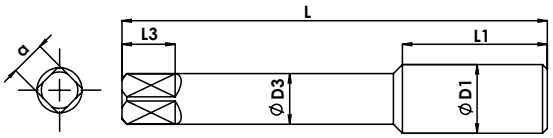


HOLE TYPE

HSS | ISO 529 | 6H



Reinforced Shank (M3 - M10)



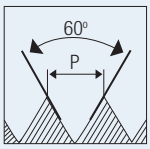
Reduced Shank (M12 - M30)

ISO 529 / IS 6175 Part 2							Lead Chamfer	Taper	Bottom	Pair
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.35	48	11	3.15	2.5	5	2.12	FAA0202551	FAA0202555	FAA0202535
M 3	0.6	48	11	3.15	2.5	5	2.12	FAA0202542	FAA0202544	FAA0202541
M 4	0.5	53	13	4	3.15	6	2.8	FAA0202565	FAA0202569	FAA0202564
M 4	0.75	53	13	4	3.15	6	2.8	FAA0202576	FAA0202578	FAA0202575
M 5	0.5	58	16	5	4	7	3.55	FAA0202589	FAA0202593	FAA0202588
M 5.5	0.9	62	17	5.6	4.5	7	4	FAA0202615	FAA0202616	FAA0202614
M 6	0.5	66	19	6.3	5	8	4.5	FAA0202627	FAA0202629	FAA0202626
M 6	0.75	66	19	6.3	5	8	4.5	FAA0202634	FAA0202640	FAA0202633
M 7	0.75	66	19	7.1	5.6	8	5.3	FAA0202666	FAA0202670	FAA0202665
M 8	1	69	19	8	6.3	9	6	FAA0202698	FAA0202704	FAA0202697
M 9	1	69	19	9	7.1	10	7.1	FAA0202732	FAA0202736	FAA0202731
M 10	1	76	20	10	8	11	7.5	FAA0202759	FAA0202764	FAA0202758
M 10	1.25	76	20	10	8	11	7.5	FAA0202787	FAA0202793	FAA0202786
ISO 529 / IS 6175 Part 3										
M 11	1.25	82	22	8	6.3	9	9.8	FAA0202830	FAA0202831	FAA0202829
M 12	1	84	24	9	7.1	10	11	FAA0202846	FAA0202855	FAA0202845
M 12	1.25	84	24	9	7.1	10	10.8	FAA0202870	FAA0202874	FAA0202869
M 12	1.5	89	29	9	7.1	10	10.5	FAA0202895	FAA0202903	FAA0202893
M 14	1	87	22	11.2	9	12	13	FAA0202946	FAA0202951	FAA0202945
M 14	1.25	90	25	11.2	9	12	12.8	FAA0202967	FAA0202973	FAA0202966
M 14	1.5	95	30	11.2	9	12	12.5	FAA0202989	FAA0202997	FAA0202988

Unit : mm

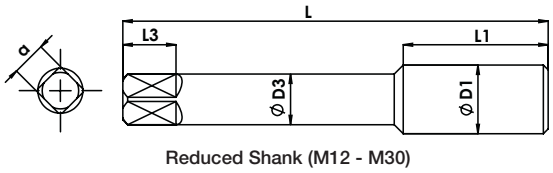
TOTEM® HSS Hand Taps

MF Metric fine threads



HOLE TYPE

HSS | ISO 529 | 6H



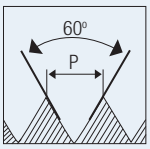
Reduced Shank (M12 - M30)

ISO 529 / IS 6175 Part 3							Lead Chamfer	Taper	Bottom	Pair
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 16	1	92	22	12.5	10	13	15	FAA0203042	FAA0203046	FAA0203041
M 16	1.5	102	32	12.5	10	13	14.5	FAA0203064	FAA0203072	FAA0203063
M 18	1	97	22	14	11.2	14	17	FAA0203098	FAA0203101	FAA0203097
M 18	1.5	104	29	14	11.2	14	16.5	FAA0203107	FAA0203115	FAA0203106
M 18	2	112	37	14	11.2	14	16	FAA0203130	FAA0203132	FAA0203129
M 20	1	102	27	14	11.2	14	19	FAA0203147	FAA0203149	FAA0203146
M 20	1.5	104	29	14	11.2	14	18.5	FAA0203156	FAA0203164	FAA0203155
M 20	2	112	37	14	11.2	14	18	FAA0203181	FAA0203185	FAA0203180
M 22	1	109	29	16	12.5	16	21	FAA0203196	FAA0203198	FAA0203195
M 22	1.5	113	33	16	12.5	16	20.5	FAA0203202	FAA0203208	FAA0203201
M 22	2	118	38	16	12.5	16	20	FAA0203219	FAA0203221	FAA0203218
M 24	1	114	29	18	14	18	23	FAA0203228	FAA0203229	FAA0203227
M 24	1.5	120	35	18	14	18	22.5	FAA0203234	FAA0203239	FAA0203233
M 24	2	120	35	18	14	18	22	FAA0203254	FAA0203258	FAA0203253
M 25	1	114	29	18	14	18	24	FAA0203267	FAA0203269	FAA0203266
M 25	1.5	120	35	18	14	18	23.5	FAA0203274	FAA0203278	FAA0203273
M 27	1.5	127	37	20	16	20	25.5	FAA0203307	FAA0203309	FAA0203306
M 27	2	127	37	20	16	20	25	FAA0203316	FAA0203320	FAA0203315
M 28	1.5	127	37	20	16	20	26.5	FAA0203329	FAA0203331	FAA0203328
M 30	1.5	127	37	20	16	20	28.5	FAA0203344	FAA0203348	FAA0203343

Unit : mm

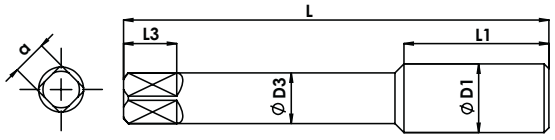
TOTEM® HSS Machine Taps

MF Metric fine threads



HOLE TYPE

HSS | ISO 529 | 6H



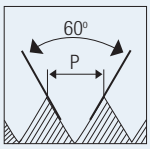
Reduced Shank (M12 - M30)

ISO 529 / IS 6175 Part 3							Lead Chamfer	Taper	Bottom	Pair
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 30	2	127	37	20	16	20	28	FAA0203359	FAA0203363	FAA0203358
M 30	3	138	48	20	16	20	27	FAA0203371	FAA0203373	FAA0203370
M 32	1.5	137	37	22.4	18	22	30.5	FAA0203385	FAA0203389	FAA0203384
M 33	1.5	137	37	22.4	18	22	31.5	FAA0203398	FAA0203399	FAA0203397
M 33	2	137	37	22.4	18	22	31	FAA0203403	FAA0203405	FAA0203402
M 33	3	151	51	22.4	18	22	30	FAA0203409	FAA0203411	FAA0203408
M 36	1.5	144	39	25	20	24	34.5	FAA0203435	FAA0203437	FAA0203434
M 36	2	144	39	25	20	24	34	FAA0203442	FAA0203444	FAA0203441
M 36	3	162	57	25	20	24	33	FAA0203450	FAA0203452	FAA0203449
M 39	1.5	149	39	28	22.4	26	37.5	FAA0203464	FAA0203465	FAA0203463
M 39	2	149	39	28	22.4	26	37		FAA0203467	FAA0203466
M 39	3	170	60	28	22.4	26	36	FAA0203470	FAA0203472	FAA0203469
M 40	1.5	149	39	28	22.4	26	38.5	FAA0203477	FAA0203479	FAA0203476
M 42	1.5	149	39	28	22.4	26	40.5	FAA0203490	FAA0203491	FAA0203489
M 42	3	170	60	28	22.4	26	39	FAA0203500	FAA0203502	FAA0203499
M 45	1.5	165	45	31.5	25	28	43.5	FAA0203521	FAA0203522	FAA0203520
M 45	3	187	67	31.5	25	28	42	FAA0203529	FAA0203531	FAA0203528
M 48	1.5	165	45	31.5	25	28	46.5	FAA0203533	FAA0203534	FAA0203532
M 48	2	165	45	31.5	25	28	46	FAA0203539	FAA0203541	FAA0203538
M 48	3	187	67	31.5	25	28	45	FAA0203546	FAA0203548	FAA0203545

Unit : mm

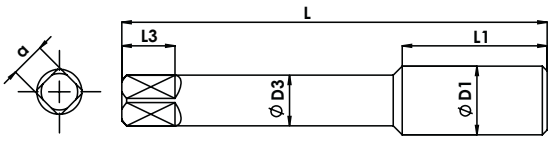
TOTEM® HSS Machine Taps

M Metric long shank coarse threads (Taper-Type A)



HOLE TYPE

HSS | ISO 2283 | 6H

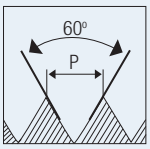


ISO 2283 / IS 6175 Part 4							Lead Chamfer	5°
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 3	0.5	66	11	2.24	1.8	4	2.5	FAA0203714
M 4	0.7	73	13	3.15	2.5	5	3.3	FAA0203721
M 5	0.8	79	16	4	3.15	6	4.2	FAA0203738
M 6	1	89	19	4.5	3.55	6	5	FAA0203747
M 8	1.25	97	22	6.3	5	8	6.75	FAA0203770
M 10	1.5	108	24	8	6.3	9	8.5	FAA0203794
M 12	1.75	119	29	9	7.1	10	10.25	FAA0203816
M 14	2	127	30	11.2	9	12	12.5	FAA0207063
M 16	2	137	32	12.5	10	13	14	FAA0203852
M 18	2.5	149	37	14	11.2	14	15.5	FAA0203867
M 20	2.5	149	37	14	11.2	14	17.5	FAA0203884

Unit : mm

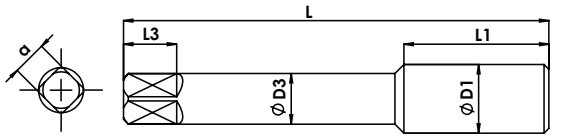
TOTEM® HSS Machine Taps

M ISO metric long shank coarse threads (Second-Type D)



HOLE TYPE

HSS | ISO 2283 | 6H

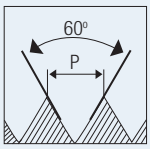


ISO 2283 / IS 6175 Part 4							Lead Chamfer	10°
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 3	0.5	66	11	2.24	0.1	4	2.5	FAA0203715
M 4	0.7	73	13	3.15	2.5	5	3.3	FAA0203722
M 5	0.8	79	16	4	3.15	6	4.2	FAA0203739
M 6	1	89	19	4.5	3.55	6	5	FAA0203748
M 8	1.25	97	22	6.3	5	8	6.75	FAA0203771
M 10	1.5	108	24	8	6.3	9	8.5	FAA0203795
M 12	1.75	119	29	9	7	10	10.25	FAA0203817
M 14	2	127	30	11.2	9	12	12	FAA0207305
M 16	2	137	32	12.5	10	13	14	FAA0203853
M 18	2.5	149	37	14	11.2	14	15.5	FAA0207306
M 20	2.5	149	37	14	11.2	14	17.5	FAA0203885

Unit : mm

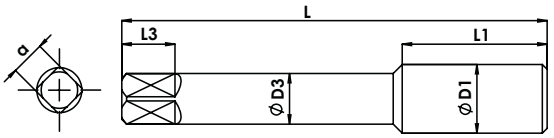
TOTEM® HSS Machine Taps

M/MF Metric long shank coarse & fine threads (Bottom-Type C)



HOLE TYPE

HSS | ISO 2283 | 6H

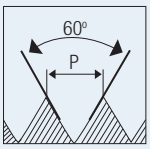


ISO 2283 / IS 6175 Part 4							Lead Chamfer	20°
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 3	0.5	66	11	2.24	1.8	4	2.5	FAA0203716
M 3.5	0.6	68	13	2.5	2	4	2.9	FAA0203719
M 4	0.7	73	13	3.15	2.5	5	3.3	FAA0203723
M 5	0.8	79	16	4	3.15	6	4.2	FAA0203740
M 6	1	89	19	4.5	3.55	6	5	FAA0203749
M 7	1	89	19	5.6	4.5	7	6	FAA0203759
M 8	1	97	19	6.3	5	8	7	FAA0203767
M 8	1.25	97	22	6.3	5	8	6.75	FAA0203772
M 9	1.25	97	22	7.1	5.6	8	7.75	FAA0203781
M 10	1	108	20	8	6.3	9	9	FAA0203786
M 10	1.25	108	20	8	6.3	9	8.75	FAA0203792
M 10	1.5	108	24	8	6.3	9	8.5	FAA0203796
M 12	1.25	119	24	9	7.1	10	10.75	FAA0203808
M 12	1.5	119	29	9	7.1	10	10.5	FAA0203813

Unit : mm

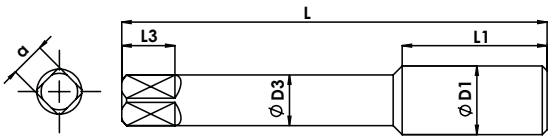
TOTEM® HSS Machine Taps

M/MF Metric long shank coarse & fine threads (Bottom-Type C)



HOLE TYPE

HSS | ISO 2283 | 6H

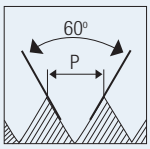


ISO 2283 / IS 6175 Part 4							Lead Chamfer	20°
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 12	1.75	119	29	9	7.1	10	10.25	FAA0203818
M 14	1.25	127	25	11.2	9	12	12.75	FAA0203828
M 14	1.5	127	30	11.2	9	12	12.5	FAA0203832
M 14	2	127	30	11.2	9	12	12	FAA0203841
M 16	1.5	137	32	12.5	10	13	14.5	FAA0203849
M 16	2	137	32	12.5	10	13	14	FAA0203854
M 18	1.5	149	29	14	11.2	14	16.5	FAA0203864
M 18	2.5	149	37	14	11.2	14	15.5	FAA0203868
M 20	1.5	149	29	14	11.2	14	18.5	FAA0203875
M 20	2.5	149	37	14	11.2	14	17.5	FAA0203886
M 22	2.5	158	38	16	12.5	16	19.5	FAA0203902
M 24	3	172	45	18	14	18	21	FAA0203918
M 27	3	180	45	20	16	20	24	FAA0203940
M 30	3.5	183	48	20	16	20	26.5	FAA0203955

Unit : mm

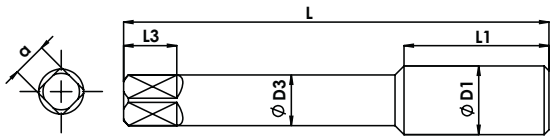
TOTEM® HSS Machine Taps

M/MF Metric long shank coarse & fine threads (SPPT-Type B)



HOLE TYPE

HSS | ISO 2283 | 6H



ISO 2283 / IS 6175 Part 4

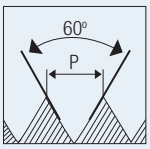
Spiral Point with 10° lead chamfer

Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 3	0.5	66	11	2.24	1.8	4	2.5	FAA0203717
M 3.5	0.6	68	13	2.5	2	4	2.9	FAA0203720
M 4	0.7	73	13	3.15	2.5	5	3.3	FAA0203726
M 5	0.8	79	16	4	3.15	6	4.2	FAA0203743
M 6	1	89	19	4.5	3.55	6	5	FAA0203753
M 8	1.25	97	22	6.3	5	8	6.75	FAA0203775
M 10	1.25	108	20	8	6.3	9	8.75	FAA0203793
M 10	1.5	108	24	8	6.3	9	8.5	FAA0203798
M 12	1.5	119	29	9	7.1	10	10.5	FAA0203815
M 12	1.75	119	29	9	7.1	10	10.25	FAA0203821
M 14	1.5	127	30	11.2	9	12	12.5	FAA0203835
M 14	2	127	30	11.2	9	12	12	FAA0203842
M 16	1.5	137	32	12.5	10	13	14.5	FAA0203851
M 16	2	137	32	12.5	10	13	14	FAA0203857
M 18	1.5	142	29	14	11.2	14	16.5	FAA0203865
M 18	2.5	149	37	14	11.2	14	15.5	FAA0203869
M 20	1.5	142	29	14	11.2	14	18.5	FAA0203878
M 20	2.5	149	37	14	11.2	14	17.5	FAA0203888
M 22	2.5	158	38	16	12.5	16	19.5	FAA0203903
M 24	3	172	45	18	14	18	21	FAA0203920

Unit : mm

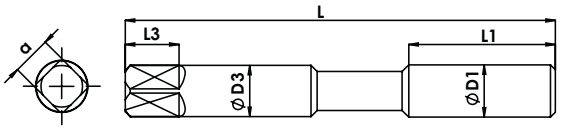
TOTEM® HSS Hand Taps

M Metric serial form coarse threads

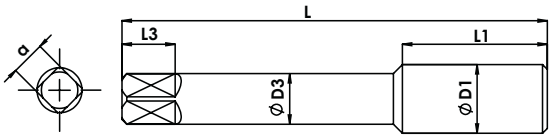


HOLE TYPE

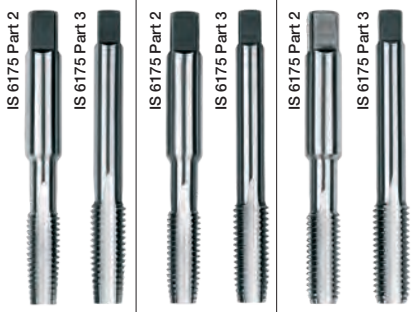
HSS | ISO 529 | 6H



Reinforced Shank (M3 - M10)



Reduced Shank (M12 - M30)

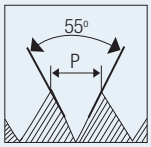


ISO 529 / IS 6175 Part 2							Lead Chamfer	Rougher	Intermediate	Finisher	Set
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
M 3	0.5	48	11	3.15	2.5	5	2.5	FAA0201821	FAA0201822	FAA0201804	FAA0201820
M 4	0.7	53	13	4	3.15	6	3.3	FAA0201881	FAA0201882	FAA0201866	FAA0201880
M 5	0.8	58	16	5	4	7	4.2	FAA0201932	FAA0201933	FAA0201917	FAA0201931
M 6	1	66	19	6.3	5	8	5	FAA0201977	FAA0201978	FAA0201959	FAA0201976
M 8	1.25	72	22	8	6.3	9	6.75	FAA0202037	FAA0202038	FAA0202020	FAA0202036
M 10	1.5	80	24	10	8	11	8.5	FAA0202108	FAA0202109	FAA0202093	FAA0202107
ISO 529 / IS 6175 Part 3											
M 12	1.75	89	29	9	7.1	10	10.25	FAA0202171	FAA0202172	FAA0202157	FAA0202170
M 14	2	95	30	11.2	9	12	12	FAA0202198	FAA0202199	FAA0202189	FAA0202197
M 16	2	102	32	12.5	10	13	14	FAA0202233	FAA0202234	FAA0202219	FAA0202232
M 18	2.5	112	37	14	11.2	14	15.5	FAA0202263	FAA0202264	FAA0202256	FAA0202262
M 20	2.5	112	37	14	11.2	14	17.5	FAA0202293	FAA0202294	FAA0202281	FAA0202292
M 22	2.5	118	38	16	12.5	16	19.5	FAA0202306	FAA0202310	FAA0202314	FAA0202321
M 24	3	130	45	18	14	18	21	FAA0202349	FAA0202350	FAA0202340	FAA0202348
M 27	3	135	45	20	16	20	24	FAA0202376	FAA0202377	FAA0202370	FAA0202375
M 30	3.5	138	48	20	16	20	26.5	FAA0202401	FAA0202402	FAA0202393	FAA0202400

Unit : mm

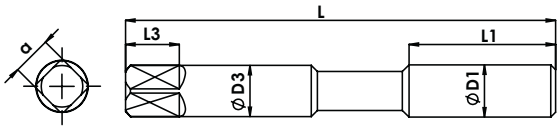
TOTEM® HSS Hand Taps

BSW Whitworth coarse threads

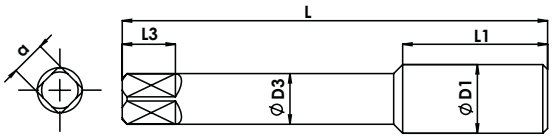


HOLE TYPE

HSS | ISO 529 | Class 2



Reinforced Shank (1/8" - 3/8")



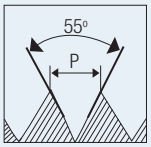
Reduced Shank (7/16" - 2")

							Lead Chamfer	Taper	Second	Bottom	Set
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/8"	40	48	11	3.15	2.5	5	2.55	FAA0200011	FAA0200013	FAA0200015	FAA0200009
5/32"	32	53	13	4	3.15	6	3.2	FAA0200022	FAA0200024	FAA0200026	FAA0200020
3/16"	24	58	16	5	4	7	3.7	FAA0200038	FAA0200042	FAA0200045	FAA0200034
1/4"	20	66	19	6.3	5	8	5.1	FAA0200065	FAA0200070	FAA0200075	FAA0200061
5/16"	18	72	22	8	6.3	9	6.5	FAA0200098	FAA0200102	FAA0200106	FAA0200094
3/8"	16	80	24	10	8	11	7.9	FAA0200120	FAA0200124	FAA0200127	FAA0200115
7/16"	14	85	25	8	6.3	9	9.3	FAA0200143	FAA0200147	FAA0200151	FAA0200139
1/2"	12	89	29	9.5	7.5	10	10.5	FAA0200162	FAA0200165	FAA0200168	FAA0200159
9/16"	12	95	30	11.2	9	12	12.1	FAA0200178	FAA0200180	FAA0200182	FAA0200177
5/8"	11	102	32	12.5	10	13	13.5	FAA0200193	FAA0200197	FAA0200201	FAA0200189
11/16"	11	112	37	14	11.2	14	15.1	FAA0200231	FAA0200232	FAA0200233	FAA0200230
3/4"	10	112	37	14	11.2	14	16.25	FAA0200213	FAA0200217	FAA0200221	FAA0200211
7/8"	9	118	38	16	12.5	16	19.25	FAA0200237	FAA0200241	FAA0200245	FAA0200235
1"	8	130	45	18	14	18	22	FAA0200257	FAA0200261	FAA0200265	FAA0200254
1.1/8"	7	138	48	20	16	20	24.75	FAA0200275	FAA0200277	FAA0200279	FAA0200274
1.1/4"	7	151	51	22.4	18	22	28	FAA0200282	FAA0200284	FAA0200286	FAA0200281
1.3/8"	6	162	57	25	20	24	30.1	FAA0200291	FAA0200292	FAA0200293	FAA0200290
1.1/2"	6	170	60	28	22.4	26	33.5	FAA0200295	FAA0200297	FAA0200299	FAA0200294
1.5/8"	5	170	60	28	22.4	26	35.7	-	-	FAA0200303	FAA0200302
1.3/4"	5	187	67	31.5	25	28	39	FAA0200305	FAA0200306	FAA0200307	FAA0200304
1.7/8"	4.5	187	67	31.5	25	28	41.3	FAA0200309	FAA0200310	FAA0200311	FAA0200308
2"	4.5	200	70	35.5	28	31	44.5	FAA0200313	FAA0200314	FAA0200315	FAA0200312

Unit : mm

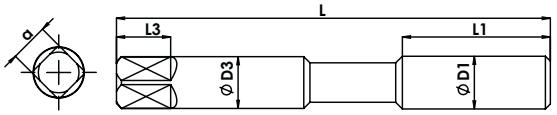
TOTEM® HSS Hand Taps

BSF Whitworth fine threads

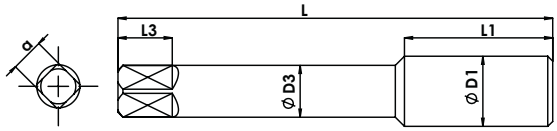


HOLE TYPE

HSS | ISO 529 | Class 2



Reinforced Shank (3/16" - 3/8")



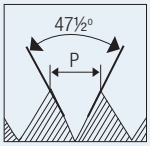
Reduced Shank (7/16" - 2")

							Lead Chamfer	Taper	Second	Bottom	Set
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
3/16"	32	58	16	5	4	7	4	FAA0200348	FAA0200349	FAA0200350	FAA0200346
1/4"	26	66	19	6.3	5	8	5.3	FAA0200363	FAA0200366	FAA0200369	FAA0200360
5/16"	22	72	22	8	6.3	9	6.8	FAA0200383	FAA0200385	FAA0200387	FAA0200381
3/8"	20	80	24	10	8	11	8.3	FAA0200397	FAA0200399	FAA0200401	FAA0200394
7/16"	18	85	25	8	6.3	9	9.7	FAA0200409	FAA0200412	FAA0200415	FAA0200407
1/2"	16	89	29	9.5	7.5	10	11.1	FAA0200421	FAA0200423	FAA0200425	FAA0200419
9/16"	16	95	30	11.2	9	12	12.7	FAA0200432	FAA0200433	FAA0200434	FAA0200431
5/8"	14	102	32	12.5	10	13	14	FAA0200440	FAA0200443	FAA0200446	FAA0200437
11/16"	14	112	37	14	11.2	14	15.5	FAA0200451	FAA0200452	FAA0200453	FAA0200450
3/4"	12	112	37	14	11.2	14	16.75	FAA0200455	FAA0200457	FAA0200459	FAA0200454
7/8"	11	118	38	16	12.5	16	19.75	FAA0200464	FAA0200466	FAA0200467	FAA0200462
1"	10	130	45	18	14	18	22.75	FAA0200472	FAA0200474	FAA0200476	FAA0200470
1.1/8"	9	138	48	20	16	20	25.5	FAA0200479	FAA0200480	FAA0200481	FAA0200478
1.1/4"	9	151	51	22.4	18	22	28.5	FAA0200483	FAA0200484	FAA0200485	FAA0200482
1.3/8"	8	162	57	25	20	24	31.5	FAA0200487	FAA0200488	FAA0200489	FAA0200486
1.1/2"	8	170	60	28	22.4	26	34.5	FAA0200491	FAA0200492	FAA0200493	FAA0200490
1.5/8"	8	170	60	28	22.4	26	37.7	FAA0200496	-	-	FAA0200494
1.3/4"	7	187	67	31.5	25	28	41	-	-	-	FAA0200495
2"	7	200	70	35.5	28	31	47	FAA0200498	FAA0200499	FAA0200500	FAA0200497

Unit : mm

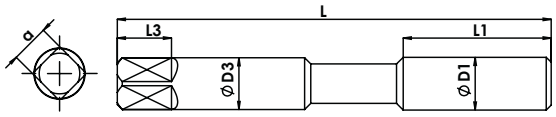
TOTEM® HSS Hand Taps

BA British association threads



HOLE TYPE

HSS | ISO 529 | Class 2

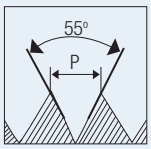


							Lead Chamfer	Taper	Second	Bottom	Set
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
12	90.9	40	7	2.5	2	4	1.05	FAA0200647	FAA0200648	FAA0200649	FAA0200646
11	81.9	41	8	2.5	2	4	1.2	FAA0200643	FAA0200644	FAA0200645	FAA0200642
10	72.6	41	8	2.5	2	4	1.4	FAA0200635	FAA0200637	FAA0200639	FAA0200632
9	65.1	41	8	2.5	2	4	1.55	FAA0200625	FAA0200627	FAA0200629	FAA0200623
8	59.1	44.5	9.5	2.8	2.24	5	1.8	FAA0200616	FAA0200618	FAA0200620	FAA0200613
7	52.9	44.5	9.5	2.8	2.24	5	2.05	FAA0200603	FAA0200606	FAA0200609	FAA0200601
6	47.9	44.5	9.5	2.8	2.24	5	2.3	FAA0200590	FAA0200593	FAA0200596	FAA0200588
5	43	48	11	3.15	2.5	5	2.65	FAA0200578	FAA0200581	FAA0200584	FAA0200576
4	38.5	50	13	3.55	2.8	5	3	FAA0200564	FAA0200567	FAA0200570	FAA0200562
3	34.8	53	13	4.5	3.55	6	3.4	FAA0200555	FAA0200557	FAA0200559	FAA0200552
2	31.4	58	16	5	4	7	4	FAA0200541	FAA0200544	FAA0200547	FAA0200539
1	28.2	62	17	5.6	4.5	7	4.5	FAA0200529	FAA0200532	FAA0200535	FAA0200527
0	25.4	66	19	6.3	5	8	5.1	FAA0200517	FAA0200520	FAA0200523	FAA0200515

Unit : mm

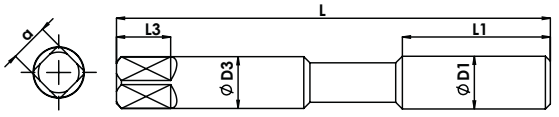
TOTEM® HSS Hand Taps

BSB British brass threads

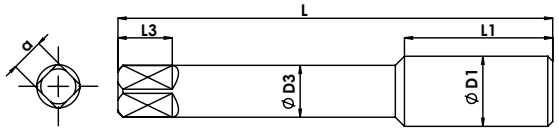


HOLE TYPE

HSS | ISO 529 | Class 2



Reinforced Shank (1/8" - 3/8")



Reduced Shank (7/16" - 2")

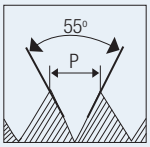
							Lead Chamfer	Taper	Second	Bottom	Set
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/4"	26	66	19	6.3	5	8	5.3	FAA0200653	FAA0200654	FAA0200655	FAA0200651
5/16"	26	69	19	8	6.3	9	5.8	FAA0200658	FAA0200659	FAA0200660	FAA0200656
3/8"	26	76	20	10	8	11	8.4	FAA0200663	FAA0200664	FAA0200665	FAA0200661
7/16"	26	82	22	8	6.3	9	10	FAA0200668	FAA0200669	FAA0200670	FAA0200666
1/2"	26	84	24	9	7.1	10	11.5	FAA0200673	FAA0200674	FAA0200675	FAA0200671
9/16"	26	90	25	11.2	9	12	13.1	FAA0200678	FAA0200679	FAA0200680	FAA0200676
5/8"	26	95	25	12.5	10	13	14.7	FAA0200683	FAA0200684	FAA0200685	FAA0200681
3/4"	26	104	29	14	11.2	14	17.8	FAA0200687	FAA0200688	FAA0200689	FAA0200686
7/8"	26	113	33	16	12.5	16	21	FAA0200691	FAA0200692	FAA0200693	FAA0200690
1"	26	120	35	18	14	18	24.2	FAA0200694	-	FAA0200695	FAA0207315

Unit : mm

TOTEM® HSS Hand Taps

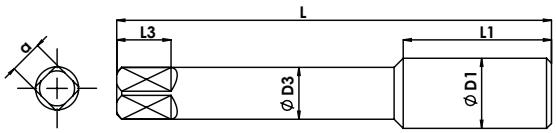
BS Con

British standard conduit threads



HOLE TYPE

HSS | ISO 529 | Class 2

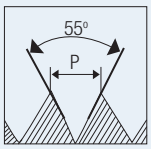


							Lead Chamfer	Taper	Bottom	Pair
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/2"	18	84	24	9	7.1	10	11.5	FAA0200697	FAA0200698	FAA0200696
5/8"	18	95	25	12.5	10	13	14.2	-	FAA0200700	FAA0200699
3/4"	16	104	29	14	11.2	14	17.5	FAA0200702	FAA0200704	FAA0200701
1"	16	120	35	18	14	18	23.8	FAA0200707	FAA0200708	FAA0200706

Unit : mm

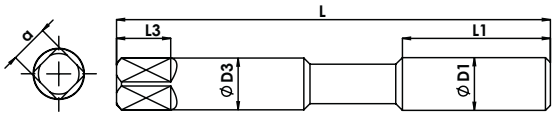
TOTEM® HSS Hand Taps

ME Model engineer

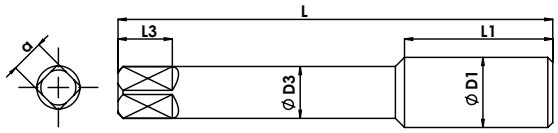


HOLE TYPE

HSS | ISO 529 | Class 2



Reinforced Shank (1/8" - 3/8")



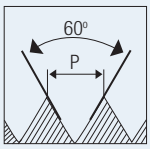
Reduced Shank (7/16" - 2")

							Lead Chamfer	Taper	Second	Bottom	EDP No.
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	Set
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/8"	40	48	11	3.15	2.5	5	2.55				FAA0207317
5/32"	40	53	13	4	3.15	6	3.3	FAA0200720	FAA0200721	FAA0200722	FAA0200718
3/16"	40	58	16	5	4	7	4	FAA0200724	FAA0200725	FAA0200726	FAA0200723
7/32"	40	62	17	5.6	4.5	7	4.8	FAA0200729	FAA0200730	FAA0200731	FAA0200727
1/4"	40	66	13	6.3	5	8	5.5	FAA0200733	FAA0200734	FAA0200735	FAA0200732
9/32"	32	66	19	7.1	5.6	8	6.1	FAA0200739	FAA0200740	FAA0200741	FAA0200737
5/16"	32	66	16	8	6.3	9	7	FAA0200743	FAA0200744	FAA0200745	FAA0200742
3/8"	32	73	16	10	8	11	8.6	FAA0200748	FAA0200749	FAA0200750	FAA0200746
7/16"	32	80	20	8	6.3	9	10.3	-	-	-	FAA0207320
1/2"	32	80	20	9	10	7.1	11.9	-	-	-	FAA0207324

Unit : mm

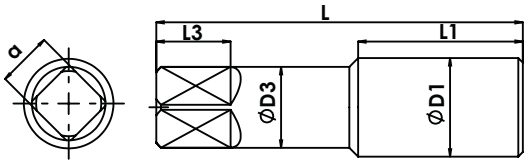
TOTEM® HSS Hand Taps

BSP British pipe threads



HOLE TYPE

HSS ISO 2284

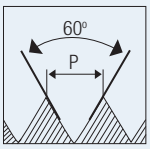


							Lead Chamfer	Taper	Second	Bottom	Set
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/8"	28	59	15	8	6.3	9	8.8	FAA0204606	FAA0204610	FAA0204614	FAA0204602
1/4"	19	67	19	10	8	11	11.8	FAA0204627	FAA0204631	FAA0204634	FAA0204623
3/8"	19	75	21	12.5	10	13	15.25	FAA0204648	FAA0204652	FAA0204656	FAA0204644
1/2"	14	87	26	16	12.5	16	19	FAA0204665	FAA0204669	FAA0204673	FAA0204662
5/8"	14	91	26	18	14	18	21	FAA0204680	FAA0204682	FAA0204684	FAA0204678
3/4"	14	96	28	20	16	20	24.5	FAA0204689	FAA0204692	FAA0204695	FAA0204686
7/8"	14	102	29	22.4	18	22	28.25	FAA0204702	-	FAA0204704	FAA0204700
1"	11	109	33	25	20	24	30.75	FAA0204708	FAA0204713	FAA0204715	FAA0204706
1.1/4"	11	119	36	31.5	25	28	39.5	FAA0204722	FAA0204724	FAA0204727	FAA0204721
1.1/2"	11	125	37	35.5	28	31	45	FAA0204733	FAA0204735	FAA0204738	FAA0204732
1.3/4"	11	132	39	35.5	28	31	51	FAA0204743	-	FAA0204744	FAA0204742
2"	11	140	41	40	31.5	34	57	FAA0204746	-	FAA0204749	FAA0204745

Unit : mm

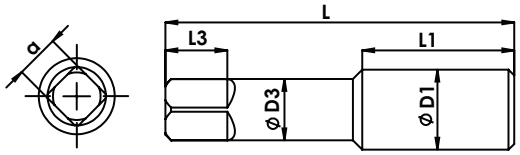
TOTEM® HSS Hand Taps

BSPT British taper pipe threads



HOLE TYPE

HSS ISO 2284

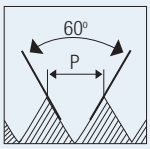


							Lead Chamfer	Taper	Bottom	Pair
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/8"	28	59	15	8	6.3	9	8.8	FAA0204836	FAA0204840	FAA0204833
1/4"	19	67	19	10	8	11	11.8	FAA0204849	FAA0204852	FAA0204846
3/8"	19	75	21	12.5	10	13	15.25	FAA0204857	FAA0204859	FAA0204855
1/2"	14	87	26	16	12.5	16	19	FAA0204865	FAA0204868	FAA0204863
3/4"	14	96	28	20	16	20	24.5	FAA0204873	FAA0204876	FAA0204871
1"	11	109	33	25	20	24	30.75	FAA0204881	FAA0204883	FAA0204880
1.1/4"	11	119	36	31.5	25	28	39.5	FAA0204890	FAA0204891	FAA0204889
1.1/2"	11	125	37	35.5	28	31	45	FAA0204893	FAA0204894	FAA0204892
2"	11	140	41	40	31.5	34	57	-	-	FAA0204895

Unit : mm

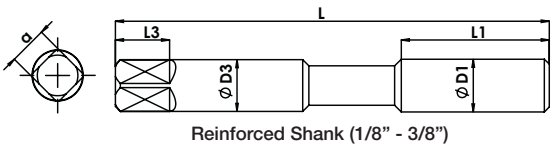
TOTEM® HSS Hand Taps

UNC Unified coarse threads

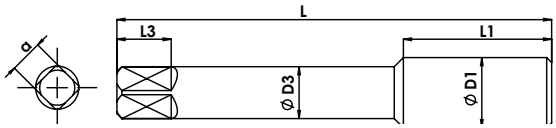


HOLE TYPE

HSS | ISO 529 | 2B



Reinforced Shank (1/8" - 3/8")



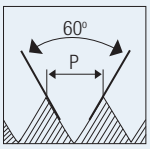
Reduced Shank (7/16" - 2")

							Lead Chamfer	Taper	Second	Bottom	Set
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/4"	20	66	19	6.3	5	8	5.1	FAA0200880	FAA0200885	FAA0200891	FAA0200875
5/16"	18	72	22	8	6.3	9	6.6	FAA0200912	FAA0200916	FAA0200920	FAA0200907
3/8"	16	80	24	10	8	11	8	FAA0200945	FAA0200949	FAA0200953	FAA0200940
7/16"	14	85	25	8	6.3	9	9.4	FAA0200984	FAA0200987	FAA0200990	FAA0200980
1/2"	13	89	29	9	7.1	10	10.8	FAA0201011	FAA0201014	FAA0201017	FAA0201007
9/16"	12	95	30	11.2	9	12	12.2	FAA0201044	FAA0201046	FAA0201048	FAA0201042
5/8"	11	102	32	12.5	10	13	13.5	FAA0201062	FAA0201065	FAA0201068	FAA0201058
3/4"	10	112	37	14	11.2	14	16.5	FAA0201095	FAA0201098	FAA0201101	FAA0201092
7/8"	9	118	38	16	12.5	16	19.5	FAA0201127	FAA0201130	FAA0201133	FAA0201125
1"	8	130	45	18	14	18	22.25	FAA0201155	FAA0201158	FAA0201161	FAA0201151
1.1/8"	7	138	48	20	16	20	25	FAA0201182	FAA0201183	FAA0201184	FAA0201181
1.1/4"	7	151	51	22.4	18	22	28	FAA0201193	FAA0201194	FAA0201195	FAA0201192
1.3/8"	6	162	57	25	20	24	30.75	FAA0201201	FAA0201202	FAA0201203	FAA0201200
1.1/2"	6	170	60	28	22.4	26	34	FAA0201209	FAA0201210	FAA0201211	FAA0201208
1.3/4"	5	187	67	31.5	25	28	39.5	FAA0201220	FAA0201221	FAA0201222	FAA0201219
2"	4.5	200	70	35.5	28	31	45	FAA0201225	FAA0201226	FAA0201227	FAA0201224

Unit : mm

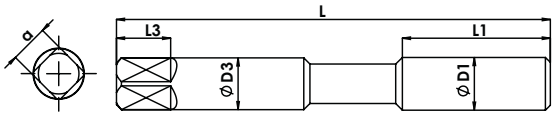
TOTEM® HSS Hand Taps

UNC Unified coarse threads



HOLE TYPE

HSS | ISO 529 | 2B

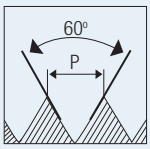


							Lead Chamfer	Taper	Second	Bottom	Set
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1	64	41	8	2.5	2	4	1.55	FAA0200811	FAA0200812	FAA0200813	FAA0200810
2	56	44.5	9.5	2.8	2.24	5	1.85	FAA0200815	FAA0200816	FAA0200817	FAA0200814
3	48	44.5	9.5	2.8	2.24	5	2.1	FAA0200820	FAA0200821	FAA0200822	FAA0200819
4	40	48	11	3.15	2.5	5	2.35	FAA0200826	FAA0200828	FAA0200830	FAA0200824
5	40	48	11	3.15	2.5	5	2.65	FAA0200834	FAA0200835	FAA0200836	FAA0200833
6	32	50	13	3.55	2.8	5	2.85	FAA0200839	FAA0200840	FAA0200841	FAA0200838
8	32	53	13	4.5	3.55	6	3.5	FAA0200847	FAA0200849	FAA0200851	FAA0200845
10	24	58	16	5	4	7	3.9	FAA0200857	FAA0200859	FAA0200862	FAA0200855
12	24	62	17	5.6	4.5	7	4.5	FAA0200867	FAA0200868	FAA0200869	FAA0200866

Unit : mm

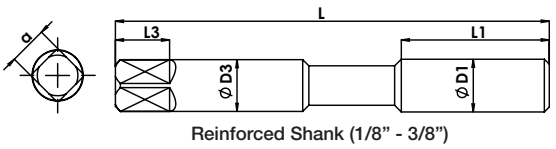
TOTEM® HSS Hand Taps

UNF Unified fine threads

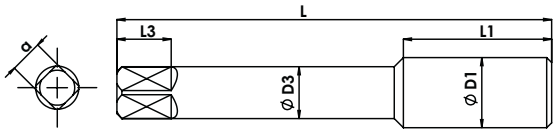


HOLE TYPE

HSS | ISO 529 | 2B



Reinforced Shank (1/8" - 3/8")



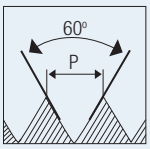
Reduced Shank (7/16" - 2")

							Lead Chamfer	Taper	Second	Bottom	Set
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/4"	28	66	19	6.3	5	8	5.5	FAA0201319	FAA0201324	FAA0201329	FAA0201315
5/16"	24	69	19	8	6.3	9	6.9	FAA0201353	FAA0201357	FAA0201362	FAA0201349
3/8"	24	76	20	10	8	11	8.5	FAA0201394	FAA0201398	FAA0201402	FAA0201390
7/16"	20	82	22	8	6.3	9	9.9	FAA0201433	FAA0201436	FAA0201439	FAA0201430
1/2"	20	84	24	9	7.1	10	11.5	FAA0201457	FAA0201460	FAA0201463	FAA0201455
9/16"	18	90	25	11.2	9	12	12.9	FAA0201489	FAA0201491	FAA0201493	FAA0201488
5/8"	18	95	25	12.5	10	13	14.5	FAA0201506	FAA0201509	FAA0201512	FAA0201503
3/4"	16	104	29	14	11.2	14	17.5	FAA0201532	FAA0201535	FAA0201538	FAA0201528
7/8"	14	113	33	16	12.5	16	20.4	FAA0201557	FAA0201560	FAA0201563	FAA0201555
1"	12	120	35	18	14	18	23.25	FAA0201588	FAA0201591	FAA0201594	FAA0201586
1.1/8"	12	127	37	20	16	20	26.5	FAA0201611	FAA0201612	FAA0201613	FAA0201610
1.1/4"	12	137	37	22.4	18	22	29.5	FAA0201623	FAA0201624	FAA0201625	FAA0201622
1.3/8"	12	144	37	25	20	24	32.75	FAA0201630	FAA0201631	FAA0201632	FAA0201629
1.1/2"	12	149	39	28	22.4	26	36	FAA0201638	FAA0201639	FAA0201640	FAA0201637

Unit : mm

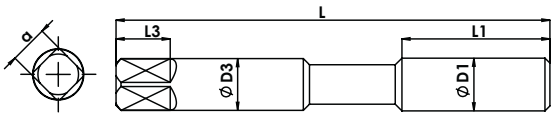
TOTEM® HSS Hand Taps

UNF Unified fine threads



HOLE TYPE

HSS | ISO 529 | 2B

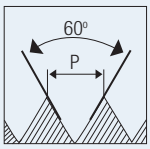


							Lead Chamfer	Taper	Second	Bottom	Set
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
0	80	41	8	2.5	2	4	1.25	FAA0201237	FAA0201238	FAA0201239	FAA0201236
1	72	41	8	2.5	2	4	1.55	-	FAA0201241	FAA0201242	FAA0201240
2	64	44.5	9.5	2.8	2.24	5	1.9	FAA0201244	FAA0201245	FAA0201246	FAA0201243
3	56	44.5	9.5	2.8	2.24	5	2.15	FAA0201249	FAA0201250	FAA0201251	FAA0201248
4	48	48	11	3.15	2.5	5	2.4	FAA0201254	FAA0201255	FAA0201256	FAA0201253
5	44	48	11	3.15	2.5	5	2.7	FAA0201259	FAA0201260	FAA0201261	FAA0201258
6	40	50	13	3.55	2.8	5	2.95	FAA0201264	FAA0201265	FAA0201266	FAA0201263
8	36	53	13	4.5	3.55	6	3.5	FAA0201269	FAA0201270	FAA0201271	FAA0201268
10	32	58	16	5	4	7	4.1	FAA0201276	FAA0201280	FAA0201283	FAA0201275
12	28	62	17	5.6	4.5	7	4.7	FAA0201303	FAA0201305	FAA0201307	FAA0201302

Unit : mm

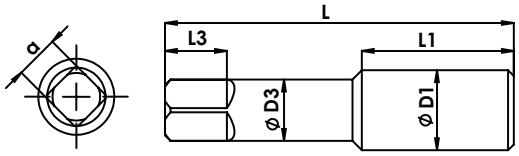
TOTEM® HSS Hand Taps

NPT Pipe threads



HOLE TYPE

HSS ANSI 94.9

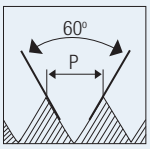


							Lead Chamfer	Taper	Bottom	Pair
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
1/16"	27	2.1/8	11/16	0.312	0.234	3/8	6.3	FAA0204897	FAA0204898	FAA0204896
1/8"	27	2.1/8	3/4	0.437	0.328	3/8	8.7	FAA0204901	FAA0204903	FAA0204899
1/4"	18	2.7/16	1.1/16	0.562	0.421	7/16	11.1	FAA0204911	FAA0204914	FAA0204909
3/8"	18	2.9/16	1.1/16	0.7	0.531	1/2	14.5	FAA0204921	FAA0204925	FAA0204919
1/2"	14	3.1/8	1.3/8	0.687	0.515	5/8	18	FAA0204932	FAA0204934	FAA0204928
3/4	14	3.1/4	1.3/8	0.906	0.679	11/16	23.25	FAA0204943	FAA0204946	FAA0204942
1"	11.5	3.3/4	1.3/4	1.125	0.843	13/16	29	FAA0204951	FAA0204954	FAA0204950
1.1/4"	11.5	4	1.3/4	1.312	0.984	15/16	38	FAA0204958	FAA0204959	FAA0204957
1.1/2"	11.5	4.1/4	1.3/4	1.5	1.125	1	44	FAA0204963	FAA0204964	FAA0204962
2"	11.5	4.1/2	1.3/4	1.875	1.406	1.1/8	56	FAA0204969	FAA0204968	FAA0204967
2.1/2"	8	5.1/2	2.9/16	2.25	1.687	1.1/4	65.48	-	-	FAA0204970
3"	8	6	2.5/8	2.625	1.968	1.3/8	-	-	-	FAA0207340

Unit : mm

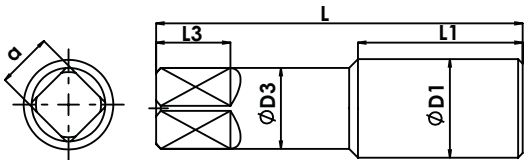
TOTEM® HSS Hand Taps

NPS Pipe threads special



HOLE TYPE

HSS ANSI 94.9



							Lead Chamfer	Taper	Second	Bottom	Set
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1				
1/16"	27	2.1/8	11/16	0.312	0.234	3/8	6.3	-	-	-	FAA0207341
1/8"	27	2.1/8	3/4	0.437	0.328	3/8	8.7	FAA0205003	FAA0205004	FAA0205005	FAA0205002
1/4"	18	2.7/16	1.1/16	0.562	0.421	7/16	11.1	FAA0205006	FAA0205007	FAA0205008	FAA0207342
3/8"	18	2.9/16	1.1/16	0.7	0.531	1/2	14.5	FAA0205009	FAA0205010	FAA0205011	FAA0207343
1/2"	14	3.1/8	1.3/8	0.687	0.515	5/8	18	FAA0205012	FAA0205013	FAA0205014	FAA0207344
3/4"	14	3.1/4	1.3/8	0.906	0.679	11/16	23.25	FAA0205015	FAA0205016	FAA0205017	FAA0207345
1"	11.5	3.3/4	1.3/4	1.125	0.843	13/16	29	-	-	-	FAA0207346
1.1/4"	11.5	4	1.3/4	1.312	0.984	15/16	38	-	-	FAA0205018	FAA0207349
1.1/2"	11.5	4.1/4	1.3/4	1.5	1.125	1	44	-	-	-	FAA0207351
2"	11.5	4.1/2	1.3/4	1.875	1.406	1.1/8	56	-	-	-	FAA0207354

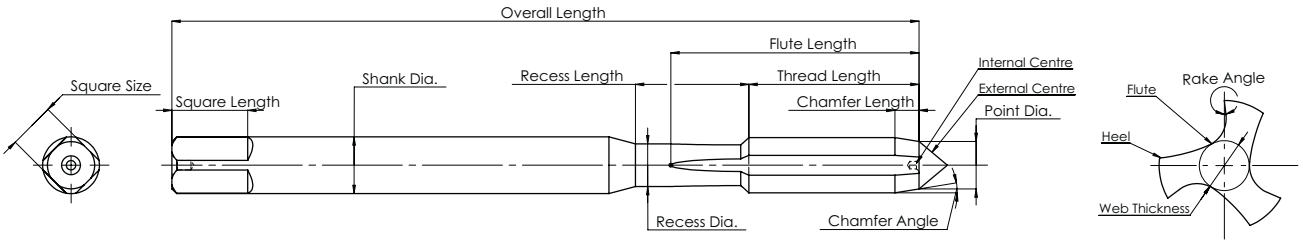
Unit : mm

TOTEM®

High Performance Cutting Tools

TECHNICAL DETAILS

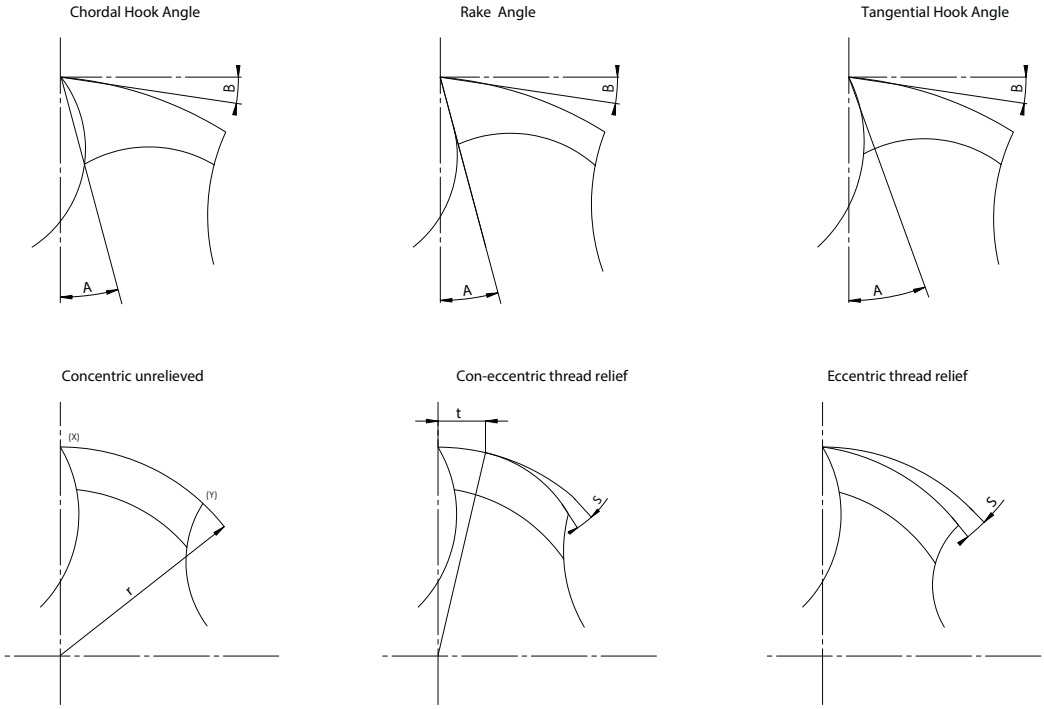
Tap nomenclature

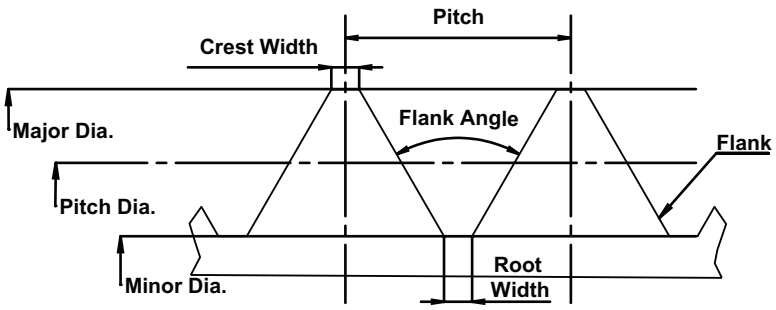


- **THREAD LENGTH:** It is a total length of threaded portion.
- **OVERALL LENGTH:** The axial distance between the two extreme ends of a tap is called as the overall length of the tap.
- **SQUARE:** The square end of the tap shank, for holding it in the tap wrench.
- **SHANK :** It is the cylindrical part if tap which is use for hold or drive.
- **CUTTING EDGE :** The edge formed by the intersection of the flute face and the form of the thread, imposed on the land
- **FLUTE :** It is the groove in the body in tap which provide cutting edge. Permits removal of chips and allows coolant or lubricant to reach the cutting edge.
- **LAND :** It is the surface between cutting edge and non cutting edge
- **WEB :** The central portion of tap which joins the land and extending along the fluted portion of tap
- **WEB TAPER :** It is the increase in the web thickness from the entering end of the Tap towards the shank end of the flutes.
- **HEEL :** It is the edge formed by the intersection of the relieved surface behind the cutting edge and the flute
- **CHAMFER :** The taper on the threads at the front end of the tap made by grinding and relieving the crest of the first few teeth
- **RAKE ANGLE :** The angular relationship of the straight cutting face of the tooth with respect to a radial line through the crest of the tooth of cutting edge. There are three type of rake angle. The details given below. Positive rake means that the crest of the cutting face is angularly ahead. Negative rake means that the crest of the cutting face is angularly behind. Zero radial rake means the cutting face is directly on a radial line
- **CREST :** It is the prominent part of thread i.e. Top surface joining the two sides of thread
- **ROOT :** It is bottom of groove between sides of two adjacent thread
- **FLANK :** The flank angle are angle between individual flank and perpendicular to axis of thread, It is equal to as half angle of thread
- **INCLUDED ANGLE :** It is the angle between two flank of thread

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Tap nomenclature





Thread Profile

- **DEPTH OF THREAD :** It is the distance between the crest and root of single thread
- **THREAD RELIEF :** The clearance produced on the land by gradually reducing the diameter of the entire thread form between the cutting edge and the non cutting edge
- **MAJOR DIAMETER :** It is the diameter over the crest of thread. Basic major diameter, it is the nominal diameter
- **MINOR DIAMETER :** It is the diameter between the two root of opposite thread.
- **EFFECTIVE DIAMETER (PCD) :** The pitch circle diameter of thread as generated by straight line parallel to axis of tap. This straight line is called as Pitch line. Along the pitch line the width of threads and width of spaces are equal on a perfect thread. This is the important parameter in screw thread and it decides the quality of fit between the two threaded assembly.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

USE YOUR TAPS SELECTOR

Select execution of tool considering blind or through hole **B**

Select thread form and find page number, select from DIN/ISO/JIS standard length **C**

Select your work piece material from this table with desired Vc **A**

DIN 371 / DIN 376 / DIN 374 / ISO 529 / JIS

Page No. DIN / ISO / JIS													
	M	5 / 18 / 31	5 / 18	5 / 18 / 31	36 / 52 / 67	36 / 52	36 / 52 / 67	90	6 / 19	6 / 19	6 / 19	9 / 22	9 / 22
	MF	10 / 23	10 / 23	10 / 23	41 / 57	41 / 57	41 / 57	94	11 / 24	11 / 24	11 / 24	-	-
	UNC	14 / 27	14 / 27	14 / 27	46 / 61	46 / 61	-	-	-	-	-	-	-
	UNF	16 / 29	16 / 29	16 / 29	49 / 64	49 / 64	-	-	-	-	-	-	-
Series		SA1	SA3	SA4	SB1	SB3	SB4	SD4	SAF3	SAF5	SAF7	SAF5	SAF7
Execution		Spiral Point	Spiral Point	Spiral Point	Spiral Flute	Spiral Flute	Spiral Flute	Forming	Spiral Point	Spiral Point	Spiral Point	Spiral Point	Spiral Point
Tool Material		HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE	HSSE-PM	HSSE-PM
Helix		-	-	-	35	35	35	-	-	-	-	-	-
Coating		Bright	TiN	TiAlN	Bright	TiN	TiAlN	TiAlN	TiN	TiCN	AlCrN	TiCN	AlCrN
Chamfer		B/ 4-4.5P	B/ 4-4.5P	B/ 4-4.5P	C/2-3P	C/2-3P	C/2-3P	C/ 2-3P	B/ 4-4.5P	B/ 4-4.5P	B/ 4-4.5P	B/ 4-4.5P	B/ 4-4.5P
Hole Type		Through	Through	Through	Blind/ Through	Blind/ Through	Blind/ Through	Through / Blind	Through	Through	Through	Through	Through
Coolent Feed		No	No	No	No	No	No	No	No	No	No	No	No
Oil Groove		-	-	-	-	-	-	Yes	-	-	-	-	-
P0		10-12	15-20	20-25	8-12								
P1			15-20	15-20	8-12	10-15	15-20	15-20	15-20	15-25			
P2				15-20		8-15	10-18	12-15	15-20	15-25	15-25	25-30	25-30
P3				8-12						15-20	15-20	20-25	20-25
P4													12-16
P5													
P6													
M1													
M2													
M3													
K1				30-35			10-20						
K2			15-20	20-25		8-12	8-12						
K3			12-15										
N1		15-20			15-25								
N2		15-20			15-25								
N3						15-20							
N4		25-30				20-25							
S1													
S2													
S3													
S4													

Select your work piece material from this table with desired Vc **A**

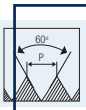
Go to desired page number find your tool on the page **D**

SB DIN

HSS TAPS

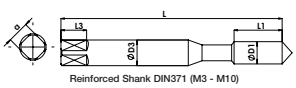
TOTEM Silver cut **Spiral Flute Taps**

M Metric coarse threads

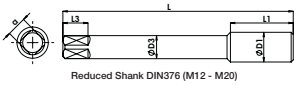


HOLE TYPE

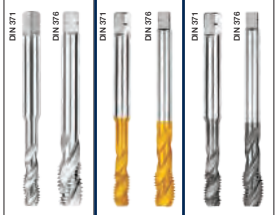
HSS-E | DIN 371/376 | 6HX | C/2-3P | 35°



Reinforced Shank DIN371 (M3 - M10)



Reduced Shank DIN376 (M12 - M20)



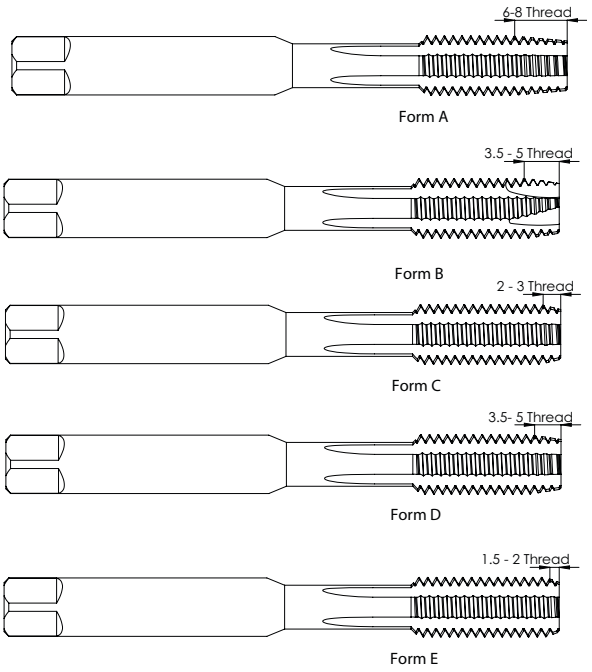
Series	SB1	SB3	SB4
Material - 1st choice	P0-P1	P1-P2	P1-P2
Material - 2nd choice	N1-N2	K2, N3-N4	K1-K2
Coating	Bright	TiN	TiAlN

DIN 371									
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.	EDP No.	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1			
M 3	0.5	56	6	3.5	2.7	6	2.5	FAB0203197	FAB0203207	FAB0204334
M 3.5	0.6	56	7	4	3	6	2.9	FAB0204328	FAB0204331	FAB0204335
M 4	0.7	63	8	4.5	3.4	6	3.3	FAB0203198	FAB0203208	FAB0200968
M 5	0.8	70	8	6	4.9	8	4.2	FAB0203199	FAB0203209	FAB0203685
M 6	1	80	10	6	4.9	8	5	FAB0203200	FAB0203210	FAB0203686
M 7	1	80	10	7	5.5	8	6	FAB0203201	FAB0203211	FAB0204336
M 8	1.25	90	13	8	6.2	9	6.8	FAB0203202	FAB0203212	FAB0203687
M 10	1.5	100	15	10	8	11	8.5	FAB0203203	FAB0203213	FAB0203688

Select the size of nominal diameter required **E**

* For best result use Totem range of pre tapping drills

Chamfer forms



Form A
6 - 8 threads for short through hole

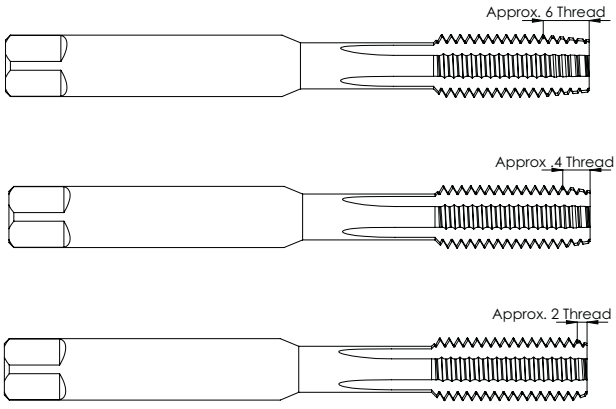
Form B
3.5 - 5 threads with spiral point for all through holes and deep tapping holes

Form C
2 - 3 threads for blind holes; generally for aluminium and grey cast iron.

Form D
3.5 - 5 threads for short through hole

Form E
1.5 - 2 threads for blind holes with small run-out depth

Chamfer length for set of 3 taps

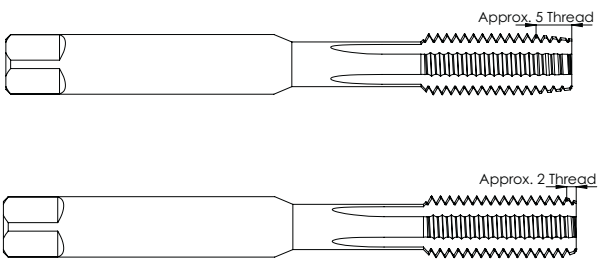


Taper Tap
6 threads approx.

Second Tap
4 threads approx.

Bottom Tap
2 threads approx.

Chamfer length for set of 2 taps (Pairs)



Taper Tap
5 threads approx.

Bottom Tap
2 threads approx.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Material details

Material Group		Material Description	Content	Tensile Strength RM (MPa)*	Hardness (HB)	Hard-ness (HRC)	Torque Constant (Kc) N/mm²
Steels	P0	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	—	2000
	P1	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	—	2100
	P2	Medium- and High-Carbon Steels	C >0,25%	<530	<220	<25	2200
	P3	Alloy Steels and Tool Steels	C >0,25%	600-850	<330	<35	2400
	P4	Alloy Steels and Tool Steels	C >0,25%	850-1400	340–450	35-48	2500
	P5	Ferritic, Martensitic, and PH Stainless Steels	—	600-900	<330	<35	—
	P6	High-Strength Ferritic, Martensitic, and PH Stainless Steels	—	900-1350	350–450	35-48	2600
Stainless Steels	M1	Austenitic Stainless Steel	—	<600	130-200	-	2300
	M2	High-Strength Austenitic Stainless and Cast Stainless Steels	—	600-800	150–230	<25	2600
	M3	Duplex Stainless Steel	—	<800	135–275	<30	3000
Cast Iron	K1	Grey Cast Iron	—	125-500	120–290	<32	1600
	K2	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	—	<600	130–260	<28	1700
	K3	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	—	>600	180–350	<43	2000
Non-Ferrous	N1	Wrought Aluminium	—	—	—	—	700
	N2	Low-Silicon Aluminium Alloys and Magnesium Alloys	Si <12,2%	—	—	—	800
	N3	High-Silicon Aluminium Alloys and Magnesium Alloys	Si > 12,2%	—	—	—	1000
	N4	Copper, Brass, Zinc-Based on Machinability Index Range of 70–100	—	—	—	—	800
	N5	Nylon, Plastics, Rubbers, Phenolics, Resins, Fibreglass	—	—	—	—	—
	N6	Carbon, Graphite Composites, CFRP	—	—	—	—	—
	N7	Metal Matrix Composites (MMC)	—	—	—	—	—
Special Alloys	S1	Iron-Based, Heat-Resistant Alloys	—	500-1200	160-260	25-48	—
	S2	Cobalt-Based, Heat-Resistant Alloys	—	1000-1500	250-450	25-48	—
	S3	Nickel-Based, Heat-Resistant Alloys	—	600-1700	160-450	<48	2000
	S4	Titanium and Titanium Alloys	—	900-1600	300-400	33-48	2300
Hardened Steels	H1	Hardened Materials	—	—	—	44-48	2600
	H2	Hardened Materials	—	—	—	48-55	2900
	H3	Hardened Materials	—	—	—	56-60	2900
	H4	Hardened Materials	—	—	—	>60	—

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Material details

Material Group		ANSI	DIN
Steels	P0	A36, 1008, 1010, 1018 through 1029; 1108, 1117	
	P1	10L18, 1200 Series, 1213, 12L14	C15, Ck22, ST37-2, S235JR, 9SMnPb28, GS38
	P2	1035, 1045, 10L45, 1050, 10L50, 1080, 1137, 1144, 11L44, 1525, 1545, 1572	ST52, S355JR, C35, GS60, Cf53
	P3	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T	16MnCr5, Ck45, 21CrMoV5-7, 38SMn28
	P4	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
	P5	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
	P6	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series	X102CrMo17, G-X120Cr29
Stainless Steels	M1	200 Series, 301, 302, 304, 304L, 309	X5CrNi 18 10, X2CrNiMo 17 13 2, G-X25CrNiSi18 9, X15CrNiSi 20 12
	M2	310, 316, 316L, 321, 347, 384 ASTM Cast XM-1, XM-5, XM-7, XM-21	X2CrNiMo 13 4, X5NiCr 32 21, X5CrNiNb 18 10, G-X15CrNi 25-20
	M3	323, 329, F55, 2205, S329000	X8CrNiMo27 5, X2CrNiMoN22 5 3, X20CrNiSi25 4, G-X40CrNiSi27 4
Cast Iron	K1	class 20, 25, 30, 35, 40, 45, 50, 55, 60, G1800, G3000, G3500, G4000	GG15, GG25, GG30, GG40, GTW40
	K2	60-40-18, 65-45-12, 80-55-06, SAE J434:D4018, D4512, D5506, ASTM A47: Grade 32510, 35018, SAE J158: Grade M3210, M4504, M5003, M5503, M7002,ASTM A842: Grade 250, 300, 350, 400, 450	GGG40, GTS35
	K3	ASTM A536:100-70-03, 120-90-02, SAE J434: D7003, SAE J158:Grade M8501AST A897: 125-80-10, 150-100-7, 175-125-4, 200-150-1, 230-185	GGG60, GTW55, GTS65
Non-Ferrous	N1	2025, 5050, 7050, 1000, 2017	AlMg1, Al99.5, AlCuMg1, AlCuBiPb, AlMgSi1, ALMgSiPb
	N2	2024, 6061, 7075	GAlSiCu4, GDAlSi10Mg
	N3	—	G-ALSi12, G-AlSi17Cu4, G-AlSi21CuNiMg
	N4	C81500	CuZn40, Ms60, G-CuSn5ZnPb, CuZn37, CuSi3Mn
	N5	—	LEXAN®, HOSTALEN™, Polystyrol, Makralon®
	N6	Graphite, CFK, CFRP	CFK, GFK
	N7	C63000	—
Special Alloys	S1	INCOLOY® 800 Series, A608, A567, Discaloy™, INVAR®, N-155, 16-25-6, 19-9 DL; Cast: ASTM A-297, A-351, A-567, A-608	X1NiCrMoCu32 28 7, X12NiCrSi36 16, X5NiCrAlTi31 20, X40CoCrNi20 20
	S2	Haynes® 25 (L605), Haynes 188, J-1570, Stellite®, AiResist 213; Cast: AiResist 13, Haynes 21, MAR-M302, MAR-M509, NASA Co-W-Re, WI-52	Haynes® 188, Stelllite® 6,21,31
	S3	Astroloy™, Hastelloy® B/C/ C-276 /X, INCONEL® 600 and 700 Series, IN102,INCOLOY 900 Series, Rene 41, Waspalloy®, Monel®, K-500, MAR-M20, NIMONIC®, UDIMET®	INCONEL® 690, INCONEL 625, Hastelloy®, NIMONIC® 75
	S4	Pure: Ti 98.8, Ti 98.9,Ti 99.9; Alloyed: Ti 5Al-2.5Sn, Ti6Al-4V, Ti6Al-2Sn-4Zr-2Mo,Ti-3Al-8V-6Cr-4Mo-4Zr, Ti-10V-2Fe-3Al, Ti-13V-11Cr-3Al	Ti1, TiAl5Sn2, TiAl6V4, TiAl4Mo4Sn2
Hardened Steels	H1	Tool Steel H10, H11, H13, D2, D3, 4340, P20	GX260NiCr42, GX330NiCr42, GX300CrNiSi952, GX300CrMo153, HARDOX® 400
	H2	Tool Steel H10, H11, H13, D2, D3, 4340, P20	—
	H3	Tool Steel H10, H11, H13, D2, D3, 4340, P20	—
	H4	Tool Steel H10, H11, H13, D2, D3, 4340, P20	—

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

P-Steel

Steel is the most used workpiece material in metal cutting. Steel as a material is comprised mainly of iron and carbon, often with a modest mixture of alloying elements. Steel has a typical carbon content of .05% to 1.5 %

Plain Carbon Steel

This category of steels includes those materials that are a combination of iron and carbon with no alloying elements. As the carbon content in these materials is increased, the ductility of the material is reduced. The carbon content is usually 0.8%. The hardness varies from 90 up to 350HB

Typical uses of this steel include: Axles, shafts, tubes, forgings, welded constructions, structural steel, deep drawn and stamped products, pressure vessel steel, and a variety of cast steels.

Alloy Steels

Plain carbon steels are made up primarily of iron and carbon, while alloy steels include these same elements with many other elemental additions. The purpose of alloying steel is either to enhance the material's physical properties or its ultimate manufacturability. The physical property enhancements include improved toughness, tensile strength, hardenability, ductility and wear resistance. Alloyed steels have a carbon content lower than 1.7 % and alloying elements such as Ni, Cr, Mo, V and W.

The machinability of steel differs, depending on alloying elements, heat treatment and manufacturing process (forged, rolled, cast, etc.).

Components manufactured from this steel include Crank Shafts, Connecting Rods, Cam Shafts, Hubs, Axles, Shafts, other forging components.

M-Stainless steel

As the name implies, this group of materials is designed to resist oxidation and other forms of corrosion, in addition to heat in some instances. These materials tend to have significantly greater corrosion resistance and strength at high temperatures than their plain or alloy steel counterparts due to the substantial additions of Chromium, Nickel, Molybdenum, Niobium and Titanium supply different characteristics, such as resistance towards corrosion and strength at high temperatures. These additions combine with Oxygen to create a passivating layer on the surface of the steel, which provides a non-corrosive property to the material.

Stainless steels are used extensively in the food processing, medical – surgical implants, chemical and petroleum industries to transfer corrosive liquids between processing and storage facilities. Stainless steels can be cold formed, forged, machined, welded or extruded.

Ferritic and martensitic stainless steel

Ferritic steels have magnetic properties. Martensitic stainless steels have relatively high carbon content, which make them hardenable. Weldability is low for both ferritic and martensitic and medium to low resistance against corrosion, which increases with a larger Cr-content.

Austenitic stainless steel

Austenitic Stainless steel are the most common and familiar types of stainless steel. They are most easily recognized as nonmagnetic. They are extremely formable and weldable, and they can be successfully used from cryogenic temperatures to the red-hot temperatures of furnaces and jet engines. They contain between about 16 and 25% chromium, and they can also contain nitrogen in solution, both of which contribute to their high corrosion resistance. Were it not for the cost of the nickel that helps stabilize their austenitic structure, these alloys would be used even more widely.

Work hardening produces hard surfaces and hard chips, which in turn lead to notch wear. It also creates adhesion and produces built-up edge. It has a relative machinability of 60%. The hardening condition can tear coating and substrate material from the edge, resulting in chipping and bad surface finish. Austenite produces tough, long, continuous chips, which are difficult to break. Generates lot of heat during machining.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

K-Cast iron

Cast iron is an iron carbon mixture that is generally used to pour sand castings, as opposed to making billets or bar stock. It has excellent flow properties and therefore, when it is heated to extreme temperatures. Ideal material for complex cast shapes and intricate moulds.

This material is often used for automotive engine blocks, cylinder heads, valve bodies, manifolds, heavy equipment oil pans and machine bases.

Grey Cast Iron

Grey cast iron is an extremely versatile, very machinable relatively low strength cast iron used for pipe, automotive engine blocks, farm implements and fittings. This material receives its dark grey colour from the excess carbon in the form of graphite flakes, which give it its name. It has graphite in typical flake form and the main properties are low impact strength, good thermal conductivity, less heat when engine operates and low heat in cutting process; good dampening properties, absorbs the vibrations in the engine.

Malleable Cast Iron

When white cast iron castings are annealed, malleable iron castings are formed. Malleable iron castings result when hard, brittle cementite in white iron castings is transformed into tempered carbon or graphite in the form of rounded nodules or aggregate. The resulting material is a strong, ductile, tough and very machinable product that is used on a broad scope of applications.

Nodular Cast Iron

Nodular or Ductile iron is used to manufacture a wide range of automotive engine components including cam shafts, crank shafts, bearing caps and cylinder heads. This material is also frequently used for heavy equipment cast parts as well as heavy machinery faceplates and guides. Nodular iron is strong, ductile, tough and extremely shock resistant.

Components manufactured from this material include hubs, tubing, rollers, exhaust manifolds, crankshafts, differential housings, bearing caps, exhaust manifolds, bedplates, turbo charger housings, clutch plates and fly wheels.

N-Non-ferrous materials

Non-ferrous metals are metals that do not contain iron. Non-ferrous metals are used because of desirable properties such as low weight (e.g., Aluminium), higher conductivity (e.g., Copper), non-magnetic property or resistance to corrosion (e.g., Zinc).

Aluminium (Al) alloys comprising less than 12-13% Silicon (Si) represent the largest part.

LM2 (ADC 12)

One of the two most widely used alloys for all types of die-castings. Mainly used in Automobile Industry for manufacturing components like Crank case, cylinder head, transmission housings, brackets.

LM4

The most versatile of the alloys, has very good casting characteristics and is used for a very wide range of applications.

LM5

Suitable for sand and chill castings requiring maximum corrosion resistance. Mainly used for castings in marine application.

LM6

Suitable for large, intricate and thin walled castings in all types of moulds. Also used where corrosion resistance or ductility is required.

LM9

Used for applications especially in low pressure die casting, requiring the characteristics of LM6 with higher tensile strength after heat treatment.

LM13

Used in applications where thermal stresses are more e.g Piston. This alloy can withstand higher temperature and load. It has a good wear resistance properties and machinability. But it requires heat treatment.

LM 24

Suitable for large, intricate and thin walled castings in all types of moulds, also used where corrosion resistance or ductility is required

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Formulas

TAP DRILL SIZE

A. Tap Drill Size (Inch Size Cut Taps)
Drill Ø = Basic O.D. OF Thread – ((0.0130 X % of Full Thread)/Pitch (T.P.I.))

B. Tap Drill Size (Inch Size Roll Form Taps)
Drill Ø = BASIC O.D. OF Thread– ((0.0068 X % of Full Thread)/Pitch (T.P.I.))

C. Tap Drill Size (Metric Size Cut Taps)
Drill Ø = Basic O.D. OF Thread – ((Pitch in mm X % of Full Thread)/76.98)

D. Tap Drill Size (Metric Size Roll Form Taps)
DRILL Ø = BASIC O.D. OF THD – ((Pitch in mm X % of Full Thread)/147.06).

OR

Drill Diameter = Nominal diameter - Pitch

INCH – METRIC CONVERSIONS

A. INCHES TO MILLIMETERS MM = INCH X 25.4

B. MILLIMETERS TO INCHES INCH = MM/25.4 - OR – INCH = MM X 0.03937

THREADING FORMULAS

Cutting Speed (Vc) $= \dfrac{N \times 3.14 \times D}{1000}$ (m/min)

RPM (N) $= \dfrac{Vc \times 1000}{3.14 \times D}$ (RPM)

Torque (Md) $= \dfrac{P^2 \times D \times Kc}{8000}$ (Nm)

Power (P) $= \dfrac{Md \times 2 \times 3.14\ N}{60}$ (KW)

Vc - Cutting Speed (m/min)

P - Pitch (mm)

Kc - Specific cutting force (N/mm²)

P - Power (KW)

Md - Torque (Nm)

D - Nominal Dia (mm)

N - RPM

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Hardness and tensile strength

Vickers Hardness No. HV	Rockwell C. Scale Hardness No. HRC	Brinell Hardness No. HB	Tensile strength N/mm²
940	68		
900	67		
864	66		
829	65		
800	64		
773	63		
745	62		
720	61		
698	60		
675	59		
655	58	2200	
650	618	2180	
640	608	2145	
639	57	607	2140
630	599	2105	
620	589	2070	
615	56	584	2050
610	580	2030	
600	570	1995	
596	55	567	1980
590	561	1955	
580	551	1920	
578	54	549	1910
570	542	1880	
560	53	532	1845
550	523	1810	
544	52	517	1790
540	513	1775	
530	504	1740	
527	51	501	1730
520	494	1700	
514	50	488	1680
510	485	1665	
500	475	1630	
497	49	472	1620
490	466	1595	
484	48	460	1570
480	456	1555	
473	47	449	1530
470	447	1520	
460	437	1485	
458	46	435	1480
450	428	1455	
446	45	424	1440
440	418	1420	

Vickers Hardness No. HV	Rockwell C. Scale Hardness No. HRC	Brinell Hardness No. HB	Tensile strength N/mm²
434	44	413	1400
423	43	402	1360
413	42	393	1330
403	41	383	1300
392	40	372	1260
382	39	363	1230
373	38	354	1200
364	37	346	1170
355	36	337	1140
350	333	1125	
345	35	328	1110
340	323	1095	
336	34	319	1080
330	314	1060	
327	33	311	1050
320	304	1030	
317	32	301	1020
310	31	295	995
302	30	287	970
300	285	965	
295	280	950	
293	29	278	940
290	276	930	
287	28	273	920
285	271	915	
280	27	266	900
275	261	880	
272	26	258	870
270	257	865	
268	25	255	860
265	252	850	
260	24	247	835
255	23	242	820
250	22	238	800
245	233	785	
243	21	231	780
240	228	770	
235	223	755	
230	219	740	
225	214	720	
220	209	705	
215	204	690	
210	199	675	
205	195	660	
200	190	640	

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

TOTEM® Technical Details

Table cutting speeds

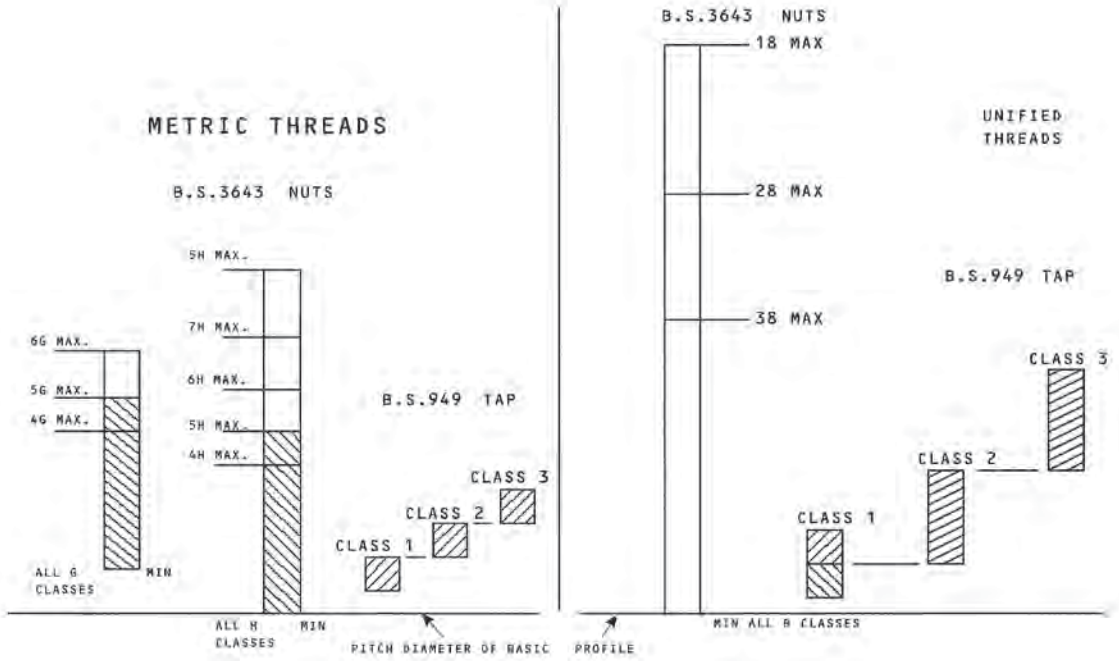
M/min	5	8	10	15	20	25	30	40	50	60	70	80	90	100	110	150
Tool dia mm /inch	Revolutions Per Minute (RPM)															
1	1592	2546	3138	4775	6366	7958	9549	12732	15916	19099	22282	25465	28648	31831	35014	47747
1.5	1061	1698	2122	3183	4244	5305	6366	8488	10610	12732	14854	16977	19099	21221	23343	31831
2	796	1273	1592	2387	3183	3979	4775	6366	7958	9549	11141	12732	14324	15916	17507	23873
2.5	637	1019	1273	1910	2546	3183	3820	5093	6366	7639	8913	10186	11459	12732	14006	19099
3	531	849	1061	1592	2122	2653	3183	4244	5305	6366	7427	8488	9549	10610	11671	15916
1/8”	500	801	1001	1501	2002	2502	3003	4004	5005	6006	7007	8008	9009	10010	11011	15015
3.5	455	728	909	1364	1819	2274	2728	3638	4547	5457	6366	7176	8185	9095	10004	13642
4	398	637	796	1194	1592	1989	2387	3183	3979	4775	5570	6366	7162	7958	8754	11937
4.5	354	566	707	1061	1415	1768	2122	2829	3537	4244	4951	5659	6366	7074	7781	10610
3/16”	334	535	669	1003	1337	1672	2006	2675	3344	4012	4681	5350	6018	6687	7356	10031
5	318	509	637	955	1273	1592	1910	2546	3183	3820	4456	5093	5730	6366	7003	9549
6	265	424	531	796	1061	1326	1592	2122	2653	3183	3714	4244	4775	5305	5836	7958
1/4”	251	401	501	752	1003	1253	1504	2005	2506	3008	3509	4010	4511	5013	5514	7519
7	227	364	455	682	909	1137	1364	1819	2274	2728	3183	3638	4093	4547	5002	6821
5/16”	200	321	401	601	802	1002	1203	1604	2004	2405	2806	3207	3608	4009	4410	6013
8	199	318	398	597	796	995	1194	1592	1989	2387	2785	3183	3581	3979	4377	5968
9	177	283	354	531	707	884	1061	1415	1768	2122	2476	2829	3183	3537	3890	5305
3/8”	167	267	334	501	668	835	1002	1336	1670	2004	2338	2672	3006	3340	3674	5010
10	159	255	318	477	637	796	955	1273	1592	1910	2228	2546	2865	3183	3501	4775
7/16”	143	229	287	430	573	716	860	1146	1433	1719	2006	2292	2579	2865	3152	4298
12	133	212	265	398	531	663	796	1061	1326	1592	1857	2122	2387	2653	2918	3979
1/2”	125	201	251	376	501	627	752	1003	1253	1504	1754	2005	2256	2506	2757	3760
14	114	182	227	341	455	568	682	909	1137	1364	1592	1819	2046	2274	2501	3410
9/16”	111	178	223	334	446	557	668	891	1114	1337	1559	1782	2005	2228	2450	3341
15	106	170	212	318	424	531	637	849	1061	1273	1485	1698	1910	2122	2334	3183

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Recommended tap tolerances

Tap Tolerance BS 949	Class 1	Class 2	Class 3
Metric BS 3643	Classes 4H, 5H	Classes 6H, 4G, 5G	Classes 7H, 8H, 9G
Unified BS 1580	Class 3B	Class 2B	Class 1B
Whitworth BS 84	Close Class	Medium Class	Normal Class
B.A. BS 93	-	Normal Class	-

DISPOSITION OF TAP TOLERANCES IN RELATION TO NUT TOLERANCES FOR METRIC AND UNIFIED THREADS



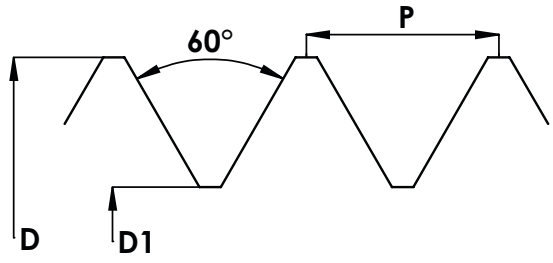
THREAD TOLERANCES FOR TAP TO ANSI 9-49

up to 1" Diameter	GH 2	Basic pitch diameter, plus 0.0005", plus 0.0010"
up to 1" Diameter	GH 3	Basic pitch diameter, plus 0.0010", plus 0.0015"
up to 1" Diameter	GH 4	Basic pitch diameter, plus 0.0015", plus 0.0020"
Over 1" Dia. to 1 1/2" Dia.	GH 4	Basic pitch diameter, plus 0.0010", plus 0.0020"
Over 1 1/2" Dia.	GH 7	Basic pitch diameter, plus 0.0015", plus 0.0035"

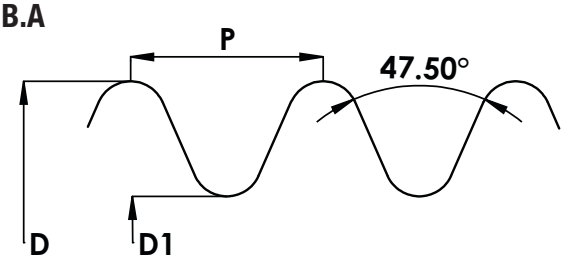
Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Thread forms

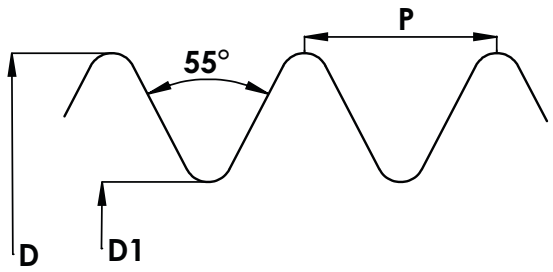
Metric ISO - UNC - UNF



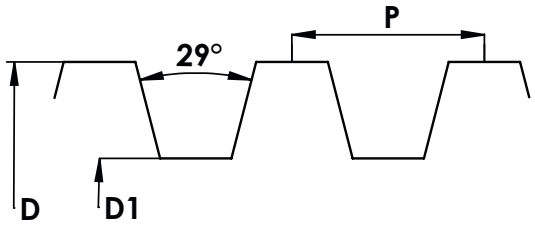
B.A



BSW - BSF - BSP



ACME



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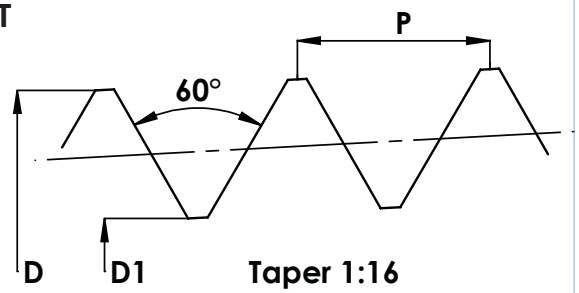

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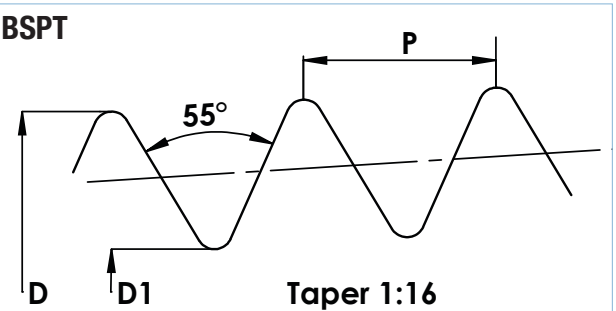
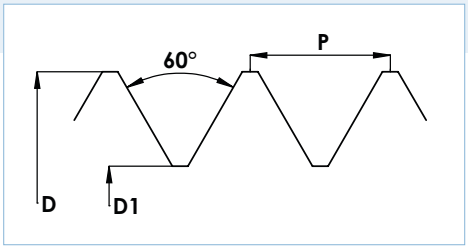


ACME	:	Acme Thread
BA	:	British Association Standard Thread
BSF	:	British Standard Fine Thread Series
BSP	:	British Standard Pipe
BSPT	:	British Standard Taper Pipe Thread
BSW	:	British Standard Whitworth Coarse Thread Series
M	:	Metric Screw Thread Series
NGT	:	National Gas Taper Thread (See “SGT”)
NPS	:	for Tap marking only (See NPSC, NPSM)
NPSF	:	Dryseal American National Standard Fuel Internal Straight Pipe Thread
NPSI	:	Dryseal American National Standard Intermediate Internal Straight Pipe Thread
NPT	:	American National Standard Taper Pipe Thread
NPTF	:	Dryseal American National Standard Taper Pipe Thread
PG	:	Panzer Gewinder
STI	:	Special Thread for Helial Coil Wire Screw Thread Inserts
UN	:	Unified Constant Pitch Thread Series
UNC	:	Unified Coarse Thread Series
UNEF	:	Unified Extra Fine Thread Series
UNF	:	Unified Fine Thread Series
UNS	:	Unified Thread-Special
WW	:	British Standard Whitworth Special Thread

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Recommended tap drill sizes



Metric Coarse		
Nominal Diameter ØD	Pitch	Drill Size
2	0.4	1.6
2.2	0.45	1.75
2.3	0.4	1.9
2.5	0.45	2.05
2.6	0.45	2.1
3	0.5	2.5
3.5	0.6	2.9
4	0.7	3.3
4.5	0.75	3.7
5	0.8	4.2
6	1	5
7	1	6
8	1.25	6.8
9	1.25	7.8
10	1.5	8.5
11	1.5	9.5
12	1.75	10.2
14	2	12
16	2	14
18	2.5	15.5
20	2.5	17.5
22	2.5	19.5
24	3	21
27	3	24
30	3.5	26.5
33	3.5	29.5
36	4	32
39	4	35
42	4.5	37.5
45	4.5	40.5
48	5	43
52	5	47
56	5.5	50.5
60	5.5	54.5
64	6	58
68	6	62
-	-	-
-	-	-
-	-	-
-	-	-

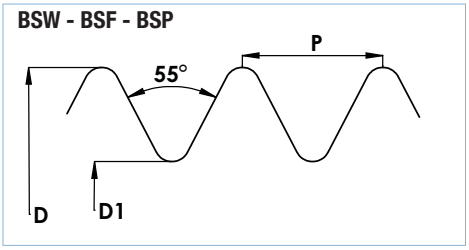
Metric Fine		
Nominal Diameter ØD	Pitch	Drill Size
2.5	0.35	2.15
3	0.35	2.65
3.5	0.35	3.15
4	0.5	3.5
4.5	0.5	4
5	0.5	4.5
6	0.75	5.2
7	0.75	6.2
8	0.75	7.2
8	1	7
9	1	8
10	0.75	9.2
10	1	9
10	1.25	8.8
11	1	10
12	1	11
12	1.25	10.8
12	1.5	10.5
14	1	13
14	1.25	12.8
14	1.5	12.5
15	1	14
15	1.5	13.5
16	1	15
16	1.5	14.5
17	1	16
17	1.5	15.5
18	1.5	16.5
18	2	16
20	1	19
20	1.5	18.5
20	2	18
22	1	21
22	1.5	20.5
22	2	20
24	1	23
24	1.5	22.5
24	2	22
24	1	24
25	1.5	23.5

Metric Fine		
Nominal Diameter ØD	Pitch	Drill Size
26	1.5	24.5
27	1	26
27	1.5	25.5
27	2	25
28	1.5	26.5
28	2	26
30	1	29
30	1.5	28.5
30	2	28
32	1.5	30.5
32	2	30
33	1.5	31.5
33	2	31
33	3	30
35	1.5	33.5
36	1.5	34.5
36	2	34
36	3	33
38	1.5	36.5
39	1.5	37.5
39	2	37
39	3	36
40	1.5	38.5
40	2	38
40	3	37
42	1.5	40.5
42	2	40
42	3	39
45	1.5	43.5
45	2	43
45	3	42
48	1.5	46.5
48	2	46
48	3	45
50	1.5	48.5
50	2	48
50	3	47
52	1.5	50.5
52	2	50
52	3	49

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

TOTEM® Technical Details

Recommended tap drill sizes



BSW		
Nominal Diameter Ø D	TPI	Drill Size in mm
1/16”	60	1.2
3/32”	48	1.9
1/8”	40	2.6
5/32”	32	3.2
3/16”	24	3.7
7/32”	24	4.5
1/4”	20	5.1
9/32”	20	5.8
5/16”	18	6.5
3/8”	16	7.9
7/16”	14	9.3
1/2”	12	10.5
9/16”	12	12.1
5/8”	11	13.5
11/16”	11	15.1
3/4”	10	16.3
7/8”	9	19.3
15/16”	9	20.6
1”	8	22.0
1.1/8”	7	24.8
1.1/4”	7	28.0
1.3/8”	6	30.5
1.1/2”	6	33.5
1.5/8”	5	36.0
1.3/4”	5	39.0
1.7/8”	4 ½	41.3
2”	4 ½	44.5

BSF		
Nominal Diameter Ø D	TPI	Drill Size in mm
3/16”	32	4
7/32”	28	4.6
1/4”	26	5.30
9/32”	26	6.00
5/16”	22	6.80
3/8”	20	8.30
7/16”	18	9.70
1/2”	16	11.10
9/16”	16	12.70
5/8”	14	14.00
11/16”	14	15.50
3/4”	12	16.75
7/8”	11	19.75
15/16”	11	21.50
1”	10	22.75
1.1/8”	9	25.50
1.1/4”	9	28.50
1.3/8”	8	31.50
1.1/2”	8	34.50
1.5/8”	8	37.70
1.3/4”	7	41.00
1.7/8”	7	43.70
2”	7	47.00
-	-	-
-	-	-
-	-	-
-	-	-

BSP		
Nominal Diameter Ø D	TPI	Drill Size in mm
1/8”	28	8.80
1/4”	19	11.80
3/8”	19	15.25
1/2”	14	19.00
5/8”	14	21.00
3/4”	14	24.50
7/8”	14	28.25
1”	11	30.75
1.1/4”	11	39.50
1.1/2”	11	45.00
1.3/4”	11	51.00
2”	11	57.00
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
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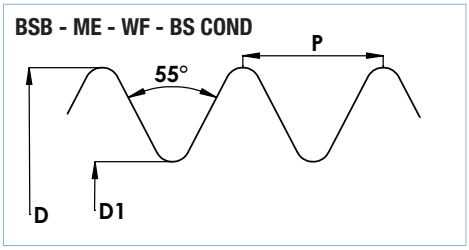
Recommended tap drill sizes



BSB		
Nominal Diameter Ø D	TPI	Drill Size in mm
1/4”	26	5.3/.4
9/32”	26	6.10
5/16”	26	6.90
3/8”	26	8.40
7/16”	26	10.00
1/2”	26	11.50
9/16”	26	13.1/13
5/8”	26	14.70
11/16”	26	16.50
3/4”	26	17.80
7/8”	26	21.00
1”	26	24.20
1.1/8”	26	27.50
1.1/4”	26	30.50
1.3/8”	26	33.70
1.1/2”	26	36.90
2	26	49.60

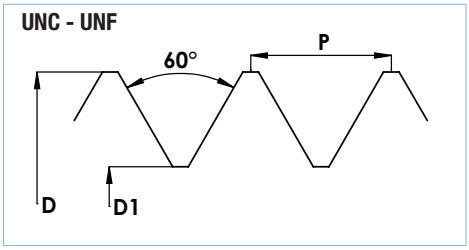
ME		
Nominal Diameter Ø D	TPI	Drill Size in mm
1/8”	40	2.55
5/32”	40	3.30
3/16”	40	4.00
7/32”	40	4.80
1/4”	40	5.50
9/32”	32	6.10
5/16”	32	7.00
3/8”	32	8.60
7/16”	26	10.00
1/2”	26	11.50

BS COND.		
Nominal Diameter Ø D	TPI	Drill Size in mm
1/2”	18	11.50
5/8”	18	14.20
3/4”	16	17.50
7/8”	16	20.60
1”	16	23.80
1.1/4”	16	30.10
1.1/2”	14	36.10
2	14	48.80

WHITWORTH FORM SPECIAL		
Nominal Diameter Ø D	TPI	Drill Size in mm
1/4”	24/28/32	5.3, 5.4, 5.5
5/16”	24/40	6.75 ,7.3
3/8”	24,40	8.4, 8.9
7/16”	20/24/40	9.8/10, 10.5
1/2”	20/24/40	11.5, 11.9, 12
9/16”	20	13.1
5/8”	20	14.5
11/16”	20	16.2
3/4”	14/20	17.1, 17.8
7/8”	14/16/20	20.0, 20.6, 21.0
1”	12/20	23.0, 24.0

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Recommended tap drill sizes

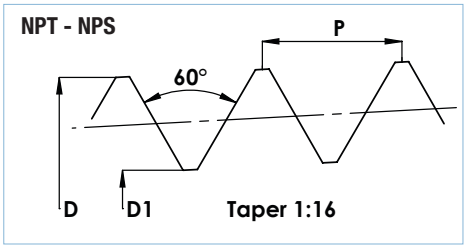


UNC		
Nominal Diameter Ø D	Pitch	Drill Size
#1	64	1.5
#2	56	1.8
#3	48	2.1
#4	40	2.3
#5	40	2.6
#6	32	2.85
#8	32	3.5
#10	24	3.9
#12	24	4.5
1/4"	20	5.2
5/16"	18	6.6
3/8"	16	8
7/16"	14	9.4
1/2"	13	10.75
9/16"	12	12.25
5/8"	11	13.5
3/4"	10	16.5
7/8"	9	19.5
1"	8	22.25
1.1/8"	7	25
1.1/4"	7	28.25
1.3/8"	6	30.75
1.1/2"	6	34
1.3/4"	5	39.5
2"	4.5	45.25

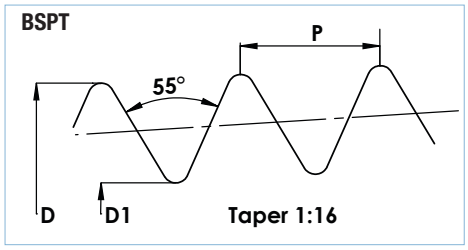
UNF		
Nominal Diameter Ø D	Pitch	Drill Size
#1	80	1.3
#2	72	1.6
#3	64	1.9
#4	56	2.1
#5	48	2.4
#6	44	2.7
#8	40	3
#10	36	3.5
#12	32	4.1
1/4"	28	4.7
5/16"	28	5.5
3/8"	24	6.9
7/16"	24	8.5
1/2"	20	9.9
9/16"	20	11.5
5/8"	18	12.9
3/4"	18	14.5
7/8"	16	17.5
1"	14	20.5
1.1/8"	12	23.25
1.1/4"	12	26.5
1.3/8"	12	29.5
1.1/2"	12	32.7
2"	12	36

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

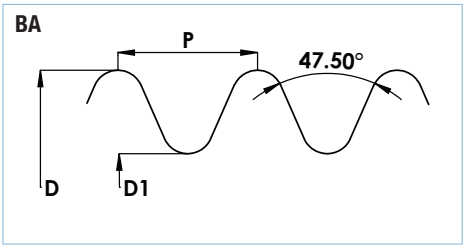
Recommended tap drill sizes



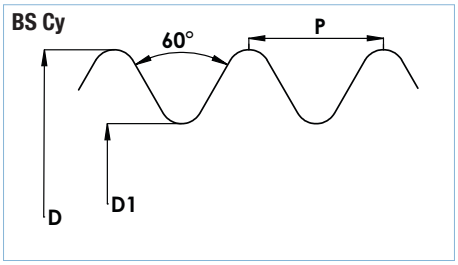
NPT & NPS			
Nominal Diameter ØD	TPI	Drill Size in mm	
		Tapping With Reamer	Tapping Without Reamer
1/16"	27	6.00	6.30
1/8"	27	8.40	8.70
1/4"	18	10.70	11.10
3/8"	18	14.25	14.50
1/2"	14	17.50	18.00
3/4"	14	22.75	23.25
1"	11.5	28.50	29.00
1.1/4"	11.5	37.50	38.00
1.1/2"	11.5	43.50	44.00
2"	11.5	55.00	56.00



BSPT		
Nominal Diameter ØD	TPI	Drill Size in mm
1/8"	28	8.80
1/4"	19	11.80
3/8"	19	15.25
1/2"	14	19.00
5/8"	14	21.00
3/4"	14	24.50
7/8"	14	28.25
1"	11	30.75
1.1/4"	11	39.50
1.1/2"	11	45.00
1.3/4"	11	51.00
2	11	57.00



BA			
Size	Diameter	TPI	Drill Size in mm
0	0.2362	25.4	5.10
1	0.2087	28.2	4.50
2	0.1850	31.4	4.00
3	0.1614	34.8	3.40
4	0.1417	38.5	3.00
5	0.1260	43	2.65
6	0.1102	47.9	2.30
7	0.0984	52.9	2.05
8	0.0866	59.1	1.80
9	0.0748	65.1	1.55
10	0.0669	72.6	1.40
11	0.0591	81.9	1.20
12	0.0512	90.9	1.05



BS Cy		
Size	TPI	Drill Size in mm
1/8"	40	2.65
5/32"	32	3.30
3/16"	32	4.10
7/32"	26	4.80
1/4"	26	5.60
5/16"	26	7.20
3/8"	26	8.70
7/16"	26	10.30
1/2"	26	11.90
9/16"	26	13.50
5/8"	26	15.00
3/4"	26	18.20
1"	24	24.50

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Surface treatment

While selecting the correct type of tap for a job, the material to be tapped should also be considered. This may determine the surface coating that should be applied to the tap in order to extend its life. Most taps are supplied with no surface treatment. They are referred to as 'Bright Finish'. These taps are mainly for use on non-ferrous materials, or steels that do not cold weld. Bright finish taps are therefore suitable for all hand operations, where speeds are too low for cold welding to occur, and for most machine operations.

STEAM OXIDE:

A black oxided surface (Fe3O4) produced on the surface of a finished tap by means of a steam furnace. This oxidized surface is porous and helps retain cutting fluid in the working portion of the tap. The materials on which steam oxide has shown improvement in performance are stainless steels, steel forgings, tool and die steels, hot and cold rolled steels, and high nickel alloys.

TITANIUM NITRIDE (TiN):

A thin deposit (approx. 0.0001") applied to the surface of a finished tap utilizing PVD coating technology. TiN coating increases the surface hardness and wear resistance. Use of TiN coating on standard tools will help increase tool life in harder materials (up to 32 HrC), such as stainless steels, steel forgings, tool and die steels and hot and cold rolled steels. TiN coating also works very well with water-base cutting fluids.

TITANIUM CARBONITRIDE (TiCN):

Similar to TiN, TiCN is applied utilizing PVD coating technology. This coating combines high hardness (approx. 2800 vickers) with the anti-seizure properties of Nitride. A lower coefficient of friction helps reduce welding by 75% over TiN coated tools. These features make TiCN especially beneficial in non-ferrous material and hardened steels.

TITANIUM ALUMINUM NITRIDE (TiAlN):

TiAlN is applied using PVD coating technology. The addition of aluminum reduces friction and increases the coating oxidation temperature. As a result, TiAlN has increased resistance to heat and oxidation wear. This makes TiAlN better suited for High Speed/High Heat applications. TiAlN coating is incorporated into many of our tools.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Cutting speeds based on machining condition

Tapping speeds are determined by many factors. The main ones are:-

a) Thread pitch

b) Material being tapped

c) Hole depth

d) Hole type, through or blind

e) Depth of thread

f) Lubricant quality and flow rate

Tapping speeds should be decreased if :-

a) Lubricant is poor, or flow is restricted

b) Bottom lead or Spiral flute taps are used

c) Thread depth (%) increases.

d) Thread pitch is coarse

e) Cutting taper threads (50% normal speed)

f) Cutting Acme or Trapezoidal threads (40% normal speed)

Tapping speeds can be increased if:-

a) Thread depth decreases

b) Thread pitch is fine

c) Coolant flow and quality is good

d) Spiral point or Fluteless (Roll) taps are used

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Troubleshooting

Many factors can affect the quality of a tapped thread.
Some more common problems are listed along with probable causes.

POOR THREAD FINISH
Misalignment of tap and work piece
Incorrect feed rate
Chips/swarf not being cleared properly
Tapping device or machine faulty
Insufficient or incorrect lubricant
Incorrectly ground or blunt tap
Wrong tap selection

OVERSIZE/BELL MOUTHED
Misalignment
Incorrect feed rate
Incorrect tapping drill
Tapping device or machine faulty
Insufficient or incorrect lubricant
Incorrectly ground or eccentric tap
Wrong tap selection

EXCESSIVE TAP WEAR
Wrong tap selection
Blunt or incorrectly sharpened tap
Insufficient or incorrect lubricant
Tapping speed too high
Hole work hardened
Taps Technical Information

COLD WELDING
Wrong material composition
Blunt or incorrectly sharpened tap
Insufficient or incorrect lubricant
Tapping speed too high
Material too soft

TAP BREAKING
Incorrectly sharpened/blunt tap
Tap hits bottom of hole
Machine or tapping device faulty
Wrong tap selection
Incorrect or insufficient lubricant
Tapping speed too high
Hole work hardened
Inefficient chip or swarf removal
Incorrect tapping drill size

TAP TEETH CHIPPING
Incorrectly sharpened/blunt tap
Tap hits bottom of hole
Machine or tapping device faulty

In order to minimize problems the following rules should be followed:-

1) Use a pitch controlled tapping attachment
2) Choose the correct lubricant
3) Use the correct type of tap for the job
4) Use the correct tapping drill size
5) Choose the correct speeds and feeds
6) Keep taps sharp. Regrind with a proper machine
7) Ensure accurate alignment
8) Check hardness of material, especially when changing batches
9) Ensure thread gauging is recently certified

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Case studies

Industry Segment	Automotive
Tap series	SA3
Size	M8 X 1.25 SA3 6HX DIN 371
Component	Bush
Work material	EN8
Type of hole	Through hole
Hole dia	6.8 mm
Drill depth	12 mm
Tapping depth	12 mm
Machine	Radial drilling
Tapping direction	Vertical
Speed (Vc)	20 m/min
Coolant	Tapping Oil
Tool Life	40m
Competitor tool life	25m

Industry Segment	Automotive
Tap series	SAF5
Size	M12X1.25 SAF5 DIN 374
Component	Wheel Hub
Work material	16MnCr5
Type of hole	Through hole
Hole dia	10.75 mm
Drill depth	12 mm
Tapping depth	12 mm
Machine	HMC (2 spindle)
Tapping direction	Horizontal
Speed (Vc)	22 m/min
Coolant	Water Soluble Oil
Tool Life	754 nos
Competitor tool life	400 nos

Industry Segment	Automotive
Tap series	SA3
Size	M3 X 0.5 SA3
Component	Hub
Work material	S45C
Type of hole	Through hole (4holes)
Hole dia	2.5 mm
Drill depth	6.0 mm
Tapping depth	6.0 mm
Machine	Tapping Machine
Tapping direction	Vertical
Speed (Vc)	25 m/min
Coolant	Neat cutting oil
Tool Life	730 nos
Competitor tool life	600 nos

Industry Segment	Automotive
Tap series	SBF5
Size	M14 X 1.5 SBF5
Component	Housing
Work material	C40
Type of hole	Blind hole
Hole dia	12.5 mm
Drill depth	40.0 mm
Tapping depth	35.0 mm
Machine	Tapping Machine
Tapping direction	Vertical
Speed (Vc)	15 m/min
Coolant	Water Soluble Oil
Tool Life	470 nos
Competitor tool life	430 nos

Industry Segment	Automotive
Tap series	SC4
Size	M8 X 1.25 SC4 DIN 371
Component	Cylinder Head
Work material	Grey Cast Iron (220BHN)
Type of hole	Blind hole
Hole dia	6.8 mm
Drill depth	20.0 mm
Tapping depth	16.0 mm
Machine	Makino HMC
Tapping direction	Horizontal
Speed (Vc)	50 m/min
Coolant	Water Soluble Oil
Tool Life	67 mtrs
Competitor tool life	58 mtrs

Industry Segment	Automotive
Tap series	SD3
Size	M6 X 1 SD3 DIN 371
Component	Under Bracket
Work material	EN8D
Type of hole	Through hole
Hole dia	5.55 mm
Drill depth	10.0 mm
Tapping depth	10.0 mm
Machine	AMS - VMC
Tapping direction	Vertical
Speed (Vc)	20 m/min
Coolant	Water Soluble Oil
Tool Life	2200 nos
Competitor tool life	800 nos

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Case studies

Industry Segment	Automotive
Tap series	SD3
Size	M6 X 1 SD3 DIN 371
Component	Bracket
Work material	AC4C (Al. Casting)
Type of hole	Blind hole
Hole dia	5.55 mm
Drill depth	23.0 mm
Tapping depth	20.0 mm
Machine	AMS
Tapping direction	Vertical
Speed (Vc)	30 m/min
Coolant	Water Soluble Oil
Tool Life	353 mtrs
Competitor tool life	240 mtrs

Industry Segment	Automotive
Tap series	SAF5
Size	HPT 12X1.25 SAF5 OAL 110
Component	Bearing Hub
Work material	C56 E2
Type of hole	Through hole (4nos)
Hole dia	10.75 mm
Drill depth	12.0 mm
Tapping depth	12.0 mm
Machine	Hyundai - VMC
Tapping direction	Vertical
Speed (Vc)	20 m/min
Coolant	Water Soluble Oil
Tool Life	505 comp
Competitor tool life	400 comp

Industry Segment	Automotive
Tap series	SBF TC
Size	7/16 UNF SBF3 1B OAL 110
Component	Crank Shaft
Work material	41Cr4 (30 - 32 HRC)
Type of hole	Blind hole
Hole dia	9.2 mm
Drill depth	77.0 mm
Tapping depth	70.0 mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	300 RPM
Coolant	Water Soluble Oil
Tool Life	26 mtrs
Competitor tool life	21 mtrs

Industry Segment	Automotive
Tap series	SBF
Size	M24X1.5 SBF3 ISO
Component	Axle
Work material	Forged Steel
Type of hole	Blind Hole
Hole dia	22.5 mm
Drill depth	45.0 mm
Tapping depth	39.0 mm
Machine	Radial Drilling M/c
Tapping direction	Vertical
Speed (Vc)	150 RPM
Coolant	Water Soluble Oil
Tool Life	20 mts
Competitor tool life	18 mts

Industry Segment	Automotive
Tap series	SD3
Size	M6X1X100 OAL SD3
Component	Crank Case
Work material	ADC12
Type of hole	Blind hole (8holes / Comp)
Hole dia	5.5 mm
Drill depth	9.0 mm
Tapping depth	8.0 mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	2100 RPM
Coolant	Water Soluble Oil
Tool Life	118 mtrs
Competitor tool life	96 mtrs

Industry Segment	Automotive
Tap series	SBF TC
Size	M14X1.5 SBF7 TC DIN 374
Component	Tie Rod
Work material	S45C Forged Steel (220-260 BHN)
Type of hole	Blind hole
Hole dia	12.50 mm
Drill depth	45.0 mm
Tapping depth	38.0 mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	300 RPM
Coolant	Water Soluble Oil
Tool Life	17.6 mtrs
Competitor tool life	16.5 mtrs

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Case studies

Industry Segment	Automotive
Tap series	SA3
Size	M6X1 SA3 6G ISO
Component	Hub
Work material	S45C (25 - 30 HRC)
Type of hole	Through hole (4holes)
Hole dia	5.0 mm
Drill depth	6.0 mm
Tapping depth	6.0 mm
Machine	Tapping Machine
Tapping direction	Vertical
Speed (Vc)	515 RPM
Coolant	Neat cutting oil
Tool Life	30 mtrs
Competitor tool life	22 mtrs

Industry Segment	Automotive
Tap series	SC4
Size	M12X1.75 SC4 ISO
Component	Flange
Work material	S.G. Iron (200 - 230 BHN)
Type of hole	Blind / Through hole
Hole dia	10.25 mm
Drill depth	16.0 mm
Tapping depth	12.0 mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	650 RPM
Coolant	Water Soluble Oil
Tool Life	13.2 mtrs
Competitor tool life	11.3 mtrs

Industry Segment	Automotive
Tap series	SB3
Size	M6X1 SB3 ISO
Component	Housing STR MTR
Work material	Aluminium Casting
Type of hole	Blind (2 holes / component)
Hole dia	5mm
Drill depth	27mm
Tapping depth	17mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	1000 RPM
Coolant	Castrol
Tool Life	68 mts
Competitor tool life	41 mts

Industry Segment	Automotive
Tap series	SB4
Size	M8X1.25 SB4 DIN 371
Component	Cylinder Head
Work material	Aluminium Casting
Type of hole	Blind (17 holes / component)
Hole dia	6.8mm
Drill depth	23mm
Tapping depth	18mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	800 RPM
Coolant	Water Soluble Oil
Tool Life	107 mts
Competitor tool life	87 mts

Industry Segment	Electrical
Tap series	SA4
Size	M5 X 0.8 SA4 6HX DIN 371
Component	Motor Cover
Work material	Grey Cast Iron (25HRC)
Type of hole	Through hole
Hole dia	4.2mm
Drill depth	8mm
Tapping depth	8mm
Machine	Radial Drilling Machine
Tapping direction	Vertical
Speed (Vc)	510 RPM
Coolant	Tapping Oil
Tool Life	62 mts
Competitor tool life	49 mts

Industry Segment	Automotive
Tap series	SBF3
Size	M10X1.25 SBF5 7G
Component	Crown Wheel
Work material	16MnCr5 (210 BHN)
Type of hole	Blind hole
Hole dia	8.75mm
Drill depth	14.5mm
Tapping depth	11mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	500 RPM
Coolant	Water Soluble Oil
Tool Life	40 mts
Competitor tool life	36 mts

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Case studies

Industry Segment	Valve & Pump
Tap series	SBS
Size	M10 X 1.5 SBS3 DIN 371
Component	Piston Valve Body
Work material	A105 Cast Steel (30 HRC)
Type of hole	Through hole (2holes)
Hole dia	8.5 mm
Drill depth	20.5 mm
Tapping depth	19.5 mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	300 RPM
Coolant	Water Soluble Oil
Tool Life	24 mts
Competitor tool life	18 mts

Industry Segment	Automotive
Tap series	SBF5
Size	M12 X 1.25 SBF5 LH 7GX
Component	SN Valve Body
Work material	A350 LF2 (Forged Steel)
Type of hole	Through hole
Hole dia	10.8 mm
Drill depth	6.0 mm
Tapping depth	6.0 mm
Machine	HMC
Tapping direction	Horizontal
Speed (Vc)	210 RPM
Coolant	Water Soluble Oil
Tool Life	750 nos
Competitor tool life	954 nos

Industry Segment	Automotive
Tap series	SBF5
Size	M12 X 1.75 SBF5 7GX TC PM
Component	Output Shaft
Work material	20MnCr5
Type of hole	Blind hole
Hole dia	10.3 mm
Drill depth	24.0 mm
Tapping depth	22.0 mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	16 m/min
Coolant	Water Soluble Oil
Tool Life	20 mtrs (CPC reduction 20%)
Competitor tool life	20 mtrs

Industry Segment	Automotive
Tap series	SD3
Size	M6 X 1 SD3 DIN 371
Component	Clutch Cover
Work material	ADC12
Type of hole	Blind Hole
Hole dia	5.48 mm
Drill depth	16.0 mm
Tapping depth	13.0 mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	2000 RPM
Coolant	Water Soluble Oil
Tool Life	457 mts
Competitor tool life	250 mts

Industry Segment	Medical
Tap series	SBI
Size	M7 X 1 LS SBI6 PM
Component	Nail – A493011210
Work material	Titanium Alloy
Type of hole	Blind hole
Hole dia	6.0 mm
Drill depth	20.0 mm
Tapping depth	17.6 mm
Machine	Tapping Machine
Tapping direction	Vertical
Speed (Vc)	50 RPM
Coolant	Neat Cutting Oil
Tool Life	100 Comp (consistency achieved)
Competitor tool life	40 Comp (Tap breakage)

Industry Segment	Automotive
Tap series	SBF3
Size	M6 X 1 SBF3 TC DIN 371
Component	Balancing Shaft
Work material	41Cr4 (30 - 32 HRC)
Type of hole	Blind Hole
Hole dia	5.0 mm
Drill depth	20.0 mm
Tapping depth	12.5 mm
Machine	VMC - Makino
Tapping direction	Vertical
Speed (Vc)	350 RPM
Coolant	Water Soluble Oil
Tool Life	200 comp
Competitor tool life	560 comp

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Case studies

Industry Segment	Valve & Pump
Tap series	SBS
Size	M6 X 1 SBS5 DIN 371
Component	Upper Body Cover
Work material	WCC (32 HRC)
Type of hole	Blind hole (8holes)
Hole dia	5.0 mm
Drill depth	20.0 mm
Tapping depth	15.0 mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	16m/min
Coolant	Water Soluble Oil
Tool Life	40 Comp
Competitor tool life	31 Comp

Industry Segment	Automotive
Tap series	SC
Size	M12 X 1.75 SC4'E' TC DIN 376
Component	SO2 Cover
Work material	S.G Iron
Type of hole	Blind Hole
Hole dia	10.3 mm
Drill depth	21.0 mm
Tapping depth	18.0 mm
Machine	VMC - Makino
Tapping direction	Vertical
Speed (Vc)	34m/min
Coolant	Water Soluble Oil
Tool Life	80 mts
Competitor tool life	160 mts

Industry Segment	Valve & Pump
Tap series	SC
Size	M5 X 0.8 SC5 PM DIN 371
Component	Cylinder Block (Compressor)
Work material	Grey Cast Iron (200BHN)
Type of hole	Blind hole (4 holes)
Hole dia	4.2 mm
Drill depth	22.0 mm
Tapping depth	18.0 mm
Machine	VMC Fine ATC
Tapping direction	Vertical
Speed (Vc)	550 RPM
Coolant	Water Soluble Oil
Tool Life	5800 Comp
Competitor tool life	5200 Comp

Industry Segment	Valve & Pump
Tap series	SBS
Size	M6 X 1 SBS5
Component	XI Job
Work material	SS202
Type of hole	Blind hole
Hole dia	5.0 mm
Drill depth	21.0 mm
Tapping depth	17.0 mm
Machine	Geedee Weiler Turing Center
Tapping direction	Horizontal
Speed (Vc)	600 RPM
Coolant	Water Soluble Oil
Tool Life	25.5 mts
Competitor tool life	20 mts

Industry Segment	Automotive
Tap series	SC
Size	M8 X 1.25 SC4 DIN 371
Component	Axial Housing
Work material	Grey Cast Iron
Type of hole	Blind Hole (2 holes)
Hole dia	6.8 mm
Drill depth	20.0 mm
Tapping depth	15.0 mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	20m/min
Coolant	Water Soluble Oil
Tool Life	3000 Comp
Competitor tool life	3200 Comp

Industry Segment	Automotive
Tap series	SC
Size	3/4" UNF SB4 SPL
Component	Axle Housing
Work material	Forged Steel
Type of hole	Blind Hole
Hole dia	mm
Drill depth	42.0 mm
Tapping depth	40.0 mm
Machine	Radial Drilling Machine
Tapping direction	Vertical
Speed (Vc)	12m/min
Coolant	Water Soluble Oil
Tool Life	27 mts
Competitor tool life	32 mts

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

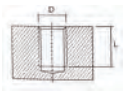
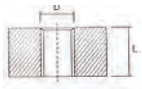
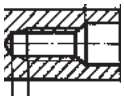
Case studies

Industry Segment	Automotive
Tap series	SCF
Size	M12 X 1.25 SCC5 OH2 HSSE PM
Component	Crankshaft
Work material	Ductile Cast Iron
Type of hole	Blind Hole
Hole dia	10.8 mm
Drill depth	17.0 mm
Tapping depth	13.0 mm
Machine	SPM
Tapping direction	Horizontal
Speed (Vc)	120 RPM
Coolant	Neat Cutting Oil
Tool Life	800 Comp (Reduction in CPC)
Competitor tool life	800 Comp

Industry Segment	Automotive
Tap series	SA
Size	M8 X1.25 SA3 DIN 371
Component	Rear Axle Plate
Work material	Forged Steel (22 HRC)
Type of hole	Through hole
Hole dia	6.8 mm
Drill depth	20.0 mm
Tapping depth	15.0 mm
Machine	VMC
Tapping direction	Vertical
Speed (Vc)	800 RPM
Coolant	Water Soluble Oil
Tool Life	48 mts
Competitor tool life	40 mts

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Custom tool request form - HSS taps

Customer:			
Customer Name		Date	
Address:			
Contact Person:			
Contact No.	Tel._____	Mobile:_____	
	Email :_____		
Tap Details:		**Work material Details:**	
Tap Size :		Component Name:	
Tolerance/Gauge Details:		Material Type:	
Standard:		Hardness:	
Tap Dimensional Details (For Special)		Tensile Strength	
Pre Tapping Hole			
Type Of Hole			
☐ Drilled	☐ Reamed	☐ Punched	☐ Cast
☐ Blind Hole	☐ Through Hole	☐ Steped Hole	
			
Drill /Hole Dia	Hole Depth:	Thread Depth:	
Machine Details			
Machine make/ Type :			
Operation:	☐ Vertical	☐ Horizontal	☐ Angular
	☐ Hand Tapping	☐ Machine Tapping	
Type Of Tap Holder:	☐ Rigid Type	☐ Floating Type	☐ Collect Chuck
Cutting Speed	_____RPM	_____M/Min	M/c Power:_____hp
Lubrication	☐ Oil	☐ Water Soluble	☐ Brush
	☐ Air/Dry	☐ Other	
Type Of Chips:	☐ Continuous	☐ Semi Continous	☐ Short
	☐ Powder		
Coatings:	☐ Tin	☐ TiAlN	☐ TiCn
	☐ Other		
Current Supplier's Detail			
Tool Make:		Consumption/mth.:_____	
Tool Size:_____		Tool Price:_____	
Tool Life :_____		Cost Per Component:_____	
Additional Information if any:			
Sales Engineer		**Branch Manager**	
DSO:			

Note: Trial tool/custom tool request form can be downloaded from our website www.forbesprecision.co.in

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

TOTEM® Technical Details

Trial tool results form

Customer Name		Ref No.	
Address		Date	
		Sales/Appl. Engg.:	
Contact Person's Name & Dept.:		Contact No.:	
Tool Description:			
Component Details:		Operation Details:	
Component Name:		Type :	
Material:		Hole/Drill Depth:	
Hardness:		Hole Type:	
Tensile Strength:		Gauge Details:	
Recommonded Parameters:			
Size:		Coolant:	
Speed:		These parameters are for only as a guide can vary according to working conditions	
Feed:			

Machine/Tapping Details:				
Present Status		**Trial Status**		
M/c. Type		Tool-1	Tool-2	Tool-3
Spindle rpm:				
Speed:				
Feed:				
Coolant:				
Tap Make:				
No Of Flutes:				
Type /Tool No:				
Life Obtained				
Kind of Failure		Thread Chip off / Thread worn out / No Go answering / Go Tight / Tap Breakage / Reverse Cutting / Chip Clogging / Built up edge		
Tool Consumption /Quarter:				
Cost / Component:				
Cycle time of operation:				

Trial Result Summary:			

Additional Information if any:	
Sales Engineer	**Branch Manager**
DSO:	

Note: Trial tool/custom tool request form can be downloaded from our website www.forbesprecision.co.in

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TOTEM®

High Performance Cutting Tools

SOLID CARBIDE END MILLS

END MILL SELECTION GUIDE

TOTEM®

		For 55-70 HRc				For 45-70 HRc				High feed	
Description		Ball nose 2 flute	Torus 4 flute	Multi flute finisher	Multi flute finisher with corner radius	Ball nose 2 flute	Ball nose 4 flute	Torus 2 flute	Torus 4 flute	Torus cutter for high feed machining	Multi flute finisher
Page No.		2.015	2.021	2.027	2.028	2.031	2.032	2.034	2.036	2.039	2.041
Length		Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Stub/Reg
Dia Range Std		0.1-12.0	0.1-12.0	3.0-20.0	3.0-20.0	1.0-16.0	6.0-16.0	1.5-16.0	3.0-16.0	2.0-12.0	3.0-20.0
Dia Range Spl											
Length of Cut (ap Max)		0.2D	0.75D	2D	2D	2D	2D	2D	2D	0.05D	2D
No of Flutes		2	4	6-16	6-16	2	4	2	4	4	6-8
Helix		30^0	30^0	45^0	45^0	30^0	30^0	30^0	30^0		45^0
Coating		TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN
Shank		Round	Round	Round	Round	Round	Round	Round	Round	Round	Round
Square End				√							√
Ball Nose		√				√	√				
Corner Radius			√		√			√	√	√	
Corner Chamfer											
Center Cutting		√	√	√	√	√	√	√	√	√	√
Chip Breaker											
Neck Type		√	√	√	√	√	√	√	v	√	√
Steel	P0										
	P1										
	P2										
	P3									•	
	P4									•	
	P5					•	•	•	•		•
	P6					•	•	•	•		•
Stainless Steel	M1										
	M2										
	M3										
Cast Iron	K1										
	K2										
	K3										
Non-Ferrous	N1										
	N2										
	N3										
	N4										
	N5										
	N6										
	N7										
Special Alloys	S1										
	S2										
	S3										
	S4										
Hardened Steel	H1					•	•	•	•	•	•
	H2					•	•	•	•		•
	H3	•	•	•	•	•	•	•	•		•
	H4	•	•	•	•	•	•	•	•		•
Periphery Milling											
Slotting											
Ramping											
Profiling											

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END MILL SELECTION GUIDE

TOTEM®

			Micro End Mill						Diamond Tipped		Graphite Milling	
Description		Multi flute finisher with corner radius	2 Flute micro end mill	4 Flute micro end mill	2 Flute micro end mill with corner radius	4 Flute micro end mill with corner radius	2 Flute micro ball nose	2 flute ball nose for exotic material	End mill with corner radius	Ball nose end mill	Rougher	3 Flute end mill
Page No.		2.044	2.047	2.053	2.057	2.063	2.067	2.076	2.079	2.081	2.088	2.090
Length		Stub/Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg	Reg
Dia Range Std		3.0-20.0	0.1-3.0	0.2-3.0	0.1-3.0	0.2-3.0	0.1-3.0	0.4-12.0	3-12.0	3-12.0	4.0-16.0	2.0-12.0
Dia Range Spl												
Length of Cut (ap Max)		2D	0.6D	0.6D	0.6D	0.6D	0.6D	1.5D	0.65D	0.65D	2.5D	2D
No of Flutes		6-8	2	4	2	4	2	2	2	2	2	3
Helix		45^0	30^0	30^0	30^0	30^0	30^0	30^0	0^0	0^0	25^0	40^0
Coating		TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	Diamond Tipped	Diamond Tipped	Diamond Coating	Diamond Coating
Shank		Round	Round	Round	Round	Round	Round	Round	Round	Round	Round	Round
Square End			√	√								√
Ball Nose							√	√		√		
Corner Radius		v			√	√			√			
Corner Chamfer											√	
Center Cutting		√	√	√	√	√	√	√	√	√	√	√
Chip Breaker												
Neck Type		√	√	√	√	√	√	√	√	√	√	√
Steel	P0											
	P1											
	P2											
	P3											
	P4											
	P5	•	•	•	•	•	•	•				
	P6	•	•	•	•	•	•	•				
Stainless Steel	M1		•	•	•	•	•	•				
	M2		•	•	•	•	•	•				
	M3		•	•	•	•	•	•				
Cast Iron	K1		•	•	•	•	•	•				
	K2							•				
	K3											
Non-Ferrous	N1								•	•		
	N2								•	•		
	N3								•	•		
	N4								•	•		
	N5								•	•	•	•
	N6								•	•	•	•
	N7								•	•	•	•
Special Alloys	S1		•	•	•	•	•	•				
	S2		•	•	•	•	•	•				
	S3		•	•	•	•	•	•				
	S4		•	•	•	•	•	•				
Hardened Steel	H1	•	•	•	•	•	•	•				
	H2	•	•	•	•	•	•					
	H3	•	•	•	•	•	•					
	H4	•	•	•	•	•	•					
Periphery Milling												
Slotting												
Ramping												
Profiling												

END MILL SELECTION GUIDE

TOTEM®

		Graphite Milling				For 45 - 62 HRc Proton Plus				
Description		End mill with corner radius	Ball nose	Micro end mill with corner radius	Micro ball nose	4 Flute end mill regular length	4 Flute end mill long length	4 Flute end mill long reach length	4 Flute end mill Regular Length	4 Flute end mill long Length
Page No.		2.091	2.095	2.099	2.101	2.104	2.105	2.106	2.107	2.108
Length		Reg	Reg	Reg	Reg	Reg	Long Length	Long Reach	Reg	Long
Dia Range Std		2.0-12.0	2.0-12.0	0.3-1.5	0.3-1.5	3.0-16.0	3.0-16.0	6.0-12.0	3.0-25.0	6.0-25.0
Dia Range Spl						1.0-25.4	1.0-20.0	1.0-20.0	1.0-25.0	1.0-25.0
Length of Cut (ap Max)		2D	2D	2D	1D	0.1D	0.1D	0.1D	0.1D	0.1D
No of Flutes		2-3-4	2-3-4	2	2	4	4	4	4-5	4-6
Helix		40^0	40^0	40^0	40^0	30^0	30^0	30^0	50^0	50^0
Coating		Diamond Coating	Diamond Coating	Diamond Coating	Diamond Coating	Proton Plus	Proton Plus	Proton Plus	Proton Plus	Proton Plus
Shank		Round	Round	Round	Round	Round	Round	Round	Round	Round
Square End						√	√	√	√	√
Ball Nose			√		√					
Corner Radius		√		√		√	√	√		
Corner Chamfer										
Center Cutting		√	√	√	√	√	√	√	√	√
Chip Breaker										
Neck Type		√	√	√	√					
Steel	P0									
	P1									
	P2									
	P3									
	P4									
	P5					•	•	•	•	•
	P6					•	•	•	•	•
Stainless Steel	M1									
	M2									
	M3									
Cast Iron	K1									
	K2									
	K3									
Non-Ferrous	N1									
	N2									
	N3									
	N4									
	N5	•	•	•	•					
	N6	•	•	•	•					
	N7	•	•	•	•					
Special Alloys	S1									
	S2									
	S3									
	S4									
Hardened Steel	H1					•	•	•	•	•
	H2					•	•	•	•	•
	H3					•	•	•	•	•
	H4					•	•	•	•	•
Periphery Milling						√	√	√	√	√
Slotting										
Ramping						√	√	√	√	√
Profiling						√	√	√	√	√

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END MILL SELECTION GUIDE

TOTEM®

		For 45 - 62 HRc Proton Plus				For 32- 45 HRc High Speed Machining			
Description		4 Flute end mill regular Length	Ball nose 2 flute regular length	Ball nose 2 flute long length	Ball nose 2 flute long reach length	4 Flute end mill regular length	2 Flute end mill regular length	Ball nose 4 flute regular length	Ball nose 2 flute regular length
Page No.		2.109	2.110	2.111	2.112	2.115	2.116	2.117	2.118
Length		Reg	Reg	Long Length	Long Reach	Reg	Reg	Reg	Reg
Dia Range Std		3.0-20.0	1.0-12.0	1.0-12.0	6.0-12.0	3.0-20.0	3.0-20.0	3.0-20.0	3.0-20.0
Dia Range Spl		1.0-25.0	1.0-20.0	1.0-20.0	1.0-20.0	3.0-20.0	3.0-20.0	3.0-20.0	3.0-20.0
Length of Cut (ap Max)		0.1D	0.02D	0.02D	0.02D	1D	0.5D	1D	0.5D
No of Flutes		4	2	2	2	4	2	4	2
Helix		50^0	30^0	30^0	30^0	30^0	30^0	30^0	30^0
Coating		Proton Plus	Proton Plus	Proton Plus	Proton Plus	TiAlN	TiAlN	TiAlN	TiAlN
Shank		Round	Round	Round	Round	Round	Round	Round	Round
Square End		√				√	√		
Ball Nose			√	√	√			√	√
Corner Radius		√				Custom Solution	Custom Solution		
Corner Chamfer									
Center Cutting		√	√	√	√	√	√	√	√
Chip Breaker									
Neck Type									
Steel	P0								
	P1								
	P2								
	P3					•	•	•	•
	P4					•	•	•	•
	P5	•	•	•	•				
	P6	•	•	•	•				
Stainless Steel	M1					•	•	•	•
	M2								
	M3								
Cast Iron	K1								
	K2								
	K3								
Non-Ferrous	N1								
	N2								
	N3								
	N4								
	N5								
	N6								
	N7								
Special Alloys	S1								
	S2								
	S3								
	S4								
Hardened Steel	H1	•	•	•	•				
	H2	•	•	•	•				
	H3	•	•	•	•				
	H4	•	•	•	•				
Periphery Milling		√	√	√	√	√	√	√	√
Slotting						√	√	√	√
Ramping		√	√	√	√	√	√	√	√
Profiling		√	√	√	√	√	√	√	√

END MILL SELECTION GUIDE

TOTEM®

		For SS,Ti & High Temperature Alloys				Trochoidal milling		
Description		4 Flute Variable Helix End mill F177TR/ NF177 TR	Ball Nose 4 flute variable helix F179 TR	Ball Nose 4 flute variable helix F179 TRL	5 Flute end mill F178 TR (Gold & Black)	7 Flute end mill for tro-choidal milling F180TR/ NF180TR/F180TRL	5 Flute end mill for trochoidal milling 5VR	6 Flute end mill for trochoidal milling 6VR
Page No.		2.124	2.127	2.128	2.130	2.132	2.135	2.136
Length		Reg	Reg	Long	Reg	Long	Reg	Reg
Dia Range Std		6.0-20.0	6.0-20.0	6.0-20.0	6.0-16.0	10.0-16.0	6.0-16.0	6.0-20.0
Dia Range Spl		1.5-25.4	3.0-25.4	3.0-25.4	1.5-25.4	8.0-20.0	4.0-20.0	4.0-20.0
Length of Cut (ap Max)		ap max	ap max	ap max	ap max	ap max	ap max	ap max
No of Flutes		4	4	4	5	7	5	6
Helix		35^0/ 38^0	35^0/ 38^0	35^0/ 38^0	35^0/ 38^0	38^0	Vari	45^0
Coating		Cr Base	Cr Base	Cr Base	Cr Base	Cr Base	Cr Base	Cr Base
Shank		Round	Round	Round	Round	Round	Round	Round
Square End		√			√			√
Ball Nose			√	√				
Corner Radius		√			√	√	√	
Corner Chamfer		√						
Center Cutting		√	√	√	√	√	√	√
Chip Breaker								
Neck Type		√			Custom Solution	√		
Steel	P0							
	P1	•	•	•	•	•	•	•
	P2	•	•	•	•	•	•	•
	P3	•	•	•	•	•	•	•
	P4	•	•	•	•	•	•	•
	P5	•	•	•	•	•	•	•
	P6	•	•	•	•	•	•	•
Stainless Steel	M1	•	•	•	•	•	•	•
	M2	•	•	•	•	•	•	•
	M3	•	•	•	•	•	•	•
Cast Iron	K1	•	•	•	•		•	•
	K2	•	•	•	•		•	•
	K3	•	•	•	•		•	•
Non-Ferrous	N1							
	N2							
	N3							
	N4							
	N5							
	N6							
	N7							
Special Alloys	S1	•	•	•	•	•	•	•
	S2	•	•	•	•	•	•	•
	S3	•	•	•	•	•	•	•
	S4	•	•	•	•	•	•	•
Hardened Steel	H1	•	•	•	•	•	•	•
	H2					•		
	H3							
	H4							
Periphery Milling		√	√	√	√	√	√	√
Slotting		√	√	√	√		√	
Ramping		√	√	√	√		√	
Profiling		√	√	√	√		√	

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END MILL SELECTION GUIDE

TOTEM®

		Razor cut - for roughing & Aluminium							
Description		CBC	CBCH / NCBCH	3FWFXL	3FWFCR	3FWF	3F	2FWF	1F
Page No.		2.140	2.141	2.142	2.143	2.144	2.144	2.145	2.146
Length		Reg	Reg	Long reach	Reg	Reg	Reg	Reg	Reg
Dia Range Std		6.0-25.0	6.0-25.0	6.0-20.0	6.0-16.0	3.0-20.0	3.0-20.0	1.5-20.0	3.0-10.0
Dia Range Spl		4.0-25.0	4.0-25.0	4.0-25.0	4.0-20.0	3.0-20.0	3.0-20.0	1.5-20.0	3.0-10.0
Length of Cut (ap Max)		ap max	ap max	ap max	ap max	ap max	ap max	ap max	ap max
No of Flutes		3	3	3	3	3	3	2	1
Helix		30°	40°	38°	38°	38°	45°	45°	30°
Coating		Bright	Bright	Bright	Bright	Bright	Bright	Bright	Bright
Shank		Round	Round	Round	Round	Round	Round	Round	Round
Square End						√	√	√	√
Ball Nose									
Corner Radius		Custom Solution	√	√	√	Custom Solution	Custom Solution	Custom Solution	Custom Solution
Corner Chamfer		√	Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution
Center Cutting		√	√	√	√	√	√	√	√
Chip Breaker		√	√						
Neck Type									
Steel	P0								
	P1								
	P2								
	P3								
	P4								
	P5								
	P6								
Stainless Steel	M1								
	M2								
	M3								
Cast Iron	K1								
	K2								
	K3								
Non-Ferrous	N1	•	•	•	•	•	•	•	•
	N2	•	•	•	•	•	•	•	•
	N3		•						
	N4		•						
	N5		•						
	N6								
	N7								
Special Alloys	S1								
	S2								
	S3								
	S4								
Hardened Steel	H1								
	H2								
	H3								
	H4								
Periphery Milling		√	√	√	√	√	√	√	√
Slotting		√	√	√	√	√	√	√	√
Ramping		√	√	√	√	√	√	√	√
Profiling		√	√	√	√	√	√	√	√

END MILL SELECTION GUIDE

TOTEM®

		Chip breaker rougher						For General Purpose Application on Variety of Materials			
Description		F192CBS Sinusoidal Chip breaker	F192CB Sinusoidal Chip breaker	F192CBL Sinusoidal Chip breaker	F193CB Chip breaker with flat pitch	NF193 CB / NF193CBL Chip breaker with flat pitch	F194CB Chip breaker with flat pitch	4 Flute end mill Regular length F111 GP	4 Flute end mill Stub length F163 GP	4 Flute end mill long length F122 GP	4 Flute end mill extra long F187 GP
Page No.		2.151	2.152	2.153	2.154	2.155	2.156	2.162	2.163	2.164	2.165
Length		Stub	Reg	Long	Reg	Long	Reg	Reg	Stub	Long Length	Extra Long
Dia Range Std		8.0-20.0	4.0-20.0	6.0-12.0	6.0-25.0	6.0-25.0	6.0-25.0	1.0-25.0	1.0-20.0	3.0-25.0	3.0-20.0
Dia Range Spl		6.0-25.4	4.0-25.4	6.0-25.4	6.0-25.0	6.0-25.0	6.0-25.0	0.3-32.0	0.3-32.0	3.0-25.0	3.0-20.0
Length of Cut (ap Max)		ap max	ap max	ap max	ap max	ap max	ap max	ap max	ap max	ap max	ap max
No of Flutes		3-4	3-4	3-4	4-6	4-6	4-6	4	4	4	4
Helix		20^0	20^0	20^0	45^0	45^0	45^0	30^0	30^0	30^0	30^0
Coating		TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN
Shank		Round	Round	Round	Round	Round	Round	Round	Round	Round	Round
Square End		√	√	√				√	√	√	√
Ball Nose											
Corner Radius		Custom Solution	Custom Solution	Custom Solution	√	√		Custom Solution	Custom Solution	Custom Solution	Custom Solution
Corner Chamfer		Custom Solution	Custom Solution	Custom Solution			√	Custom Solution	Custom Solution	Custom Solution	Custom Solution
Center Cutting		√	√	√	√	√	√	√	√	√	√
Chip Breaker		√	√	√	√	√	√				
Neck Type		Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution
Steel	P0	•						•	•	•	•
	P1	•	•	•				•	•	•	•
	P2	•	•	•				•	•	•	•
	P3	•	•	•	•	•	•	•	•	•	•
	P4	•	•	•	•	•	•	•	•	•	•
	P5	•	•	•	•	•	•				
	P6	•	•	•	•	•	•				
Stainless Steel	M1	•	•	•	•	•	•	•	•	•	•
	M2	•	•	•	•	•	•	•	•	•	•
	M3	•	•	•	•	•	•	•	•	•	•
Cast Iron	K1	•	•	•	•	•	•	•	•	•	•
	K2	•	•	•	•	•	•	•	•	•	•
	K3	•	•	•	•	•	•	•	•	•	•
Non-Ferrous	N1							•	•	•	•
	N2							•	•	•	•
	N3							•	•	•	•
	N4										
	N5										
	N6										
	N7										
Special Alloys	S1	•	•	•	•	•	•	•	•	•	•
	S2	•			•	•	•	•	•	•	•
	S3	•	•	•	•	•	•	•	•	•	•
	S4	•			•	•	•	•	•	•	•
Hardened Steel	H1	•	•	•	•	•	•	•	•	•	•
	H2	•			•	•	•	•	•	•	•
	H3				•	•	•	•	•	•	•
	H4										
Periphery Milling		√	√	√	√	√	√	√	√	√	√
Slotting		√	√	√	√	√	√	√	√	√	√
Ramping		√	√		√	√	√	√	√	√	√
Profiling		√	√		√	√	√	√	√	√	√

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END MILL SELECTION GUIDE

TOTEM®

		For General Purpose Application on Variety of Materials								
Description		4 flute end mill long reach F181 GP	3 Flute end mill regular length F116 GP	2 Flute end mill stub length F164 GP	2 Flute end mill regular length F121 GP	2 Flute end mill long length F123 GP	2 Flute end mill long reach F183 GP	Ball Nose 4 flute Stub Length F165 GP	Ball Nose 4 flute Regular Length F140 GP	Ball Nose 4 flute long reach F184 GP
Page No.		2.166	2.167	2.168	2.169	2.170	2.171	2.172	2.173	2.174
Length		Long Reach	Reg	Stub	Reg	Long Length	Long Reach	Stub	Reg	Long Reach
Dia Range Std		3.0-20.0	1.0-25.0	1.0-20.0	1.0-25.0	3.0-20.0	3.0-20.0	1.0-20.0	1.0-25.0	3.0-20.0
Dia Range Spl		3.0-20.0	1.0-32.0	0.5-20.0	1.0-32.0	3.0-25.4	3.0-20.0	1.0-20.0	1.0-25.4	3.0-20.0
Length of Cut (ap Max)		ap max	ap max	ap max	ap max	ap max	ap max	ap max	ap max	ap max
No of Flutes		4	3	2	2	2	2	4	4	4
Helix		30^0	30^0	30^0	30^0	30^0	30^0	30^0	30^0	30^0
Coating		TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN
Shank		Round	Round	Round	Round	Round	Round	Round	Round	Round
Square End		√	√	√	√	√	√			
Ball Nose								√	√	√
Corner Radius		Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution			
Corner Chamfer		Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution			
Center Cutting		√	√	√	√	√	√	√	√	√
Chip Breaker										
Neck Type		Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution	Custom Solution			Custom Solution
Steel	P0	•	•	•	•	•	•	•	•	•
	P1	•	•	•	•	•	•	•	•	•
	P2	•	•	•	•	•	•	•	•	•
	P3	•	•	•	•	•	•	•	•	•
	P4	•	•	•	•	•	•	•	•	•
	P5									
	P6									
Stainless Steel	M1	•	•	•	•	•	•	•	•	•
	M2	•	•	•	•	•	•	•	•	•
	M3	•	•	•	•	•	•	•	•	•
Cast Iron	K1	•	•	•	•	•	•	•	•	•
	K2	•	•	•	•	•	•	•	•	•
	K3	•	•	•	•	•	•	•	•	•
Non-Ferrous	N1	•	•	•	•	•	•	•	•	•
	N2	•	•	•	•	•	•	•	•	•
	N3	•	•	•	•	•	•	•	•	•
	N4									
	N5									
	N6									
	N7									
Special Alloys	S1	•	•	•	•	•	•	•	•	•
	S2	•	•	•	•	•	•	•	•	•
	S3	•	•	•	•	•	•	•	•	•
	S4	•	•	•	•	•	•	•	•	•
Hardened Steel	H1	•	•	•	•	•	•	•	•	•
	H2	•	•	•	•	•	•	•	•	•
	H3	•	•	•	•	•	•	•	•	•
	H4									
Periphery Milling		√	√	√	√	√	√	√	√	√
Slotting		√	√	√	√	√	√	√	√	√
Ramping		√	√	√	√	√	√	√	√	√
Profiling		√	√	√	√	√	√	√	√	√

END MILL SELECTION GUIDE

TOTEM®

		For General Purpose Application on Variety of Materials							
Description		Ball Nose 2 flute regular length F150 GP	Ball Nose 2 flute stub length F166 GP	Ball Nose 2 flute long reach F186 GP	4 flute end mill long length F125GP	2 flute end mill long length F126GP	4 flute extra long end mill F188GP	Chip breaker regular length F114 CB GP	Chp breaker long length F132 CB GP
Page No.		2.175	2.176	2.177	2.178	2.179	2.180	2.183	2.184
Length		Reg	Stub	Long Reach	Long Length	Long Length	Extra Long	Reg	Long Length
Dia Range Std		1.0-25.0	1.0-20.0	3.0-20.0	3.0-20.0	3.0-25.0	3.0-20.0	4.0-20.0	6.0-16.0
Dia Range Spl		1.0-25.4	3.0-20.0	3.0-20.0	3.0-20.0	3.0-20.0	3.0-20.0	3.0-25.4	3.0-25.4
Length of Cut (ap Max)		ap max	ap max	ap max	ap max	ap max	ap max	ap max	ap max
No of Flutes		2	2	2	4	2	4	4	4
Helix		30^0	30^0	30^0	30^0	30^0	30^0	30^0	30^0
Coating		TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN
Shank		Round	Round	Round	Round	Round	Round	Round	Round
Square End								√	√
Ball Nose		√	√	√	√	√	√		
Corner Radius									
Corner Chamfer									
Center Cutting		√	√	√	√	√	√	√	√
Chip Breaker								√	√
Neck Type				Custom Solution	Custom Solution	Custom Solution	Custom Solution		
Steel	P0	•	•	•	•	•	•	•	•
	P1	•	•	•	•	•	•	•	•
	P2	•	•	•	•	•	•	•	•
	P3	•	•	•	•	•	•	•	•
	P4	•	•	•	•	•	•	•	•
	P5							•	•
	P6							•	•
Stainless Steel	M1	•	•	•	•	•	•	•	•
	M2	•	•	•	•	•	•	•	•
	M3	•	•	•	•	•	•	•	•
Cast Iron	K1	•	•	•	•	•	•	•	•
	K2	•	•	•	•	•	•	•	•
	K3	•	•	•	•	•	•	•	•
Non-Ferrous	N1	•	•	•	•	•	•		
	N2	•	•	•	•	•	•		
	N3	•	•	•	•	•	•		
	N4								
	N5								
	N6								
	N7								
Special Alloys	S1	•	•	•	•	•	•	•	•
	S2	•	•	•	•	•	•	•	•
	S3	•	•	•	•	•	•	•	•
	S4	•	•	•	•	•	•	•	•
Hardened Steel	H1	•	•	•	•	•	•	•	•
	H2	•	•	•	•	•	•	•	•
	H3	•	•	•	•	•	•	•	•
	H4								
Periphery Milling		√	√	√	√	√	√	√	√
Slotting		√	√	√	√	√	√	√	√
Ramping		√	√	√	√	√	√	√	√
Profiling		√	√	√	√	√	√	√	√

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END MILL SELECTION GUIDE

TOTEM®

		For General Purpose Application on Variety of Materials							
Description		2 Flute end mill regular length F121 XL	4 Flute end mill regular length F111 XL	Ball nose 2 flute regular length F150 XL	Ball nose 4 flute Regular Length F140 XL	2 flute end mill long length F123 XL	4 flute end mill long length F122 XL	4 flute ball nose long length F125 XL	Express Carbide End Mills
Page No.		2.186	2.187	2.188	2.189	2.190	2.191	2.192	2.195
Length		Reg	Reg	Reg	Reg	Long Length	Long Length	Long Length	Reg
Dia Range Std		1.0-20.0	1.0-20.0	1.0-20.0	1.0-20.0	3.0-20.0	3.0-20.0	3.0-20.0	1.0-20.0
Dia Range Spl									
Length of Cut (ap Max)		ap max	ap max	ap max	ap max	ap max	ap max	ap max	ap max
No of Flutes		2	4	2	4	2	4	4	4
Helix		30^0	30^0	30^0	30^0	30^0	30^0	30^0	30^0
Coating		TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN
Shank		Round	Round	Round	Round	Round	Round	Round	Round
Square End		√	√			√	√		√
Ball Nose				√	√			√	
Corner Radius									
Corner Chamfer									
Center Cutting		√	√	√	√	√	√	√	√
Chip Breaker									
Neck Type									
Steel	P0	•	•	•	•	•	•	•	•
	P1	•	•	•	•	•	•	•	•
	P2	•	•	•	•	•	•	•	•
	P3	•	•	•	•	•	•	•	•
	P4	•	•	•	•	•	•	•	•
	P5	•	•	•	•	•	•	•	•
	P6	•	•	•	•	•	•	•	•
Stainless Steel	M1	•	•	•	•	•	•	•	•
	M2	•	•	•	•	•	•	•	•
	M3	•	•	•	•	•	•	•	•
Cast Iron	K1	•	•	•	•	•	•	•	•
	K2	•	•	•	•	•	•	•	•
	K3	•	•	•	•	•	•	•	•
Non-Ferrous	N1	•	•	•	•	•	•	•	•
	N2	•	•	•	•	•	•	•	•
	N3	•	•	•	•	•	•	•	•
	N4	•	•	•	•	•	•	•	•
	N5	•	•	•	•	•	•	•	•
	N6	•	•	•	•	•	•	•	•
	N7								
Special Alloys	S1	•	•	•	•	•	•	•	•
	S2	•	•	•	•	•	•	•	•
	S3	•	•	•	•	•	•	•	•
	S4	•	•	•	•	•	•	•	•
Hardened Steel	H1	•	•	•	•	•	•	•	•
	H2	•	•	•	•	•	•	•	•
	H3	•	•	•	•	•	•	•	•
	H4	•	•	•	•	•	•	•	•
Periphery Milling		√	√	√	√	√	√	√	√
Slotting		√	√	√	√	√	√	√	√
Ramping		√	√	√	√	√	√	√	√
Profiling		√	√	√	√	√	√	√	√

USE YOUR ENDMILLS SELECTOR

Select length of tool **D**

Select HP/GP (High Performance / General Performance) **A**

Select corner style **C**

Select your work piece material from this table **B**

	For 45 - 58 HRc Proton Plus						For 30- 45 HRc High Speed Machining			
Description	4 flute end mill regular length	4 flute end mill long length	4 flute end mill long reach length	ball nose 2 flute regular length	ball nose 2 flute long length	ball nose 2 flute long reach length	4 flute end mill regular length	2 flute end mill regular length	Ball Nose 4 flute regular length	Ball Nose 2 flute regular length
Page No.	107	109	111	112	113	114	116	117	118	119
Length	Reg	Long Length	Long Reach	Reg	Long Length	Long Reach	Reg	Reg	Reg	Reg
Dia Range Std	3.0-16.0	3.0-16.0	6.0-12.0	1.0-12.0	1.0-12.0	6.0-12.0	3.0-20.0	3.0-20.0	3.0-20.0	3.0-20.0
Dia Range Spl	2.0-25.4	2.0-20.0	2.0-20.0	1.0-20.0	1.0-20.0	1.0-20.0	3.0-20.0	3.0-20.0	3.0-20.0	3.0-20.0
Length of Cut (Ap Max)	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD	1XD
No of Flutes	4	4	4	2	2	2	4	2	4	2
Helix	30°	30°	30°	30°	30°	30°	30°	30°	30°	30°
Coating	Proton Plus	Proton Plus	Proton Plus	Proton Plus	Proton Plus	Proton Plus	TiAlN	TiAlN	TiAlN	TiAlN
Shank										
Square End	√	√	√				√	√		
Ball Nose				√	√	√			√	√
Corner Radius	√	√	√				Custom Solution	Custom Solution		
Corner Chamfer										
Center Cutting	√	√	√	√	√	√	√	√	√	√
Chip Breaker										
Neck Type										
P0										
P1										
P2							•	•	•	•
P3							•	•	•	•
P4							•	•	•	•
P5										
P6										
M1										
M2										
M3										
K1										
K2										
K3										
N1										
N2										
N3										
N4										
N5										
N6										
N7										
S1										
S2										
S3										
S4										
H1	•	•	•	•	•	•				
H2	•	•	•	•	•	•				
H3	•	•	•	•	•	•				
H4										
Periphery Milling	√	√	√	√	√	√	√	√	√	√
Slotting							√	√	√	√
Ramping	√	√	√	√	√	√	√	√	√	√
Profiling	√	√	√	√	√	√	√	√	√	√

Find your tool on the page **E**

TOTEM® Solid Carbide End Mills

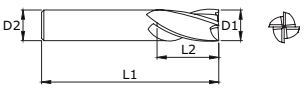
HSM Series

END MILLS

4 Flute Centre cutting HSM end mill for 30-45 HRc steel

Carbide | REG | 30° | 6535 HA | 30 - 45 HRC | TiAlN

P2-P4



Unit : mm

Diameter ØD1	EDP No	Flute Length L2	Overall Length L1	Shank Diameter ØD2
3	FBK0501200	12	38	3
4	FBK0501974	14	51	4
5	FBK0501326	20	51	5
6	FBK0501366	20	64	6
8	FBK0501975	20	64	8
10	FBK0500846	25	70	10
12	FBK0500942	25	76	12
14	FBK0501017	30	89	14
16	FBK0501048	30	89	16
20	FBK0501125	38	102	20

Select tool diameter **F**

*Custom Solution possible Refer page 2.171

sales@forbesprecision.co.in

TOTEM®

High Performance Cutting Tools

HIGH PERFORMANCE END MILLS

CONTENTS

PROTON HD 2 FLUTE BALL NOSE END MILL 2.015

WORK PIECE MATERIALS

PRIMARY
Hardened steel from 55-70 HRc (H3-H4)

FEATURES
- New designed ball nose geometry with ultra fine grade
- 2 flute Centre Cutting tool with 30 degrees helix
- high precision end mill for finishing

FUNCTION
- High cutting speeds on Hard materials
- Excellent surface finish

BENEFITS
- No EDM is required (milling is much faster).
- Polishing can be minimized.
- One single clamping, so it is easier to achieve accurate results.

PROTON HD 4 FLUTE END MILL 2.021

WORK PIECE MATERIALS

PRIMARY
Hardened steel from 55-70 HRc (H3-H4)

FEATURES
- Upgraded geometry with ultra fine grade
- 4 flute centre cutting tool with 30 degrees helix
- High precision torus cutter for profiling

FUNCTION
- High cutting speeds on Hard materials
- Excellent surface finish

BENEFITS
- No EDM is required (milling is much faster).
- Polishing can be minimized.
- One single clamping, so it is easier to achieve accurate results.

PROTON HD MULTI FLUTE END MILL (WITH/WITHOUT CORNER RADIUS) 2.027

WORK PIECE MATERIALS

PRIMARY
Hardened steel from 55-70 HRc (H3-H4)

FEATURES
- Upgraded geometry with ultra fine grade
- Multi flute centre cutting tool with 45 degrees helix

FUNCTION
- High precision tool for wall finishing
- Excellent surface finish

BENEFITS
- No EDM is required (milling is much faster).
- Polishing can be minimized.
- One single clamping, so it is easier to achieve accurate results.
- Available with extra teeth for higher productivity

PROTON HD 2/4 FLUTE BALL NOSE END MILL 2.031

WORK PIECE MATERIALS

PRIMARY
Steel (P5-P6) and hardened steel from 45-70 HRc (H1-H4)

FEATURES
- 2 /4 flute Ball Nose- Center Cutting tool with 30 degrees Helix
- Superior surface finish
- high precision end mill for finishing

FUNCTION
- Optimized coating for better tool life
- High cutting speeds on Hard materials

BENEFITS
- No EDM is required (milling is much faster).
- Polishing can be minimized.
- One single clamping, so it is easier to achieve accurate results.

PROTON HD 2/4 FLUTE END MILL 2.034

WORK PIECE MATERIALS

PRIMARY
Steel (P5-P6) and hardened steel from 45-70 HRc (H1-H4)

FEATURES
- 2 /4 flute torus- center cutting tool with 30 degrees Helix
- Superior surface finish
- high precision end mill for profliing

FUNCTION
- Optimized coating for better tool life
- Special designed centre

BENEFITS
- No EDM is required (milling is much faster).
- Polishing can be minimized.
- Best suited for roughing and finishing application.
- One single clamping, so it is easier to achieve accurate results.

PROTON HD MULTI FLUTE END MILL (WITH/WITHOUT CORNER RADIUS) 2.041

WORK PIECE MATERIALS

PRIMARY
Steel (P5-P6) and hardened steel from 45-70 HRc (H1-H4)

FEATURES
- Upgraded geometry with ultra fine grade
- Multi flute centre cutting tool with 45 degrees helix
- Superior surface

FUNCTION
- High precision tool for wall finishing
- Excellent surface finish

BENEFITS
- No EDM is required (milling is much faster).
- Polishing can be minimized.
- One single clamping, so it is easier to achieve accurate results.

CONTENTS

PROTON HD TORUS CUTTER FOR HIGH FEED MACHINING — 2.039

WORK PIECE MATERIALS

PRIMARY
Steel upto 40 Hrc (P3-P4), hardened steel (H1)

FEATURES
- 4 flute, high feed geometry
- Unique high feed geometry for superior MRR

FUNCTION
- Optimized coating for better tool life
- Special designed centre

BENEFITS
- High feed with superior MRR

PROTON HD 2/4 FLUTE MICRO END MILL — 2.047

WORK PIECE MATERIALS

PRIMARY
Steel (P5-P6), Cast Iron (K1), Stainless Steel (M1-M3), Super Alloys (S1-S4)

SECONDARY
Hardened steel (H1-H4)

FEATURES
- 2/4 flute micro tool geometry
- Superior surface finish
- Wear resistance coating for superior tool life

FUNCTION
- Excellent for rib milling
- Special designed centre geometry to ensure least deflection

BENEFITS
- No EDM is required (milling is much faster).
- Polishing can be minimized.
- One single clamping, so it is easier to achieve accurate results.

PROTON HD 2/4 FLUTE MICRO END MILL WITH CORNER RADIUS — 2.057

WORK PIECE MATERIALS

PRIMARY
Steel (P5-P6), Cast Iron (K1), Stainless Steel (M1-M3), Super Alloys (S1-S4)

SECONDARY
Hardened steel (H1-H4)

FEATURES
- 2/4 flute micro tool geometry with corner radius
- Superior surface finish
- Wear resistance coating for superior tool life

FUNCTION
- Excellent for rib milling
- Special designed centre geometry to ensure least deflection

BENEFITS
- No EDM is required (milling is much faster).
- Polishing can be minimized.
- One single clamping, so it is easier to achieve accurate results.

PROTON HD 2 FLUTE MICRO BALL NOSE END MILL — 2.067

WORK PIECE MATERIALS

PRIMARY
Steel (P5-P6), Cast Iron (K1), Stainless Steel (M1-M3), Super Alloys (S1-S4)

SECONDARY
Hardened steel (H1-H4)

FEATURES
- 2/4 flute micro ball nose geometry
- Superior surface finish
- Wear resistance coating for superior tool life

FUNCTION
- Excellent for rib milling
- Special designed centre geometry to ensure least deflection

BENEFITS
- No EDM is required (milling is much faster).
- Polishing can be minimized.
- One single clamping, so it is easier to achieve accurate results.

PROTON HD 2 FLUTE MICRO BALL NOSE END MILL FOR EXOTIC MATERIALS — 2.076

WORK PIECE MATERIALS

PRIMARY
Super Alloys (S1-S4)

SECONDARY
Steel (P5-P6), Cast Iron (K1-K2), Stainless Steel (M1-M3), Hardened Steel (H1)

FEATURES
- 2 Ball nose- center cutting tool with 30 degrees helix
- Superior coating for super alloys

FUNCTION
- Optimized coating for better tool life
- Special designed centre

BENEFITS
- Superior tool life
- More accuracy & a better surface finish

PROTON HD 2 FLUTE DIAMOND TIPPED END MILL WITH CORNER RADIUS — 2.079

WORK PIECE MATERIALS

PRIMARY
CFRP, GFRP, Plastics, Nylon (N5/N6/N7)

SECONDARY
Non-Ferrous (N1-N4)

FEATURES
- 2 flute
- Smooth surface finish
- 0 Degree helix
- Available in standard and Long

FUNCTION
- Optimized coating for better tool life
- Special designed centre

BENEFITS
- 2 To 5 times more toollife
- More accuracy & a better surface finish
- Higher machine efficiency

CONTENTS

PROTON HD 2 FLUTE DIAMOND TIPPED BALL NOSE END MILL — 2.081

WORK PIECE MATERIALS

PRIMARY
CFRP, GFRP, Plastics, Nylon (N5/N6/N7)

SECONDARY
Non-Ferrous (N1-N4)

FEATURES
- 2 flute
- Smooth surface finish
- 0 Degree helix
- Available in standard and Long

FUNCTION
- Optimized coating for better tool life
- Special designed centre

BENEFITS
- 2 To 5 times more tool life
- More accuracy & a better surface finish
- Higher machine efficiency

PROTON HD 2 FLUTE DIAMOND COATED ROUGHER FOR GRAPHITE — 2.088

WORK PIECE MATERIALS

PRIMARY
Graphite (N6)

SECONDARY
Non-Ferrous (N5/N7)

FEATURES
- 2 flute
- Smooth surface finish
- 25 Degree helix
- Available in standard and Long

FUNCTION
- Optimized coating for better tool life
- Special designed centre

BENEFITS
- Supeiror tool life
- High accuracy & a better surface finish
- Higher machine efficiency

PROTON HD 3 FLUTE DIAMOND COATED END MILL FOR GRAPHITE — 2.090

WORK PIECE MATERIALS

PRIMARY
Graphite (N6)

SECONDARY
Non-Ferrous (N5/N7)

FEATURES
- 3 flute
- Smooth surface finish
- 40 Degree helix

FUNCTION
- Optimized coating for better tool life
- Special designed centre

BENEFITS
- Supeiror tool life
- High accuracy & a better surface finish
- Higher machine efficiency

PROTON HD OPTIMUM FLUTE DIAMOND COATED END MILL WITH CORNER RADIUS FOR GRAPHITE — 2.091

WORK PIECE MATERIALS

PRIMARY
Graphite (N6)

SECONDARY
Non-Ferrous (N5/N7)

FEATURES
- Optimum flute
- Smooth surface finish
- 40 Degree helix
- Available in short, standard and long

FUNCTION
- Optimized coating for better tool life
- Special designed centre

BENEFITS
- Supeiror tool life
- High accuracy & a better surface finish
- Higher machine efficiency

PROTON HD OPTIMUM FLUTE DIAMOND COATED BALL NOSE END MILL FOR GRAPHITE — 2.095

WORK PIECE MATERIALS

PRIMARY
Graphite (N6)

SECONDARY
Non-Ferrous (N5/N7)

FEATURES
- Optimum flute
- Smooth surface finish
- 40 Degree helix
- Available in short, standard and long

FUNCTION
- Optimized coating for better tool life
- Special designed centre

BENEFITS
- Supeiror tool life
- High accuracy & a better surface finish
- Higher machine efficiency

PROTON HD 2 FLUTE DIAMOND COATED MICRO END MILL WITH CORNER RADIUS FOR GRAPHITE — 2.099

WORK PIECE MATERIALS

PRIMARY
Graphite (N6)

SECONDARY
Non-Ferrous (N5/N7)

FEATURES
- Optimum flute
- Smooth surface finish
- 40 Degree helix

FUNCTION
- Optimized coating for better tool life
- Special designed centre

BENEFITS
- Supeiror tool life
- High accuracy & a better surface finish
- Higher machine efficiency

CONTENTS

PROTON HD 2 FLUTE DIAMOND TIPPED BALL NOSE END MILL — 2.101

WORK PIECE MATERIALS

PRIMARY
CFRP, GFRP, Plastics, Nylon (N5/N6/N7)

SECONDARY
Non-Ferrous (N1-N4)

FEATURES
- 2 flute
- Smooth Surface Finish
- 0 Degree helix
- Available in Standard and Long

FUNCTION
- Optimized coating for better tool life
- Special designed centre

BENEFITS
- 2 To 5 times more tool life
- More accuracy & a better surface finish
- Higher machine efficiency

PROTON PLUS 4 FLUTE END MILL - R SERIES — 2.104

WORK PIECE MATERIALS

PRIMARY
Hardened Steel (H1-H4)

SECONDARY
Steel (P5-P6)

FEATURES
- Superior nano grain structure raw material
- Wear resistant grade
- Ideal chip flow geometry
- Close tolerance end mills for finishing for higher accuracy
- 30 Degree helix

FUNCTION
- Operates at high cutting speeds on hardened materials
- Polishing for hardened dies can be minimized
- No need of multiple setups, Job can be finished with single setup with high accuracy

BENEFITS
- More accuracy & a better surface finish
- Higher Tool Life and consistency

PROTON PLUS 4 FLUTE END MILL - L SERIES — 2.105

WORK PIECE MATERIALS

PRIMARY
Hardened steel (H1-H4)

SECONDARY
Steel (P5-P6)

FEATURES
- Superior nano grain structure raw material
- Wear resistant grade
- Ideal chip flow geometry
- Close tolerance end mills for finishing for higher accuracy
- 30 Degree helix

FUNCTION
- Operates at high cutting speeds on hardened materials
- Polishing for hardened dies can be minimized
- No need of multiple setups, Job can be finished with single setup with high accuracy

BENEFITS
- More accuracy & a better surface finish
- Higher tool Life and consistency
- Higher machine efficiency

PROTON PLUS 4 FLUTE END MILL - LR SERIES — 2.106

WORK PIECE MATERIALS

PRIMARY
Hardened steel (H1-H4)

SECONDARY
Steel (P5-P6)

FEATURES
- Superior nano grain structure raw material
- Wear resistant grade
- Ideal chip flow geometry
- Close tolerance end mills for finishing for higher accuracy
- 30 Degree helix

FUNCTION
- Operates at high cutting speeds on hardened materials
- Polishing for hardened dies can be minimized
- No need of multiple setups, Job can be finished with single setup with high accuracy

BENEFITS
- More accuracy & a better surface finish
- Higher tool Life and consistency

PROTON PLUS 4 FLUTE END MILL WITH 50 DEGREE HELIX — 2.107

WORK PIECE MATERIALS

PRIMARY
Hardened Steel (H1-H4)

SECONDARY
Steel (P5-P6)

FEATURES
- Superior nano grain structure raw material
- Wear resistant grade
- Ideal chip flow geometry
- Close tolerance end mills for finishing for higher accuracy
- 50 Degree helix

FUNCTION
- Operates at high cutting speeds on hardened materials
- Polishing for hardened dies can be minimized
- No need of multiple setups, Job can be finished with single setup with high accuracy

BENEFITS
- More accuracy & a better surface finish
- Higher Tool Life and consistency

PROTON PLUS 4 FLUTE END MILL WITH 50 DEGREE HELIX - LONG FLUTE SERIES — 2.108

WORK PIECE MATERIALS

PRIMARY
Steel (P5-P6) from 45-60 HRc

SECONDARY
Hardened steel (H1-H4)

FEATURES
- Superior nano grain structure raw material
- Wear resistant grade
- Ideal chip flow geometry
- Close tolerance end mills for finishing for higher accuracy
- 50 Degree helix

FUNCTION
- Operates at high cutting speeds on hardened materials
- Polishing for hardened dies can be minimized
- No need of multiple setups, Job can be finished with single setup with high accuracy

BENEFITS
- More accuracy & a better surface finish
- Higher tool Life and consistency

CONTENTS

PROTON PLUS 4 FLUTE END MILL WITH 50 DEGREE HELIX - CR SERIES — 2.109

WORK PIECE MATERIALS

PRIMARY
Hardened steel (H1-H4)

SECONDARY
Steel (P5-P6)

FEATURES
- Superior nano grain structure raw material
- Wear resistant grade
- Ideal chip flow geometry
- Close tolerance end mills for finishing for higher accuracy
- 50 Degree helix

FUNCTION
- Operates at high cutting speeds on hardened materials
- Polishing for hardened dies can be minimized
- No need of multiple setups, Job can be finished with single setup with high accuracy

BENEFITS
- More accuracy & a better surface finish
- Higher tool life and consistency

PROTON PLUS 2 FLUTE BALL NOSE END MILL - REGULAR, LONG & LONG REACH SERIES — 2.110

WORK PIECE MATERIALS

PRIMARY
Hardened steel (H1-H4)

SECONDARY
Steel (P5-P6)

FEATURES
- Superior nano grain structure raw material
- Wear resistant grade
- Ideal chip flow geometry
- Close tolerance end mills for finishing for higher accuracy
- 30 Degree helix

FUNCTION
- Operates at high cutting speeds on hardened materials
- Polishing for hardened dies can be minimized
- No need of multiple setups, Job can be finished with single setup with high accuracy

BENEFITS
- More accuracy & a better surface finish
- Higher tool life and consistency

HSM SERIES 2/4 FLUTE END MILL — 2.115

WORK PIECE MATERIALS

PRIMARY
P3-P4 Steel from 30-45 HRc

SECONDARY
Stainless steel (M1)

FEATURES
- Superior micro grain structure raw material
- 2 /4 Flute
- Wear resistant grade
- Same tool for roughing and finishing for mould machining
- Ideal to machine upto 42 HRc
- Smooth surface finish
- 30 Degree helix

FUNCTION
- Optimized coating for better tool life
- Operates at high cutting speeds on moulds

BENEFITS
- No EDM is required (milling is much faster).
- Higher tool life and consistency

HSM SERIES 2/4 FLUTE BALL NOSE END MILL — 2.117

WORK PIECE MATERIALS

PRIMARY
P3-P4 Steel from 30-45 HRc

SECONDARY
Stainless Steel (M1)

FEATURES
- Superior micro grain structure raw material
- 2 /4 Flute
- Wear resistant grade
- Same tool for roughing and finishing for mould machining
- Ideal to machine upto 42 HRc
- Smooth surface finish
- 30 Degree helix

FUNCTION
- Optimized coating for better tool life
- Operates at high cutting speeds on Moulds

BENEFITS
- No EDM is required (milling is much faster).
- Higher tool life and consistency

TURBO ROUGHER-TR (F177TR / NF177TR) — 2.124

WORK PIECE MATERIALS

PRIMARY
PH Steel

SECONDARY
(Stainless steel)

FEATURES
- Variable pitch and variable helix
- Stable core geometry
- Optimized centre cutting geometry
- New generation coating
- Available in 4 flutes
- Available with neck options

FUNCTION
- High MRR
- Ability to work at high parameters due to the reinforced core.

BENEFITS
- Higher productivity
- Superior tool Life.
- Excellent surface finish.

TURBO ROUGHER-TR (F179TR / F179TRL) — 2.127

WORK PIECE MATERIALS

PRIMARY
PH Steel

SECONDARY
(Heat resistant super alloys)

FEATURES
- Variable pitch and variable helix
- Stable core geometry
- Optimized centre cutting geometry ball profile
- New generation coating
- Avaiable in 4 flutes

FUNCTION
- Ability to work at high parameters due to the reinforced core.
- High MRR
- Higher productivity

BENEFITS
- Superior tool Life.
- Excellent wall surface finish.
- High MRR

CONTENTS

TURBO ROUGHER-TR (F178TR- BLACK) 2.130

WORK PIECE MATERIALS

PRIMARY
Titanium

SECONDARY
(Heat Resistant Super Alloys)

FEATURES
- Variable pitch and variable helix
- Stable core geometry
- Optimized centre cutting geometry with 3 degree ramping capability
- New generation coating
- Avaiable in 5 Flutes

FUNCTION
- Ability to work at high parameters due to the reinforced core.
- High MRR
- Higher productivity

BENEFITS
- Superior tool life.
- Excellent wall surface finish.
- High MRR

FOR TROCHOIDAL MILLING

TURBO ROUGHER-TR (F178TR- GOLD) 2.130

WORK PIECE MATERIALS

PRIMARY
Stainless Steel

SECONDARY
(Steel)

FEATURES
- Variable pitch and variable helix
- Stable core geometry
- Optimized centre cutting geometry with 3 degree ramping capability
- New generation coating
- Avaiable in 5 flutes

FUNCTION
- Ability to work at high parameters due to the reinforced core.
- High MRR
- Higher productivity

BENEFITS
- Superior tool Life.
- Excellent wall surface finish.
- High MRR

FOR TROCHOIDAL MILLING

TURBO ROUGHER-TR (F180TR/NF180TR/F180TRL) 2.132

WORK PIECE MATERIALS

PRIMARY
Titanium

SECONDARY
(Stainless Steel)

FEATURES
- Variable pitch and variable helix
- Stable core geometry
- Optimized centre cutting geometry
- New generation coating
- Avaiable in 7 flutes
- Avaiable with neck options

FUNCTION
- Ability to work at high parameters due to the reinforced core.
- High MRR
- Higher productivity

BENEFITS
- Superior tool life.
- Excellent wall surface finish.
- High MRR

FOR TROCHOIDAL MILLING

5VR 2.135

WORK PIECE MATERIALS

PRIMARY
Titanium

SECONDARY
(PH Steel)

FEATURES
- Robust core design
- 5 flutes for high productivity
- Optimized centre cutting geometry with 3 degree ramping capability

FUNCTION
- Operates at high cutting speeds
- Geometry programmed to suit adequate material removal at various enagemnet angles

BENEFITS
- Highest dynamic speed rates
- Highest material removal rate
- Least cutting forces
- Prolonged tool life due to reduced shock
- High savings in cycle time when compared to the conventional milling strategy

FOR TROCHOIDAL MILLING

6VR 2.136

WORK PIECE MATERIALS

PRIMARY
Titanium

SECONDARY
(Stainless steel)

FEATURES
- Robust core design
- 6 flutes for high productivity

FUNCTION
- Operates at high cutting speeds
- Geometry programmed to suit adequate material removal at various enagemnet angles

BENEFITS
- Highest dynamic speed rates
- Highest material removal rate
- Least cutting forces
- Prolonged tool life due to reduced shock
- High savings in cycle time when compared to the conventional milling strategy

FOR TROCHOIDAL MILLING

RAZORCUT CBC/CBCH/NCBCH 2.140

WORK PIECE MATERIALS

PRIMARY
Aluminium 6000/7000 series

SECONDARY
Wrought Aluminium 6061 & Cast Aluminum 6061

FEATURES
- 3 Flutes
- Center cutting
- Coarse pitch (CBC)/chamfered pitch (CBCH/NCBCH)
- Roughing for aluminium
- Uncoated

FUNCTION
- High MRR
- Excellent for roughing of alumnium

BENEFITS
Superior tool life

FOR TROCHOIDAL MILLING

Note:- Ask for the TiCN Coated Program to machine Cast Aluminium Skin

CONTENTS

RAZORCUT 3FWF/3FWFCR/3FWFXL — 2.142

WORK PIECE MATERIALS

PRIMARY
Aluminium 6000/7000 series

SECONDARY
Wrought aluminium 6061 & cast aluminum 6061

FEATURES
- 3 Flutes
- Unequal flute design
- Center cutting
- Wiper design for excellent floor finish
- Uncoated

FUNCTION
- High MRR
- Excellent for finishing of alumnium

BENEFITS
- Superior tool life
- Excellent floor finish

Note:- Ask for the TiCN Coated Program to machine Cast Aluminium Skin

RAZORCUT 3F — 2.144

WORK PIECE MATERIALS

PRIMARY
Aluminium 6000/7000 series

SECONDARY
Wrought aluminium 6061 & cast aluminum 6061

FEATURES
- 3 Flutes
- Unequal flute design
- Center cutting
- Uncoated

FUNCTION
- High MRR
- Excellent for semifinishing of alumnium

BENEFITS
- Superior tool life
- Excellent floor finish

RAZORCUT 2FWF — 2.145

WORK PIECE MATERIALS

PRIMARY
Aluminium 6000/7000 series

SECONDARY
Wrought aluminium 6061 & cast aluminum 6061

FEATURES
- 2 Flutes
- 45 Degree helix
- Center cutting
- Wiper design for excellent floor finish
- Uncoated

FUNCTION
- High MRR
- Excellent for finishing of alumnium

BENEFITS
- Superior tool life
- Excellent floor finish

RAZORCUT 1F — 2.146

WORK PIECE MATERIALS

PRIMARY
Aluminium & Plastics

SECONDARY
Delerine, PEEK, Organic Materials

FEATURES
- 1 Flute
- 30 Degree helix
- Unique flute design for excellent wall finish
- Uncoated & polished
- Sharp cutting edge

FUNCTION
- High MRR
- Excellent for machining plastics, delerine and Organic materials

BENEFITS
- Superior tool life
- Excellent floor finish

Note:- Ask for the TiCN Coated Program to machine Cast Aluminium Skin

F192CB / F192 CBS / F192 CBL — 2.151

WORK PIECE MATERIALS

PRIMARY
Steel

SECONDARY
Cast iron

FEATURES
- 3-4 Flutes
- Center cutting
- Sinosoidal pitch
- Superior coating

FUNCTION
- High MRR
- Stable cutting at high cutting speeds

BENEFITS
Superior tool life

F193CB/NF193CB/NF193CBL — 2.154

WORK PIECE MATERIALS

PRIMARY
Titanium & PH Steel

SECONDARY
Stainless steel

FEATURES
- 4-6 Flutes
- Center cutting
- 45 degree helix for faster chip evacuation
- Flat pitch
- Superior coating

FUNCTION
- High MRR
- Excellent for machining plastics, delerine and organic materials

BENEFITS
- Superior tool life
- Excellent floor finish

CONTENTS

F194CB — 2.156

WORK PIECE MATERIALS

PRIMARY
Titanium

SECONDARY
Stainless steel

FEATURES
- 4-6 Flutes
- Center cutting
- 45 degree Helix for faster chip evacuation
- Flat pitch
- Superior coating

FUNCTION
- High MRR
- Stable cutting at high cutting speeds

BENEFITS
Superior tool life

FOR TROCHOIDAL MILLING

GENERAL PURPOSE ENDMILLS - GP SERIES — 2.162

WORK MATERIAL
Steel, Stainless Steel, Cast Iron, Non Ferrous, Special Alloy, Hardened Steel

DIA
1-25 mm

SIZE
Stub/STD/long/extra long/long reach
Available in 2 flute / 3 flute / 4 flute
Avaiable in ball nose and end mill
Avaiable uncoated/ TiN coated and TiAlN coated

FEATURES & BENEFITS
- Low cost of operation
- Lower CPC
- Tialn coating for better tool life
- Universal grade for all materials

ECONOMY RANGE ENDMILLS - XL SERIES — 2.186

WORK MATERIAL
Steel, Stainless Steel, Cast Iron, Non Ferrous, Special Alloy, Hardened Steel

DIA
1-20 mm

SIZE
Stub/STD/long
Avaiable in ball nose and end mill
Avaiable uncoated / TiN coated and TiAlN coated

FEATURES & BENEFITS
- Low cost of operation
- Lower CPC
- TiAlN coating for better tool life
- Universal grade for all materials

EXPRESS RANGE — 2.195

WORK MATERIAL
Steel, Stainless Steel, Cast Iron, Non Ferrous, Special Alloy, Hardened Steel

DIA
1-20 mm

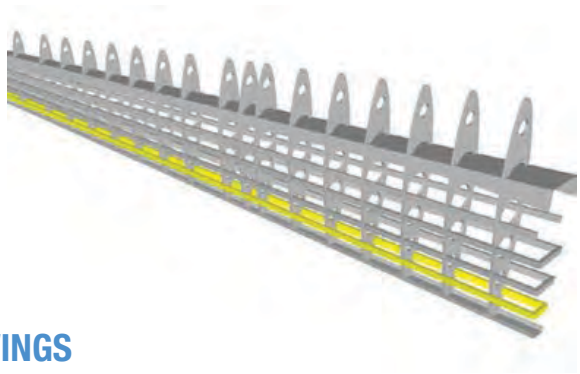
SIZE
Standard End mill 4 flutes
Avaiable in TiAlN coated

FEATURES & BENEFITS
- Low cost of operation
- Lower CPC
- TiAlN coating for better tool life
- Universal grade for all materials

ENGINE COMPONENTS
POWER PLANT

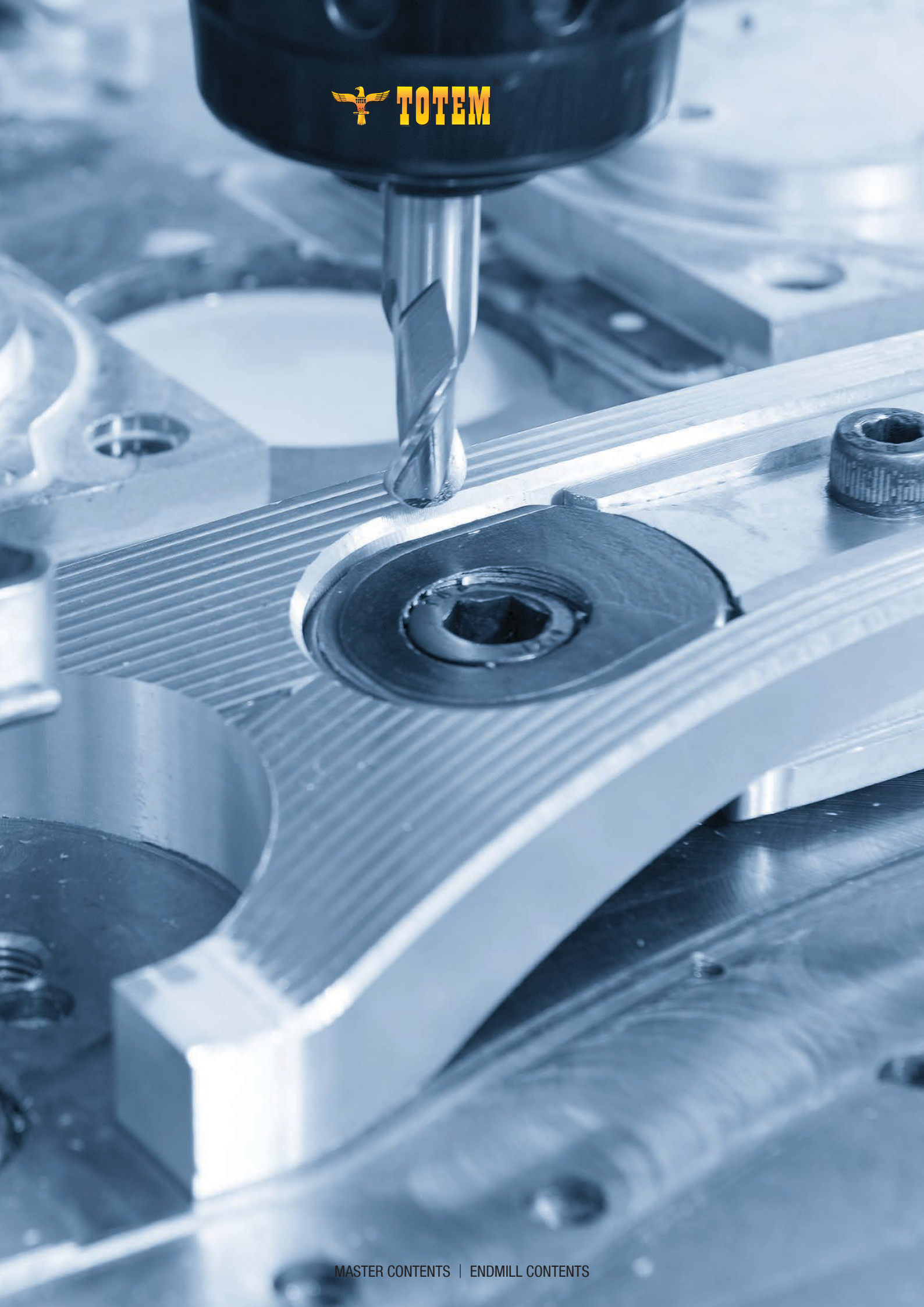
FUSELAGE

LANDING GEAR



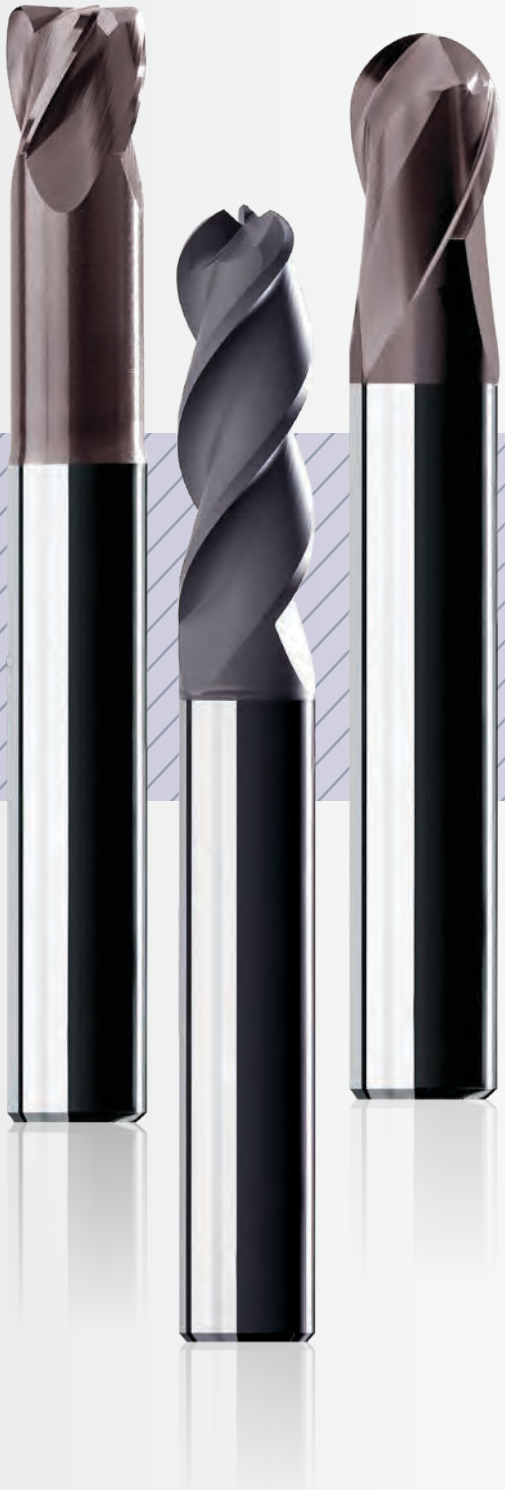
WINGS

EMPENNAGE


TOTEM

TOTEM®

High Performance Cutting Tools



TOOLING SOLUTIONS FOR DIE, MOULD & PATTERN INDUSTRY

MASTER CONTENTS | ENDMILL CONTENTS

TOOLING SOLUTIONS

FOR

DIE & MOULD INDUSTRY

	ISO Material Group	Application Hardness Range	Catalogue Series	Surface Coating	Standard Range	Size Range	No of Flute	Trochoidal Milling Capability	Pg No.
	P2-P4	32 -45 HRC	HSM	TiAlN Base	Flat Endmill	3 mm to 20 mm	2 Flute / 4 Flute	Yes	2.115
					Ball nose Endmill	3 mm to 20 mm	2 Flute / 4 Flute	Yes	2.117
	P6 H1-H3	45-58 HRC	Proton Plus Series	Proton Plus	Flat Endmill	1 mm to 25 mm	2 /4/5/6 Flute	Yes	2.104
					Ball nose Endmill	1 mm to 12 mm	2 Flute	Yes	2.110
	P3-P4 H1-H4	45-70 HRC	Proton HD	TiAlN Base	Ball nose Endmill	1.0 mm to 16 mm	2 Flute / 4 Flute	Yes	2.031
					Torus Style	3mm to 16 mm	2 Flute / 4 Flute	Yes	2.034
					Multi flute finisher	3.0 mm to 20 mm	6-8 Flute	Yes	2.039
					Multi flute finisher with CR	3.0 mm to 20 mm	6-8 Flute	Yes	2.042
	H1-H4 P2-P6	45-70 HRC	Proton HD	TiAlN Base	Micro Flat Endmill	0.1 mm to 3 mm	2 Flute	Yes	2.047
					Micro Flat Endmill	0.2 mm to 3 mm	4 Flute	Yes	2.053
					Micro Ball nose Endmill	0.1 mm to 3 mm	2 Flute	Yes	2.067
					Micro - Flat & Ball with CR	0.1 mm to 3 mm	2 Flute / 4 Flute	Yes	2.057
	H3/H4	55-70 HRC	Proton HD	TiAlN Base	Ball nose 2 flute	0.1 mm to 12 mm	2 Flute	Yes	2.015
					Torus Style	0.1 mm to 12 mm	4 Flute	Yes	2.021
					Multi flute finisher	3.0 mm to 20 mm	6-16 Flute	Yes	2.027
					Multi flute finisher with CR	3.0 mm to 20 mm	6-16 Flute	Yes	2.028

SUCCESS STORIES

Customer	Mould Maker	
Component	Mould	
Material	1.2379 62 HRc	
Code	FBK0503571	
Description	EM 10.0 (FHPM 6 100 078 10 40) PHD	
	Competitor	Forbes
Ø	10 mm	10 mm
Z	6 Flutes	6 Flutes
Vc	100 m/min	100 m/min
n	3180 rpm	3180 rpm
F	0.05 mm/rev	0.6 mm/rev
Vf	954 mm/min	11448 mm/min
ap	20mm	20mm
ae	0.1 mm	0.1 mm
Coolant	Cold Air	Cold Air
Productivity	10 times Higher	

Customer	Mould Maker	
Component	Mould	
Material	1.2379 62 HRc	
Code	FBK0503535	
Description	BEM 6.0 (FHPK 2 060 064 06 L070) PHD	
	Competitor	Forbes
Ø	6 mm	6 mm
Z	2 Flutes	2 Flutes
Vc	160 m/min	160 m/min
n	8400 rpm	8400 rpm
F	0.157 mm/rev	0.157 mm/rev
Vf	2630 mm/min	2630 mm/min
ap	0.3 mm	0.3 mm
ae	1.2 mm	1.2 mm
Coolant	Min Lubrication	Min Lubrication
Q	0.95 mm3/min	0.95 mm3/min
Tool Life	30 mins	2 Hours
Productivity	4 times Higher	

Customer	Mould Maker	
Component	Mould	
Material	1.21662 60 HRc	
Code	FBK0503554	
Description	EM 8.0 (FHPT 4 08B 078 08 40 L160) PHD	
	Competitor	Forbes
Ø	8 mm	8 mm
Z	4 Flutes	4 Flutes
Vc	25 m/min	200 m/min
n	995 rpm	7958 rpm
F	0.038 mm/rev	0.079 mm/rev
Vf	150 mm/min	2500 mm/min
ap	3 mm	3 mm
ae	0.25 mm	0.1 mm
Coolant	Cold Air	Cold Air
Q	0.11 mm3/min	0.75 mm3/min
Productivity	6 times Higher	

Customer	Mould Maker	
Component	Mould	
Material	Elmax Hardened 62 HRc	
Code	FBK0505796	
Description	EM 1.5 (FHPT 4 015 064 06 40 L015) PHD	
	Competitor	Forbes
Ø	1.5 mm	1.5 mm
Z	4 Flutes	4 Flutes
Vc	85 m/min	85 m/min
n	18000 rpm	18000 rpm
F	0.0115 mm/rev	0.02 mm/rev
Vf	828 mm/min	1440 mm/min
ap	0.65 mm	0.65 mm
ae	0.04 mm	0.04 mm
Coolant	Min Lubrication	Min Lubrication
Q	21.52 mm3/min	37.44 mm3/min
Productivity	42% Higher MRR	

End mills for hardened steels from 55-70 HRc

Advantages

- No EDM is required (milling is much faster).
- Polishing can be minimized.
- One single clamping, so it is easier to achieve accurate results.

Several strategies are possible

HPM (High Perfomance Machining)	HSM (High Speed Machining)
High cutting speed (Vc)	High cutting speed (Vc)
Large cutting depth (ap)	Small cutting depth (ap)
Small cutting width (ae)	Small cutting width (ae)
Medium feed per tooth (fz)/ table feed (Vf)	High feed per tooth (fz) / table feed (Vf)

FG code: FBK0504466

Workpiece material: 1.2379
Hardness: 62HRc

	Competitor	Totem
Vc	100 m/min	100 m/min
n	3180 rpm	3180 rpm
fz	0.05 mm/t	0.60 mm/t
Z	6	6
Vf	1.000 mm/min	11.500 mm/min
ap	20 mm	20 mm
ae	0.1 mm	0.1 mm

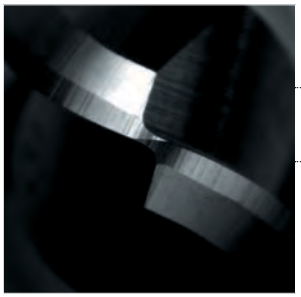
Depending on the workpiece different strategies can be chosen.
Chip removal and coolant in such applications are crucial.

Program

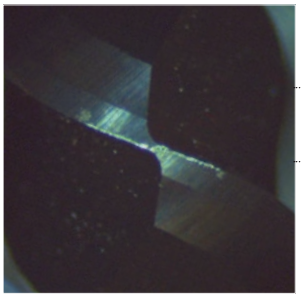
- Centre cutting high performance ball nose 2 Flute for 55-70 HRc
- Centre cutting high performance torus 4 Flute for 55-70 HRc
- Centre cutting high performance multi flute finisher for 55-70 HRc
- Centre cutting high performance multi flute finisher with corner radius for 55-70 HRc

Coating Details

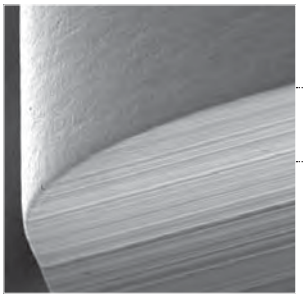
- Multi layer coating
- Nano structure
- Extreme hardness
- Longer tool life



Optimized center



Wear

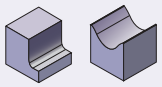


Edge preparation

For multi flute finisher with corner radius the tolerance on the corner radius is ±0.005mm.

2 Flute

Centre cutting high performance ball nose 2 flute for 55-70 HRc



HSM | 30° | f7 | 6535 HA | h5

IMAGE 1

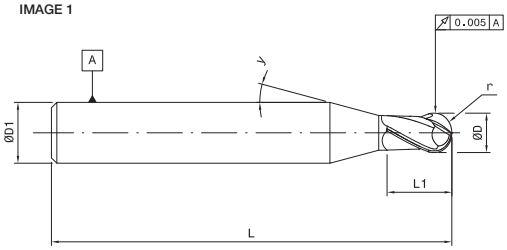
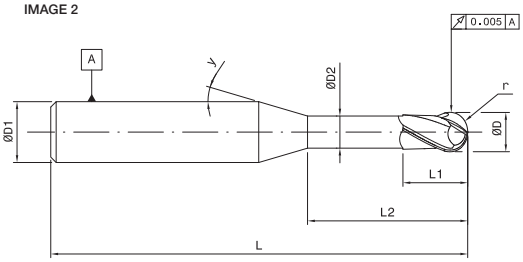


IMAGE 2



H3-H4

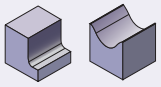
Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
0.10	0.15	-	-	51.00	4.00	0.05	2	15	1	0.684	0.706	0.755	0.812	FBK0506053
0.10	0.15	0.09	2.00	51.00	4.00	0.05	2	15	2	2.357	2.437	2.616	2.825	FBK0506054
0.20	0.30	-	-	51.00	4.00	0.10	2	15	1	0.786	0.810	0.863	0.925	FBK0506055
0.20	0.30	0.19	2.00	51.00	4.00	0.10	2	15	2	2.355	2.434	2.609	2.812	FBK0506056
0.20	0.30	0.19	4.00	51.00	4.00	0.10	2	15	2	4.423	4.573	4.909	5.299	FBK0506057
0.20	0.30	0.19	6.00	51.00	4.00	0.10	2	15	2	6.490	6.713	7.208	7.785	FBK0506058
0.40	0.50	-	-	51.00	4.00	0.20	2	15	1	1.299	1.337	1.423	1.522	FBK0506059
0.40	0.50	0.38	2.00	51.00	4.00	0.20	2	15	2	2.371	2.447	2.615	2.811	FBK0506060
0.40	0.50	0.38	4.00	51.00	4.00	0.20	2	15	2	4.439	4.586	4.915	5.298	FBK0506061
0.40	0.50	0.38	6.00	51.00	4.00	0.20	2	15	2	6.506	6.726	7.215	7.784	FBK0506062
0.40	0.50	0.38	8.00	51.00	4.00	0.20	2	15	2	8.573	8.865	9.515	10.27	FBK0506063
0.50	0.70	-	-	51.00	4.00	0.25	2	15	1	1.504	1.548	1.645	1.758	FBK0506064
0.50	0.70	0.46	2.00	51.00	4.00	0.25	2	15	2	2.408	2.483	2.651	2.846	FBK0506065
0.50	0.70	0.46	4.00	51.00	4.00	0.25	2	15	2	4.476	4.623	4.951	5.332	FBK0506066
0.50	0.70	0.46	6.00	51.00	4.00	0.25	2	15	2	6.543	6.762	7.250	7.818	FBK0506067
0.50	0.70	0.46	8.00	51.00	4.00	0.25	2	15	2	8.610	8.902	9.550	10.304	FBK0506068
0.60	0.80	-	-	51.00	4.00	0.30	2	15	1	2.259	2.327	2.479	2.656	FBK0506069
0.60	0.80	0.56	2.00	51.00	4.00	0.30	2	15	2	2.543	2.621	2.795	2.997	FBK0506070
0.80	1.00	-	-	51.00	4.00	0.40	2	15	1	2.462	2.534	2.694	2.880	FBK0506071
1.00	1.20	-	-	51.00	4.00	0.50	2	15	1	2.665	2.741	2.909	3.104	FBK0506072
1.00	1.20	0.96	2.20	51.00	4.00	0.50	2	15	2	2.743	2.821	2.995	3.197	FBK0506073
1.00	1.20	0.96	4.00	51.00	4.00	0.50	2	15	2	4.603	4.746	5.064	5.435	FBK0506074
1.00	1.20	0.96	6.00	51.00	4.00	0.50	2	15	2	6.671	6.886	7.364	7.921	FBK0506075
1.00	1.20	0.96	8.00	51.00	4.00	0.50	2	15	2	8.738	9.025	9.664	10.407	FBK0506076

Machining with a Tilt Angle will help in better tool life as the cutting speed at the center of a ball nose tool is 0
Application data on page no 2.020

2 Flute

Centre cutting high performance ball nose 2 flute for 55-70 HRc



HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

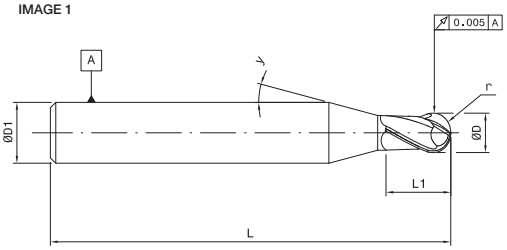
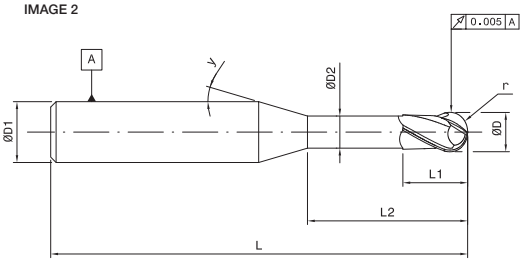


IMAGE 2



H2-H3

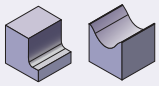
Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.00	1.20	0.96	10.00	51.00	4.00	0.50	2	15	2	10.805	11.164	11.964	12.894	FBK0506077
1.50	1.80	-	-	51.00	4.00	0.75	2	15	1	4.066	4.182	4.439	4.738	FBK0506078
1.50	1.80	1.45	3.30	51.00	4.00	0.75	2	15	2	4.163	4.282	4.546	4.854	FBK0506079
1.50	1.80	1.45	4.00	51.00	4.00	0.75	2	15	2	4.886	5.030	5.351	5.725	FBK0506080
1.50	1.80	1.45	6.00	51.00	4.00	0.75	2	15	2	6.954	7.170	7.651	8.211	FBK0506081
1.50	1.80	1.45	8.00	51.00	4.00	0.75	2	15	2	9.021	9.309	9.951	10.697	FBK0506082
1.50	1.80	1.45	10.00	51.00	4.00	0.75	2	15	2	11.088	11.448	12.25	13.183	FBK0506083
2.00	2.50	-	-	51.00	4.00	1.00	2	15	1	4.781	4.913	5.206	5.548	FBK0506084
2.00	2.50	1.90	4.00	51.00	4.00	1.00	2	15	2	4.974	5.113	5.421	5.78	FBK0506085
2.00	2.50	1.90	6.00	51.00	4.00	1.00	2	15	2	7.042	7.252	7.721	8.266	FBK0506086
2.00	2.50	1.90	8.00	51.00	4.00	1.00	2	15	2	9.109	9.392	10.02	10.752	FBK0506087
2.00	2.50	1.90	10.00	51.00	4.00	1.00	2	15	2	11.176	11.531	12.32	13.239	FBK0506088
2.50	3.00	-	-	51.00	4.00	1.25	2	15	1	5.290	5.431	5.744	6.109	FBK0506089
2.50	3.00	2.40	4.50	51.00	4.00	1.25	2	15	2	5.483	5.630	5.959	6.341	FBK0506090
2.50	3.00	2.40	6.00	51.00	4.00	1.25	2	15	2	7.033	7.235	7.683	8.205	FBK0506091
2.50	3.00	2.40	8.00	51.00	4.00	1.25	2	15	2	9.101	9.374	9.983	10.692	FBK0506092
2.50	3.00	2.40	10.00	51.00	4.00	1.25	2	15	2	11.168	11.513	12.283	13.178	FBK0506093
3.00	3.50	-	-	51.00	4.00	1.50	2	15	1	5.798	5.948	6.281	6.669	FBK0506094
3.00	3.50	2.90	5.00	51.00	4.00	1.50	2	15	2	5.991	6.148	6.496	6.901	FBK0506095
3.00	3.50	2.90	6.00	51.00	4.00	1.50	2	15	2	7.025	7.217	7.646	8.144	FBK0506096
3.00	3.50	2.90	7.00	51.00	4.00	1.50	2	15	2	8.058	8.287	8.796	9.388	FBK0506097
3.00	3.50	2.90	8.00	51.00	4.00	1.50	2	15	2	9.092	9.357	9.946	10.631	FBK0506098
3.00	3.50	2.90	10.00	51.00	4.00	1.50	2	15	2	11.159	11.496	12.245	∞	FBK0506099

Machining with a Tilt Angle will help in better tool life as the cutting speed at the center of a ball nose tool is 0
Application data on page no 2.020

2 Flute

Centre cutting high performance ball nose 2 flute for 55-70 HRc



HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

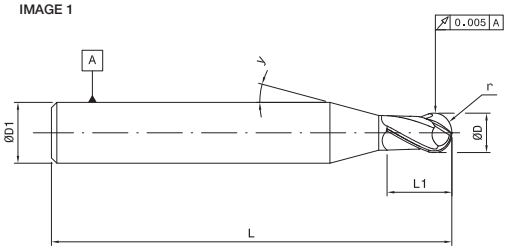
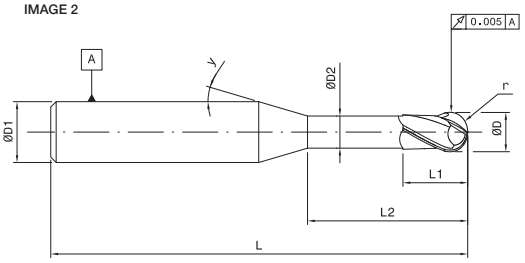


IMAGE 2



H3-H4

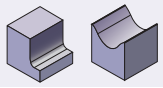
Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
0.10	0.15	-	-	64.00	6.00	0.05	2	15	1	0.684	0.706	0.755	0.812	FBK0505685
0.10	0.15	0.09	2.00	64.00	6.00	0.05	2	15	2	2.357	2.437	2.616	2.825	FBK0505686
0.20	0.30	-	-	64.00	6.00	0.10	2	15	1	0.786	0.810	0.863	0.925	FBK0505687
0.20	0.30	0.19	2.00	64.00	6.00	0.10	2	15	2	2.355	2.434	2.609	2.812	FBK0505688
0.20	0.30	0.19	4.00	64.00	6.00	0.10	2	15	2	4.423	4.573	4.909	5.299	FBK0505689
0.20	0.30	0.19	6.00	64.00	6.00	0.10	2	15	2	6.490	6.713	7.208	7.785	FBK0505690
0.40	0.50	-	-	64.00	6.00	0.20	2	15	1	1.299	1.337	1.423	1.522	FBK0505691
0.40	0.50	0.38	2.00	64.00	6.00	0.20	2	15	2	2.371	2.447	2.615	2.811	FBK0505692
0.40	0.50	0.38	4.00	64.00	6.00	0.20	2	15	2	4.439	4.586	4.915	5.298	FBK0505693
0.40	0.50	0.38	6.00	64.00	6.00	0.20	2	15	2	6.506	6.726	7.215	7.784	FBK0505694
0.40	0.50	0.38	8.00	64.00	6.00	0.20	2	15	2	8.573	8.865	9.515	10.27	FBK0505695
0.50	0.70	-	-	64.00	6.00	0.25	2	15	1	1.504	1.548	1.645	1.758	FBK0504418
0.50	0.70	0.46	2.00	64.00	6.00	0.25	2	15	2	2.408	2.483	2.651	2.846	FBK0505696
0.50	0.70	0.46	4.00	64.00	6.00	0.25	2	15	2	4.476	4.623	4.951	5.332	FBK0505697
0.50	0.70	0.46	6.00	64.00	6.00	0.25	2	15	2	6.543	6.762	7.250	7.818	FBK0505698
0.50	0.70	0.46	8.00	64.00	6.00	0.25	2	15	2	8.610	8.902	9.550	10.304	FBK0505699
0.60	0.80	-	-	64.00	6.00	0.30	2	15	1	2.259	2.327	2.479	2.656	FBK0504419
0.60	0.80	0.56	2.00	64.00	6.00	0.30	2	15	2	2.543	2.621	2.795	2.997	FBK0504420
0.80	1.00	-	-	64.00	6.00	0.40	2	15	1	2.462	2.534	2.694	2.880	FBK0504421
1.00	1.20	-	-	64.00	6.00	0.50	2	15	1	2.665	2.741	2.909	3.104	FBK0504422
1.00	1.20	0.96	2.20	64.00	6.00	0.50	2	15	2	2.743	2.821	2.995	3.197	FBK0505700
1.00	1.20	0.96	4.00	64.00	6.00	0.50	2	15	2	4.603	4.746	5.064	5.435	FBK0504424
1.00	1.20	0.96	6.00	64.00	6.00	0.50	2	15	2	6.671	6.886	7.364	7.921	FBK0505701
1.00	1.20	0.96	8.00	64.00	6.00	0.50	2	15	2	8.738	9.025	9.664	10.407	FBK0505702

Machining with a Tilt Angle will help in better tool life as the cutting speed at the center of a ball nose tool is 0
Application data on page no 2.020

2 Flute

Centre cutting high performance ball nose 2 flute for 55-70 HRc



HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

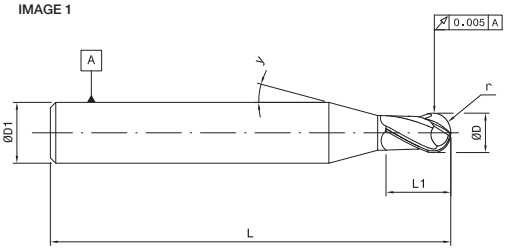
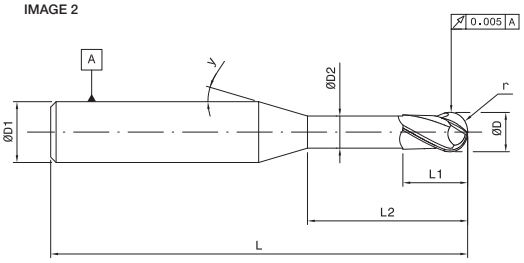


IMAGE 2



H3-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.00	1.20	0.96	10.00	64.00	6.00	0.50	2	15	2	10.805	11.164	11.964	12.894	FBK0505703
1.50	1.80	-	-	64.00	6.00	0.75	2	15	1	4.066	4.182	4.439	4.738	FBK0504425
1.50	1.80	1.45	3.30	64.00	6.00	0.75	2	15	2	4.163	4.282	4.546	4.854	FBK0505704
1.50	1.80	1.45	4.00	64.00	6.00	0.75	2	15	2	4.886	5.030	5.351	5.725	FBK0505705
1.50	1.80	1.45	6.00	64.00	6.00	0.75	2	15	2	6.954	7.170	7.651	8.211	FBK0505706
1.50	1.80	1.45	8.00	64.00	6.00	0.75	2	15	2	9.021	9.309	9.951	10.697	FBK0505707
1.50	1.80	1.45	10.00	64.00	6.00	0.75	2	15	2	11.088	11.448	12.25	13.183	FBK0505708
2.00	2.50	-	-	64.00	6.00	1.00	2	15	1	4.781	4.913	5.206	5.548	FBK0504426
2.00	2.50	1.90	4.00	64.00	6.00	1.00	2	15	2	4.974	5.113	5.421	5.780	FBK0504427
2.00	2.50	1.90	6.00	64.00	6.00	1.00	2	15	2	7.042	7.252	7.721	8.266	FBK0505709
2.00	2.50	1.90	8.00	64.00	6.00	1.00	2	15	2	9.109	9.392	10.02	10.752	FBK0505710
2.00	2.50	1.90	10.00	64.00	6.00	1.00	2	15	2	11.176	11.531	12.32	13.239	FBK0505711
2.50	3.00	-	-	64.00	6.00	1.25	2	15	1	5.290	5.431	5.744	6.109	FBK0504428
2.50	3.00	2.40	4.50	64.00	6.00	1.25	2	15	2	5.483	5.630	5.959	6.341	FBK0505712
2.50	3.00	2.40	6.00	64.00	6.00	1.25	2	15	2	7.033	7.235	7.683	8.205	FBK0505713
2.50	3.00	2.40	8.00	64.00	6.00	1.25	2	15	2	9.101	9.374	9.983	10.692	FBK0505714
2.50	3.00	2.40	10.00	64.00	6.00	1.25	2	15	2	11.168	11.513	12.283	13.178	FBK0505715
3.00	3.50	-	-	64.00	6.00	1.50	2	15	1	5.798	5.948	6.281	6.669	FBK0504429
3.00	3.50	2.90	5.00	64.00	6.00	1.50	2	15	2	5.991	6.148	6.496	6.901	FBK0505716
3.00	3.50	2.90	6.00	64.00	6.00	1.50	2	15	2	7.025	7.217	7.646	8.144	FBK0505717
3.00	3.50	2.90	7.00	64.00	6.00	1.50	2	15	2	8.058	8.287	8.796	9.388	FBK0504430
3.00	3.50	2.90	8.00	64.00	6.00	1.50	2	15	2	9.092	9.357	9.946	10.631	FBK0505718
3.00	3.50	2.90	10.00	64.00	6.00	1.50	2	15	2	11.159	11.496	12.245	13.117	FBK0505719
4.00	4.50	-	-	64.00	6.00	2.00	2	15	1	6.815	6.983	7.356	7.791	FBK0504431

Machining with a Tilt Angle will help in better tool life as the cutting speed at the center of a ball nose tool is 0
Application data on page no 2.020

2 Flute

Centre cutting high performance ball nose 2 flute for 55-70 HRc

HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 3

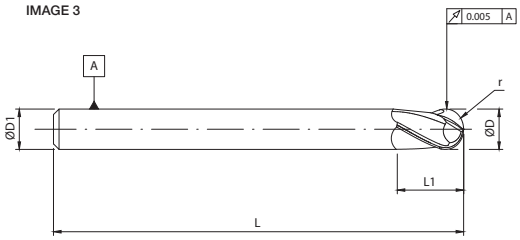
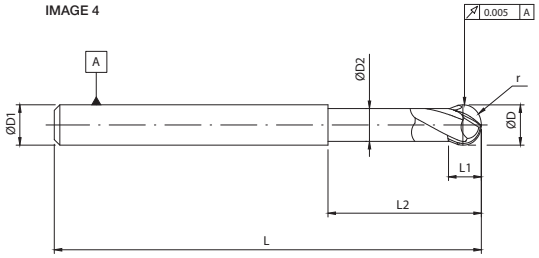


IMAGE 4



H3-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	Effective length compared with Inclined Angle 0.5°	1°	2°	3°	EDP No
4.00	4.50	3.80	8.00	64.00	6.00	2.00	2	15	2	9.268	9.521	10.085	10.741	FBK0504432
5.00	6.00	-	-	64.00	6.00	2.50	2	15	2	8.349	8.553	9.006	9.534	FBK0504433
5.00	6.00	4.70	10.00	64.00	6.00	2.50	2	15	2	11.512	11.826	12.525	∞	FBK0504434
6.00	7.00	-	-	64.00	6.00	3.00	2	-	1	∞	∞	∞	∞	FBK0503535
6.00	7.00	5.70	12.00	64.00	6.00	3.00	2	-	2	∞	∞	∞	∞	FBK0504435
6.00	7.00	5.70	25.00	64.00	6.00	3.00	2	-	2	∞	∞	∞	∞	FBK0504436
8.00	9.00	-	-	64.00	8.00	4.00	2	-	1	∞	∞	∞	∞	FBK0504437
8.00	9.00	7.60	16.00	64.00	8.00	4.00	2	-	2	∞	∞	∞	∞	FBK0504438
8.00	9.00	7.60	25.00	64.00	8.00	4.00	2	-	2	∞	∞	∞	∞	FBK0503536
10.00	12.00	-	-	78.00	10.00	5.00	2	-	1	∞	∞	∞	∞	FBK0504439
10.00	12.00	9.60	20.00	78.00	10.00	5.00	2	-	2	∞	∞	∞	∞	FBK0503537
12.00	15.00	-	-	78.00	12.00	6.00	2	-	1	∞	∞	∞	∞	FBK0504440

Tolerance chart

Diameter range	Shank	Cutting diameter	Cutting diameter	Cutting diameter	Cutting diameter
	ØD1-h5	ØD-e8	ØD-f7	ØD-g7	ØFHC
D ≤ 3	0	-0.014	-0.006	-0.002	0
	-0.004	-0.028	-0.016	-0.012	-0.025
3 < D ≤ 6	0	-0.020	-0.010	-0.004	0
	-0.005	-0.038	-0.022	-0.016	-0.030
6 < D ≤ 10	0	-0.025	-0.013	-0.005	0
	-0.006	-0.047	-0.028	-0.02	-0.036
10 < D ≤ 18	0	-0.032	-0.016	-0.006	0
	-0.008	-0.059	-0.034	-0.024	-0.043
18 < D ≤ 30	0	-0.040	-0.020	-0.006	0
	-0.009	-0.073	-0.041	-0.024	-0.052

Machining with a Tilt Angle will help in better tool life as the cutting speed at the center of a ball nose tool is 0
Remark ∞ means no collusion in projection length area
Application data on page no 2.020

Cutting parameters

Centre cutting high performance 2 flute for ball nose 50-70 HRc - 0.1 mm to 2.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling	Cutting Speed (Vc) m/min: Profiling	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)																	
								Diameter in mm																	
								mm	0.1		0.2		0.4		0.5		0.6		0.8		1.0		1.5		2.0	
			ap 0.2D ae/D 3%	ap 0.2D ae/D 3%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Hardened Steel	H	3	150	180	MQL/ COLD AIR	150	220	fz	0.002	0.007	0.004	0.010	0.006	0.013	0.007	0.015	0.009	0.018	0.009	0.018	0.015	0.025	0.020	0.035	0.030	0.050
		4	200	220	MQL/ COLD AIR	200	250	fz	0.002	0.007	0.004	0.010	0.006	0.013	0.007	0.015	0.009	0.018	0.009	0.018	0.015	0.025	0.020	0.035	0.030	0.050

Centre cutting high performance 2 flute for ball nose 50-70 HRc - 2.5 mm to 12.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling	Cutting Speed (Vc) m/min: Profiling	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)																	
								Diameter in mm																	
								mm	2.5		3.0		4.0		5.0		6.0		8.0		10.0		12.0			
			ap 0.2D ae/D 3%	ap 0.2D ae/D 3%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max		
Hardened Steel	H	3	150	180	MQL/ COLD AIR	150	220	fz	0.035	0.055	0.040	0.060	0.050	0.080	0.060	0.110	0.065	0.125	0.080	0.130	0.085	0.135	0.100	0.140		
		4	200	220	MQL/ COLD AIR	200	250	fz	0.035	0.055	0.040	0.060	0.050	0.080	0.060	0.110	0.065	0.125	0.080	0.130	0.085	0.135	0.100	0.140		

FBK0503535

Workpiece material: 1.2379

Hardness: 62 HRc

	Competitor	Totem
Ø	6mm	6mm
z	2 flutes	2 flutes
vc	160 m/min	160 m/min
n	8400 rpm	8400 rpm
fz	0.157 mm/t	0.157 mm/t
vf	2630 mm/min	2630 mm/min
ap	0.3 mm	0.3 mm
ae	1.2 mm	1.2 mm
Coolant	min. lubrication	min. lubrication

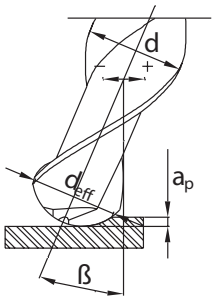
Q	0.95 mm^3/min	0.95 mm^3/min
Tool Life	30 mins	2 Hrs

Advantages

- Consistency
- Higher Tool Life

Tips:

- Use a rigid milling machine and clamping method
- Try to minimize entering and exiting the workpiece
- Use minimum lubrication or oil-mist-spray



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1

* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D\text{-}ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D\text{-}2 \times ADOC}{D}\right)\right]$$

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)
Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

4 Flute

Centre cutting high performance torus 4 flute for 55-70 HRc

HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

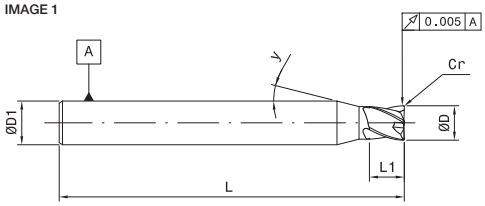
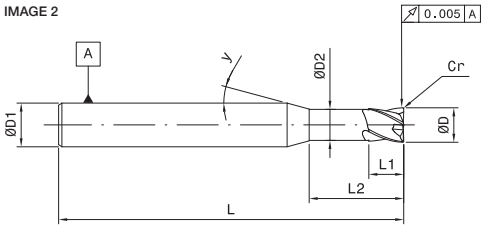


IMAGE 2



H3-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
0.20	0.20	-	-	51.00	4.00	0.01	4	15	1	0.685	0.709	0.761	0.822	FBK0505720
0.20	0.20	0.18	0.40	51.00	4.00	0.01	4	15	2	0.724	0.749	0.804	0.869	FBK0505721
0.40	0.40		-	51.00	4.00	0.01	4	15	1	1.202	1.244	1.336	1.444	FBK0505722
0.40	0.40	0.38	0.90	51.00	4.00	0.01	4	15	2	1.241	1.284	1.379	1.490	FBK0505723
0.40	0.40	0.38	1.60	51.00	4.00	0.01	4	15	2	1.964	2.032	2.184	2.360	FBK0505724
0.50	0.50	-	-	51.00	4.00	0.03	4	15	1	1.305	1.349	1.448	1.563	FBK0505725
0.50	0.50	0.48	1.00	51.00	4.00	0.03	4	15	2	1.343	1.389	1.491	1.610	FBK0505726
0.50	0.50	0.48	2.00	51.00	4.00	0.03	4	15	2	2.377	2.459	2.641	2.853	FBK0505727
0.60	0.60	-	-	51.00	4.00	0.05	4	15	1	2.060	2.130	2.286	2.468	FBK0505728
0.60	0.60	0.56	1.60	51.00	4.00	0.05	4	15	2	2.138	2.210	2.372	2.561	FBK0505729
0.60	0.60	0.56	2.40	51.00	4.00	0.05	4	15	2	2.965	3.066	3.292	3.555	FBK0505730
0.80	0.80		-	51.00	4.00	0.05	4	15	1	2.267	2.344	2.516	2.716	FBK0505731
0.80	0.80	0.76	1.80	51.00	4.00	0.05	4	15	2	2.344	2.424	2.602	2.809	FBK0505732
0.80	0.80	0.76	3.20	51.00	4.00	0.05	4	15	2	3.791	3.922	4.212	4.550	FBK0505733
1.00	1.00	-	-	51.00	4.00	0.05	4	15	1	2.474	2.558	2.746	2.965	FBK0505734
1.00	1.00	0.96	2.00	51.00	4.00	0.05	4	15	2	2.551	2.638	2.832	3.058	FBK0505735
1.00	1.00	0.96	4.00	51.00	4.00	0.05	4	15	2	4.618	4.778	5.132	5.544	FBK0505736
1.00	1.00	0.96	6.00	51.00	4.00	0.05	4	15	2	6.686	6.917	7.432	8.030	FBK0505737
1.00	1.00		-	51.00	4.00	0.10	4	15	1	2.472	2.555	2.739	2.953	FBK0505738
1.00	1.00	0.96	2.00	51.00	4.00	0.10	4	15	2	2.549	2.635	2.825	3.046	FBK0505739
1.00	1.00	0.96	4.00	51.00	4.00	0.10	4	15	2	4.617	4.774	5.124	5.532	FBK0505740
1.00	1.00	0.96	6.00	51.00	4.00	0.10	4	15	2	6.684	6.913	7.424	8.018	FBK0505741
1.50	1.50	-	-	51.00	4.00	0.10	4	15	1	3.778	3.906	4.191	4.523	FBK0505742
1.50	1.50	1.45	3.00	51.00	4.00	0.10	4	15	2	3.874	4.006	4.299	4.639	FBK0505743
1.50	1.50	1.45	6.00	51.00	4.00	0.10	4	15	2	6.975	7.215	7.748	8.369	FBK0505744
1.50	1.50	1.45	9.00	51.00	4.00	0.10	4	15	2	10.076	10.424	11.198	12.098	FBK0505745
1.50	1.50	-	-	51.00	4.00	0.20	4	15	1	3.775	3.899	4.177	4.499	FBK0505746

Application data on page no 2.026

4 Flute

Centre cutting high performance torus 4 flute for 55-70 HRc

HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

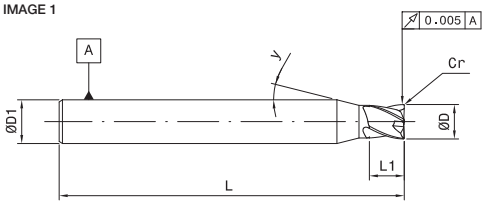
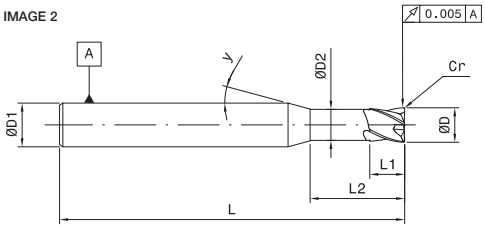


IMAGE 2



H3-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.50	1.50	1.45	3.00	51.00	4.00	0.20	4	15	2	3.871	3.999	4.284	4.615	FBK0505747
1.50	1.50	1.45	6.00	51.00	4.00	0.20	4	15	2	6.972	7.208	7.733	8.345	FBK0505748
1.50	1.50	1.45	9.00	51.00	4.00	0.20	4	15	2	10.073	10.417	11.183	12.074	FBK0505749
2.00	2.00	-	-	51.00	4.00	0.10	4	15	1	4.295	4.441	4.766	5.145	FBK0505750
2.00	2.00	1.90	4.00	51.00	4.00	0.10	4	15	2	5.005	5.175	5.556	5.999	FBK0505751
2.00	2.00	1.90	8.00	51.00	4.00	0.10	4	15	2	9.139	9.454	10.155	10.971	FBK0505752
2.00	2.00	1.90	12.00	51.00	4.00	0.10	4	15	2	13.274	13.733	14.755	15.944	FBK0505753
2.00	2.00	-	-	51.00	4.00	0.30	4	15	1	4.288	4.427	4.736	5.096	FBK0505754
2.00	2.00	1.90	4.00	51.00	4.00	0.30	4	15	2	4.998	5.162	5.526	5.95	FBK0505755
2.00	2.00	1.90	8.00	51.00	4.00	0.30	4	15	2	9.133	9.440	10.125	10.923	FBK0505756
2.00	2.00	1.90	12.00	51.00	4.00	0.30	4	15	2	13.267	13.719	14.725	15.895	FBK0505757
2.50	2.50	-	-	51.00	4.00	0.10	4	15	1	4.812	4.976	5.341	5.767	FBK0505758
2.50	2.50	2.40	5.00	51.00	4.00	0.10	4	15	2	6.038	6.245	6.706	7.242	FBK0505759
2.50	2.50	2.40	10.00	51.00	4.00	0.10	4	15	2	11.207	11.594	12.455	13.457	FBK0505760
2.50	2.50	2.40	15.00	51.00	4.00	0.10	4	15	2	16.375	16.942	18.204	∞	FBK0505761
2.50	2.50	-	-	51.00	4.00	0.30	4	15	1	4.805	4.962	5.311	5.718	FBK0505762
2.50	2.50	2.40	5.00	51.00	4.00	0.30	4	15	2	6.032	6.231	6.676	7.193	FBK0505763
2.50	2.50	2.40	10.00	51.00	4.00	0.30	4	15	2	11.200	11.580	12.425	13.409	FBK0505764
2.50	2.50	2.40	15.00	51.00	4.00	0.30	4	15	2	16.368	16.928	18.174	∞	FBK0505765
3.00	3.00	-	-	51.00	4.00	0.20	4	15	1	5.325	5.504	5.901	6.364	FBK0505766
3.00	3.00	-	6.00	51.00	4.00	0.20	4	15	1	7.069	7.308	7.841	8.461	FBK0505767
3.00	3.00	-	12.00	51.00	4.00	0.20	4	15	1	13.271	13.726	14.74	∞	FBK0505768
3.00	3.00	-	18.00	51.00	4.00	0.20	4	15	1	19.473	20.144	∞	∞	FBK0505769
3.00	3.00	-	-	51.00	4.00	0.20	4	15	1	5.325	5.504	5.901	6.364	FBK0505770
3.00	3.00	-	6.00	51.00	4.00	0.50	4	15	1	7.058	7.287	7.796	8.388	FBK0505771
3.00	3.00	-	12.00	51.00	4.00	0.50	4	15	1	13.26	13.705	14.695	∞	FBK0505772
3.00	3.00	-	18.00	51.00	4.00	0.50	4	15	1	19.462	20.123	∞	∞	FBK0505773

Remark ∞ means no collusion in projection length area

Application data on page no 2.026

4 Flute

Centre cutting high performance torus 4 flute for 55-70 HRc

HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

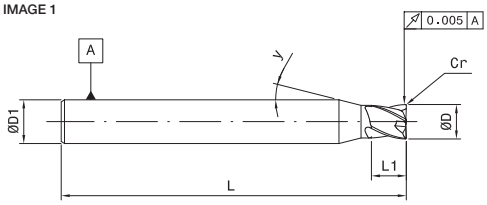
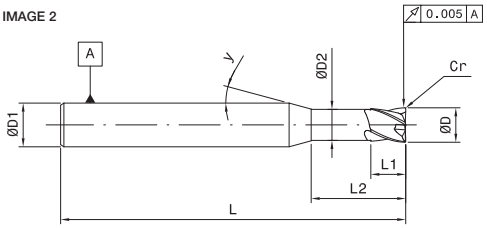


IMAGE 2



H3-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
0.20	0.20	-	-	64.00	6.00	0.01	4	15	1	0.685	0.709	0.761	0.822	FBK0505774
0.20	0.20	0.18	0.40	64.00	6.00	0.01	4	15	2	0.724	0.749	0.804	0.869	FBK0505775
0.40	0.40	-	-	64.00	6.00	0.01	4	15	1	1.202	1.244	1.336	1.444	FBK0505776
0.40	0.40	0.38	0.90	64.00	6.00	0.01	4	15	2	1.241	1.284	1.379	1.490	FBK0505777
0.40	0.40	0.38	1.60	64.00	6.00	0.01	4	15	2	1.964	2.032	2.184	2.360	FBK0505778
0.50	0.50	-	-	64.00	6.00	0.03	4	15	1	1.305	1.349	1.448	1.563	FBK0505779
0.50	0.50	0.48	1.00	64.00	6.00	0.03	4	15	2	1.343	1.389	1.491	1.610	FBK0505780
0.50	0.50	0.48	2.00	64.00	6.00	0.03	4	15	2	2.377	2.459	2.641	2.853	FBK0505781
0.60	0.60	-	-	64.00	6.00	0.05	4	15	1	2.060	2.130	2.286	2.468	FBK0505782
0.60	0.60	0.56	1.60	64.00	6.00	0.05	4	15	2	2.138	2.210	2.372	2.561	FBK0505783
0.60	0.60	0.56	2.40	64.00	6.00	0.05	4	15	2	2.965	3.066	3.292	3.555	FBK0505784
0.80	0.80	-	-	64.00	6.00	0.05	4	15	1	2.267	2.344	2.516	2.716	FBK0505785
0.80	0.80	0.76	1.80	64.00	6.00	0.05	4	15	2	2.344	2.424	2.602	2.809	FBK0505786
0.80	0.80	0.76	3.20	64.00	6.00	0.05	4	15	2	3.791	3.922	4.212	4.550	FBK0505787
1.00	1.00	-	-	64.00	6.00	0.05	4	15	1	2.474	2.558	2.746	2.965	FBK0505788
1.00	1.00	0.96	2.00	64.00	6.00	0.05	4	15	2	2.551	2.638	2.832	3.058	FBK0505789
1.00	1.00	0.96	4.00	64.00	6.00	0.05	4	15	2	4.618	4.778	5.132	5.544	FBK0505790
1.00	1.00	0.96	6.00	64.00	6.00	0.05	4	15	2	6.686	6.917	7.432	8.030	FBK0505791
1.00	1.00	-	-	64.00	6.00	0.10	4	15	1	2.472	2.555	2.739	2.953	FBK0505792
1.00	1.00	0.96	2.00	64.00	6.00	0.10	4	15	2	2.549	2.635	2.825	3.046	FBK0505793
1.00	1.00	0.96	4.00	64.00	6.00	0.10	4	15	2	4.617	4.774	5.124	5.532	FBK0505794
1.00	1.00	0.96	6.00	64.00	6.00	0.10	4	15	2	6.684	6.913	7.424	8.018	FBK0505795
1.50	1.50	-	-	64.00	6.00	0.10	4	15	1	3.778	3.906	4.191	4.523	FBK0505796
1.50	1.50	1.45	3.00	64.00	6.00	0.10	4	15	2	3.874	4.006	4.299	4.639	FBK0505797
1.50	1.50	1.45	6.00	64.00	6.00	0.10	4	15	2	6.975	7.215	7.748	8.369	FBK0505798
1.50	1.50	1.45	9.00	64.00	6.00	0.10	4	15	2	10.076	10.424	11.198	12.098	FBK0505799
1.50	1.50	-	-	64.00	6.00	0.20	4	15	1	3.775	3.899	4.177	4.499	FBK0505800
1.50	1.50	1.45	3.00	64.00	6.00	0.20	4	15	2	3.871	3.999	4.284	4.615	FBK0505801

Application data on page no 2.026

4 Flute

Centre cutting high performance torus 4 flute for 55-70 HRc

HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

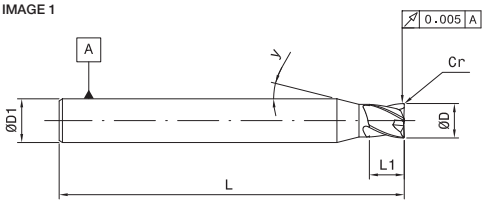
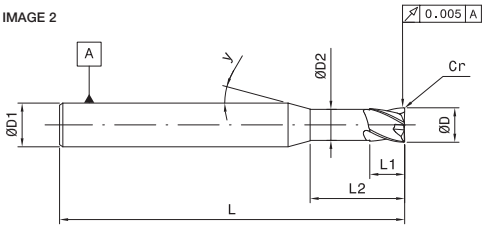


IMAGE 2



H3-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.50	1.50	1.45	6.00	64.00	6.00	0.20	4	15	2	6.972	7.208	7.733	8.345	FBK0505802
1.50	1.50	1.45	9.00	64.00	6.00	0.20	4	15	2	10.073	10.417	11.183	12.074	FBK0505803
2.00	2.00	-	-	64.00	6.00	0.10	4	15	1	4.295	4.441	4.766	5.145	FBK0505804
2.00	2.00	1.90	4.00	64.00	6.00	0.10	4	15	2	5.005	5.175	5.556	5.999	FBK0504441
2.00	2.00	1.90	8.00	64.00	6.00	0.10	4	15	2	9.139	9.454	10.155	10.971	FBK0504442
2.00	2.00	1.90	12.00	64.00	6.00	0.10	4	15	2	13.274	13.733	14.755	15.944	FBK0504443
2.00	2.00	-	-	64.00	6.00	0.30	4	15	1	4.288	4.427	4.736	5.096	FBK0505805
2.00	2.00	1.90	4.00	64.00	6.00	0.30	4	15	2	4.998	5.162	5.526	5.950	FBK0504444
2.00	2.00	1.90	8.00	64.00	6.00	0.30	4	15	2	9.133	9.440	10.125	10.923	FBK0504445
2.00	2.00	1.90	12.00	64.00	6.00	0.30	4	15	2	13.267	13.719	14.725	15.895	FBK0504446
2.50	2.50	-	-	64.00	6.00	0.10	4	15	1	4.812	4.976	5.341	5.767	FBK0505806
2.50	2.50	2.40	5.00	64.00	6.00	0.10	4	15	2	6.038	6.245	6.706	7.242	FBK0505807
2.50	2.50	2.40	10.00	64.00	6.00	0.10	4	15	2	11.207	11.594	12.455	13.457	FBK0505808
2.50	2.50	2.40	15.00	64.00	6.00	0.10	4	15	2	16.375	16.942	18.204	19.673	FBK0505809
2.50	2.50	-	-	64.00	6.00	0.30	4	15	1	4.805	4.962	5.311	5.718	FBK0505810
2.50	2.50	2.40	5.00	64.00	6.00	0.30	4	15	2	6.032	6.231	6.676	7.193	FBK0505811
2.50	2.50	2.40	10.00	64.00	6.00	0.30	4	15	2	11.200	11.580	12.425	13.409	FBK0505812
2.50	2.50	2.40	15.00	64.00	6.00	0.30	4	15	2	16.368	16.928	18.174	19.625	FBK0505813
3.00	3.00	-	-	64.00	6.00	0.20	4	15	1	5.325	5.504	5.901	6.364	FBK0505814
3.00	3.00	2.90	6.00	64.00	6.00	0.20	4	15	2	7.069	7.308	7.841	8.461	FBK0504447
3.00	3.00	2.90	12.00	64.00	6.00	0.20	4	15	2	13.271	13.726	14.74	15.919	FBK0504448
3.00	3.00	2.90	18.00	64.00	6.00	0.20	4	15	2	19.473	20.144	21.639	23.378	FBK0504449
3.00	3.00	-	-	64.00	6.00	0.50	4	15	1	5.325	5.504	5.901	6.364	FBK0505815
3.00	3.00	2.90	6.00	64.00	6.00	0.50	4	15	2	7.058	7.287	7.796	8.388	FBK0504450
3.00	3.00	2.90	12.00	64.00	6.00	0.50	4	15	2	13.26	13.705	14.695	15.846	FBK0504451
3.00	3.00	2.90	18.00	64.00	6.00	0.50	4	15	2	19.462	20.123	21.594	23.305	FBK0504452
4.00	4.00	3.80	8.00	64.00	6.00	0.20	4	15	2	9.329	9.647	10.355	11.179	FBK0503544

Application data on page no 2.026

4 Flute

Centre cutting high performance torus 4 flute for 55-70 HRc

HSM | 30° | f7 | 6535 HA | h5 | TiAlN

H3-H4

IMAGE 1

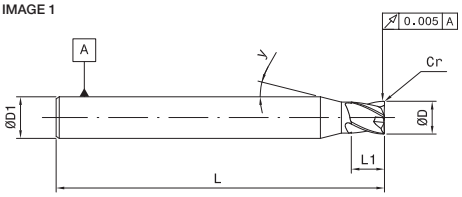


IMAGE 2

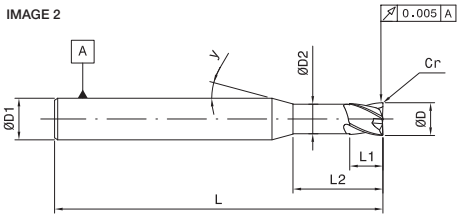
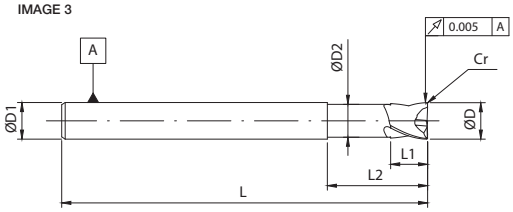


IMAGE 3



Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
4.00	4.00	3.80	16.00	64.00	6.00	0.20	4	15	2	17.598	18.204	19.554	∞	FBK0503545
4.00	4.00	3.80	24.00	64.00	6.00	0.20	4	15	2	25.867	26.762	28.753	∞	FBK0503546
4.00	4.00	3.80	8.00	64.00	6.00	0.50	4	15	2	9.319	9.626	10.31	11.106	FBK0503547
4.00	4.00	3.80	16.00	64.00	6.00	0.50	4	15	2	17.588	18.183	19.509	∞	FBK0503548
4.00	4.00	3.80	24.00	64.00	6.00	0.50	4	15	2	25.857	26.741	28.708	∞	FBK0503549
6.00	6.00	5.70	12.00	64.00	6.00	0.50	4	-	3	-	-	-	-	FBK0503550
6.00	6.00	5.70	24.00	64.00	6.00	0.50	4	-	3	-	-	-	-	FBK0503551
6.00	6.00	5.70	12.00	64.00	6.00	1.00	4	-	3	-	-	-	-	FBK0503538
6.00	6.00	5.70	24.00	64.00	6.00	1.00	4	-	3	-	-	-	-	FBK0503539
8.00	8.00	7.60	16.00	78.00	8.00	0.50	4	-	3	-	-	-	-	FBK0503554
8.00	8.00	7.60	32.00	78.00	8.00	0.50	4	-	3	-	-	-	-	FBK0503555
8.00	8.00	7.60	16.00	78.00	8.00	1.00	4	-	3	-	-	-	-	FBK0503556
8.00	8.00	7.60	32.00	78.00	8.00	1.00	4	-	3	-	-	-	-	FBK0503540
10.00	10.00	9.60	20.00	100.00	10.00	0.50	4	-	3	-	-	-	-	FBK0503558
10.00	10.00	9.60	40.00	100.00	10.00	0.50	4	-	3	-	-	-	-	FBK0503559
10.00	10.00	9.60	20.00	100.00	10.00	1.00	4	-	3	-	-	-	-	FBK0503560
10.00	10.00	9.60	40.00	100.00	10.00	1.00	4	-	3	-	-	-	-	FBK0503561
12.00	12.00	11.60	24.00	100.00	12.00	0.50	4	-	3	-	-	-	-	FBK0503562
12.00	12.00	11.60	48.00	100.00	12.00	0.50	4	-	3	-	-	-	-	FBK0503563
12.00	12.00	11.60	24.00	100.00	12.00	1.00	4	-	3	-	-	-	-	FBK0503564
12.00	12.00	11.60	48.00	100.00	12.00	1.00	4	-	3	-	-	-	-	FBK0503565

Remark ∞ means no collusion in projection length area

Application data on page no 2.026

Cutting parameters

Centre cutting high performance 4 flute for 55-70 HRc - 0.1 mm to 2.0 mm

Material Group			Cutting Speed (Vc) m/min		Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)																	
			Shoulder Milling	Profiling				Diameter in mm																	
								mm	0.1		0.2		0.4		0.5		0.6		0.8		1.0		1.5		2.0	
			ap 0.75D ae/D 2.5%	ap 0.75D ae/D 2.5%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Hardened Steel	H	3	150	180	MQL/ COLD AIR	150	220	fz	0.002	0.007	0.004	0.010	0.006	0.013	0.007	0.015	0.009	0.018	0.009	0.018	0.015	0.025	0.020	0.035	0.030	0.050
		4	200	220	MQL/ COLD AIR	200	250	fz	0.002	0.007	0.004	0.010	0.006	0.013	0.007	0.015	0.009	0.018	0.009	0.018	0.015	0.025	0.020	0.035	0.030	0.050

Centre cutting high performance 4 flute for 55-70 HRc - 2.5 mm to 12.0 mm

Material Group			Cutting Speed (Vc) m/min		Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)																	
			Shoulder Milling	Profiling				Diameter in mm																	
								mm	2.5		3.0		4.0		5.0		6.0		8.0		10		12			
			ap 0.75D ae/D 2.5%	ap 0.75D ae/D 2.5%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max		
Hardened Steel	H	3	150	180	MQL/ COLD AIR	150	220	fz	0.035	0.055	0.040	0.060	0.050	0.080	0.060	0.110	0.065	0.125	0.080	0.130	0.085	0.135	0.100	0.140		
		4	200	220	MQL/ COLD AIR	200	250	fz	0.035	0.055	0.040	0.060	0.050	0.080	0.060	0.110	0.065	0.125	0.080	0.130	0.085	0.135	0.100	0.140		

Advantages

- Consistency of cutting speeds.
- Optimized performance.
- High productivity
- Ideal chipflow geometry
- Optimized for hardened steels

FBK0503554

Workpiece material: 1.2162
Hardness: 60 HRc

	Competitor	Totem
Ø	8mm	8mm
z	4 flutes	4 flutes
vc	25 m/min	200 m/min
n	995 rpm	7958 rpm
fz	0.038 mm/t	0.079 mm/t
vf	150 mm/min	2500 mm/min
ap	3 mm	3 mm
ae	0.25 mm	0.1 mm
Coolant	air	air

Q	0.11 mm^3/min	0.75 mm^3/min

Finishing application
6 times faster than competitor

FBK0505796

Workpiece material: Elmax hardened
Hardness: 62 HRc

	Competitor	Totem
Ø	1.5 mm	1.5 mm
z	4 teeth	2 teeth
vc	85 m/min	85 m/min
n	18000 rpm	18000 rpm
fz	0.02 mm/t	0.023 mm/t
vf	1440 mm/min	828 mm/min
ap	0.65 mm	0.65 mm
ae	0.04 mm	0.04 mm
Coolant	MMS	MMS

Q	21.52 mm^3/min	37.44 mm^3/min

Finishing application
42% Higher MRR

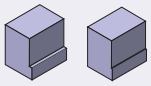
Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Multi Flute

Centre cutting high performance multi flute finisher for 55-70 HRc



HPM HSM | 6-16 | 45° | f7 | 6535 HA | h5 | TiAlN

Regular

Extra Teeth

H3-H4

IMAGE 1

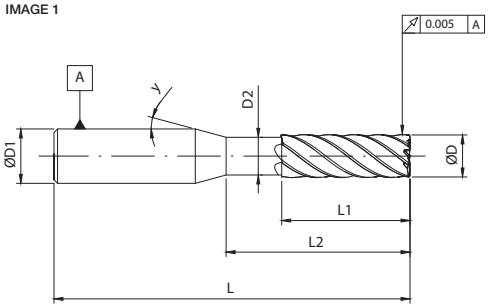
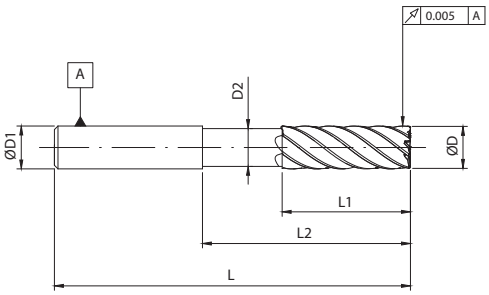


IMAGE 2



Regular

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
3.00	8.00	2.90	15.00	64.00	6.00	-	6	15	1	FBK0503566
4.00	10.00	3.80	16.00	64.00	6.00	-	6	15	1	FBK0503567
5.00	12.00	4.70	18.00	64.00	6.00	-	6	15	1	FBK0503568
6.00	14.00	5.60	20.00	64.00	6.00	-	6	-	2	FBK0503569
8.00	18.00	7.60	25.00	78.00	8.00	-	6	-	2	FBK0503570
10.00	22.00	9.40	30.00	78.00	10.00	-	6	-	2	FBK0503571
12.00	26.00	11.40	35.00	89.00	12.00	-	6	-	2	FBK0503572
16.00	34.00	15.40	40.00	89.00	16.00	-	6	-	2	FBK0504453
20.00	42.00	19.40	48.00	102.00	20.00	-	8	-	2	FBK0504454

Also available with extra teeth for higher productivity

Extra Teeth

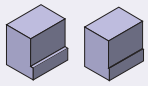
ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
8.00	18.00	7.60	25.00	78.00	8.00	-	8	-	2	FBK0504455
10.00	22.00	9.40	30.00	78.00	10.00	-	10	-	2	FBK0504456
12.00	26.00	11.40	35.00	89.00	12.00	-	12	-	2	FBK0504457
16.00	34.00	15.40	40.00	89.00	16.00	-	16	-	2	FBK0504458

Remark ∞ means no collusion in projection length area

Application data on page no 2.029

Multi Flute

Centre cutting high performance multi flute finisher with corner radius for 55-70 HRc



HPM HSM | 6-16 | 45° | f7 | 6535 HA | h5 | TiAlN

Regular

Extra Teeth

H3-H4

IMAGE 1

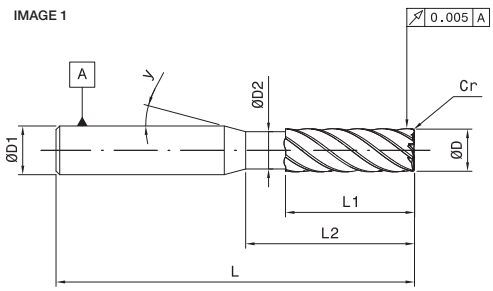
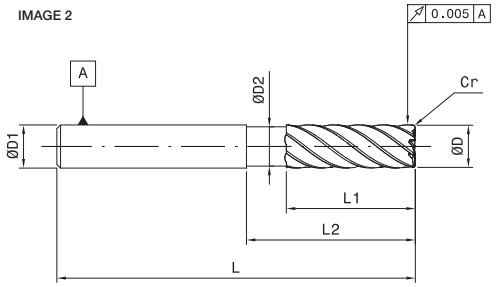


IMAGE 2



Regular

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
3.00	8.00	2.90	15.00	64.00	6.00	0.30	6	15	1	FBK0504459
4.00	10.00	3.80	16.00	64.00	6.00	0.30	6	15	1	FBK0504460
5.00	12.00	4.70	18.00	64.00	6.00	0.30	6	15	1	FBK0504461
5.00	12.00	4.70	18.00	64.00	6.00	0.50	6	15	1	FBK0504462
6.00	14.00	5.60	20.00	64.00	6.00	0.50	6	-	2	FBK0504463
6.00	14.00	5.60	20.00	64.00	6.00	1.00	6	-	2	FBK0504464
8.00	18.00	7.40	25.00	70.00	8.00	0.50	6	-	2	FBK0504465
8.00	18.00	7.40	25.00	70.00	8.00	1.00	6	-	2	FBK0503542
10.00	22.00	9.40	30.00	78.00	10.00	0.50	6	-	2	FBK0504466
10.00	22.00	9.40	30.00	78.00	10.00	1.00	6	-	2	FBK0503543
10.00	22.00	9.40	30.00	78.00	10.00	1.50	6	-	2	FBK0504467
12.00	26.00	11.40	35.00	78.00	12.00	0.50	6	-	2	FBK0503573
12.00	26.00	11.40	35.00	78.00	12.00	1.00	6	-	2	FBK0504468
12.00	26.00	11.40	35.00	78.00	12.00	2.00	6	-	2	FBK0504469
16.00	34.00	15.40	40.00	89.00	16.00	1.00	6	-	2	FBK0504470
16.00	34.00	15.40	40.00	89.00	16.00	2.00	6	-	2	FBK0504471
20.00	42.00	19.40	48.00	102.00	20.00	1.00	8	-	2	FBK0504472
20.00	42.00	19.40	48.00	102.00	20.00	2.00	8	-	2	FBK0504473

Also available with extra teeth for higher productivity

Extra Teeth

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
8.00	18.00	7.60	25.00	78.00	8.00	0.50	8	-	2	FBK0504474
10.00	22.00	9.40	30.00	78.00	10.00	0.50	10	-	2	FBK0504475
12.00	26.00	11.40	35.00	89.00	12.00	0.50	12	-	2	FBK0504476
16.00	34.00	15.40	40.00	89.00	16.00	0.50	16	-	2	FBK0504477

Remark ∞ means no collusion in projection length area

Application data on page no 2.029

Cutting parameters

- Centre cutting high performance multi flute finisher for 55-70 HRc - 3.0 mm to 8.0 mm
- Centre cutting high performance multi flute finisher with corner radius for 55-70 HRc - 3.0 mm to 8.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling			Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)											
									Diameter in mm											
									mm	3.0		4.0		5.0		6.0		8.0		
			ap 2D ae/D 1.5%	ap 1.5D ae/D 2%	ap 1D ae/D 2%		min	max	Range	min	max	min	max	min	max	min	max	min	max	
Hardened Steel	H	3	66	77	110	MQL/ COLD AIR	110	170	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	60.000	0.080	
		4	48	56	80	MQL/ COLD AIR	80	140	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	60.000	0.080	

- Centre cutting high performance multi flute finisher for 55-70 HRc - 10.0 mm to 20.0 mm
- Centre cutting high performance multi flute finisher with corner radius for 55-70 HRc - 10.0 mm to 20.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling			Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)											
									Diameter in mm											
									mm	10		12		16		20				
			ap 2D ae/D 1.5%	ap 1.5D ae/D 2%	ap 1D ae/D 2%		min	max	Range	min	max	min	max	min	max	min	max	min	max	
Hardened Steel	H	3	66	77	110	MQL/ COLD AIR	110	170	fz	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140			
		4	48	56	80	MQL/ COLD AIR	80	140	fz	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140			

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Multi flute finisher

Multi flute finisher with extra teeth

Multi flute finisher with corner radius

Multi flute finisher with corner radius and extra teeth

End mills for hardened steels 45-70 HRc

An optimized combination between geometry, coating and tolerances result in an excellent surface finish and extended toollife.

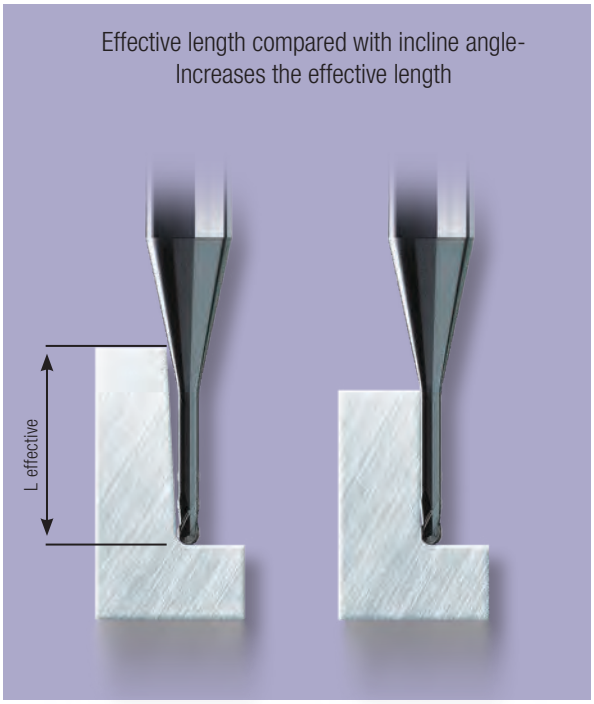
Program

- Centre cutting high performance ball nose 2 flute for 45-70 HRc
- Centre cutting high performance ball nose 4 flute for 45-70 HRc
- Centre cutting high performance torus 2 flute for 45-70 HRc
- Centre cutting high performance torus 4 flute for 45-70 HRc
- Centre cutting high performance multi flute finisher for 45-70 HRc
- Centre cutting high performance multi flute finisher with corner radius for 45-70 HRc
- Centre cutting high performance torus cutter for high feed machining
- Centre cutting high performance 2 flute micro end mill
- Centre cutting high performance 4 flute micro end mill
- Centre cutting high performance 2 flute micro end mill with corner radius
- Centre cutting high performance 4 flute micro end mill with corner radius
- Centre cutting high performance 2 flute micro ball nose

Ballnose geometries

- Special designed center
- Smooth surface finish
- Optimized coating for tool life improvement

Effective length compared with incline angle-
Increases the effective length



FBK0503554

Workpiece material: 1.2162
Hardness: 60 HRc

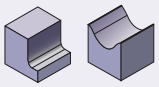
	Competitor	Totem
Ø	8mm	8mm
z	4 flutes	4 flutes
vc	25 m/min	200 m/min
n	995 rpm	7958 rpm
fz	0.038 mm/t	0.079 mm/t
vf	150 mm/min	2500 mm/min
ap	3 mm	3 mm
ae	0.25 mm	0.1 mm
Coolant	air	air

Q	0.11 mm^3/min	0.75 mm^3/min

Higher productivity

2 Flute

Centre cutting high performance ball nose 2 flute for 45-70 HRc



HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

P5-P6
H1-H4

IMAGE 1

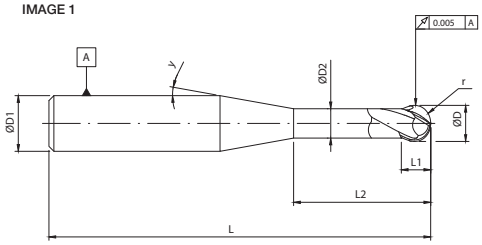
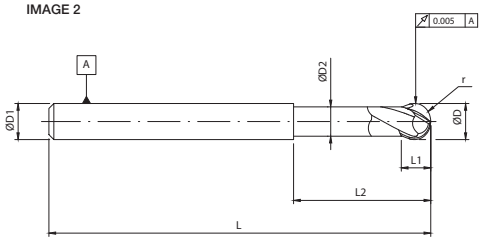


IMAGE 2



Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No
1.00	2.00	0.90	4.00	64.00	6.00	0.50	2	7	1	FBK0504478
1.00	2.00	0.90	4.00	78.00	6.00	0.50	2	4	1	FBK0504479
1.50	2.00	1.40	4.00	64.00	6.00	0.80	2	6	1	FBK0504480
1.50	2.00	1.40	4.00	78.00	6.00	0.80	2	4	1	FBK0504481
2.00	3.00	1.90	5.00	64.00	6.00	1.00	2	6	1	FBK0504482
2.00	3.00	1.90	8.00	64.00	6.00	1.00	2	9	1	FBK0505816
2.00	3.00	1.90	8.00	78.00	6.00	1.00	2	4	1	FBK0505817
2.00	3.00	1.90	15.00	78.00	6.00	1.00	2	5	1	FBK0504483
3.00	4.00	2.90	7.00	64.00	6.00	1.50	2	5	1	FBK0504484
3.00	4.00	2.90	15.00	78.00	6.00	1.50	2	4	1	FBK0504485
3.00	4.00	2.90	7.00	100.00	6.00	1.50	2	2	1	FBK0504486
4.00	5.00	3.80	8.00	64.00	6.00	2.00	2	4	1	FBK0504487
4.00	5.00	3.80	15.00	78.00	6.00	2.00	2	3	1	FBK0504488
4.00	5.00	3.80	8.00	100.00	6.00	2.00	2	1	1	FBK0504489
5.00	5.00	4.70	10.00	64.00	6.00	2.50	2	2	1	FBK0504490
5.00	5.00	4.70	20.00	78.00	6.00	2.50	2	2	1	FBK0504491
6.00	6.00	5.60	25.00	64.00	6.00	3.00	2	-	2	FBK0504492
6.00	6.00	5.60	35.00	78.00	6.00	3.00	2	-	2	FBK0504493
6.00	6.00	5.60	25.00	100.00	8.00	3.00	2	2	1	FBK0504494
8.00	8.00	7.40	25.00	64.00	8.00	4.00	2	-	2	FBK0504495
8.00	8.00	7.40	35.00	78.00	8.00	4.00	2	-	2	FBK0504496
8.00	8.00	7.40	50.00	100.00	8.00	4.00	2	-	2	FBK0504497
8.00	8.00	7.40	30.00	120.00	10.00	4.00	2	2	1	FBK0504498
10.00	10.00	9.40	35.00	78.00	10.00	5.00	2	-	2	FBK0504499
10.00	10.00	9.40	55.00	100.00	10.00	5.00	2	-	2	FBK0504500
10.00	10.00	9.40	30.00	120.00	12.00	5.00	2	2	1	FBK0504501
12.00	12.00	11.40	35.00	78.00	12.00	6.00	2	-	2	FBK0504502
12.00	12.00	11.40	55.00	100.00	12.00	6.00	2	-	2	FBK0504503
12.00	12.00	11.40	40.00	120.00	16.00	6.00	2	5	1	FBK0504504
16.00	20.00	15.40	50.00	100.00	16.00	8.00	2	-	2	FBK0504505
16.00	20.00	15.40	100.00	150.00	16.00	8.00	2	-	2	FBK0504506

Machining with a Tilt Angle will help in better tool life as the cutting speed at the center of a ball nose tool is 0
Application data on page no 2.033

4 Flute

Centre cutting high performance ball nose 4 flute for 45-70 HRc

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

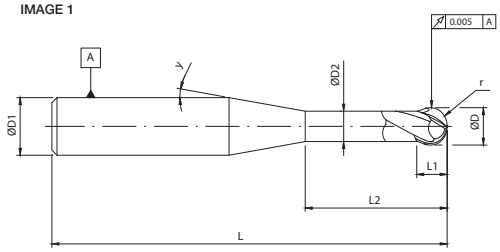
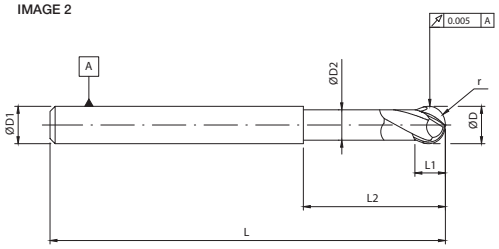


IMAGE 2



P5-P6
H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No
6.00	6.00	5.60	25.00	64.00	6.00	3.00	4	-	2	FBK0504511
6.00	6.00	5.60	35.00	78.00	6.00	3.00	4	-	2	FBK0504512
6.00	6.00	5.60	25.00	100.00	8.00	3.00	4	2	1	FBK0504513
8.00	8.00	7.40	25.00	64.00	8.00	4.00	4	-	2	FBK0504514
8.00	8.00	7.40	35.00	78.00	8.00	4.00	4	-	2	FBK0504515
8.00	8.00	7.40	50.00	100.00	8.00	4.00	4	-	2	FBK0504516
8.00	8.00	7.40	30.00	120.00	10.00	4.00	4	2	1	FBK0504517
10.00	10.00	9.40	35.00	78.00	10.00	5.00	4	-	2	FBK0504518
10.00	10.00	9.40	55.00	100.00	10.00	5.00	4	-	2	FBK0504519
10.00	10.00	9.40	30.00	120.00	12.00	5.00	4	2	1	FBK0504520
12.00	12.00	11.40	35.00	78.00	12.00	6.00	4	-	2	FBK0504521
12.00	12.00	11.40	55.00	100.00	12.00	6.00	4	-	2	FBK0504522
12.00	12.00	11.40	40.00	120.00	16.00	6.00	4	5	1	FBK0504523
16.00	20.00	15.40	50.00	100.00	16.00	8.00	4	-	2	FBK0504524
16.00	20.00	15.40	100.00	150.00	16.00	8.00	4	-	2	FBK0504525

Machining with a Tilt Angle will help in better tool life as the cutting speed at the center of a ball nose tool is 0
Application data on page no 2.033

Cutting parameters

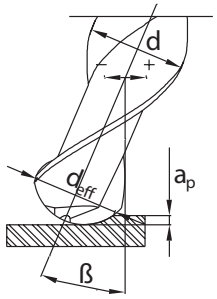
- Centre cutting high performance ball nose 2 flute for 45-70 HRc (Roughing+ Finishing) - 1.0 mm to 5.0 mm
- Centre cutting high performance ball nose 4 flute for 45-70 HRc (Roughing+ Finishing) - 1.0 mm to 5.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling / Rough Milling	Cutting Speed (Vc) m/min: Profile Milling / Finish Milling	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)											
								Diameter in mm											
								mm	1.0		1.5		2.0		3.0		4.0		5.0	
			ap 1D ae/D 30%	ap 1D ae/D 10%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	5	150	180	Emulsion	150	250	fz	0.015	0.025	0.020	0.030	0.025	0.035	0.028	0.040	0.030	0.045	0.035	0.050
		6	120	150		120	200	fz	0.015	0.025	0.020	0.030	0.025	0.035	0.028	0.040	0.030	0.045	0.035	0.050
			ap 0.5D ae/D 5%	ap 0.5D ae/D 2%		Cutting Speed (Vc) m/min		mm	1.0		1.5		2.0		3.0		4.0		5.0	
						min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Hardened Steel	H	1	120	150	MQL/ Cold Air	120	180	fz	0.015	0.025	0.020	0.030	0.025	0.035	0.028	0.040	0.030	0.045	0.035	0.050
		2	150	180		150	200	fz	0.015	0.025	0.020	0.030	0.025	0.035	0.028	0.040	0.030	0.045	0.035	0.050
		3	200	220		200	250	fz	0.015	0.025	0.020	0.030	0.025	0.035	0.028	0.040	0.030	0.045	0.035	0.050
		4	200	220		200	250	fz	0.015	0.025	0.020	0.030	0.025	0.035	0.028	0.040	0.030	0.045	0.035	0.050

- Centre cutting high performance ball nose 2 flute for 45-70 HRc (Roughing+ Finishing) - 6.0 mm to 16.0 mm
- Centre cutting high performance ball nose 4 flute for 45-70 HRc (Roughing+ Finishing) - 6.0 mm to 16.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling / Rough Milling	Cutting Speed (Vc) m/min: Profile Milling / Finish Milling	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)											
								Diameter in mm											
								mm	6.0		8.0		10.0		12.0		16.0			
			ap 1D ae/D 30%	ap 1D ae/D 10%		min	max	Range	min	max	min	max	min	max	min	max	min	max		
Steel	P	5	150	180	Emulsion	150	250	fz	0.040	0.055	0.050	0.065	0.055	0.080	0.065	0.090	0.075	0.110		
		6	120	150		120	200	fz	0.040	0.055	0.050	0.065	0.055	0.080	0.065	0.090	0.075	0.110		
			ap 0.5D ae/D 5%	ap 0.5D ae/D 2%		Cutting Speed (Vc) m/min		mm	6.0		8.0		10.0		12.0		16.0			
						min	max	Range	min	max	min	max	min	max	min	max	min	max		
Hardened Steel	H	1	120	150	MQL/ Cold Air	120	180	fz	0.040	0.055	0.050	0.065	0.055	0.080	0.065	0.090	0.075	0.110		
		2	150	180		150	200	fz	0.040	0.055	0.050	0.065	0.055	0.080	0.065	0.090	0.075	0.110		
		3	200	220		200	250	fz	0.040	0.055	0.050	0.065	0.055	0.080	0.065	0.090	0.075	0.110		
		4	200	220		200	250	fz	0.040	0.055	0.050	0.065	0.055	0.080	0.065	0.090	0.075	0.110		

#RPM = Vc x 318.057/Tool Dia. #mm/min = RPM x number of teeth x mm/tooth



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1

* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D-ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D-2 \times ADOC}{D}\right)\right]$$

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

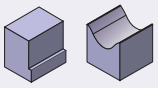
Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

2 Flute

Centre cutting high performance torus 2 flute for 45-70 HRc



HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

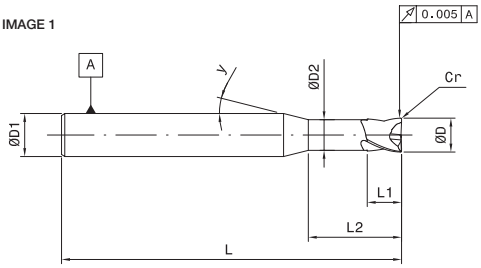
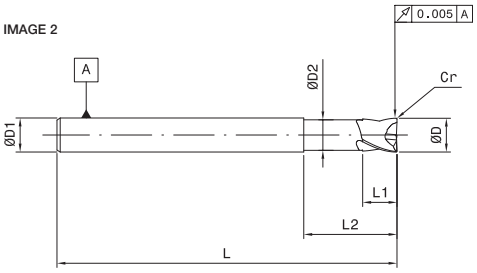


IMAGE 2



P5-P6
H1-H4

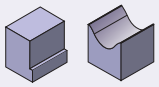
Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
1.50	2.00	1.40	5.00	64.00	6.00	0.30	2	7	1	FBK0504534
1.50	2.00	1.40	10.00	64.00	6.00	0.30	2	9	1	FBK0504535
2.00	3.00	1.90	5.00	64.00	6.00	0.50	2	6	1	FBK0504536
2.00	3.00	1.90	8.00	64.00	6.00	0.50	2	7	1	FBK0505818
2.00	3.00	1.90	10.00	64.00	6.00	0.50	2	8	1	FBK0504537
2.00	3.00	1.90	15.00	78.00	6.00	0.50	2	5	1	FBK0504538
2.00	3.00	1.90	8.00	78.00	6.00	0.50	2	4	1	FBK0505819
3.00	4.00	2.90	7.00	64.00	6.00	0.50	2	5	1	FBK0504539
3.00	4.00	2.90	15.00	78.00	6.00	0.50	2	4	1	FBK0504540
4.00	5.00	3.80	8.00	64.00	6.00	0.50	2	4	1	FBK0504541
4.00	5.00	3.80	8.00	64.00	6.00	1.00	2	4	1	FBK0504542
4.00	5.00	3.80	15.00	78.00	6.00	0.50	2	3	1	FBK0504543
4.00	5.00	3.80	15.00	78.00	6.00	1.00	2	3	1	FBK0504544
5.00	5.00	4.70	10.00	64.00	6.00	0.50	2	3	1	FBK0504545
5.00	5.00	4.70	10.00	64.00	6.00	1.00	2	3	1	FBK0504546
5.00	5.00	4.70	20.00	78.00	6.00	0.50	2	3	1	FBK0504547
5.00	5.00	4.70	20.00	78.00	6.00	1.00	2	2	1	FBK0504548
6.00	6.00	5.60	25.00	64.00	6.00	0.50	2	-	2	FBK0504549
6.00	6.00	5.60	25.00	64.00	6.00	1.00	2	-	2	FBK0504550
6.00	6.00	5.60	25.00	64.00	6.00	1.50	2	-	2	FBK0504551
6.00	6.00	5.60	35.00	78.00	6.00	0.50	2	-	2	FBK0504552
6.00	6.00	5.60	35.00	78.00	6.00	1.00	2	-	2	FBK0504553
6.00	6.00	5.60	35.00	78.00	6.00	1.50	2	-	2	FBK0504554
6.00	6.00	5.60	25.00	100.00	8.00	0.50	2	2	1	FBK0504555
6.00	6.00	5.60	25.00	100.00	8.00	1.00	2	2	1	FBK0504556

Application data on page no 2.038

2 Flute

Centre cutting high performance torus 2 flute for 45-70 HRc



HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

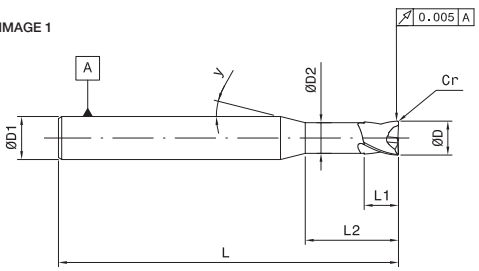
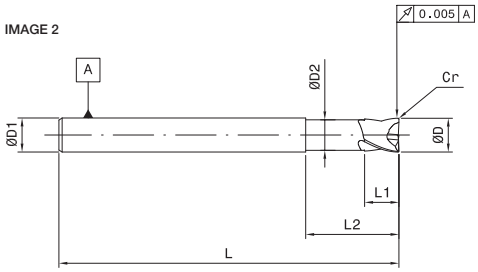


IMAGE 2



P5-P6

H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
6.00	6.00	5.60	25.00	100.00	8.00	1.50	2	2	1	FBK0504557
8.00	8.00	7.40	25.00	64.00	8.00	0.50	2	-	2	FBK0504558
8.00	8.00	7.40	25.00	64.00	8.00	1.00	2	-	2	FBK0504559
8.00	8.00	7.40	25.00	64.00	8.00	2.00	2	-	2	FBK0504560
8.00	8.00	7.40	25.00	78.00	8.00	0.50	2	-	2	FBK0504561
8.00	8.00	7.40	35.00	78.00	8.00	1.00	2	-	2	FBK0504562
8.00	8.00	7.40	35.00	78.00	8.00	2.00	2	-	2	FBK0504563
8.00	8.00	7.40	50.00	100.00	8.00	1.00	2	-	2	FBK0504564
8.00	8.00	7.40	50.00	100.00	8.00	2.00	2	-	2	FBK0504565
8.00	8.00	7.40	30.00	120.00	10.00	1.00	2	2	1	FBK0504566
8.00	8.00	7.40	30.00	120.00	10.00	2.00	2	2	1	FBK0504567
10.00	10.00	9.40	35.00	78.00	10.00	0.50	2	-	2	FBK0504568
10.00	10.00	9.40	35.00	78.00	10.00	1.00	2	-	2	FBK0504569
10.00	10.00	9.40	35.00	78.00	10.00	2.00	2	-	2	FBK0504570
10.00	10.00	9.40	55.00	100.00	10.00	1.00	2	-	2	FBK0504571
10.00	10.00	9.40	55.00	100.00	10.00	2.00	2	-	2	FBK0504572
10.00	10.00	9.40	30.00	120.00	12.00	2.00	2	2	1	FBK0504573
12.00	12.00	11.40	35.00	78.00	12.00	0.50	2	-	2	FBK0504574
12.00	12.00	11.40	35.00	78.00	12.00	2.00	2	-	2	FBK0504575
12.00	12.00	11.40	55.00	100.00	12.00	1.00	2	-	2	FBK0504576
12.00	12.00	11.40	55.00	100.00	12.00	2.00	2	-	2	FBK0504577
12.00	12.00	11.40	40.00	120.00	16.00	2.00	2	5	1	FBK0504578
16.00	20.00	15.40	50.00	100.00	16.00	3.50	2	-	2	FBK0504579
16.00	20.00	15.40	100.00	150.00	16.00	3.50	2	-	2	FBK0504580

Application data on page no 2.038

4 Flute

Centre cutting high performance torus 4 flute for 45-70 HRc

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

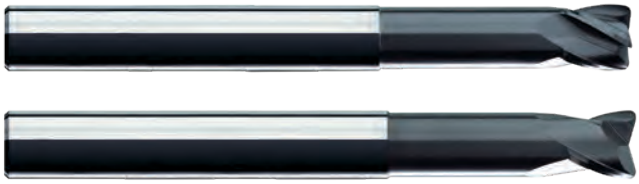


IMAGE 1

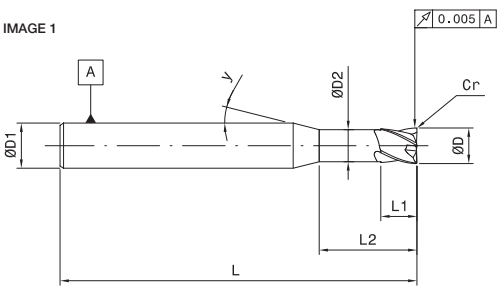
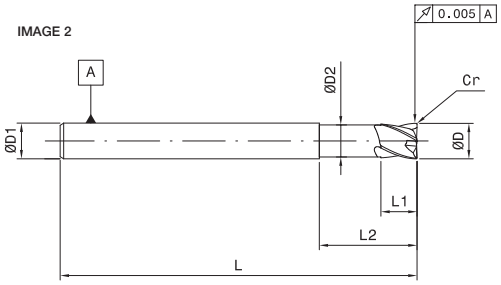


IMAGE 2



P5-P6
H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
3.00	4.00	2.90	7.00	64.00	6.00	0.5	4	5	1	FBK0505820
3.00	4.00	2.90	15.00	78.00	6.00	0.5	4	4	1	FBK0505821
4.00	5.00	3.80	8.00	64.00	6.00	0.5	4	4	1	FBK0505822
4.00	5.00	3.80	8.00	64.00	6.00	1	4	4	1	FBK0505823
4.00	5.00	3.80	15.00	78.00	6.00	0.5	4	3	1	FBK0505824
4.00	5.00	3.80	15.00	78.00	6.00	1	4	3	1	FBK0505825
5.00	5.00	4.70	10.00	64.00	6.00	0.5	4	2	1	FBK0505826
5.00	5.00	4.70	10.00	64.00	6.00	1	4	2	1	FBK0505827
5.00	5.00	4.70	20.00	78.00	6.00	0.5	4	2	1	FBK0505828
5.00	5.00	4.70	20.00	78.00	6.00	1	4	2	1	FBK0505829
6.00	6.00	5.60	25.00	64.00	6.00	0.5	4	-	2	FBK0504581
6.00	6.00	5.60	25.00	64.00	6.00	1	4	-	2	FBK0504582
6.00	6.00	5.60	25.00	64.00	6.00	1.5	4	-	2	FBK0504583
6.00	6.00	5.60	35.00	78.00	6.00	0.5	4	-	2	FBK0504584
6.00	6.00	5.60	35.00	78.00	6.00	1.5	4	-	2	FBK0504585
6.00	6.00	5.60	25.00	100.00	8.00	0.5	4	2	1	FBK0504586
6.00	6.00	5.60	25.00	100.00	8.00	1.5	4	2	1	FBK0504587
8.00	8.00	7.40	25.00	64.00	8.00	0.5	4	-	2	FBK0504588
8.00	8.00	7.40	25.00	64.00	8.00	1	4	-	2	FBK0504589
8.00	8.00	7.40	25.00	64.00	8.00	2	4	-	2	FBK0504590

Application data on page no 2.038

4 Flute

Centre cutting high performance torus 4 flute for 45-70 HRc

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

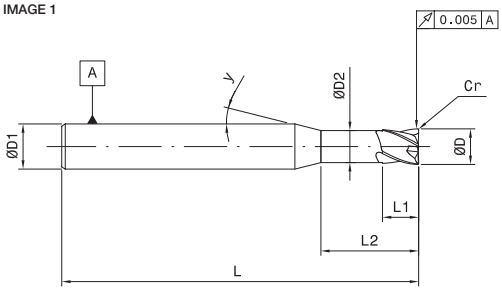
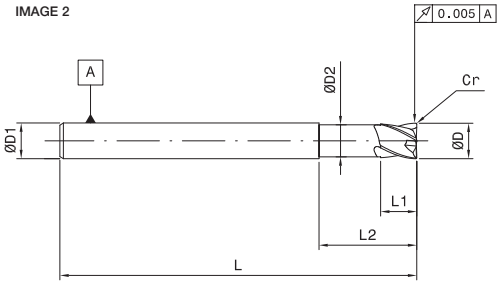


IMAGE 2



P5-P6
H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
8.00	8.00	7.40	25.00	78.00	8.00	0.5	4	-	2	FBK0504591
8.00	8.00	7.40	35.00	78.00	8.00	1	4	-	2	FBK0504592
8.00	8.00	7.40	35.00	78.00	8.00	2	4	-	2	FBK0504593
8.00	8.00	7.40	50.00	100.00	8.00	0.5	4	-	2	FBK0505830
8.00	8.00	7.40	50.00	100.00	8.00	1	4	-	2	FBK0504594
8.00	8.00	7.40	50.00	100.00	8.00	2	4	-	2	FBK0504595
8.00	8.00	7.40	30.00	120.00	10.00	1	4	-	2	FBK0504596
8.00	8.00	7.40	30.00	120.00	10.00	2	4	2	1	FBK0504597
10.00	10.00	9.40	35.00	78.00	10.00	0.5	4	2	1	FBK0504598
10.00	10.00	9.40	35.00	78.00	10.00	2	4	-	2	FBK0504599
10.00	10.00	9.40	55.00	100.00	10.00	1	4	-	2	FBK0504600
10.00	10.00	9.40	55.00	100.00	10.00	2	4	-	2	FBK0504601
10.00	10.00	9.40	30.00	120.00	12.00	2	4	-	2	FBK0504602
12.00	12.00	11.40	35.00	78.00	12.00	0.5	4	2	1	FBK0504603
12.00	12.00	11.40	35.00	78.00	12.00	2	4	-	2	FBK0504604
12.00	12.00	11.40	55.00	100.00	12.00	1	4	-	2	FBK0504605
12.00	12.00	11.40	55.00	100.00	12.00	2	4	-	2	FBK0504606
12.00	12.00	11.40	40.00	120.00	16.00	2	4	-	2	FBK0504607
16.00	20.00	15.40	50.00	100.00	16.00	3.5	4	5	1	FBK0504608
16.00	20.00	15.40	100.00	150.00	16.00	3.5	4	-	2	FBK0504609

Application data on page no 2.038

Cutting parameters

- Centre cutting high performance torus 2 flute for 45-70 HRc (Roughing+ Finishing) - 1.0 mm to 5.0 mm
- Centre cutting high performance torus 4 flute for 45-70 HRc (Roughing+ Finishing) - 1.0 mm to 5.0 mm

Material Group			Cutting Speed (Vc) m/min		Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)											
			Shoulder Milling (Rough Milling)	Profile Milling (Finish Milling)				Diameter in mm											
								mm	1.0		1.5		2.0		3.0		4.0		5.0	
			ap 1D ae/D 30%	ap 1D ae/D 10%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	5	150	180	Emulsion	150	250	fz	0.015	0.025	0.020	0.030	0.025	0.035	0.028	0.040	0.030	0.045	0.035	0.050
		6	120	150		120	200	fz	0.015	0.025	0.020	0.030	0.025	0.035	0.028	0.040	0.030	0.045	0.035	0.050
			ap 0.5D ae/D 5%	ap 0.5D ae/D 2%		Cutting Speed (Vc) m/min		mm	1.0		1.5		2.0		3.0		4.0		5.0	
						min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Hardened Steel	H	1	120	150	MQL/ Cold Air	120	180	fz	0.015	0.025	0.020	0.030	0.025	0.035	0.028	0.040	0.030	0.045	0.035	0.050
		2	150	180		150	200	fz	0.015	0.025	0.020	0.030	0.025	0.035	0.028	0.040	0.030	0.045	0.035	0.050
		3	200	220		200	250	fz	0.015	0.025	0.020	0.030	0.025	0.035	0.028	0.040	0.030	0.045	0.035	0.050
		4	200	220		200	250	fz	0.015	0.025	0.020	0.030	0.025	0.035	0.028	0.040	0.030	0.045	0.035	0.050

- Centre cutting high performance torus 2 flute for 45-70 HRc (Roughing+ Finishing) - 6.0 mm to 16.0 mm
- Centre cutting high performance torus 4 flute for 45-70 HRc (Roughing+ Finishing) - 6.0 mm to 16.0 mm

Material Group			Cutting Speed (Vc) m/min		Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)											
			Shoulder Milling (Rough Milling)	Profile Milling (Finish Milling)				Diameter in mm											
								mm	6.0		8.0		10.0		12.0		16.0			
			ap 1D ae/D 30%	ap 1D ae/D 10%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	5	150	180	Emulsion	150	250	fz	0.040	0.055	0.050	0.065	0.055	0.080	0.065	0.090	0.075	0.110		
		6	120	150		120	200	fz	0.040	0.055	0.050	0.065	0.055	0.080	0.065	0.090	0.075	0.110		
			ap 0.5D ae/D 5%	ap 0.5D ae/D 2%		Cutting Speed (Vc) m/min		mm	6.0		8.0		10.0		12.0		16.0			
						min	max	Range	min	max	min	max	min	max	min	max	min	max		
Hardened Steel	H	1	120	150	MQL/ Cold Air	120	180	fz	0.040	0.055	0.050	0.065	0.055	0.080	0.065	0.090	0.075	0.110		
		2	150	180		150	200	fz	0.040	0.055	0.050	0.065	0.055	0.080	0.065	0.090	0.075	0.110		
		3	200	220		200	250	fz	0.040	0.055	0.050	0.065	0.055	0.080	0.065	0.090	0.075	0.110		
		4	200	220		200	250	fz	0.040	0.055	0.050	0.065	0.055	0.080	0.065	0.090	0.075	0.110		

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Tips:

Radial runout determines tool life - Our tools are manufactured with precison tolerance

4 Flute

Centre cutting high performance torus cutter for high feed machining

HVM HPM | e8 | 6535 HA | h5 | TiAIN

P3-P4
H1

IMAGE 1

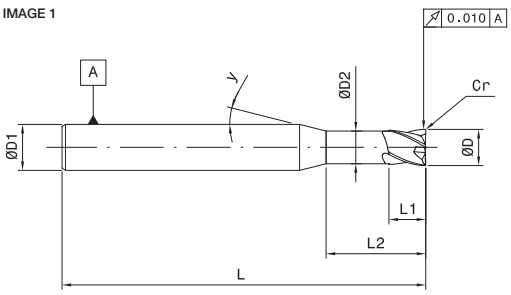
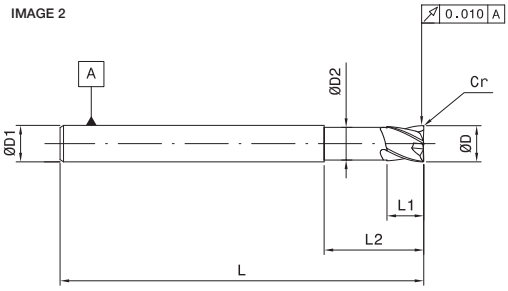


IMAGE 2



Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
2.00	1.00	1.80	4.00	60.00	6.00	0.50	4	15	1	FBK0503979
2.00	1.00	1.80	8.00	60.00	6.00	0.50	4	15	1	FBK0503980
3.00	1.50	2.70	6.00	60.00	6.00	0.75	4	15	1	FBK0503981
3.00	1.50	2.70	12.00	60.00	6.00	0.75	4	15	1	FBK0503982
4.00	2.00	3.60	8.00	60.00	6.00	1.00	4	15	1	FBK0503983
4.00	2.00	3.60	16.00	60.00	6.00	1.00	4	15	1	FBK0503984
6.00	3.00	5.50	12.00	80.00	6.00	1.50	4	-	2	FBK0503659
6.00	3.00	5.50	24.00	80.00	6.00	1.50	4	-	2	FBK0503986
8.00	4.00	7.40	16.00	90.00	8.00	2.00	4	-	2	FBK0503987
8.00	4.00	7.40	32.00	90.00	8.00	2.00	4	-	2	FBK0503988
10.00	5.00	9.20	20.00	100.00	10.00	2.50	4	-	2	FBK0503989
10.00	5.00	9.20	40.00	100.00	10.00	2.50	4	-	2	FBK0503990
12.00	6.00	11.00	24.00	110.00	12.00	3.00	4	-	2	FBK0503991
12.00	6.00	11.00	48.00	110.00	12.00	3.00	4	-	2	FBK0503992

Tolerance chart

Diameter range	Shank	Cutting diameter	Cutting diameter	Cutting diameter	Cutting diameter
	ØD1-h5	ØD-e8	ØD-f7	ØD-g7	ØFHC
D ≤ 3	0	-0.014	-0.006	-0.002	0
	-0.004	-0.028	-0.016	-0.012	-0.025
3 < D ≤ 6	0	-0.020	-0.010	-0.004	0
	-0.005	-0.038	-0.022	-0.016	-0.030
6 < D ≤ 10	0	-0.025	-0.013	-0.005	0
	-0.006	-0.047	-0.028	-0.02	-0.036
10 < D ≤ 18	0	-0.032	-0.016	-0.006	0
	-0.008	-0.059	-0.034	-0.024	-0.043
18 < D ≤ 30	0	-0.040	-0.020	-0.006	0
	-0.009	-0.073	-0.041	-0.024	-0.052

Application data on page no 2.046

Cutting parameters

Centre cutting high performance torus cutter for high feed machining - 2.0 mm to 12.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling ap<0.05D ae/D-60%	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)													
							Diameter in mm													
							mm	2.0		3.0		4.0		6.0		8.0		10.0		12.0	
					min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	3	230	Emulsion	230	330	fz	0.100	0.140	0.150	0.220	0.220	0.300	0.340	0.500	0.450	0.600	0.560	0.750	0.670	0.840
		4	200		200	250	fz	0.100	0.140	0.150	0.220	0.220	0.300	0.340	0.500	0.450	0.600	0.560	0.750	0.670	0.840
Hardened Steel	H	1	80	MQL/ Cold Air	80	120	fz	0.100	0.140	0.150	0.220	0.220	0.300	0.340	0.500	0.450	0.600	0.560	0.750	0.670	0.840

Centre cutting high performance torus cutter for high feed machining - 2.0 mm to 12.0 mm

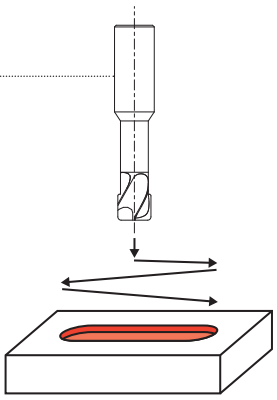
Material Group			Cutting Speed (Vc) m/min for Slot Milling ap<0.05D ae/D 100%	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)													
							Diameter in mm													
							mm	2.0		3.0		4.0		6.0		8.0		10.0		12.0	
					min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	3	230	Emulsion	230	330	fz	0.070	0.100	0.120	0.190	0.180	0.250	0.280	0.400	0.400	0.550	0.500	0.700	0.600	0.800
		4	200		200	250	fz	0.070	0.100	0.120	0.190	0.180	0.250	0.280	0.400	0.400	0.550	0.500	0.700	0.600	0.800
Hardened Steel	H	1	80	MQL/ Cold Air	80	120	fz	0.070	0.100	0.120	0.190	0.180	0.250	0.280	0.400	0.400	0.550	0.500	0.700	0.600	0.800

FBK0503987
Workpiece material: 1.2311

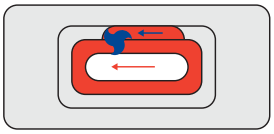
	Totem
Ø	8mm
Z	4 Flute
vc	150 m/min
n	6000 rpm
fz	0.,70 mm/t
vf	16800 mm/min
ap	0.,5 mm
ae	8.0 mm
Coolant	emulsion

Q	67.2 cm^3/min

This endmill can be used for pocket milling; for strategy see drawings above.



Always mill from inside to outside. If possible use helicoidal down-milling, otherwise ramping down.



Advantages

- High feed rates
- Lower cycle time for roughing

Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Multi Flute

Centre cutting high performance multi flute finisher for 45-70 HRc

HPM | 6-8 | 45° | f7 | 6535 HA | h5 | TiAIN

IMAGE 1

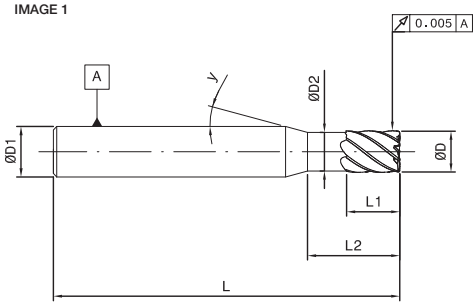
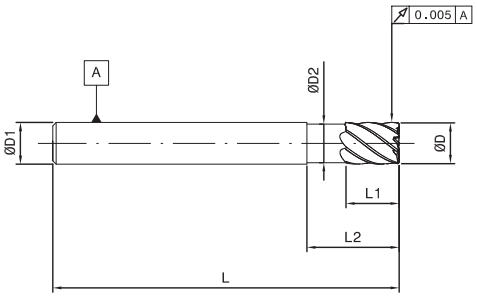


IMAGE 2



P5-P6

H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
Short										
3.00	3.00	2.90	10.00	64.00	6.00	-	6	15	1	FBK0504610
4.00	4.00	3.80	10.00	64.00	6.00	-	6	15	1	FBK0504611
5.00	5.00	4.70	15.00	64.00	6.00	-	6	15	1	FBK0504612
6.00	6.00	5.60	20.00	64.00	6.00	-	6	-	2	FBK0504613
8.00	8.00	7.40	20.00	64.00	8.00	-	6	-	2	FBK0504614
10.00	10.00	9.40	25.00	70.00	10.00	-	6	-	2	FBK0504615
12.00	12.00	11.40	25.00	78.00	12.00	-	6	-	2	FBK0504616
16.00	16.00	15.40	35.00	89.00	16.00	-	6	-	2	FBK0504617
20.00	20.00	19.40	40.00	102.00	20.00	-	8	-	2	FBK0504618

Application data on page no 2.041

Multi Flute

Centre cutting high performance multi flute finisher for 45-70 HRc

HPM | 6-8 | 45° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

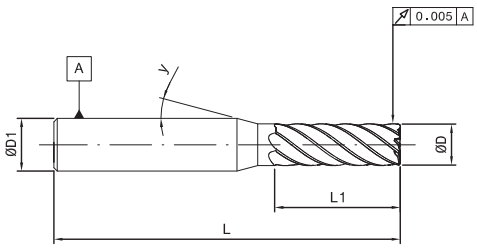
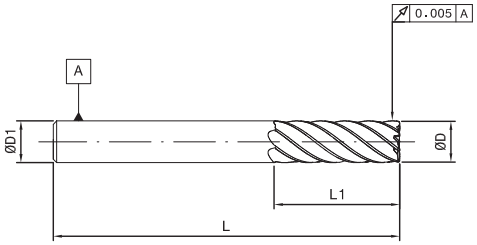


IMAGE 2



P5-P6
H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
Standard										
3.00	10.00	-	-	64.00	6.00	-	6	15	1	FBK0504619
4.00	10.00	-	-	64.00	6.00	-	6	15	1	FBK0504620
5.00	15.00	-	-	64.00	6.00	-	6	15	1	FBK0504621
6.00	20.00	-	-	64.00	6.00	-	6	15	1	FBK0504622
8.00	20.00	-	-	64.00	8.00	-	6	-	2	FBK0504623
10.00	25.00	-	-	70.00	10.00	-	6	-	2	FBK0504624
12.00	25.00	-	-	78.00	12.00	-	6	-	2	FBK0504625
16.00	30.00	-	-	89.00	16.00	-	6	-	2	FBK0504626
20.00	40.00	-	-	102.00	20.00	-	8	-	2	FBK0504627

Application data on page no 2.041

Cutting parameters

Centre cutting high performance multi flute finisher for 45-70 HRc - 3.0 mm to 20.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling (Finish Milling) ap 2D ae/D 10%	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)																	
							Diameter in mm																	
							mm	3.0		4.0		5.0		6.0		8.0		10.0		12.0		16.0		20.0	
					min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	5	130	Emulsion	130	180	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	0.060	0.080	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140
		6	100		100	160	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	0.060	0.080	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140
			ap 2D ae/D 1%		Cutting Speed (Vc) m/min		mm	3.0		4.0		5.0		6.0		8.0		10.0		12.0		16.0		20.0	
					min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Hardened Steel	H	1	150	MQL/ Cold Air	150	200	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	0.060	0.080	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140
		2	120		120	180	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	0.060	0.080	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140
		3	80		80	150	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	0.060	0.080	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140
		4	80		80	150	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	0.060	0.080	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Contact our Mould & Die experts
at sales@forbes.co.in

Multi Flute

Centre cutting high performance multi flute finisher with corner radius for 45-70 HRc

HPM HSM | 6-8 | 45° | f7 | 6535 HA | h5 | TiAlN

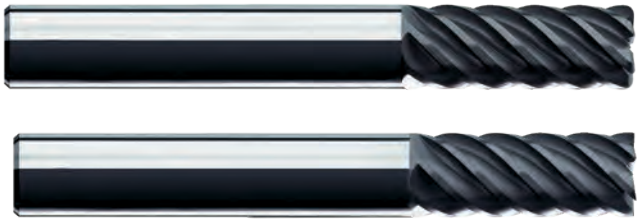


IMAGE 1

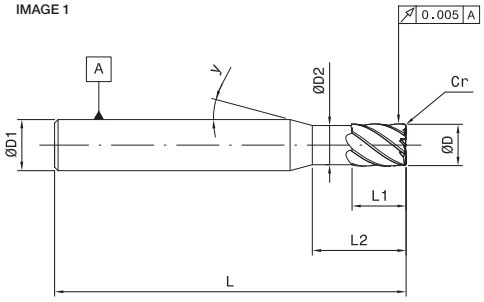
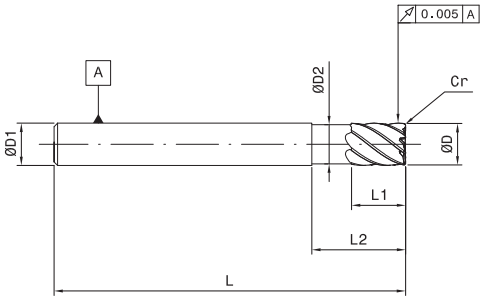


IMAGE 2



P5-P6
H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
Short										
3.00	3.00	2.90	10.00	64.00	6.00	0.30	6	15	1	FBK0504632
4.00	4.00	3.80	10.00	64.00	6.00	0.30	6	15	1	FBK0504633
5.00	5.00	4.70	15.00	64.00	6.00	0.30	6	15	1	FBK0504634
5.00	5.00	4.70	15.00	64.00	6.00	0.50	6	15	1	FBK0504635
6.00	6.00	5.60	20.00	64.00	6.00	0.50	6	-	2	FBK0504636
6.00	6.00	5.60	20.00	64.00	6.00	1.00	6	-	2	FBK0504637
8.00	8.00	7.40	20.00	64.00	8.00	0.50	6	-	2	FBK0504638
8.00	8.00	7.40	20.00	64.00	8.00	1.00	6	-	2	FBK0504639
10.00	10.00	9.40	25.00	70.00	10.00	0.50	6	-	2	FBK0504640
10.00	10.00	9.40	25.00	70.00	10.00	1.00	6	-	2	FBK0504641
10.00	10.00	9.40	25.00	70.00	10.00	1.50	6	-	2	FBK0504642
12.00	12.00	11.40	25.00	78.00	12.00	0.50	6	-	2	FBK0504643
12.00	12.00	11.40	25.00	78.00	12.00	1.00	6	-	2	FBK0504644
12.00	12.00	11.40	25.00	78.00	12.00	2.00	6	-	2	FBK0504645
16.00	16.00	15.40	35.00	89.00	16.00	1.00	6	-	2	FBK0504646
16.00	16.00	15.40	35.00	89.00	16.00	2.00	6	-	2	FBK0504647
20.00	20.00	19.40	40.00	102.00	20.00	1.00	8	-	2	FBK0504648
20.00	20.00	19.40	40.00	102.00	20.00	2.00	8	-	2	FBK0504649

Application data on page no 2.044

Multi Flute

Centre cutting high performance multi flute finisher with corner radius for 45-70 HRc

HPM HSM | 6-8 | 45° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

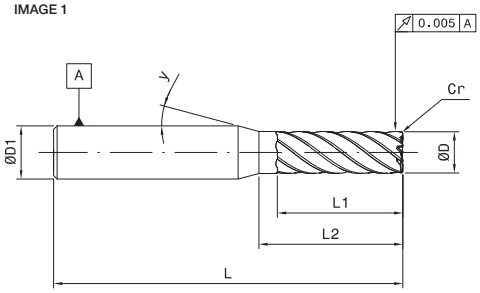
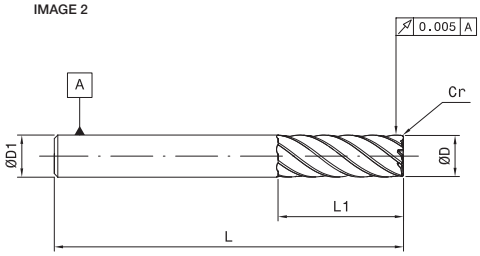


IMAGE 2



P5-P6
H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
Standard										
3.00	10.00	-	-	64.00	6.00	0.30	6	15	1	FBK0504650
4.00	10.00	-	-	64.00	6.00	0.30	6	15	1	FBK0504651
5.00	15.00	-	-	64.00	6.00	0.30	6	15	1	FBK0504652
5.00	15.00	-	-	64.00	6.00	0.50	6	15	1	FBK0504653
6.00	20.00	-	-	64.00	6.00	0.50	6	-	2	FBK0504654
6.00	20.00	-	-	64.00	6.00	1.00	6	-	2	FBK0504655
8.00	20.00	-	-	64.00	8.00	0.50	6	-	2	FBK0504656
8.00	20.00	-	-	64.00	8.00	1.00	6	-	2	FBK0504657
10.00	25.00	-	-	70.00	10.00	0.50	6	-	2	FBK0504658
10.00	25.00	-	-	70.00	10.00	1.00	6	-	2	FBK0504659
10.00	25.00	-	-	70.00	10.00	1.50	6	-	2	FBK0504660
12.00	25.00	-	-	78.00	12.00	0.50	6	-	2	FBK0504661
12.00	25.00	-	-	78.00	12.00	1.00	6	-	2	FBK0504662
12.00	25.00	-	-	78.00	12.00	2.00	6	-	2	FBK0504663
16.00	35.00	-	-	89.00	16.00	1.00	6	-	2	FBK0504664
16.00	35.00	-	-	89.00	16.00	2.00	6	-	2	FBK0504665
20.00	40.00	-	-	102.00	20.00	1.00	8	-	2	FBK0504666
20.00	40.00	-	-	102.00	20.00	2.00	8	-	2	FBK0504667

Application data on page no 2.044

Cutting parameters

Centre cutting high performance multi flute finisher with corner radius for 45-70 HRc - 3.0 mm to 8.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling, Semi Finish Milling	Cutting Speed (Vc) m/min: Shoulder Milling, Finish Milling	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)									
								Diameter in mm									
						mm		3.0		4.0		5.0		6.0		8.0	
			ap 2D ae/D 10%	ap 2D ae/D 10%		min	max	Range	min	max	min	max	min	max	min	max	min	max
Steel	P	5	130	155	Emulsion	130	180	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	0.060	0.080
		6	100	125		100	160	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	0.060	0.080
			ap 2D ae/D 1%	ap 2D ae/D 1%		Cutting Speed (Vc) m/min		mm	3.0		4.0		5.0		6.0		8.0	
						min	max	Range	min	max	min	max	min	max	min	max	min	max
Hardened Steel	H	1	150	180	MQL/ Cold Air	150	200	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	0.060	0.080
		2	120	150		120	180	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	0.060	0.080
		3	80	110		80	150	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	0.060	0.080
		4	80	110		80	150	fz	0.020	0.035	0.030	0.045	0.035	0.055	0.045	0.065	0.060	0.080

Centre cutting high performance multi flute finisher with corner radius for 45-70 HRc - 10.0 mm to 20.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling, Semi Finish Milling	Cutting Speed (Vc) m/min: Shoulder Milling, Finish Milling	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)									
								Diameter in mm									
						mm		10.0		12.0		16.0		20.0			
			ap 2D ae/D 10%	ap 2D ae/D 10%		min	max	Range	min	max	min	max	min	max	min	max	min	max
Steel	P	5	130	155	Emulsion	130	180	fz	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140		
		6	100	125		100	160	fz	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140		
			ap 2D ae/D 1%	ap 2D ae/D 1%		Cutting Speed (Vc) m/min		mm	10.0		12.0		16.0		20.0			
						min	max	Range	min	max	min	max	min	max	min	max		
Hardened Steel	H	1	150	180	MQL/ Cold Air	150	200	fz	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140		
		2	120	150		120	180	fz	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140		
		3	80	110		80	150	fz	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140		
		4	80	110		80	150	fz	0.070	0.095	0.085	0.110	0.095	0.125	0.105	0.140		

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

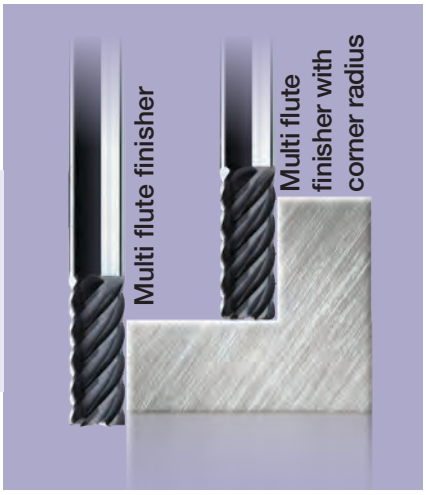
Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Multi flute finisher
Recommended for Side milling.

Multi flute finisher with corner radius
Recommended for Shoulder milling.



2 Flute

Centre cutting high performance 2 flute micro end mill

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

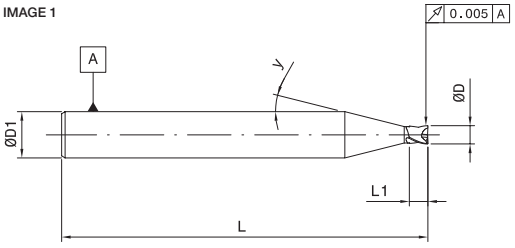
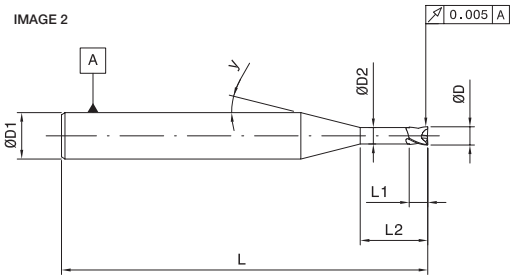


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	Effective length compared with Inclined Angle 0.5°	1°	2°	3°	EDP No
0.10	0.15	-	-	51.00	4.00	-	2	15	1	0.634	0.656	0.705	0.762	FBK0505434
0.20	0.25	-	-	51.00	4.00	-	2	15	1	0.737	0.763	0.820	0.887	FBK0505435
0.30	0.30	-	-	51.00	4.00	-	2	15	1	1.099	1.137	1.223	1.322	FBK0505436
0.30	0.30	0.28	1.50	51.00	4.00	-	2	15	2	1.861	1.926	2.070	2.238	FBK0505437
0.30	0.30	0.28	3.00	51.00	4.00	-	2	15	2	3.412	3.531	3.795	4.103	FBK0505438
0.40	0.40	-	-	51.00	4.00	-	2	15	1	1.202	1.244	1.338	1.446	FBK0505439
0.40	0.40	0.38	2.00	51.00	4.00	-	2	15	2	2.378	2.461	2.645	2.860	FBK0505440
0.40	0.40	0.38	4.00	51.00	4.00	-	2	15	2	4.445	4.600	4.945	5.346	FBK0505441
0.50	0.50	-	-	51.00	4.00	-	2	15	1	1.306	1.351	1.453	1.570	FBK0505442
0.50	0.50	0.47	3.00	51.00	4.00	-	2	15	2	3.431	3.551	3.817	4.126	FBK0505443
0.50	0.50	0.47	6.00	51.00	4.00	-	2	15	2	6.532	6.760	7.266	7.856	FBK0505444
0.50	0.50	0.47	8.00	51.00	4.00	-	2	15	2	8.599	8.899	9.566	10.342	FBK0505445
0.50	0.50	0.47	10.00	51.00	4.00	-	2	15	2	10.667	11.038	11.866	12.828	FBK0505446
0.60	0.60	-	-	51.00	4.00	-	2	15	1	2.062	2.134	2.294	2.480	FBK0505447
0.60	0.60	0.55	2.00	51.00	4.00	-	2	15	2	2.572	2.662	2.861	3.093	FBK0505448
0.60	0.60	0.55	4.00	51.00	4.00	-	2	15	2	4.639	4.801	5.161	5.580	FBK0505449
0.60	0.60	0.55	6.00	51.00	4.00	-	2	15	2	6.707	6.940	7.461	8.066	FBK0505450
0.60	0.60	0.55	8.00	51.00	4.00	-	2	15	2	8.774	9.080	9.760	10.552	FBK0505451
0.60	0.60	0.55	10.00	51.00	4.00	-	2	15	2	10.841	11.219	12.06	13.038	FBK0505452
0.80	0.80	-	-	51.00	4.00	-	2	15	1	2.269	2.348	2.524	2.729	FBK0505453
0.80	0.80	0.75	2.50	51.00	4.00	-	2	15	2	3.089	3.196	3.436	3.715	FBK0505454
0.80	0.80	0.75	5.00	51.00	4.00	-	2	15	2	5.673	5.871	6.311	6.823	FBK0505455
0.80	0.80	0.75	8.00	51.00	4.00	-	2	15	2	8.774	9.080	9.760	10.552	FBK0505456
0.80	0.80	0.75	10.00	51.00	4.00	-	2	15	2	10.841	11.219	12.06	13.038	FBK0505457
1.00	1.00	-	-	51.00	4.00	-	2	15	1	2.476	2.562	2.754	2.977	FBK0505458

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro end mill

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

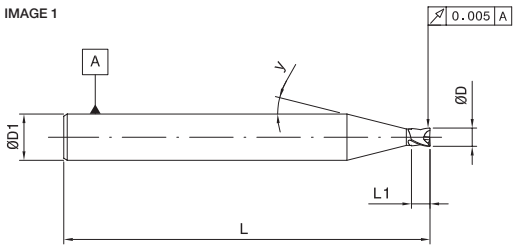
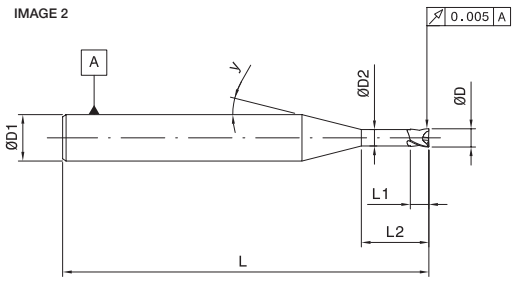


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.00	1.00	0.95	4.00	51.00	4.00	-	2	15	2	4.639	4.801	5.161	5.580	FBK0505459
1.00	1.00	0.95	6.00	51.00	4.00	-	2	15	2	6.707	6.940	7.461	8.066	FBK0505460
1.00	1.00	0.95	8.00	51.00	4.00	-	2	15	2	8.774	9.080	9.760	10.552	FBK0505461
1.00	1.00	0.95	10.00	51.00	4.00	-	2	15	2	10.841	11.219	12.06	13.038	FBK0505462
1.00	1.00	0.95	12.00	51.00	4.00	-	2	15	2	12.909	13.358	14.36	15.525	FBK0505463
1.00	1.00	0.95	15.00	51.00	4.00	-	2	15	2	16.01	16.568	17.809	19.254	FBK0505464
1.00	1.00	0.95	20.00	60.00	4.00	-	2	15	2	21.178	21.916	23.559	25.470	FBK0505465
1.00	1.00	0.95	25.00	60.00	4.00	-	2	15	2	26.346	27.264	29.308	∞	FBK0505466
1.20	1.20	-	-	51.00	4.00	-	2	15	1	3.471	3.592	3.862	4.175	FBK0505467
1.20	1.20	1.15	4.00	51.00	4.00	-	2	15	2	4.912	5.083	5.464	5.907	FBK0505468
1.20	1.20	1.15	6.00	51.00	4.00	-	2	15	2	6.979	7.222	7.763	8.393	FBK0505469
1.20	1.20	1.15	8.00	51.00	4.00	-	2	15	2	9.046	9.361	10.063	10.879	FBK0505470
1.20	1.20	1.15	12.00	51.00	4.00	-	2	15	2	13.181	13.64	14.662	15.852	FBK0505471
1.20	1.20	1.15	16.00	51.00	4.00	-	2	15	2	17.316	17.919	19.262	20.825	FBK0505472
1.50	1.50	-	-	51.00	4.00	-	2	15	1	3.781	3.913	4.206	4.548	FBK0505473
1.50	1.50	1.45	4.00	51.00	4.00	-	2	15	2	4.912	5.083	5.464	5.907	FBK0505474
1.50	1.50	1.45	6.00	51.00	4.00	-	2	15	2	6.979	7.222	7.763	8.393	FBK0505475
1.50	1.50	1.45	8.00	51.00	4.00	-	2	15	2	9.046	9.361	10.063	10.879	FBK0505476
1.50	1.50	1.45	10.00	51.00	4.00	-	2	15	2	11.114	11.501	12.363	13.366	FBK0505477
1.50	1.50	1.45	12.00	51.00	4.00	-	2	15	2	13.181	13.64	14.662	15.852	FBK0505478
1.50	1.50	1.45	15.00	51.00	4.00	-	2	15	2	16.282	16.849	18.112	19.581	FBK0505479
1.50	1.50	1.45	20.00	60.00	4.00	-	2	15	2	21.45	22.198	23.861	∞	FBK0505480
1.50	1.50	1.45	25.00	60.00	4.00	-	2	15	2	26.619	27.546	29.611	∞	FBK0505481
2.00	2.00	-	-	51.00	4.00	-	2	15	1	4.298	4.448	4.781	5.169	FBK0505482
2.00	2.00	1.90	6.00	51.00	4.00	-	2	15	2	7.075	7.322	7.871	8.509	FBK0505483

Remark ∞ means no collusion in projection length area

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro end mill

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

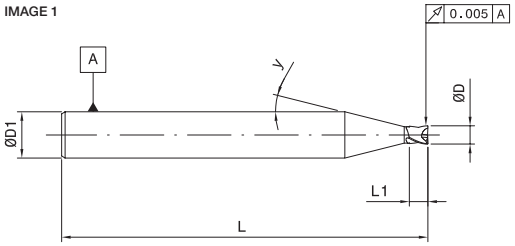
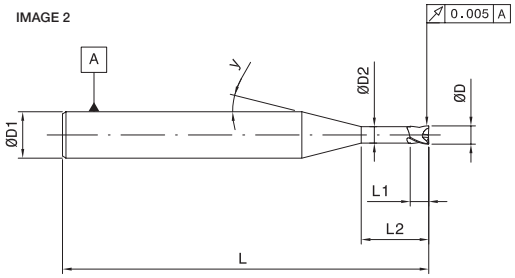


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
2.00	2.00	1.90	8.00	51.00	4.00	-	2	15	2	9.143	9.461	10.17	10.995	FBK0505484
2.00	2.00	1.90	10.00	51.00	4.00	-	2	15	2	11.21	11.601	12.47	13.482	FBK0505485
2.00	2.00	1.90	12.00	51.00	4.00	-	2	15	2	13.277	13.74	14.77	15.968	FBK0505486
2.00	2.00	1.90	16.00	51.00	4.00	-	2	15	2	17.412	18.019	19.369	∞	FBK0505487
2.00	2.00	1.90	20.00	60.00	4.00	-	2	15	2	21.547	22.297	23.969	∞	FBK0505488
2.00	2.00	1.90	25.00	60.00	4.00	-	2	15	2	26.715	27.646	∞	∞	FBK0505489
2.00	2.00	1.90	30.00	64.00	4.00	-	2	15	2	31.883	32.994	∞	∞	FBK0505490
2.50	2.50	-	-	51.00	4.00	-	2	15	1	4.815	4.983	5.356	5.791	FBK0505491
2.50	2.50	2.40	6.00	51.00	4.00	-	2	15	2	7.075	7.322	7.871	8.509	FBK0505492
2.50	2.50	2.40	8.00	51.00	4.00	-	2	15	2	9.143	9.461	10.170	10.995	FBK0505493
2.50	2.50	2.40	10.00	51.00	4.00	-	2	15	2	11.21	11.601	12.470	13.482	FBK0505494
2.50	2.50	2.40	12.00	51.00	4.00	-	2	15	2	13.277	13.74	14.770	∞	FBK0505495
2.50	2.50	2.40	16.00	51.00	4.00	-	2	15	2	17.412	18.019	19.369	∞	FBK0505496
2.50	2.50	2.40	20.00	60.00	4.00	-	2	15	2	21.547	22.297	∞	∞	FBK0505497
2.50	2.50	2.40	25.00	60.00	4.00	-	2	15	2	26.715	27.646	∞	∞	FBK0505498
2.50	2.50	2.40	30.00	64.00	4.00	-	2	15	2	31.883	32.994	∞	∞	FBK0505499
3.00	3.00	-	-	51.00	4.00	-	2	15	1	5.332	5.518	5.931	6.412	FBK0505500
3.00	3.00	2.90	6.00	51.00	4.00	-	2	15	2	7.075	7.322	7.871	8.509	FBK0505501
3.00	3.00	2.90	8.00	51.00	4.00	-	2	15	2	9.143	9.461	10.170	∞	FBK0505502
3.00	3.00	2.90	10.00	51.00	4.00	-	2	15	2	11.21	11.601	12.470	∞	FBK0505503
3.00	3.00	2.90	12.00	51.00	4.00	-	2	15	2	13.277	13.74	∞	∞	FBK0505504
3.00	3.00	2.90	16.00	51.00	4.00	-	2	15	2	17.412	18.019	∞	∞	FBK0505505
3.00	3.00	2.90	20.00	60.00	4.00	-	2	15	2	21.547	22.297	∞	∞	FBK0505506
3.00	3.00	2.90	25.00	60.00	4.00	-	2	15	2	26.715	27.646	∞	∞	FBK0505507
3.00	3.00	2.90	30.00	64.00	4.00	-	2	15	2	31.883	∞	∞	∞	FBK0505508

Remark ∞ means no collusion in projection length area
Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro end mill

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

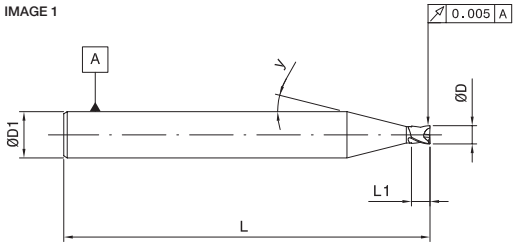
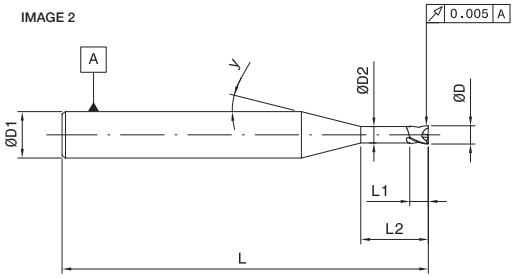


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	Effective length compared with Inclined Angle 0.5°	1°	2°	3°	EDP No
0.10	0.15	-	-	64.00	6.00	-	2	10	1	0.552	0.583	0.655	0.747	FBK0503664
0.20	0.50	-	-	64.00	6.00	-	2	10	1	0.710	0.749	0.842	0.960	FBK0505831
0.30	0.50	-	-	64.00	6.00	-	2	10	1	1.236	1.304	1.465	1.672	FBK0505546
0.30	0.50	0.28	1.50	64.00	6.00	-	2	11	2	1.826	1.916	2.126	2.388	FBK0503667
0.30	0.50	0.28	3.00	64.00	6.00	-	2	12	2	3.397	3.549	3.898	4.323	FBK0503668
0.40	0.60	-	-	64.00	6.00	-	2	10	1	1.341	1.415	1.590	1.814	FBK0505547
0.40	0.60	0.38	2.00	64.00	6.00	-	2	11	2	2.350	2.465	2.735	3.072	FBK0503670
0.40	0.60	0.38	4.00	64.00	6.00	-	2	13	2	4.439	4.621	5.032	5.525	FBK0503671
0.50	0.80	-	-	64.00	6.00	-	2	10	1	1.552	1.637	1.839	2.099	FBK0505548
0.50	0.80	0.47	3.00	64.00	6.00	-	2	12	2	3.421	3.574	3.926	4.354	FBK0503673
0.50	0.80	0.47	6.00	64.00	6.00	-	2	15	2	6.532	6.760	7.266	7.856	FBK0503674
0.50	0.80	0.47	8.00	64.00	6.00	-	2	15	2	8.599	8.899	9.566	10.342	FBK0503675
0.50	0.80	0.47	10.00	64.00	6.00	-	2	15	2	10.667	11.038	11.866	12.828	FBK0503676
0.60	0.90	-	-	64.00	6.00	-	2	10	1	1.749	1.845	2.073	2.366	FBK0505549
0.60	0.90	0.55	2.00	64.00	6.00	-	2	11	2	2.531	2.656	2.947	3.310	FBK0503678
0.60	0.90	0.55	4.00	64.00	6.00	-	2	12	2	4.623	4.830	5.304	5.884	FBK0503679
0.60	0.90	0.55	6.00	64.00	6.00	-	2	15	2	6.707	6.940	7.461	8.066	FBK0503680
0.60	0.90	0.55	8.00	64.00	6.00	-	2	15	2	8.774	9.080	9.760	10.552	FBK0503681
0.60	0.90	0.55	10.00	64.00	6.00	-	2	15	2	10.841	11.219	12.06	13.038	FBK0503682
0.80	1.20	-	-	64.00	6.00	-	2	10	1	2.591	2.733	3.071	3.504	FBK0505550
0.80	1.20	0.75	2.50	64.00	6.00	-	2	11	2	3.055	3.205	3.556	3.994	FBK0503684
0.80	1.20	0.75	5.00	64.00	6.00	-	2	13	2	5.664	5.896	6.421	7.051	FBK0503685
0.80	1.20	0.75	8.00	64.00	6.00	-	2	15	2	8.774	9.080	9.760	10.552	FBK0503686
0.80	1.20	0.75	10.00	64.00	6.00	-	2	15	2	10.841	11.219	12.06	13.038	FBK0503687

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro end mill

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

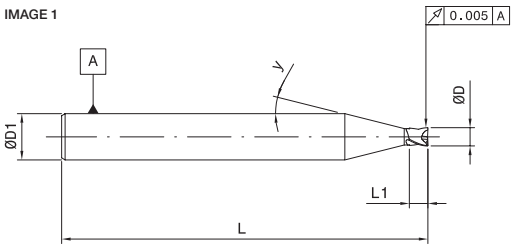
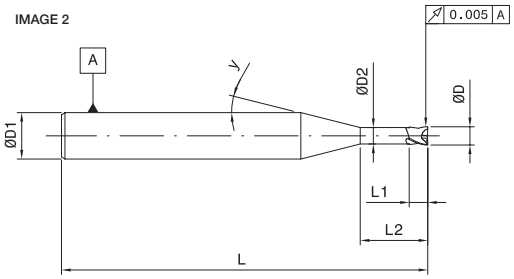


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.00	1.50	-	-	64.00	6.00	-	2	10	1	2.906	3.066	3.445	3.931	FBK0505551
1.00	1.50	0.95	4.00	64.00	6.00	-	2	11	2	4.625	4.853	5.385	6.048	FBK0503689
1.00	1.50	0.95	6.00	64.00	6.00	-	2	14	2	6.703	6.956	7.522	8.19	FBK0503690
1.00	1.50	0.95	8.00	64.00	6.00	-	2	15	2	8.774	9.080	9.760	10.552	FBK0505195
1.00	1.50	0.95	10.00	64.00	6.00	-	2	15	2	10.841	11.219	12.06	13.038	FBK0503691
1.00	1.50	0.95	12.00	64.00	6.00	-	2	15	2	12.909	13.358	14.36	15.525	FBK0505196
1.00	1.50	0.95	15.00	64.00	6.00	-	2	15	2	16.010	16.568	17.809	19.254	FBK0503692
1.00	1.50	0.95	20.00	64.00	6.00	-	2	15	2	21.178	21.916	23.559	25.47	FBK0503693
1.00	1.50	0.95	25.00	64.00	6.00	-	2	15	2	26.346	27.264	29.308	31.686	FBK0503694
1.20	1.80	-	-	64.00	6.00	-	2	10	1	3.932	4.148	4.66	5.318	FBK0505552
1.20	1.80	1.15	4.00	64.00	6.00	-	2	11	2	4.827	5.065	5.62	6.312	FBK0503696
1.20	1.80	1.15	6.00	64.00	6.00	-	2	13	2	6.940	7.224	7.868	8.639	FBK0503697
1.20	1.80	1.15	8.00	64.00	6.00	-	2	15	2	9.046	9.361	10.063	10.879	FBK0503698
1.20	1.80	1.15	12.00	64.00	6.00	-	2	15	2	13.181	13.64	14.662	15.852	FBK0503699
1.20	1.80	1.15	16.00	64.00	6.00	-	2	15	2	17.316	17.919	19.262	20.825	FBK0503700
1.50	2.30	-	-	64.00	6.00	-	2	9	1	4.438	4.713	5.38	6.267	FBK0505553
1.50	2.30	1.45	4.00	64.00	6.00	-	2	10	2	4.818	5.082	5.71	6.516	FBK0505197
1.50	2.30	1.45	6.00	64.00	6.00	-	2	12	2	6.928	7.237	7.949	8.817	FBK0503702
1.50	2.30	1.45	8.00	64.00	6.00	-	2	15	2	9.046	9.361	10.063	10.879	FBK0505198
1.50	2.30	1.45	10.00	64.00	6.00	-	2	15	2	11.114	11.501	12.363	13.366	FBK0503703
1.50	2.30	1.45	12.00	64.00	6.00	-	2	15	2	13.181	13.64	14.662	15.852	FBK0505199
1.50	2.30	1.45	15.00	64.00	6.00	-	2	15	2	16.282	16.849	18.112	19.581	FBK0503704
1.50	2.30	1.45	20.00	64.00	6.00	-	2	15	2	21.450	22.198	23.861	25.797	FBK0503705
1.50	2.30	1.45	25.00	64.00	6.00	-	2	15	2	26.619	27.546	29.611	32.013	FBK0503706
2.00	3.00	-	-	64.00	6.00	-	2	8	1	5.171	5.537	6.453	7.733	FBK0503707
2.00	3.00	1.90	6.00	64.00	6.00	-	2	11	2	7.055	7.403	8.214	9.226	FBK0503708

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro end mill

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

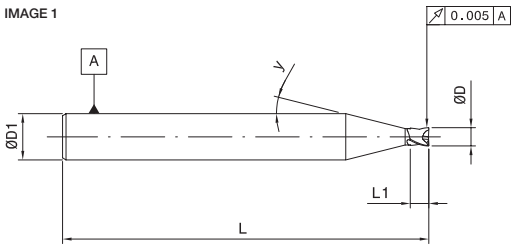
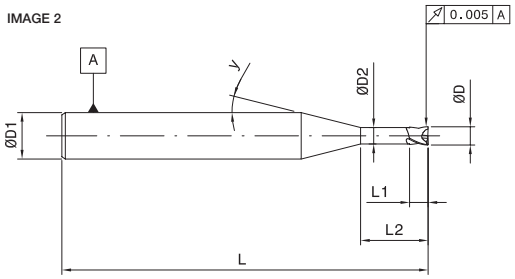


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
2.00	3.00	1.90	8.00	64.00	6.00	-	2	14	2	9.134	9.478	10.250	11.160	FBK0505200
2.00	3.00	1.90	10.00	64.00	6.00	-	2	15	2	11.210	11.601	12.470	13.482	FBK0503709
2.00	3.00	1.90	12.00	64.00	6.00	-	2	15	2	13.277	13.740	14.770	15.968	FBK0505201
2.00	3.00	1.90	16.00	64.00	6.00	-	2	15	2	17.412	18.019	19.369	20.941	FBK0503710
2.00	3.00	1.90	20.00	64.00	6.00	-	2	15	2	21.547	22.297	23.969	25.913	FBK0503711
2.00	3.00	1.90	25.00	64.00	6.00	-	2	15	2	26.715	27.646	29.718	32.129	FBK0503712
2.00	3.00	1.90	30.00	64.00	6.00	-	2	15	2	31.883	32.994	35.467	38.345	FBK0503713
2.50	3.00	-	-	64.00	6.00	-	2	8	1	5.171	5.537	6.453	7.733	FBK0503714
2.50	3.00	2.40	6.00	64.00	6.00	-	2	10	2	7.071	7.459	8.381	9.563	FBK0503715
2.50	3.00	2.40	8.00	64.00	6.00	-	2	12	2	9.136	9.545	10.483	11.628	FBK0505202
2.50	3.00	2.40	10.00	64.00	6.00	-	2	15	2	11.21	11.601	12.470	13.482	FBK0503716
2.50	3.00	2.40	12.00	64.00	6.00	-	2	15	2	13.277	13.740	14.770	15.968	FBK0505203
2.50	3.00	2.40	16.00	64.00	6.00	-	2	15	2	17.412	18.019	19.369	20.941	FBK0503717
2.50	3.00	2.40	20.00	64.00	6.00	-	2	15	2	21.547	22.297	23.969	25.913	FBK0503718
2.50	3.00	2.40	25.00	64.00	6.00	-	2	15	2	26.715	27.646	29.718	32.129	FBK0503719
2.50	3.00	2.40	30.00	64.00	6.00	-	2	15	2	31.883	32.994	35.467	38.345	FBK0505204
3.00	3.00	-	-	64.00	6.00	-	2	7	1	5.174	5.602	6.716	8.385	FBK0503720
3.00	3.00	2.90	6.00	64.00	6.00	-	2	8	2	7.149	7.656	8.922	10.693	FBK0503721
3.00	3.00	2.90	8.00	64.00	6.00	-	2	10	2	9.175	9.679	10.875	12.409	FBK0505205
3.00	3.00	2.90	10.00	64.00	6.00	-	2	13	2	11.21	11.668	12.709	13.954	FBK0503722
3.00	3.00	2.90	12.00	64.00	6.00	-	2	15	2	13.277	13.740	14.770	15.968	FBK0505206
3.00	3.00	2.90	16.00	64.00	6.00	-	2	15	2	17.412	18.019	19.369	20.941	FBK0503723
3.00	3.00	2.90	20.00	64.00	6.00	-	2	15	2	21.547	22.297	23.969	25.913	FBK0503724
3.00	3.00	2.90	25.00	64.00	6.00	-	2	15	2	26.715	27.646	29.718	32.129	FBK0503725
3.00	3.00	2.90	30.00	64.00	6.00	-	2	15	2	31.883	32.994	35.467	38.345	FBK0503726

Application data on page no 2.073 & 2.074

4 Flute

Centre cutting high performance 4 flute micro end mill

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

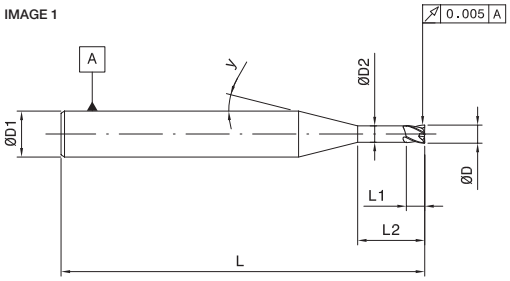
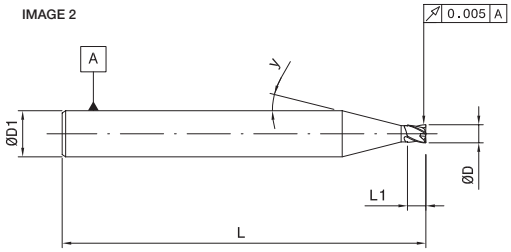


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	Effective length compared with Inclined Angle 0.5°	1°	2°	3°	EDP No
0.20	0.25	0.18	2.00	51.00	4.00	-	4	15	1	2.378	2.461	2.645	2.860	FBK0505509
0.20	0.25	0.18	4.00	51.00	4.00	-	4	15	1	4.445	4.600	4.945	5.346	FBK0505510
0.40	0.40	0.38	2.00	51.00	4.00	-	4	15	1	2.378	2.461	2.645	2.860	FBK0505511
0.40	0.40	0.38	4.00	51.00	4.00	-	4	15	1	4.445	4.600	4.945	5.346	FBK0505512
0.40	0.40	0.38	6.00	51.00	4.00	-	4	15	1	6.513	6.740	7.245	7.833	FBK0505513
0.40	0.40	0.38	8.00	51.00	4.00	-	4	15	1	8.580	8.879	9.545	10.319	FBK0505514
0.40	0.40	0.38	10.00	51.00	4.00	-	4	15	1	10.647	11.018	11.844	12.805	FBK0505515
0.50	0.50	0.46	2.00	51.00	4.00	-	4	15	1	2.397	2.481	2.667	2.883	FBK0505516
0.50	0.50	0.46	4.00	51.00	4.00	-	4	15	1	4.465	4.620	4.967	5.369	FBK0505517
0.50	0.50	0.46	6.00	51.00	4.00	-	4	15	1	6.532	6.760	7.266	7.856	FBK0505518
0.50	0.50	0.46	8.00	51.00	4.00	-	4	15	1	8.599	8.899	9.566	10.342	FBK0505519
0.50	0.50	0.46	10.00	51.00	4.00	-	4	15	1	10.667	11.038	11.866	12.828	FBK0505520
1.00	1.00	0.94	2.00	51.00	4.00	-	4	15	1	2.572	2.662	2.861	3.093	FBK0505521
1.00	1.00	0.94	4.00	51.00	4.00	-	4	15	1	4.639	4.801	5.161	5.580	FBK0505522
1.00	1.00	0.94	6.00	51.00	4.00	-	4	15	1	6.707	6.940	7.461	8.066	FBK0505523
1.00	1.00	0.94	8.00	51.00	4.00	-	4	15	1	8.774	9.080	9.760	10.552	FBK0505524
1.00	1.00	0.94	10.00	51.00	4.00	-	4	15	1	10.841	11.219	12.06	13.038	FBK0505525
1.50	1.50	-	-	51.00	4.00	-	4	15	2	3.781	3.913	4.206	4.548	FBK0505526
1.50	1.50	1.44	4.00	51.00	4.00	-	4	15	1	4.912	5.083	5.464	5.907	FBK0505527

Application data on page no 2.073 & 2.074

4 Flute

Centre cutting high performance 4 flute micro end mill

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

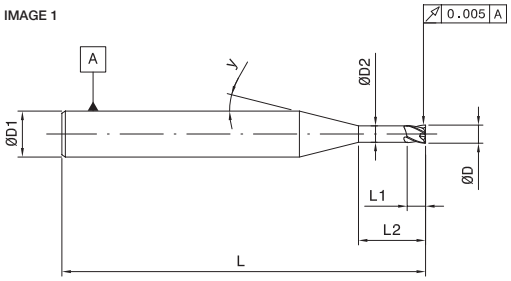
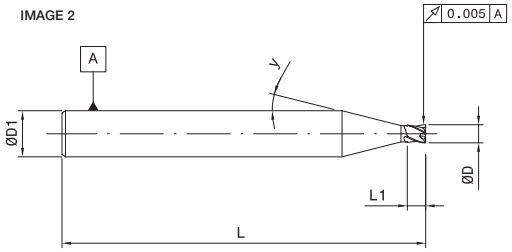


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.50	1.50	1.44	6.00	51.00	4.00	-	4	15	1	6.979	7.222	7.763	8.393	FBK0505528
1.50	1.50	1.44	8.00	51.00	4.00	-	4	15	1	9.046	9.361	10.063	10.879	FBK0505529
1.50	1.50	1.44	10.00	51.00	4.00	-	4	15	1	11.114	11.501	12.363	13.366	FBK0505530
2.00	2.00	-	-	51.00	4.00	-	4	15	2	4.298	4.448	4.781	5.169	FBK0505531
2.00	2.00	1.90	4.00	51.00	4.00	-	4	15	1	5.008	5.182	5.571	6.023	FBK0505532
2.00	2.00	1.90	6.00	51.00	4.00	-	4	15	1	7.075	7.322	7.871	8.509	FBK0505533
2.00	2.00	1.90	8.00	51.00	4.00	-	4	15	1	9.143	9.461	10.170	10.995	FBK0505534
2.00	2.00	1.90	10.00	51.00	4.00	-	4	15	1	11.210	11.601	12.470	13.482	FBK0505535
2.50	2.50	-	-	51.00	4.00	-	4	15	2	4.815	4.983	5.356	5.791	FBK0505536
2.50	2.50	2.40	4.00	51.00	4.00	-	4	15	1	5.008	5.182	5.571	6.023	FBK0505537
2.50	2.50	2.40	6.00	51.00	4.00	-	4	15	1	7.075	7.322	7.871	8.509	FBK0505538
2.50	2.50	2.40	8.00	51.00	4.00	-	4	15	1	9.143	9.461	10.170	10.995	FBK0505539
2.50	2.50	2.40	10.00	51.00	4.00	-	4	15	1	11.210	11.601	12.470	13.482	FBK0505540
3.00	3.00	-	-	51.00	4.00	-	4	15	2	5.332	5.518	5.931	6.412	FBK0505541
3.00	3.00	2.90	5.00	51.00	4.00	-	4	15	1	5.525	5.717	6.146	6.644	FBK0505542
3.00	3.00	2.90	6.00	51.00	4.00	-	4	15	1	7.075	7.322	7.871	8.509	FBK0505543
3.00	3.00	2.90	8.00	51.00	4.00	-	4	15	1	9.143	9.461	10.170	∞	FBK0505544
3.00	3.00	2.90	10.00	51.00	4.00	-	4	15	1	11.210	11.601	12.470	∞	FBK0505545

Remark ∞ means no collusion in projection length area

Application data on page no 2.073 & 2.074

4 Flute

Centre cutting high performance 4 flute micro end mill

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

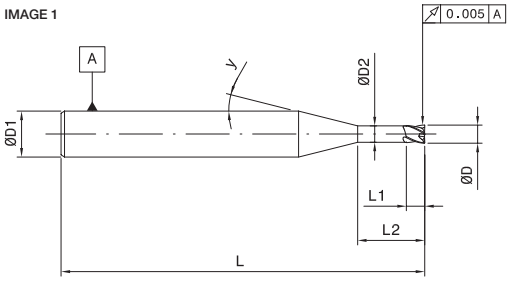
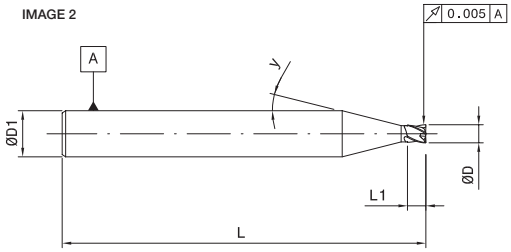


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	Effective length compared with Inclined Angle 0.5°	1°	2°	3°	EDP No
0.20	0.30	0.18	2.00	64.00	6.00	-	4	11	1	2.350	2.465	2.735	3.072	FBK0505554
0.20	0.30	0.18	4.00	64.00	6.00	-	4	13	1	4.439	4.621	5.032	5.525	FBK0505555
0.20	0.30	0.18	6.00	64.00	6.00	-	4	15	1	6.513	6.740	7.245	7.833	FBK0505832
0.20	0.30	0.18	8.00	64.00	6.00	-	4	15	1	8.580	8.879	9.545	10.319	FBK0505833
0.20	0.30	0.18	10.00	64.00	6.00	-	4	15	1	10.647	11.018	11.844	12.805	FBK0505834
0.40	0.60	0.38	2.00	64.00	6.00	-	4	11	1	2.350	2.465	2.735	3.072	FBK0505556
0.40	0.60	0.38	4.00	64.00	6.00	-	4	13	1	4.439	4.621	5.032	5.525	FBK0505557
0.40	0.60	0.38	6.00	64.00	6.00	-	4	15	1	6.513	6.740	7.245	7.833	FBK0505558
0.40	0.60	0.38	8.00	64.00	6.00	-	4	15	1	8.580	8.879	9.545	10.319	FBK0505559
0.40	0.60	0.38	10.00	64.00	6.00	-	4	15	1	10.647	11.018	11.844	12.805	FBK0505560
0.50	0.80	0.47	2.00	64.00	6.00	-	4	11	1	2.376	2.494	2.767	3.108	FBK0505561
0.50	0.80	0.47	4.00	64.00	6.00	-	4	12	1	4.464	4.664	5.122	5.682	FBK0505562
0.50	0.80	0.47	6.00	64.00	6.00	-	4	15	1	6.532	6.760	7.266	7.856	FBK0505563
0.50	0.80	0.47	8.00	64.00	6.00	-	4	15	1	8.599	8.899	9.566	10.342	FBK0505564
0.50	0.80	0.47	10.00	64.00	6.00	-	4	15	1	10.667	11.038	11.866	12.828	FBK0505565
1.00	1.50	-	-	64.00	6.00	-	4	10	2	3.055	3.223	3.621	4.133	FBK0505566
1.00	1.50	0.95	4.00	64.00	6.00	-	4	11	1	4.625	4.853	5.385	6.048	FBK0505567
1.00	1.50	0.95	6.00	64.00	6.00	-	4	14	1	6.703	6.956	7.522	8.190	FBK0505568
1.00	1.50	0.95	8.00	64.00	6.00	-	4	15	1	8.774	9.080	9.760	10.552	FBK0505569
1.00	1.50	0.95	10.00	64.00	6.00	-	4	15	1	10.841	11.219	12.06	13.038	FBK0505570

Application data on page no 2.073 & 2.074

4 Flute

Centre cutting high performance 4 flute micro end mill

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

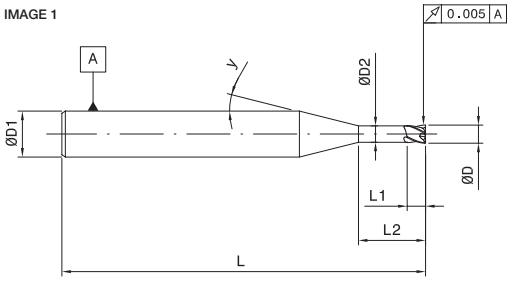
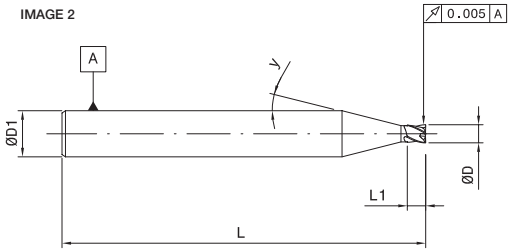


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.50	2.30	-	-	64.00	6.00	-	4	9	2	4.438	4.713	5.380	6.267	FBK0505571
1.50	2.30	1.45	4.00	64.00	6.00	-	4	10	1	4.818	5.082	5.710	6.516	FBK0505572
1.50	2.30	1.45	6.00	64.00	6.00	-	4	12	1	6.928	7.237	7.949	8.817	FBK0505573
1.50	2.30	1.45	8.00	64.00	6.00	-	4	15	1	9.046	9.361	10.063	10.879	FBK0505574
1.50	2.30	1.45	10.00	64.00	6.00	-	4	15	1	11.114	11.501	12.363	13.366	FBK0505575
2.00	3.00	-	-	64.00	6.00	-	4	8	2	5.171	5.537	6.453	7.733	FBK0505576
2.00	3.00	1.90	4.50	64.00	6.00	-	4	9	1	5.513	5.854	6.683	7.785	FBK0505577
2.00	3.00	1.90	6.00	64.00	6.00	-	4	11	1	7.055	7.403	8.214	9.226	FBK0505578
2.00	3.00	1.90	8.00	64.00	6.00	-	4	14	1	9.134	9.478	10.25	11.16	FBK0505579
2.00	3.00	1.90	10.00	64.00	6.00	-	4	15	1	11.210	11.601	12.470	13.482	FBK0505580
2.50	3.00	-	-	64.00	6.00	-	4	8	2	5.171	5.537	6.453	7.733	FBK0505581
2.50	3.00	2.40	4.50	64.00	6.00	-	4	9	1	5.513	5.854	6.683	7.785	FBK0505582
2.50	3.00	2.40	6.00	64.00	6.00	-	4	11	1	7.055	7.403	8.214	9.226	FBK0505583
2.50	3.00	2.40	8.00	64.00	6.00	-	4	14	1	9.134	9.478	10.250	11.160	FBK0505584
2.50	3.00	2.40	10.00	64.00	6.00	-	4	15	1	11.21	11.601	12.470	13.482	FBK0505585
3.00	3.00	-	-	64.00	6.00	-	4	6	2	5.193	5.710	7.131	9.498	FBK0505586
3.00	3.00	2.90	4.50	64.00	6.00	-	4	7	1	5.612	6.077	7.285	9.095	FBK0505587
3.00	3.00	2.90	6.00	64.00	6.00	-	4	8	1	7.149	7.656	8.922	10.693	FBK0505588
3.00	3.00	2.90	8.00	64.00	6.00	-	4	10	1	9.175	9.679	10.875	12.409	FBK0505589
3.00	3.00	2.90	10.00	64.00	6.00	-	4	13	1	11.21	11.668	12.709	13.954	FBK0505590

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro end mill with corner radius

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

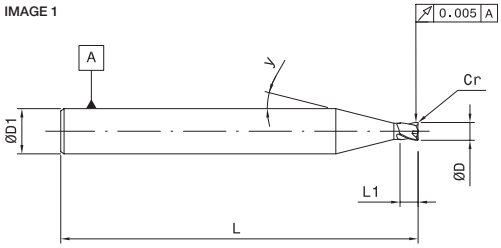
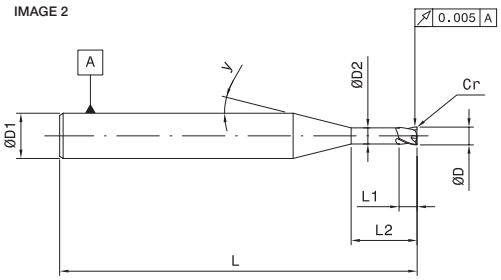


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
0.10	0.20	-	-	51.00	4.00	0.03	2	7	1	0.560	0.604	0.718	0.889	FBK0505835
0.10	0.15	-	-	51.00	4.00	0.03	2	15	1	0.633	0.654	0.701	0.755	FBK0505293
0.20	0.25	-	-	51.00	4.00	0.03	2	15	1	0.736	0.761	0.816	0.879	FBK0505294
0.30	0.30	-	-	51.00	4.00	0.05	2	15	1	1.097	1.134	1.215	1.310	FBK0505295
0.30	0.30	0.28	1.50	51.00	4.00	0.05	2	15	2	1.860	1.923	2.063	2.226	FBK0505296
0.30	0.30	0.28	3.00	51.00	4.00	0.05	2	15	2	3.410	3.527	3.788	4.091	FBK0505297
0.40	0.40	-	-	51.00	4.00	0.05	2	15	1	1.201	1.241	1.330	1.434	FBK0505298
0.40	0.40	0.38	2.00	51.00	4.00	0.05	2	15	2	2.376	2.457	2.638	2.848	FBK0505299
0.40	0.40	0.38	4.00	51.00	4.00	0.05	2	15	2	4.444	4.597	4.938	5.334	FBK0505300
0.50	0.50	-	-	51.00	4.00	0.05	2	15	1	1.304	1.348	1.445	1.558	FBK0505301
0.50	0.50	0.47	1.00	51.00	4.00	0.05	2	15	2	1.362	1.408	1.509	1.628	FBK0505302
0.50	0.50	0.47	3.00	51.00	4.00	0.05	2	15	2	3.429	3.547	3.809	4.114	FBK0505303
0.50	0.50	0.47	6.00	51.00	4.00	0.05	2	15	2	6.530	6.756	7.259	7.844	FBK0505304
0.50	0.50	0.47	8.00	51.00	4.00	0.05	2	15	2	8.598	8.896	9.558	10.33	FBK0505305
0.50	0.50	0.47	10.00	51.00	4.00	0.05	2	15	2	10.665	11.035	11.858	12.816	FBK0505306
0.60	0.60	-	-	51.00	4.00	0.05	2	15	1	2.060	2.130	2.286	2.468	FBK0505307
0.60	0.60	0.55	2.00	51.00	4.00	0.05	2	15	2	2.570	2.658	2.854	3.081	FBK0505308
0.60	0.60	0.55	4.00	51.00	4.00	0.05	2	15	2	4.638	4.798	5.153	5.567	FBK0505309
0.60	0.60	0.55	6.00	51.00	4.00	0.05	2	15	2	6.705	6.937	7.453	8.054	FBK0505310
0.60	0.60	0.55	8.00	51.00	4.00	0.05	2	15	2	8.772	9.076	9.753	10.54	FBK0505311
0.60	0.60	0.55	10.00	51.00	4.00	0.05	2	15	2	10.84	11.216	12.052	13.026	FBK0505312
0.80	0.80	-	-	51.00	4.00	0.05	2	15	1	2.267	2.344	2.516	2.716	FBK0505313
0.80	0.80	0.75	2.50	51.00	4.00	0.05	2	15	2	3.087	3.193	3.429	3.703	FBK0505314
0.80	0.80	0.75	5.00	51.00	4.00	0.05	2	15	2	5.671	5.867	6.303	6.811	FBK0505315
0.80	0.80	0.75	8.00	51.00	4.00	0.05	2	15	2	8.772	9.076	9.753	10.54	FBK0505316
0.80	0.80	0.75	10.00	51.00	4.00	0.05	2	15	2	10.84	11.216	12.052	13.026	FBK0505317
1.00	1.00	-	-	51.00	4.00	0.10	2	15	1	2.472	2.555	2.739	2.953	FBK0505318
1.00	1.00	0.95	2.00	51.00	4.00	0.10	2	15	2	2.569	2.655	2.846	3.069	FBK0505319

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro end mill with corner radius

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

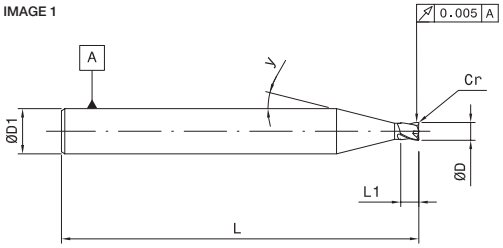
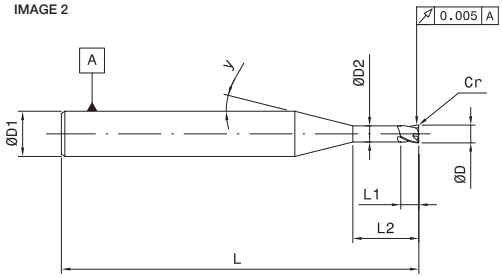


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.00	1.00	0.95	4.00	51.00	4.00	0.10	2	15	2	4.636	4.794	5.146	5.555	FBK0505320
1.00	1.00	0.95	6.00	51.00	4.00	0.10	2	15	2	6.703	6.933	7.446	8.042	FBK0505321
1.00	1.00	0.95	8.00	51.00	4.00	0.10	2	15	2	8.771	9.073	9.745	10.528	FBK0505322
1.00	1.00	0.95	10.00	51.00	4.00	0.10	2	15	2	10.838	11.212	12.045	13.014	FBK0505323
1.00	1.00	0.95	12.00	51.00	4.00	0.10	2	15	2	12.905	13.352	14.345	15.500	FBK0505324
1.00	1.00	0.95	15.00	51.00	4.00	0.10	2	15	2	16.006	16.561	17.794	19.230	FBK0505325
1.00	1.00	0.95	20.00	60.00	4.00	0.10	2	15	2	21.175	21.909	23.544	25.446	FBK0505326
1.00	1.00	0.95	25.00	60.00	4.00	0.10	2	15	2	26.343	27.257	29.293	∞	FBK0505327
1.20	1.20	-	-	51.00	4.00	0.10	2	15	1	3.468	3.585	3.847	4.150	FBK0505328
1.20	1.20	1.15	4.00	51.00	4.00	0.10	2	15	2	4.908	5.076	5.449	5.883	FBK0505329
1.20	1.20	1.15	6.00	51.00	4.00	0.10	2	15	2	6.975	7.215	7.748	8.369	FBK0505330
1.20	1.20	1.15	8.00	51.00	4.00	0.10	2	15	2	9.043	9.354	10.048	10.855	FBK0505331
1.20	1.20	1.15	12.00	51.00	4.00	0.10	2	15	2	13.177	13.633	14.647	15.828	FBK0505332
1.20	1.20	1.15	16.00	51.00	4.00	0.10	2	15	2	17.312	17.912	19.247	20.800	FBK0505333
1.50	1.50	-	-	51.00	4.00	0.15	2	15	1	3.776	3.903	4.184	4.511	FBK0505334
1.50	1.50	1.45	3.00	51.00	4.00	0.15	2	15	2	3.873	4.003	4.291	4.627	FBK0505335
1.50	1.50	1.45	4.00	51.00	4.00	0.15	2	15	2	4.906	5.072	5.441	5.870	FBK0505336
1.50	1.50	1.45	6.00	51.00	4.00	0.15	2	15	2	6.974	7.212	7.741	8.357	FBK0505337
1.50	1.50	1.45	8.00	51.00	4.00	0.15	2	15	2	9.041	9.351	10.041	10.843	FBK0505338
1.50	1.50	1.45	10.00	51.00	4.00	0.15	2	15	2	11.108	11.49	12.340	13.329	FBK0505339
1.50	1.50	1.45	12.00	51.00	4.00	0.15	2	15	2	13.176	13.63	14.640	15.816	FBK0505340
1.50	1.50	1.45	15.00	51.00	4.00	0.15	2	15	2	16.277	16.839	18.090	19.545	FBK0505341
1.50	1.50	1.45	20.00	60.00	4.00	0.15	2	15	2	21.445	22.187	23.839	∞	FBK0505342
1.50	1.50	1.45	25.00	60.00	4.00	0.15	2	15	2	26.613	27.536	29.588	∞	FBK0505343
2.00	2.00	-	-	51.00	4.00	0.20	2	15	1	4.292	4.434	4.751	5.121	FBK0505344
2.00	2.00	1.90	4.00	51.00	4.00	0.20	2	15	2	5.001	5.169	5.541	5.974	FBK0505345

Remark ∞ means no collusion in projection length area

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro end mill with corner radius

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

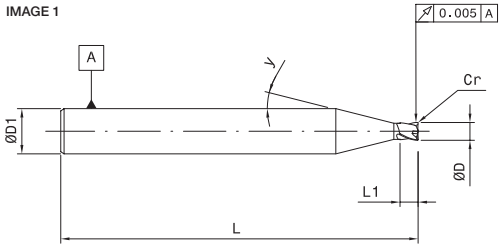
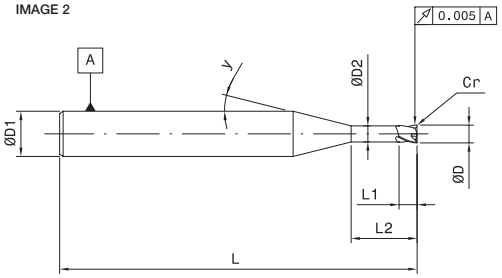


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
2.00	2.00	1.90	6.00	51.00	4.00	0.20	2	15	2	7.069	7.308	7.841	8.461	FBK0505346
2.00	2.00	1.90	8.00	51.00	4.00	0.20	2	15	2	9.136	9.447	10.14	10.947	FBK0505347
2.00	2.00	1.90	10.00	51.00	4.00	0.20	2	15	2	11.203	11.587	12.44	13.433	FBK0505348
2.00	2.00	1.90	12.00	51.00	4.00	0.20	2	15	2	13.271	13.726	14.74	15.919	FBK0505349
2.00	2.00	1.90	16.00	51.00	4.00	0.20	2	15	2	17.405	18.005	19.339	∞	FBK0505350
2.00	2.00	1.90	20.00	60.00	4.00	0.20	2	15	2	21.540	22.283	23.939	∞	FBK0505351
2.00	2.00	1.90	25.00	60.00	4.00	0.20	2	15	2	26.708	27.632	∞	∞	FBK0505352
2.00	2.00	1.90	30.00	64.00	4.00	0.20	2	15	2	31.877	32.980	∞	∞	FBK0505353
2.50	2.50	-	-	51.00	4.00	0.20	2	15	1	4.808	4.969	5.326	5.742	FBK0505354
2.50	2.50	2.40	4.00	51.00	4.00	0.20	2	15	2	5.001	5.169	5.541	5.974	FBK0505355
2.50	2.50	2.40	6.00	51.00	4.00	0.20	2	15	2	7.069	7.308	7.841	8.461	FBK0505356
2.50	2.50	2.40	8.00	51.00	4.00	0.20	2	15	2	9.136	9.447	10.140	10.947	FBK0505357
2.50	2.50	2.40	10.00	51.00	4.00	0.20	2	15	2	11.203	11.587	12.440	13.433	FBK0505358
2.50	2.50	2.40	12.00	51.00	4.00	0.20	2	15	2	13.271	13.726	14.740	∞	FBK0505359
2.50	2.50	2.40	16.00	51.00	4.00	0.20	2	15	2	17.405	18.005	19.339	∞	FBK0505360
2.50	2.50	2.40	20.00	60.00	4.00	0.20	2	15	2	21.540	22.283	∞	∞	FBK0505361
2.50	2.50	2.40	25.00	60.00	4.00	0.20	2	15	2	26.708	27.632	∞	∞	FBK0505362
2.50	2.50	2.40	30.00	64.00	4.00	0.20	2	15	2	31.877	32.980	∞	∞	FBK0505363
3.00	3.00	-	-	51.00	4.00	0.30	2	15	1	5.322	5.497	5.886	6.340	FBK0505364
3.00	3.00	2.90	6.00	51.00	4.00	0.30	2	15	2	7.065	7.301	7.826	∞	FBK0505365
3.00	3.00	2.90	8.00	51.00	4.00	0.30	2	15	2	9.133	9.440	10.125	∞	FBK0505366
3.00	3.00	2.90	10.00	51.00	4.00	0.30	2	15	2	11.200	11.580	12.425	∞	FBK0505367
3.00	3.00	2.90	12.00	51.00	4.00	0.30	2	15	2	13.267	13.719	14.725	∞	FBK0505368
3.00	3.00	2.90	16.00	51.00	4.00	0.30	2	15	2	17.402	17.998	∞	∞	FBK0505369
3.00	3.00	2.90	20.00	60.00	4.00	0.30	2	15	2	21.537	22.276	∞	∞	FBK0505370
3.00	3.00	2.90	25.00	60.00	4.00	0.30	2	15	2	26.705	27.625	∞	∞	FBK0505371
3.00	3.00	2.90	30.00	64.00	4.00	0.30	2	15	2	31.873	∞	∞	∞	FBK0505372

Remark ∞ means no collusion in projection length area

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro end mill with corner radius

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

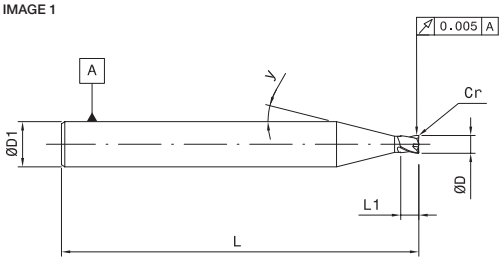
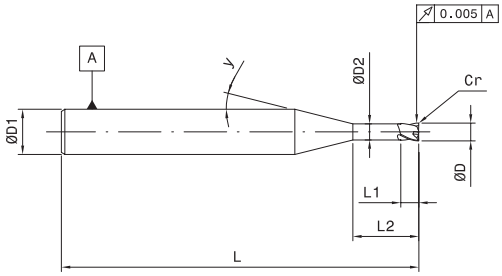


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
0.20	0.30	-	-	64.00	6.00	0.03	2	10	1	0.709	0.746	0.834	0.948	FBK0505137
0.30	0.50	-	-	64.00	6.00	0.05	2	10	1	1.234	1.299	1.453	1.651	FBK0505410
0.30	0.50	0.28	1.50	64.00	6.00	0.05	2	11	2	1.824	1.911	2.115	2.369	FBK0503728
0.30	0.50	0.28	3.00	64.00	6.00	0.05	2	12	2	3.395	3.544	3.888	4.307	FBK0503729
0.40	0.60	-	-	64.00	6.00	0.05	2	10	1	1.339	1.410	1.577	1.793	FBK0505411
0.40	0.60	0.38	2.00	64.00	6.00	0.05	2	11	2	2.347	2.460	2.725	3.054	FBK0503731
0.40	0.60	0.38	4.00	64.00	6.00	0.05	2	13	2	4.437	4.616	5.023	5.511	FBK0503732
0.50	0.80	-	-	64.00	6.00	0.05	2	10	1	1.549	1.632	1.827	2.078	FBK0505412
0.50	0.80	0.47	3.00	64.00	6.00	0.05	2	12	2	3.419	3.570	3.916	4.338	FBK0503734
0.50	0.80	0.47	6.00	64.00	6.00	0.05	2	15	2	6.530	6.756	7.259	7.844	FBK0503735
0.50	0.80	0.47	8.00	64.00	6.00	0.05	2	15	2	8.598	8.896	9.558	10.330	FBK0503736
0.50	0.80	0.47	10.00	64.00	6.00	0.05	2	15	2	10.665	11.035	11.858	12.816	FBK0503737
0.60	0.90	-	-	64.00	6.00	0.05	2	10	1	2.272	2.395	2.684	3.056	FBK0505413
0.60	0.90	0.55	2.00	64.00	6.00	0.05	2	11	2	2.529	2.651	2.936	3.291	FBK0503739
0.60	0.90	0.55	4.00	64.00	6.00	0.05	2	12	2	4.621	4.825	5.295	5.867	FBK0503740
0.60	0.90	0.55	6.00	64.00	6.00	0.05	2	15	2	6.705	6.937	7.453	8.054	FBK0503741
0.60	0.90	0.55	8.00	64.00	6.00	0.05	2	15	2	8.772	9.076	9.753	10.540	FBK0503742
0.60	0.90	0.55	10.00	64.00	6.00	0.05	2	15	2	10.840	11.216	12.052	13.026	FBK0503743
0.80	1.20	-	-	64.00	6.00	0.05	2	10	1	2.588	2.728	3.058	3.483	FBK0505414
0.80	1.20	0.75	2.50	64.00	6.00	0.05	2	11	2	3.052	3.200	3.545	3.976	FBK0503745
0.80	1.20	0.75	5.00	64.00	6.00	0.05	2	13	2	5.662	5.892	6.412	7.036	FBK0503746
0.80	1.20	0.75	8.00	64.00	6.00	0.05	2	15	2	8.772	9.076	9.753	10.54	FBK0503747
0.80	1.20	0.75	10.00	64.00	6.00	0.05	2	15	2	10.840	11.216	12.052	13.026	FBK0503748
1.00	1.50	-	-	64.00	6.00	0.10	2	9	1	2.890	3.063	3.482	4.040	FBK0505415
1.00	1.50	0.95	4.00	64.00	6.00	0.10	2	11	2	4.620	4.843	5.363	6.011	FBK0503750
1.00	1.50	0.95	6.00	64.00	6.00	0.10	2	14	2	6.700	6.948	7.506	8.164	FBK0503751

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro end mill with corner radius

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

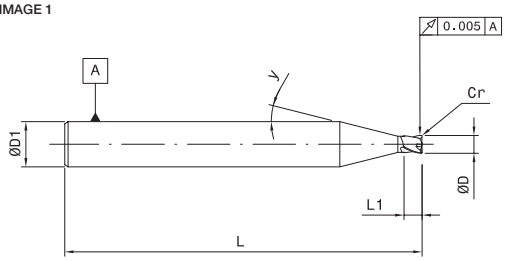
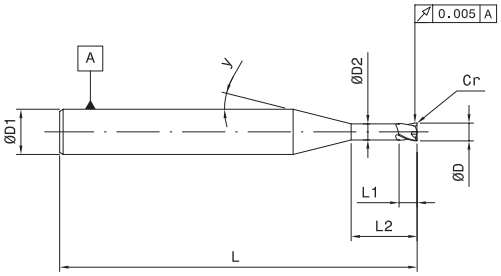


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.00	1.50	0.95	8.00	64.00	6.00	0.10	2	15	2	8.771	9.073	9.745	10.528	FBK0505138
1.00	1.50	0.95	10.00	64.00	6.00	0.10	2	15	2	10.838	11.212	12.045	13.014	FBK0503752
1.00	1.50	0.95	12.00	64.00	6.00	0.10	2	15	2	12.905	13.352	14.345	15.500	FBK0505139
1.00	1.50	0.95	15.00	64.00	6.00	0.10	2	15	2	16.006	16.561	17.794	19.23	FBK0503753
1.00	1.50	0.95	20.00	64.00	6.00	0.10	2	15	2	21.175	21.909	23.544	25.446	FBK0503754
1.00	1.50	0.95	25.00	64.00	6.00	0.10	2	15	2	26.343	27.257	29.293	31.661	FBK0503755
1.20	1.80	-	-	64.00	6.00	0.10	2	9	1	3.903	4.139	4.710	5.471	FBK0505416
1.20	1.80	1.15	4.00	64.00	6.00	0.10	2	11	2	4.822	5.055	5.598	6.275	FBK0503757
1.20	1.80	1.15	6.00	64.00	6.00	0.10	2	13	2	6.936	7.216	7.850	8.610	FBK0503758
1.20	1.80	1.15	8.00	64.00	6.00	0.10	2	15	2	9.043	9.354	10.048	10.855	FBK0503759
1.20	1.80	1.15	12.00	64.00	6.00	0.10	2	15	2	13.177	13.633	14.647	15.828	FBK0503760
1.20	1.80	1.15	16.00	64.00	6.00	0.10	2	15	2	17.312	17.912	19.247	20.800	FBK0503761
1.50	2.30	-	-	64.00	6.00	0.15	2	9	1	4.429	4.694	5.337	6.193	FBK0505417
1.50	2.30	1.45	4.00	64.00	6.00	0.15	2	10	2	4.810	5.066	5.673	6.452	FBK0505140
1.50	2.30	1.45	6.00	64.00	6.00	0.15	2	12	2	6.921	7.224	7.920	8.768	FBK0503763
1.50	2.30	1.45	8.00	64.00	6.00	0.15	2	15	2	9.041	9.351	10.041	10.843	FBK0505141
1.50	2.30	1.45	10.00	64.00	6.00	0.15	2	15	2	11.108	11.49	12.34	13.329	FBK0503764
1.50	2.30	1.45	12.00	64.00	6.00	0.15	2	15	2	13.176	13.63	14.640	15.816	FBK0505142
1.50	2.30	1.45	15.00	64.00	6.00	0.15	2	15	2	16.277	16.839	18.090	19.545	FBK0503765
1.50	2.30	1.45	20.00	64.00	6.00	0.15	2	15	2	21.445	22.187	23.839	25.761	FBK0503766
1.50	2.30	1.45	25.00	64.00	6.00	0.15	2	15	2	26.613	27.536	29.588	31.976	FBK0503767
2.00	3.00	-	-	64.00	6.00	0.20	2	8	1	5.157	5.509	6.387	7.615	FBK0503768
2.00	3.00	1.90	4.00	64.00	6.00	0.20	2	9	2	4.972	5.268	5.985	6.939	FBK0505143
2.00	3.00	1.90	6.00	64.00	6.00	0.20	2	11	2	7.046	7.384	8.171	9.152	FBK0503769

Application data on page no 2.073 & 2.074

2 Flute
Centre cutting high performance 2 flute micro end mill with corner radius

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

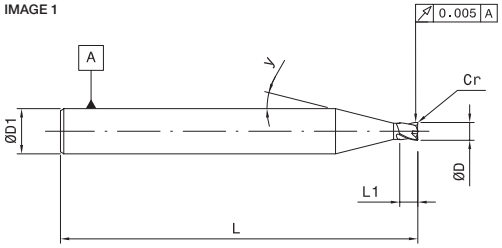
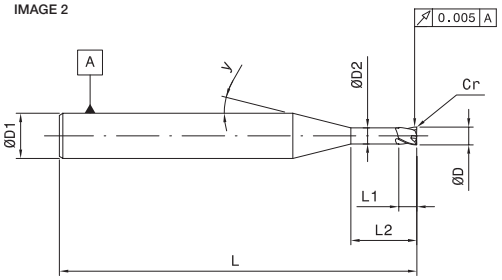


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
2.00	3.00	1.90	8.00	64.00	6.00	0.20	2	14	2	9.127	9.463	10.218	11.107	FBK0505144
2.00	3.00	1.90	10.00	64.00	6.00	0.20	2	15	2	11.203	11.587	12.440	13.433	FBK0503770
2.00	3.00	1.90	12.00	64.00	6.00	0.20	2	15	2	13.271	13.726	14.740	15.919	FBK0505145
2.00	3.00	1.90	16.00	64.00	6.00	0.20	2	15	2	17.405	18.005	19.339	20.892	FBK0503771
2.00	3.00	1.90	20.00	64.00	6.00	0.20	2	15	2	21.540	22.283	23.939	25.865	FBK0503772
2.00	3.00	1.90	25.00	64.00	6.00	0.20	2	15	2	26.708	27.632	29.688	32.080	FBK0503773
2.00	3.00	1.90	30.00	64.00	6.00	0.20	2	15	2	31.877	32.980	35.437	38.296	FBK0503774
2.50	3.00	-	-	64.00	6.00	0.20	2	7	1	5.158	5.569	6.636	8.236	FBK0503775
2.50	3.00	2.40	6.00	64.00	6.00	0.20	2	10	2	7.061	7.437	8.331	9.479	FBK0503776
2.50	3.00	2.40	8.00	64.00	6.00	0.20	2	12	2	9.127	9.527	10.444	11.562	FBK0505146
2.50	3.00	2.40	10.00	64.00	6.00	0.20	2	15	2	11.203	11.587	12.440	13.433	FBK0503777
2.50	3.00	2.40	12.00	64.00	6.00	0.20	2	15	2	13.271	13.726	14.740	15.919	FBK0505147
2.50	3.00	2.40	16.00	64.00	6.00	0.20	2	15	2	17.405	18.005	19.339	20.892	FBK0503778
2.50	3.00	2.40	20.00	64.00	6.00	0.20	2	15	2	21.540	22.283	23.939	25.865	FBK0503779
2.50	3.00	2.40	25.00	64.00	6.00	0.20	2	15	2	26.708	27.632	29.688	32.08	FBK0503780
2.50	3.00	2.40	30.00	64.00	6.00	0.20	2	15	2	31.877	32.980	35.437	38.296	FBK0505148
3.00	3.00	-	-	64.00	6.00	0.30	2	6	1	5.166	5.651	6.982	9.200	FBK0503781
3.00	3.00	2.90	6.00	64.00	6.00	0.30	2	8	2	7.129	7.614	8.823	10.514	FBK0503782
3.00	3.00	2.90	8.00	64.00	6.00	0.30	2	10	2	9.159	9.646	10.801	12.282	FBK0505149
3.00	3.00	2.90	10.00	64.00	6.00	0.30	2	13	2	11.198	11.644	12.655	13.866	FBK0503783
3.00	3.00	2.90	12.00	64.00	6.00	0.30	2	15	2	13.267	13.719	14.725	15.895	FBK0505418
3.00	3.00	2.90	16.00	64.00	6.00	0.30	2	15	2	17.402	17.998	19.324	20.868	FBK0503784
3.00	3.00	2.90	20.00	64.00	6.00	0.30	2	15	2	21.537	22.276	23.924	25.84	FBK0503785
3.00	3.00	2.90	25.00	64.00	6.00	0.30	2	15	2	26.705	27.625	29.673	32.056	FBK0503786
3.00	3.00	2.90	30.00	64.00	6.00	0.30	2	15	2	31.873	32.973	35.422	38.272	FBK0503787

Application data on page no 2.073 & 2.074

4 Flute

Centre cutting high performance 4 flute micro end mill with corner radius

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

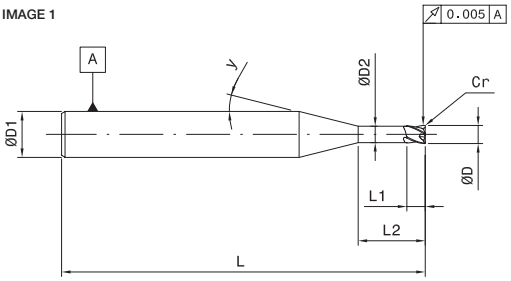
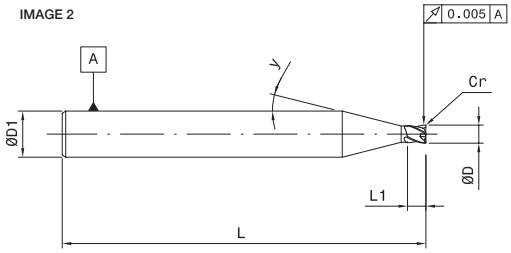


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	Effective length compared with Inclined Angle 0.5°	1°	2°	3°	EDP No
0.20	0.25	0.18	2.00	51.00	4.00	0.03	4	15	1	2.377	2.459	2.641	2.853	FBK0505373
0.20	0.25	0.18	4.00	51.00	4.00	0.03	4	15	1	4.444	4.598	4.941	5.339	FBK0505374
0.40	0.40	0.38	2.00	51.00	4.00	0.05	4	15	1	2.376	2.457	2.638	2.848	FBK0505375
0.40	0.40	0.38	4.00	51.00	4.00	0.05	4	15	1	4.444	4.597	4.938	5.334	FBK0505376
0.40	0.40	0.38	6.00	51.00	4.00	0.05	4	15	1	6.511	6.736	7.237	7.820	FBK0505377
0.40	0.40	0.38	8.00	51.00	4.00	0.05	4	15	1	8.578	8.876	9.537	10.307	FBK0505378
0.40	0.40	0.38	10.00	51.00	4.00	0.05	4	15	1	10.646	11.015	11.837	12.793	FBK0505379
0.50	0.50	0.47	2.00	51.00	4.00	0.05	4	15	1	2.396	2.477	2.659	2.871	FBK0505380
0.50	0.50	0.47	4.00	51.00	4.00	0.05	4	15	1	4.463	4.617	4.959	5.357	FBK0505381
0.50	0.50	0.47	6.00	51.00	4.00	0.05	4	15	1	6.530	6.756	7.259	7.844	FBK0505382
0.50	0.50	0.47	8.00	51.00	4.00	0.05	4	15	1	8.598	8.896	9.558	10.330	FBK0505383
0.50	0.50	0.47	10.00	51.00	4.00	0.05	4	15	1	10.665	11.035	11.858	12.816	FBK0505384
1.00	1.00	0.95	2.00	51.00	4.00	0.10	4	15	1	2.569	2.655	2.846	3.069	FBK0505385
1.00	1.00	0.95	4.00	51.00	4.00	0.10	4	15	1	4.636	4.794	5.146	5.555	FBK0505386
1.00	1.00	0.95	6.00	51.00	4.00	0.10	4	15	1	6.703	6.933	7.446	8.042	FBK0505387
1.00	1.00	0.95	8.00	51.00	4.00	0.10	4	15	1	8.771	9.073	9.745	10.528	FBK0505388
1.00	1.00	0.95	10.00	51.00	4.00	0.10	4	15	1	10.838	11.212	12.045	13.014	FBK0505389
1.50	1.50	-	-	51.00	4.00	0.15	4	15	2	3.776	3.903	4.184	4.511	FBK0505390
1.50	1.50	1.45	4.00	51.00	4.00	0.15	4	15	1	4.906	5.072	5.441	5.870	FBK0505391

Application data on page no 2.073 & 2.074

4 Flute

Centre cutting high performance 4 flute micro end mill with corner radius

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

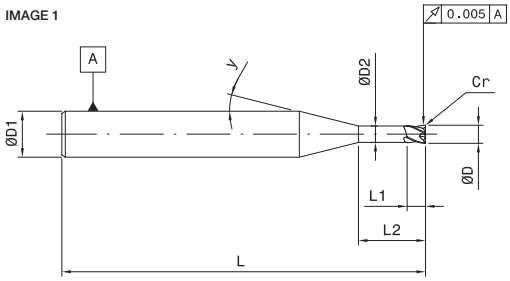
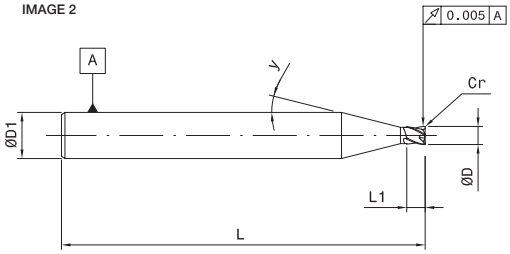


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.50	1.50	1.45	6.00	51.00	4.00	0.15	4	15	1	6.974	7.212	7.741	8.357	FBK0505392
1.50	1.50	1.45	8.00	51.00	4.00	0.15	4	15	1	9.041	9.351	10.041	10.843	FBK0505393
1.50	1.50	1.45	10.00	51.00	4.00	0.15	4	15	1	11.108	11.49	12.34	13.329	FBK0505394
2.00	2.00	-	-	51.00	4.00	0.20	4	15	2	4.292	4.434	4.751	5.121	FBK0505395
2.00	2.00	1.90	4.00	51.00	4.00	0.20	4	15	1	5.001	5.169	5.541	5.974	FBK0505396
2.00	2.00	1.90	6.00	51.00	4.00	0.20	4	15	1	7.069	7.308	7.841	8.461	FBK0505397
2.00	2.00	1.90	8.00	51.00	4.00	0.20	4	15	1	9.136	9.447	10.14	10.947	FBK0505398
2.00	2.00	1.90	10.00	51.00	4.00	0.20	4	15	1	11.203	11.587	12.440	13.433	FBK0505399
2.50	2.50	-	-	51.00	4.00	0.20	4	15	2	4.808	4.969	5.326	5.742	FBK0505400
2.50	2.50	2.40	4.00	51.00	4.00	0.20	4	15	1	5.001	5.169	5.541	5.974	FBK0505401
2.50	2.50	2.40	6.00	51.00	4.00	0.20	4	15	1	7.069	7.308	7.841	8.461	FBK0505402
2.50	2.50	2.40	8.00	51.00	4.00	0.20	4	15	1	9.136	9.447	10.140	10.947	FBK0505403
2.50	2.50	2.40	10.00	51.00	4.00	0.20	4	15	1	11.203	11.587	12.440	13.433	FBK0505404
3.00	3.00	-	-	51.00	4.00	0.30	4	15	2	5.322	5.497	5.886	6.340	FBK0505405
3.00	3.00	2.90	4.00	51.00	4.00	0.30	4	15	1	4.998	5.162	5.526	5.950	FBK0505406
3.00	3.00	2.90	6.00	51.00	4.00	0.30	4	15	1	7.065	7.301	7.826	8.436	FBK0505407
3.00	3.00	2.90	8.00	51.00	4.00	0.30	4	15	1	9.133	9.440	10.125	∞	FBK0505408
3.00	3.00	2.90	10.00	51.00	4.00	0.30	4	15	1	11.200	11.58	12.425	∞	FBK0505409

Remark ∞ means no collusion in projection length area

Application data on page no 2.073 & 2.074

4 Flute

Centre cutting high performance 4 flute micro end mill with corner radius

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

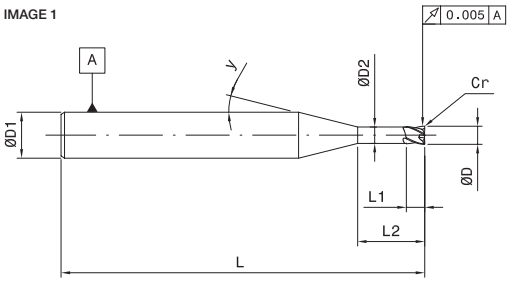
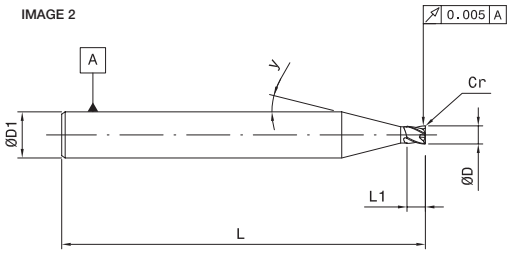


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
0.20	0.30	0.18	2.00	64.00	6.00	0.03	4	11	1	2.348	2.462	2.729	3.061	FBK0505151
0.20	0.30	0.18	4.00	64.00	6.00	0.03	4	13	1	4.438	4.618	5.027	5.517	FBK0505152
0.40	0.60	0.38	2.00	64.00	6.00	0.05	4	11	1	2.347	2.460	2.725	3.054	FBK0505156
0.40	0.60	0.38	4.00	64.00	6.00	0.05	4	13	1	4.437	4.616	5.023	5.511	FBK0505157
0.40	0.60	0.38	6.00	64.00	6.00	0.05	4	15	1	6.511	6.736	7.237	7.820	FBK0505158
0.40	0.60	0.38	8.00	64.00	6.00	0.05	4	15	1	8.578	8.876	9.537	10.307	FBK0505159
0.40	0.60	0.38	10.00	64.00	6.00	0.05	4	15	1	10.646	11.015	11.837	12.793	FBK0505160
0.50	0.80	0.47	2.00	64.00	6.00	0.05	4	11	1	2.374	2.489	2.756	3.089	FBK0505161
0.50	0.80	0.47	4.00	64.00	6.00	0.05	4	12	1	4.462	4.659	5.112	5.665	FBK0505162
0.50	0.80	0.47	6.00	64.00	6.00	0.05	4	15	1	6.530	6.756	7.259	7.844	FBK0505163
0.50	0.80	0.47	8.00	64.00	6.00	0.05	4	15	1	8.598	8.896	9.558	10.330	FBK0505164
0.50	0.80	0.47	10.00	64.00	6.00	0.05	4	15	1	10.665	11.035	11.858	12.816	FBK0505165
1.00	1.50	-	-	64.00	6.00	0.10	4	10	2	3.050	3.212	3.597	4.090	FBK0505419
1.00	1.50	0.95	4.00	64.00	6.00	0.10	4	11	1	4.620	4.843	5.363	6.011	FBK0505167
1.00	1.50	0.95	6.00	64.00	6.00	0.10	4	14	1	6.700	6.948	7.506	8.164	FBK0505168
1.00	1.50	0.95	8.00	64.00	6.00	0.10	4	15	1	8.771	9.073	9.745	10.528	FBK0505169
1.00	1.50	0.95	10.00	64.00	6.00	0.10	4	15	1	10.838	11.212	12.045	13.014	FBK0505170
1.50	2.30	-	-	64.00	6.00	0.15	4	9	2	4.429	4.694	5.337	6.193	FBK0505420
1.50	2.30	1.45	4.00	64.00	6.00	0.15	4	10	1	4.810	5.066	5.673	6.452	FBK0505172
1.50	2.30	1.45	6.00	64.00	6.00	0.15	4	12	1	6.921	7.224	7.920	8.768	FBK0505173

Application data on page no 2.073 & 2.074

4 Flute

Centre cutting high performance 4 flute micro end mill with corner radius

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

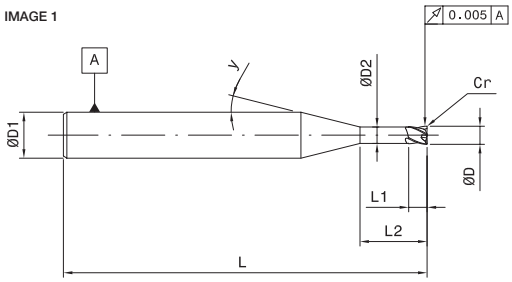
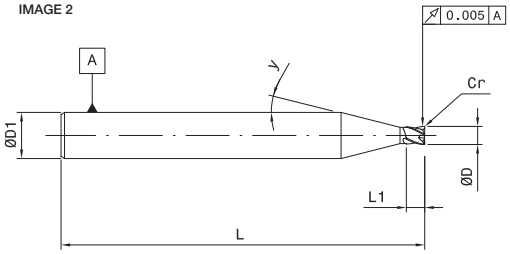


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

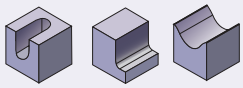
Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.50	2.30	1.45	8.00	64.00	6.00	0.15	4	15	1	9.041	9.351	10.041	10.843	FBK0505421
1.50	2.30	1.45	10.00	64.00	6.00	0.15	4	15	1	11.108	11.490	12.340	13.329	FBK0505175
2.00	3.00	-	-	64.00	6.00	0.20	4	8	2	5.157	5.509	6.387	7.615	FBK0505422
2.00	3.00	1.90	4.50	64.00	6.00	0.20	4	9	1	5.501	5.830	6.626	7.686	FBK0505423
2.00	3.00	1.90	6.00	64.00	6.00	0.20	4	11	1	7.046	7.384	8.171	9.152	FBK0505178
2.00	3.00	1.90	8.00	64.00	6.00	0.20	4	14	1	9.127	9.463	10.218	11.107	FBK0505179
2.00	3.00	1.90	10.00	64.00	6.00	0.20	4	15	1	11.203	11.587	12.440	13.433	FBK0505180
2.50	3.00	-	-	64.00	6.00	0.20	4	8	2	5.157	5.509	6.387	7.615	FBK0505424
2.50	3.00	2.40	4.50	64.00	6.00	0.20	4	9	1	5.501	5.830	6.626	7.686	FBK0505425
2.50	3.00	2.40	6.00	64.00	6.00	0.20	4	11	1	7.046	7.384	8.171	9.152	FBK0505426
2.50	3.00	2.40	8.00	64.00	6.00	0.20	4	14	1	9.127	9.463	10.218	11.107	FBK0505427
2.50	3.00	2.40	10.00	64.00	6.00	0.20	4	15	1	11.203	11.587	12.440	13.433	FBK0505428
3.00	3.00	-	-	64.00	6.00	0.30	4	6	2	5.166	5.651	6.982	9.200	FBK0505429
3.00	3.00	2.90	4.50	64.00	6.00	0.30	4	7	1	5.589	6.027	7.166	8.872	FBK0505430
3.00	3.00	2.90	6.00	64.00	6.00	0.30	4	8	1	7.129	7.614	8.823	10.514	FBK0505431
3.00	3.00	2.90	8.00	64.00	6.00	0.30	4	10	1	9.159	9.646	10.801	12.282	FBK0505432
3.00	3.00	2.90	10.00	64.00	6.00	0.30	4	13	1	11.198	11.644	12.655	13.866	FBK0505433

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro ball nose



HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

P5-P6
K1
M1-M3
S1-S4
H1-H4

IMAGE 1

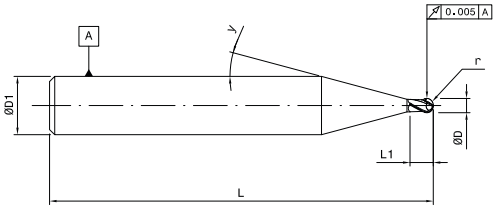
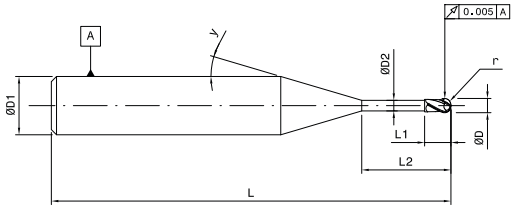


IMAGE 2



Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
0.10	0.20	-	-	51.00	4.00	0.05	2	15	1	0.684	0.706	0.755	0.812	FBK0505207
0.10	0.20	-	-	60.00	4.00	0.05	2	10	1	0.602	0.633	0.705	0.797	FBK0505208
0.20	0.30	-	-	51.00	4.00	0.10	2	15	1	0.786	0.810	0.863	0.925	FBK0505209
0.30	0.40	-	-	51.00	4.00	0.15	2	15	1	1.197	1.234	1.315	1.41	FBK0505210
0.30	0.40	0.28	1.50	51.00	4.00	0.15	2	15	2	1.856	1.916	2.048	2.202	FBK0505211
0.30	0.40	0.28	3.00	51.00	4.00	0.15	2	15	2	3.407	3.520	3.773	4.067	FBK0505212
0.40	0.50	-	-	51.00	4.00	0.20	2	15	1	1.299	1.337	1.423	1.522	FBK0505213
0.40	0.50	0.38	2.00	51.00	4.00	0.20	2	15	2	2.371	2.447	2.615	2.811	FBK0505214
0.40	0.50	0.38	4.00	51.00	4.00	0.20	2	15	2	4.439	4.586	4.915	5.298	FBK0505215
0.50	0.70	-	-	51.00	4.00	0.25	2	15	1	1.504	1.548	1.645	1.758	FBK0505216
0.50	0.70	0.47	3.00	51.00	4.00	0.25	2	15	2	3.423	3.533	3.779	4.066	FBK0505217
0.50	0.70	0.47	6.00	51.00	4.00	0.25	2	15	2	6.524	6.742	7.229	7.795	FBK0505218
0.50	0.70	0.47	8.00	51.00	4.00	0.25	2	15	2	8.591	8.882	9.529	10.281	FBK0505219
0.50	0.70	0.47	10.00	51.00	4.00	0.25	2	15	2	10.658	11.021	11.828	12.768	FBK0505220
0.60	0.80	-	-	51.00	4.00	0.30	2	15	1	2.259	2.327	2.479	2.656	FBK0505221
0.60	0.80	0.55	2.00	51.00	4.00	0.30	2	15	2	2.562	2.641	2.816	3.02	FBK0505222
0.60	0.80	0.55	4.00	51.00	4.00	0.30	2	15	2	4.629	4.780	5.116	5.507	FBK0505223
0.60	0.80	0.55	6.00	51.00	4.00	0.30	2	15	2	6.697	6.919	7.416	7.993	FBK0505224
0.60	0.80	0.55	8.00	51.00	4.00	0.30	2	15	2	8.764	9.059	9.715	10.479	FBK0505225
0.60	0.80	0.55	10.00	51.00	4.00	0.30	2	15	2	10.831	11.198	12.015	12.965	FBK0505226
0.80	1.00	-	-	51.00	4.00	0.40	2	15	1	2.462	2.534	2.694	2.88	FBK0505227
0.80	1.00	0.75	2.50	51.00	4.00	0.40	2	15	2	3.075	3.169	3.376	3.618	FBK0505228
0.80	1.00	0.75	5.00	51.00	4.00	0.40	2	15	2	5.660	5.843	6.251	6.725	FBK0505229
0.80	1.00	0.75	8.00	51.00	4.00	0.40	2	15	2	8.761	9.052	9.700	10.455	FBK0505230
0.80	1.00	0.75	10.00	51.00	4.00	0.40	2	15	2	10.828	11.191	12.000	12.941	FBK0505231
1.00	1.20	-	-	51.00	4.00	0.50	2	15	1	2.665	2.741	2.909	3.104	FBK0505232

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro ball nose

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

P5-P6
K1
M1-M3
S1-S4
H1-H4

IMAGE 1

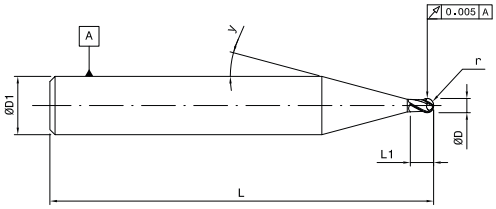
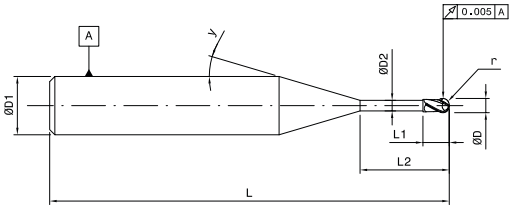


IMAGE 2



Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.00	1.20	0.95	4.00	51.00	4.00	0.50	2	15	2	4.623	4.766	5.086	5.458	FBK0505233
1.00	1.20	0.95	6.00	51.00	4.00	0.50	2	15	2	6.690	6.906	7.386	7.944	FBK0505234
1.00	1.20	0.95	8.00	51.00	4.00	0.50	2	15	2	8.757	9.045	9.685	10.431	FBK0505235
1.00	1.20	0.95	10.00	51.00	4.00	0.50	2	15	2	10.825	11.184	11.985	12.917	FBK0505236
1.00	1.20	0.95	12.00	51.00	4.00	0.50	2	15	2	12.892	13.324	14.285	15.403	FBK0505237
1.00	1.20	0.95	15.00	51.00	4.00	0.50	2	15	2	15.993	16.533	17.734	19.133	FBK0505238
1.00	1.20	0.95	20.00	60.00	4.00	0.50	2	15	2	21.161	21.881	23.484	25.348	FBK0505239
1.00	1.20	0.95	25.00	60.00	4.00	0.50	2	15	2	26.330	27.23	29.233	∞	FBK0505240
1.20	1.40	-	-	51.00	4.00	0.60	2	15	1	3.658	3.764	4.002	4.278	FBK0505241
1.20	1.40	1.15	4.00	51.00	4.00	0.60	2	15	2	4.891	5.041	5.374	5.761	FBK0505242
1.20	1.40	1.15	6.00	51.00	4.00	0.60	2	15	2	6.959	7.180	7.673	8.247	FBK0505243
1.20	1.40	1.15	8.00	51.00	4.00	0.60	2	15	2	9.026	9.320	9.973	10.734	FBK0505244
1.20	1.40	1.15	12.00	51.00	4.00	0.60	2	15	2	13.161	13.598	14.573	15.706	FBK0505245
1.20	1.40	1.15	16.00	51.00	4.00	0.60	2	15	2	17.295	17.877	19.172	20.679	FBK0505246
1.50	1.80	-	-	51.00	4.00	0.75	2	15	1	4.066	4.182	4.439	4.738	FBK0505247
1.50	1.80	1.46	4.00	51.00	4.00	0.75	2	15	2	4.867	5.010	5.330	5.701	FBK0505248
1.50	1.80	1.45	6.00	51.00	4.00	0.75	2	15	2	6.954	7.170	7.651	8.211	FBK0505249
1.50	1.80	1.45	8.00	51.00	4.00	0.75	2	15	2	9.021	9.309	9.951	10.697	FBK0505250
1.50	1.80	1.45	10.00	51.00	4.00	0.75	2	15	2	11.088	11.448	12.25	13.183	FBK0505251
1.50	1.80	1.45	12.00	51.00	4.00	0.75	2	15	2	13.156	13.588	14.55	15.670	FBK0505252
1.50	1.80	1.45	15.00	51.00	4.00	0.75	2	15	2	16.257	16.797	18.000	19.399	FBK0505253
1.50	1.80	1.45	20.00	60.00	4.00	0.75	2	15	2	21.425	22.145	23.749	∞	FBK0505254
1.50	1.80	1.45	25.00	60.00	4.00	0.75	2	15	2	26.593	27.494	29.498	∞	FBK0505255
2.00	2.50	-	-	51.00	4.00	1.00	2	15	1	4.781	4.913	5.206	5.548	FBK0505256
2.00	2.50	1.90	4.00	51.00	4.00	1.00	2	15	2	4.974	5.113	5.421	5.780	FBK0505257
2.00	2.50	1.90	6.00	51.00	4.00	1.00	2	15	2	7.042	7.252	7.721	8.266	FBK0505258

Machining with a Tilt Angle will help in better tool life as the cutting speed at the center of a ball nose tool is 0
Remark ∞ means no collusion in projection length area
Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro ball nose

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

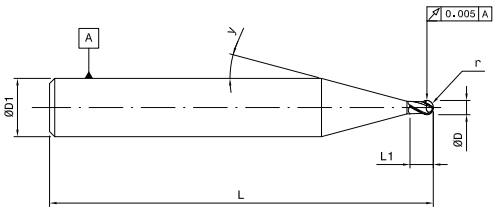
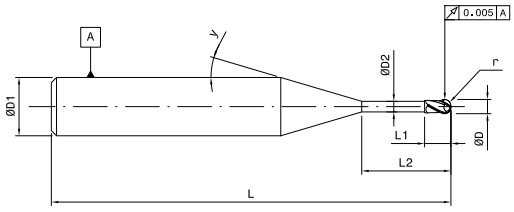


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
2.00	2.50	1.90	8.00	51.00	4.00	1.00	2	15	2	9.109	9.392	10.020	10.752	FBK0505259
2.00	2.50	1.90	10.00	51.00	4.00	1.00	2	15	2	11.176	11.531	12.320	13.239	FBK0505260
2.00	2.50	1.90	12.00	51.00	4.00	1.00	2	15	2	13.244	13.670	14.620	15.725	FBK0505261
2.00	2.50	1.90	16.00	51.00	4.00	1.00	2	15	2	17.378	17.949	19.219	∞	FBK0505262
2.00	2.50	1.90	20.00	60.00	4.00	1.00	2	15	2	21.513	22.228	23.819	∞	FBK0505263
2.00	2.50	1.90	25.00	60.00	4.00	1.00	2	15	2	26.681	27.576	29.568	∞	FBK0505264
2.00	2.50	1.90	30.00	64.00	4.00	1.00	2	15	2	31.850	32.925	∞	∞	FBK0505265
2.50	3.50	-	-	51.00	4.00	1.25	2	15	1	5.807	5.965	6.319	6.730	FBK0505266
2.50	3.50	2.40	6.00	51.00	4.00	1.25	2	15	2	7.033	7.235	7.683	8.205	FBK0505267
2.50	3.50	2.40	8.00	51.00	4.00	1.25	2	15	2	9.101	9.374	9.983	10.692	FBK0505268
2.50	3.50	2.40	10.00	51.00	4.00	1.25	2	15	2	11.168	11.513	12.283	13.178	FBK0505269
2.50	3.50	2.40	12.00	51.00	4.00	1.25	2	15	2	13.235	13.653	14.582	15.664	FBK0505270
2.50	3.50	2.40	16.00	51.00	4.00	1.25	2	15	2	17.370	17.932	19.182	∞	FBK0505271
2.50	3.50	2.40	20.00	60.00	4.00	1.25	2	15	2	21.505	22.210	∞	∞	FBK0505272
2.50	3.50	2.40	25.00	60.00	4.00	1.25	2	15	2	26.673	27.559	∞	∞	FBK0505273
2.50	3.50	2.40	30.00	64.00	4.00	1.25	2	15	2	31.841	32.907	∞	∞	FBK0505274
3.00	3.50	-	-	51.00	4.00	1.50	2	15	1	5.798	5.948	6.281	6.669	FBK0505275
3.00	3.50	2.90	6.00	51.00	4.00	1.50	2	15	2	7.025	7.217	7.646	8.144	FBK0505276
3.00	3.50	2.90	8.00	51.00	4.00	1.50	2	15	2	9.092	9.357	9.946	10.631	FBK0505277
3.00	3.50	2.90	10.00	51.00	4.00	1.50	2	15	2	11.159	11.496	12.245	∞	FBK0505278
3.00	3.50	2.90	12.00	51.00	4.00	1.50	2	15	2	13.227	13.635	14.545	∞	FBK0505279
3.00	3.50	2.90	16.00	51.00	4.00	1.50	2	15	2	17.361	17.914	∞	∞	FBK0505280
3.00	3.50	2.90	20.00	60.00	4.00	1.50	2	15	2	21.496	22.193	∞	∞	FBK0505281
3.00	3.50	2.90	25.00	60.00	4.00	1.50	2	15	2	26.664	27.541	∞	∞	FBK0505282
3.00	3.50	2.90	30.00	64.00	4.00	1.50	2	15	2	31.833	∞	∞	∞	FBK0505283

Machining with a Tilt Angle will help in better tool life as the cutting speed at the center of a ball nose tool is 0
Remark ∞ means no collusion in projection length area
Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro ball nose

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

P5-P6
K1
M1-M3
S1-S4
H1-H4

IMAGE 1

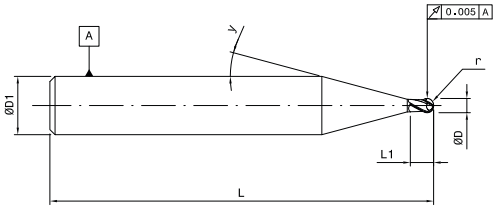
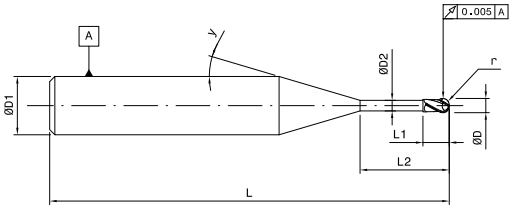


IMAGE 2



Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
0.20	0.30	-	-	64.00	6.00	0.10	2	10	1	0.705	0.738	0.817	0.918	FBK0503789
0.30	0.50	-	-	64.00	6.00	0.15	2	10	1	1.228	1.288	1.428	1.608	FBK0505284
0.30	0.50	0.28	1.50	64.00	6.00	0.15	2	11	2	1.819	1.901	2.093	2.332	FBK0503791
0.30	0.50	0.28	3.00	64.00	6.00	0.15	2	12	2	3.390	3.535	3.868	4.274	FBK0503792
0.40	0.60	-	-	64.00	6.00	0.20	2	10	1	1.331	1.393	1.540	1.730	FBK0505285
0.40	0.60	0.38	2.00	64.00	6.00	0.20	2	11	2	2.340	2.446	2.692	2.999	FBK0503794
0.40	0.60	0.38	4.00	64.00	6.00	0.20	2	13	2	4.431	4.604	4.997	5.467	FBK0503795
0.50	0.80	-	-	64.00	6.00	0.25	2	10	1	1.539	1.610	1.777	1.993	FBK0505286
0.50	0.80	0.47	3.00	64.00	6.00	0.25	2	12	2	3.411	3.552	3.877	4.273	FBK0503797
0.50	0.80	0.47	6.00	64.00	6.00	0.25	2	15	2	6.524	6.742	7.229	7.795	FBK0503798
0.50	0.80	0.47	8.00	64.00	6.00	0.25	2	15	2	8.591	8.882	9.529	10.281	FBK0503799
0.50	0.80	0.47	10.00	64.00	6.00	0.25	2	15	2	10.658	11.021	11.828	12.768	FBK0503660
0.60	0.90	-	-	64.00	6.00	0.30	2	10	1	2.259	2.367	2.622	2.950	FBK0505287
0.60	0.90	0.55	2.00	64.00	6.00	0.30	2	11	2	2.517	2.626	2.881	3.199	FBK0503802
0.60	0.90	0.55	4.00	64.00	6.00	0.30	2	12	2	4.610	4.803	5.245	5.785	FBK0503663
0.60	0.90	0.55	6.00	64.00	6.00	0.30	2	15	2	6.697	6.919	7.416	7.993	FBK0503804
0.60	0.90	0.55	8.00	64.00	6.00	0.30	2	15	2	8.764	9.059	9.715	10.479	FBK0503805
0.60	0.90	0.55	10.00	64.00	6.00	0.30	2	15	2	10.831	11.198	12.015	12.965	FBK0503806
0.80	1.20	-	-	64.00	6.00	0.40	2	10	1	2.570	2.689	2.972	3.335	FBK0505288
0.80	1.20	0.75	2.50	64.00	6.00	0.40	2	11	2	3.036	3.166	3.469	3.847	FBK0503808
0.80	1.20	0.75	5.00	64.00	6.00	0.40	2	13	2	5.648	5.863	6.350	6.933	FBK0503809
0.80	1.20	0.75	8.00	64.00	6.00	0.40	2	15	2	8.761	9.052	9.700	10.455	FBK0503810
0.80	1.20	0.75	10.00	64.00	6.00	0.40	2	15	2	10.828	11.191	12.000	12.941	FBK0503811
1.00	1.50	-	-	64.00	6.00	0.50	2	9	1	2.866	3.013	3.369	3.842	FBK0505289
1.00	1.50	0.95	4.00	64.00	6.00	0.50	2	11	2	4.602	4.804	5.275	5.864	FBK0503813
1.00	1.50	0.95	6.00	64.00	6.00	0.50	2	14	2	6.685	6.918	7.441	8.057	FBK0503814

Machining with a Tilt Angle will help in better tool life as the cutting speed at the center of a ball nose tool is 0

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro ball nose

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

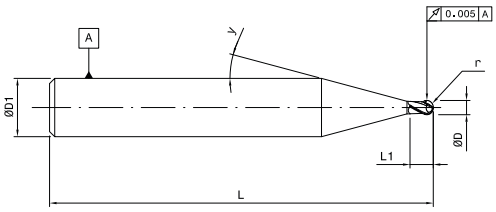
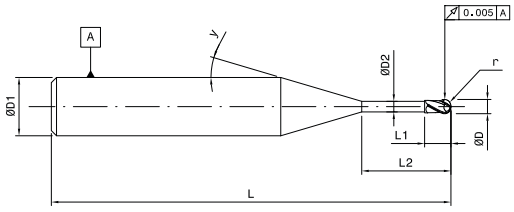


IMAGE 2



P5-P6
K1
M1-M3
S1-S4
H1-H4

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
1.00	1.50	0.95	8.00	64.00	6.00	0.50	2	15	2	8.757	9.045	9.685	10.431	FBK0505181
1.00	1.50	0.95	10.00	64.00	6.00	0.50	2	15	2	10.825	11.184	11.985	12.917	FBK0503815
1.00	1.50	0.95	12.00	64.00	6.00	0.50	2	15	2	12.892	13.324	14.285	15.403	FBK0503815
1.00	1.50	0.95	15.00	64.00	6.00	0.50	2	15	2	15.993	16.533	17.734	19.133	FBK0503816
1.00	1.50	0.95	20.00	64.00	6.00	0.50	2	15	2	21.161	21.881	23.484	25.348	FBK0503817
1.00	1.50	0.95	25.00	64.00	6.00	0.50	2	15	2	26.330	27.230	29.233	31.564	FBK0503818
1.20	1.80	-	-	64.00	6.00	0.60	2	9	1	3.874	4.077	4.568	5.223	FBK0503819
1.20	1.80	1.15	4.00	64.00	6.00	0.60	2	11	2	4.799	5.006	5.488	6.090	FBK0503820
1.20	1.80	1.15	6.00	64.00	6.00	0.60	2	13	2	6.917	7.175	7.761	8.463	FBK0503821
1.20	1.80	1.15	8.00	64.00	6.00	0.60	2	15	2	9.026	9.320	9.973	10.734	FBK0503822
1.20	1.80	1.15	12.00	64.00	6.00	0.60	2	15	2	13.161	13.598	14.573	15.706	FBK0503823
1.20	1.80	1.15	16.00	64.00	6.00	0.60	2	15	2	17.295	17.877	19.172	20.679	FBK0503824
1.50	2.30	-	-	64.00	6.00	0.75	2	9	1	4.394	4.620	5.167	5.896	FBK0505291
1.50	2.30	1.46	4.00	64.00	6.00	0.75	2	10	2	4.749	4.968	5.490	6.158	FBK0505183
1.50	2.30	1.45	6.00	64.00	6.00	0.75	2	12	2	6.895	7.170	7.802	8.572	FBK0503826
1.50	2.30	1.45	8.00	64.00	6.00	0.75	2	15	2	9.021	9.309	9.951	10.697	FBK0505184
1.50	2.30	1.45	10.00	64.00	6.00	0.75	2	15	2	11.088	11.448	12.25	13.183	FBK0503827
1.50	2.30	1.45	12.00	64.00	6.00	0.75	2	15	2	13.156	13.588	14.55	15.670	FBK0505186
1.50	2.30	1.45	15.00	64.00	6.00	0.75	2	15	2	16.257	16.797	18.000	19.399	FBK0503828
1.50	2.30	1.45	20.00	64.00	6.00	0.75	2	15	2	21.425	22.145	23.749	25.615	FBK0503829
1.50	2.30	1.45	25.00	64.00	6.00	0.75	2	15	2	26.593	27.494	29.498	31.831	FBK0503830
2.00	3.00	-	-	64.00	6.00	1.00	2	8	1	5.105	5.396	6.122	7.139	FBK0503831
2.00	3.00	1.90	4.50	64.00	6.00	1.00	2	9	2	5.121	5.376	5.995	6.819	FBK0505292
2.00	3.00	1.90	6.00	64.00	6.00	1.00	2	11	2	7.008	7.305	7.995	8.857	FBK0503832

Application data on page no 2.073 & 2.074

2 Flute

Centre cutting high performance 2 flute micro ball nose end mill

HPM HSM | 30° | f7 | 6535 HA | h5 | TiAlN

P5-P6
K1
M1-M3
S1-S4
H1-H4

IMAGE 1

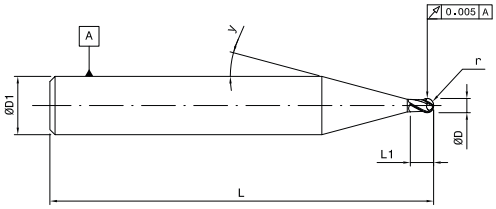
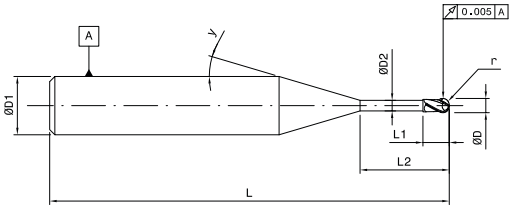


IMAGE 2



Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
2.00	3.00	1.90	8.00	64.00	6.00	1.00	2	14	2	9.098	9.403	10.087	10.894	FBK0505188
2.00	3.00	1.90	10.00	64.00	6.00	1.00	2	15	2	11.176	11.531	12.320	13.239	FBK0503833
2.00	3.00	1.90	12.00	64.00	6.00	1.00	2	15	2	13.244	13.670	14.620	15.725	FBK0505189
2.00	3.00	1.90	16.00	64.00	6.00	1.00	2	15	2	17.378	17.949	19.219	20.697	FBK0503834
2.00	3.00	1.90	20.00	64.00	6.00	1.00	2	15	2	21.513	22.228	23.819	25.670	FBK0503835
2.00	3.00	1.90	25.00	64.00	6.00	1.00	2	15	2	26.681	27.576	29.568	31.886	FBK0503836
2.00	3.00	1.90	30.00	64.00	6.00	1.00	2	15	2	31.850	32.925	35.317	38.101	FBK0503837
2.50	3.00	-	-	64.00	6.00	1.25	2	7	1	5.078	5.395	6.219	7.454	FBK0503838
2.50	3.00	2.40	6.00	64.00	6.00	1.25	2	10	2	7.006	7.322	8.072	9.035	FBK0503839
2.50	3.00	2.40	8.00	64.00	6.00	1.25	2	12	2	9.082	9.433	10.237	11.219	FBK0505190
2.50	3.00	2.40	10.00	64.00	6.00	1.25	2	15	2	11.168	11.513	12.283	13.178	FBK0503840
2.50	3.00	2.40	12.00	64.00	6.00	1.25	2	15	2	13.235	13.653	14.582	15.664	FBK0505191
2.50	3.00	2.40	16.00	64.00	6.00	1.25	2	15	2	17.370	17.932	19.182	20.637	FBK0503841
2.50	3.00	2.40	20.00	64.00	6.00	1.25	2	15	2	21.505	22.210	23.781	25.609	FBK0503842
2.50	3.00	2.40	25.00	64.00	6.00	1.25	2	15	2	26.673	27.559	29.531	31.825	FBK0503843
2.50	3.00	2.40	30.00	64.00	6.00	1.25	2	15	2	31.841	32.907	35.280	∞	FBK0505192
3.00	3.00	-	-	64.00	6.00	1.50	2	6	1	5.057	5.412	6.385	8.006	FBK0503844
3.00	3.00	2.90	6.00	64.00	6.00	1.50	2	8	2	7.050	7.444	8.426	9.801	FBK0503845
3.00	3.00	2.90	8.00	64.00	6.00	1.50	2	10	2	9.097	9.514	10.504	11.775	FBK0505193
3.00	3.00	2.90	10.00	64.00	6.00	1.50	2	13	2	11.151	11.546	12.441	13.513	FBK0503661
3.00	3.00	2.90	12.00	64.00	6.00	1.50	2	15	2	13.227	13.635	14.545	15.603	FBK0505194
3.00	3.00	2.90	16.00	64.00	6.00	1.50	2	15	2	17.361	17.914	19.144	20.576	FBK0503847
3.00	3.00	2.90	20.00	64.00	6.00	1.50	2	15	2	21.496	22.193	23.744	25.548	FBK0503848
3.00	3.00	2.90	25.00	64.00	6.00	1.50	2	15	2	26.664	27.541	29.493	∞	FBK0503849
3.00	3.00	2.90	30.00	64.00	6.00	1.50	2	15	2	31.833	32.890	35.242	∞	FBK0503850

Machining with a Tilt Angle will help in better tool life as the cutting speed at the center of a ball nose tool is 0
Remark ∞ means no collusion in projection length area
Application data on page no 2.073 & 2.074

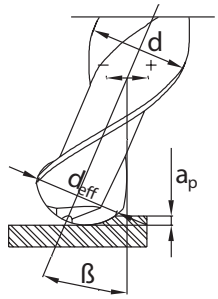
Cutting parameters

- Centre cutting high performance 2 flute micro end mill - 0.1 mm to 0.8 mm
- Centre cutting high performance 4 flute micro end mill - 0.1 mm to 0.8 mm
- Centre cutting high performance 2 flute micro end mill with corner radius - 0.1 mm to 0.8 mm
- Centre cutting high performance 4 flute micro end mill with corner radius - 0.1 mm to 0.8 mm
- Centre cutting high performance 2 flute micro ball nose - 0.1 mm to 0.8 mm

Material Group			Cutting Speed (Vc) m/min								Lubrication	Cutting Speed (Vc) m/min		mm	Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%											
			Shoulder Milling							Slot Milling					Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.													
			5	2.3	1.6	1.4	1.2	1.1	1	1					Diameter in mm												
			ap< 0.6D	ap< 0.6D	ap< 0.6D	ap< 0.5D	ap< 0.4D	ap< 0.3D	ap< 0.3D	ap< 0.3D					0.1		0.2		0.3		0.4		0.5		0.6		0.8	
			ae/D 1%	ae/D 2%	ae/D 5%	ae/D 10%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	5	150	129	118	107	97	93	89	72	Emulsion	72	150	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012
		6	180	154	141	128	115	111	107	86		86	180	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012
Stainless Steel	M	1	130	112	102	93	84	81	78	62		62	130	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012
		2	100	86	78	71	64	62	59	48		48	100	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012
		3	90	77	71	65	58	56	54	43		43	90	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012
Cast Iron	K	1	160	137	125	114	103	99	95	76		76	160	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012
Super Alloys	S	1	60	51	47	43	38	37	36	29		29	60	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012
		2	70	60	55	50	45	44	42	34		34	70	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012
		3	50	43	40	36	32	31	30	24		24	50	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012
		4	90	77	71	65	58	56	54	43		43	90	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012

- Centre cutting high performance 2 flute micro end mill - 1.0 mm to 3.0 mm
- Centre cutting high performance 4 flute micro end mill - 1.0 mm to 3.0 mm
- Centre cutting high performance 2 flute micro end mill with corner radius - 1.0 mm to 3.0 mm
- Centre cutting high performance 4 flute micro end mill with corner radius - 1.0 mm to 3.0 mm
- Centre cutting high performance 2 flute micro ball nose - 1.0 mm to 3.0 mm

Material Group			Cutting Speed (Vc) m/min								Lubrication	Cutting Speed (Vc) m/min		mm	Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%											
			Shoulder Milling							Slot Milling					Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.													
			5	2.3	1.6	1.4	1.2	1.1	1	1					Diameter in mm												
			ap< 0.6D	ap< 0.6D	ap< 0.6D	ap< 0.5D	ap< 0.4D	ap< 0.3D	ap< 0.3D	ap< 0.3D					1.0		1.2		1.5		2.0		2.5		3.0			
			ae/D 1%	ae/D 2%	ae/D 5%	ae/D 10%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max		
Steel	P	5	150	129	118	107	97	93	89	72	Emulsion	72	150	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028		
		6	180	154	141	128	115	111	107	86		86	180	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028		
Stainless Steel	M	1	130	112	102	93	84	81	78	62		62	130	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028		
		2	100	86	78	71	64	62	59	48		48	100	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028		
		3	90	77	71	65	58	56	54	43		43	90	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028		
Cast Iron	K	1	160	137	125	114	103	99	95	76		76	160	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028		
Super Alloys	S	1	60	51	47	43	38	37	36	29		29	60	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028		
		2	70	60	55	50	45	44	42	34		34	70	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028		
		3	50	43	40	36	32	31	30	24		24	50	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028		
		4	90	77	71	65	58	56	54	43		43	90	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028		



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1

* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D\text{-}ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D\text{-}2 \times ADOC}{D}\right)\right]$$

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.

(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

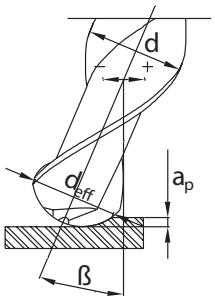
Cutting parameters

- Centre cutting high performance 2 flute micro end mill - 0.1 mm to 0.8 mm
- Centre cutting high performance 4 flute micro end mill - 0.1 mm to 0.8 mm
- Centre cutting high performance 2 flute micro end mill with corner radius - 0.1 mm to 0.8 mm
- Centre cutting high performance 4 flute micro end mill with corner radius - 0.1 mm to 0.8 mm
- Centre cutting high performance 2 flute micro ball nose - 0.1 mm to 0.8 mm

Material Group		Cutting Speed (Vc) m/min: Shoulder Milling 5	2.3	1.6	1.4	1.2	1.1	1	Slot Milling 1	Lubrication	Cutting Speed (Vc) m/min min	max	mm Range	Recommended Feed/Tooth (fz=mm/th) for shoulder milling/slot milling, reduce fz by 20%. Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing. Diameter in mm: 0.1 min	0.1 max	0.2 min	0.2 max	0.3 min	0.3 max	0.4 min	0.4 max	0.5 min	0.5 max	0.6 min	0.6 max	0.8 min	0.8 max
		ap < 0.45D	ap < 0.45D	ap < 0.45D	ap <0.4D	ap < 0.35D	ap < 0.3D	ap < 0.3D	ap<0.3D																	
		ae/D 1%	ae/D 2%	ae/D 5%	ae/D 10%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%																	
Hardened Steel	H	1	190	163	149	136	122	118	113	91	MQL/ Cold Air	91	190	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012
		2	140	120	110	100	90	86	83	67		67	140	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012
		3	90	77	71	65	58	56	54	43		43	90	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012
		4	90	77	71	65	58	56	54	43		43	90	fz	0.001	0.002	0.002	0.003	0.003	0.005	0.004	0.006	0.005	0.008	0.006	0.010	0.008	0.012

- Centre cutting high performance 2 flute micro end mill - 1.0 mm to 3.0 mm
- Centre cutting high performance 4 flute micro end mill - 1.0 mm to 3.0 mm
- Centre cutting high performance 2 flute micro end mill with corner radius - 1.0 mm to 3.0 mm
- Centre cutting high performance 4 flute micro end mill with corner radius - 1.0 mm to 3.0 mm
- Centre cutting high performance 2 flute micro ball nose - 1.0 mm to 3.0 mm

Material Group		Cutting Speed (Vc) m/min: Shoulder Milling 5	2.3	1.6	1.4	1.2	1.1	1	Slot Milling 1	Lubrication	Cutting Speed (Vc) m/min min	max	mm Range	Recommended Feed/Tooth (fz=mm/th) for shoulder milling/slot milling, reduce fz by 20%. Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing. Diameter in mm: 1.0 min	1.0 max	1.2 min	1.2 max	1.5 min	1.5 max	2.0 min	2.0 max	2.5 min	2.5 max	3.0 min	3.0 max
		ap < 0.45D	ap < 0.45D	ap < 0.45D	ap <0.4D	ap < 0.35D	ap < 0.3D	ap < 0.3D	ap<0.3D																	
		ae/D 1%	ae/D 2%	ae/D 5%	ae/D 10%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%																	
Hardened Steel	H	1	190	163	149	136	122	118	113	91	MQL/ Cold Air	91	190	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028
		2	140	120	110	100	90	86	83	67		67	140	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028
		3	90	77	71	65	58	56	54	43		43	90	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028
		4	90	77	71	65	58	56	54	43		43	90	fz	0.009	0.014	0.010	0.016	0.012	0.018	0.016	0.022	0.018	0.025	0.020	0.028



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1

* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D-ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D-2 \times ADOC}{D}\right)\right]$$

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.

(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

FBK0503797

Workpiece material: 1.2343 (52HRc)

Ø	0.5mm
Z	2 Flutes
vc	56 m/min
n	36000 rpm
fz	0.006 mm/t
vf	432 mm/min
ap	0.01 mm
ae	0.01 mm
Coolant	min. lubrication

Advantages

- Finishing application.
- Excellent surface finsish.
- Save a polishing opperation.

Coolant

Keep the tool cool!

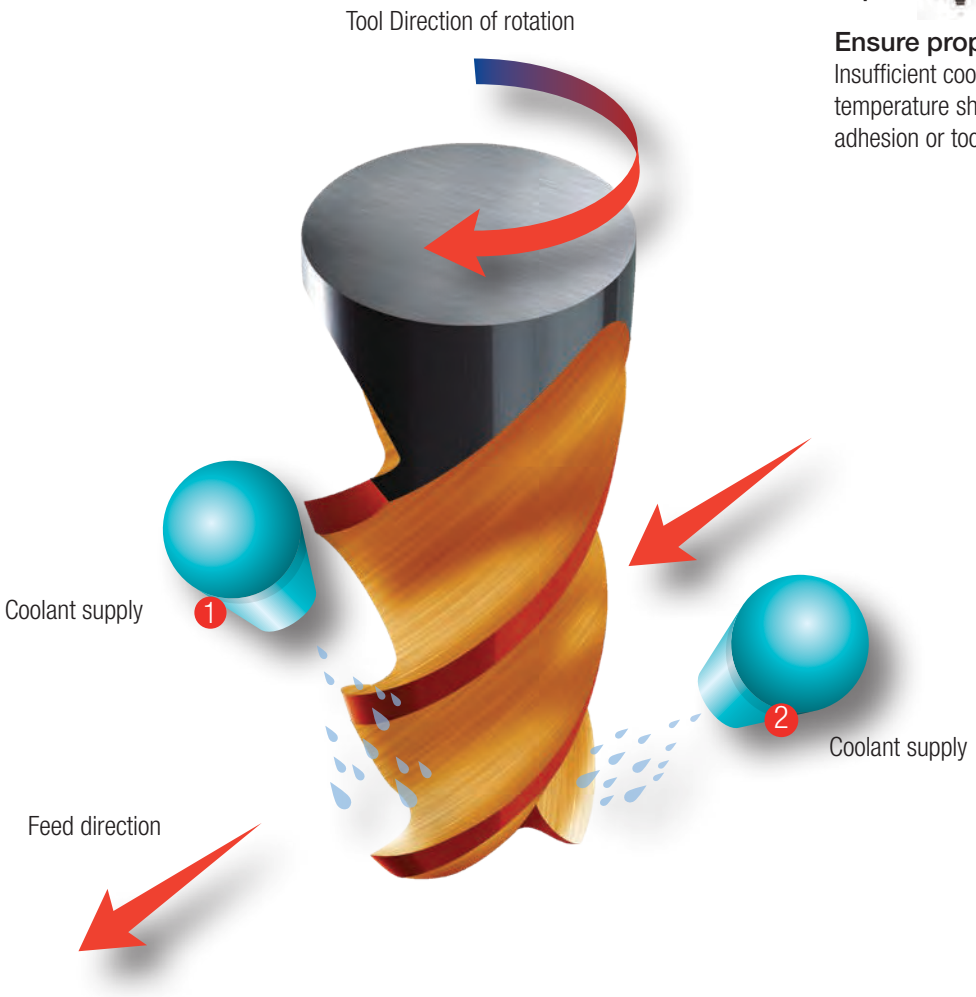
It's recommend to use coolant (emulsion, minimum lubrication, or air) if possible. Coolant contributes to improve toollife, surface finish and chip evacuation.

1. From the front into the flutes for direct cooling.
2. Pointed from the right hand side in the flutes to evacuate the chips.

When to use, what kind of coolant:*	
Emulsion	**Minimum lubrication (Preference) Or Air**
• Vc < 200 m/min	• Vc > 200 m/min
• Aluminium	• Graphite
• Copper	• Synthetics
• Exotic materials (Stainless Steel, Titanium, Hastelloy)	• Hardness over 50 HRc
• Hardness less than 50 HRc	

Tips:

Ensure proper cooling
Insufficient cooling causes temperature shocks, chip adhesion or tool breakage!



* Please follow instructions to keep the tool cool.

2 Flute

Centre cutting high performance 2 flute ball nose for exotic materials

HSM | 30° | f7 | 6535 HA | h5 | TiAlN

IMAGE 1

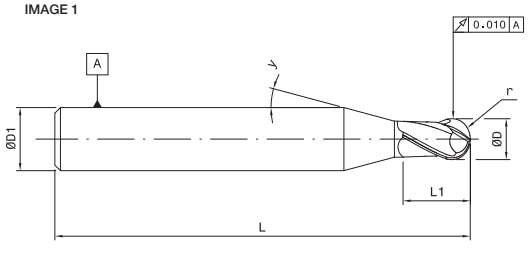
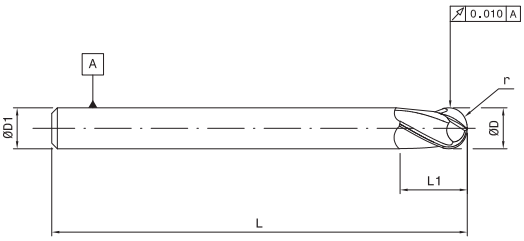


IMAGE 2



P5-P6
K1-K2
M1-M3
S1-S4
H1

* For endmills L I 100 mm.

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No
0.40	0.60	51.00	4.00	0.20	2	10	1	FBK0505037
0.50	0.90	51.00	4.00	0.25	2	10	1	FBK0505038
0.60	1.20	51.00	4.00	0.30	2	10	1	FBK0505039
0.80	1.50	51.00	4.00	0.40	2	10	1	FBK0505040
1.00	2.00	51.00	4.00	0.50	2	15	1	FBK0505041
1.50	3.00	51.00	4.00	0.75	2	15	1	FBK0505042
2.00	4.00	51.00	4.00	1.00	2	15	1	FBK0505043
3.00	6.00	51.00	4.00	1.50	2	15	1	FBK0505044
4.00	8.00	57.00	6.00	2.00	2	15	1	FBK0505045
5.00	10.00	57.00	6.00	2.50	2	15	1	FBK0505046
6.00	12.00	57.00	6.00	3.00	2	-	2	FBK0505047
8.00	16.00	63.00	8.00	4.00	2	-	2	FBK0505048
10.00	20.00	72.00	10.00	5.00	2	-	2	FBK0505049
12.00	24.00	83.00	12.00	6.00	2	-	2	FBK0505050

Application data on page no 2.077

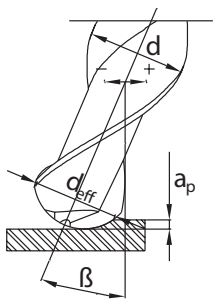
Cutting parameters

- Centre cutting high performance 2 flute ball nose end mill - 0.4 mm to 2.0 mm

Material Group			Cutting Speed (Vc) m/min		Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%													
			Shoulder Milling	Slot Milling				Diameter in mm													
								mm	0.4		0.5		0.6		0.8		1.0		1.5		2.0	
			ap<1.5D ae/D<30%	ap<1.5D ae/D<10%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	5	140	160	Emulsion	140	220	fz	0.004	0.008	0.050	0.009	0.006	0.010	0.007	0.012	0.008	0.015	0.012	0.018	0.016	0.022
		6	100	120		100	180	fz	0.004	0.008	0.050	0.009	0.006	0.010	0.007	0.012	0.008	0.015	0.012	0.018	0.016	0.022
Stainless Steel	M	1	80	100		80	130	fz	0.004	0.008	0.050	0.009	0.006	0.010	0.007	0.012	0.008	0.015	0.012	0.018	0.016	0.022
		2	60	80		60	100	fz	0.004	0.008	0.050	0.009	0.006	0.010	0.007	0.012	0.008	0.015	0.012	0.018	0.016	0.022
		3	50	70		50	90	fz	0.004	0.008	0.050	0.009	0.006	0.010	0.007	0.012	0.008	0.015	0.012	0.018	0.016	0.022
Super Alloys	S	1	40	60		40	60	fz	0.004	0.008	0.050	0.009	0.006	0.010	0.007	0.012	0.008	0.015	0.012	0.018	0.016	0.022
		2	45	65		45	70	fz	0.004	0.008	0.050	0.009	0.006	0.010	0.007	0.012	0.008	0.015	0.012	0.018	0.016	0.022
		3	30	40		30	50	fz	0.004	0.008	0.050	0.009	0.006	0.010	0.007	0.012	0.008	0.015	0.012	0.018	0.016	0.022
		4	60	80		60	90	fz	0.004	0.008	0.050	0.009	0.006	0.010	0.007	0.012	0.008	0.015	0.012	0.018	0.016	0.022
Hardened Steel	H	1	140	160	MQL/Dry Air	140	220	fz	0.004	0.008	0.050	0.009	0.006	0.010	0.007	0.012	0.008	0.015	0.012	0.018	0.016	0.022

- Centre cutting high performance 2 flute ball nose end mill - 3.0 mm to 12.0 mm

Material Group			Cutting Speed (Vc) m/min		Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%													
			Shoulder Milling	Slot Milling				Diameter in mm													
								mm	3.0		4.0		5.0		6.0		8.0		10.0		12.0	
			ap<1.5D ae/D<30%	ap<1.5D ae/D<10%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	5	140	160	Emulsion	140	220	fz	0.018	0.025	0.020	0.028	0.025	0.035	0.028	0.042	0.030	0.050	0.040	0.070	0.050	0.080
		6	100	120		100	180	fz	0.018	0.025	0.020	0.028	0.025	0.035	0.028	0.042	0.030	0.050	0.040	0.070	0.050	0.080
Stainless Steel	M	1	80	100		80	130	fz	0.018	0.025	0.020	0.028	0.025	0.035	0.028	0.042	0.030	0.050	0.040	0.070	0.050	0.080
		2	60	80		60	100	fz	0.018	0.025	0.020	0.028	0.025	0.035	0.028	0.042	0.030	0.050	0.040	0.070	0.050	0.080
		3	50	70		50	90	fz	0.018	0.025	0.020	0.028	0.025	0.035	0.028	0.042	0.030	0.050	0.040	0.070	0.050	0.080
Super Alloys	S	1	40	60		40	60	fz	0.018	0.025	0.020	0.028	0.025	0.035	0.028	0.042	0.030	0.050	0.040	0.070	0.050	0.080
		2	45	65		45	70	fz	0.018	0.025	0.020	0.028	0.025	0.035	0.028	0.042	0.030	0.050	0.040	0.070	0.050	0.080
		3	30	40		30	50	fz	0.018	0.025	0.020	0.028	0.025	0.035	0.028	0.042	0.030	0.050	0.040	0.070	0.050	0.080
		4	60	80		60	90	fz	0.018	0.025	0.020	0.028	0.025	0.035	0.028	0.042	0.030	0.050	0.040	0.070	0.050	0.080
Hardened Steel	H	1	140	160	MQL/Dry Air	140	220	fz	0.018	0.025	0.020	0.028	0.025	0.035	0.028	0.042	0.030	0.050	0.040	0.070	0.050	0.080



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1

* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D-ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D-2 \times ADOC}{D}\right)\right]$$

FBK0505048

Workpiece material: 1.4462 Duplex

	Totem
Ø	8mm
Z	2 Flutes
vc	120 m/min
n	4775 rpm
fz	0.04 mm/t
vf	385 mm/min
ap	0.1 mm
ae	0.1 mm
Coolant	emulsion

Q	2.5 Hours

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Composites and synthetics

Solutions for synthetics and composite materials

With experience in the aerospace Industry we developed Precision ground Diamond Tipped End mills for high speed machining of Synthetic Materials, CFRP and GFRP parts.

Highly accurate manufacturing by laser

Diamond tipped vs PCD

- 2 To 5 times more toollife
- More accuracy & a better surface finish
- Higher machine efficiency

FBK0506012

Workpiece material: Nylon with Glass Fibre

Hardness:

	Competitor	Totem
Ø	10mm	10mm
Z	2 Flutes	2 Flutes
V_c	251 m/min	251 m/min
n	8000 rpm	8000 rpm
fz	0.025 mm/t	0.1875 mm/t
V_f	400 mm/min	3000 mm/min
a_p	4.5 mm	1.2 mm
a_e	16 mm	10 mm
Coolant	air / external	air / external

Q	28.8 cm^3/min	36.0 cm^3/min

FBK0506012

Workpiece material: Aerospace composite T800/M21

Operation: Shoulder milling

	Totem
Ø	6mm
Z	2 Flutes
vc	235 m/min
n	12500 rpm
fz	0.12 mm/t
vf	3000 mm/min
ap	4.0 mm
ae	2.5 mm
Coolant	air / external

Result PCD	47.0 cm^3/min
Result Forbes Diamond	107.0 cm^3/min
Improvement	2.3 times higher tool life

Program

- Centre cutting high performance diamond tipped end mill with corner radius
- Centre cutting high performance diamond tipped ball nose

2 Flute

Centre cutting high performance diamond tipped end mill with corner radius

IMAGE 1

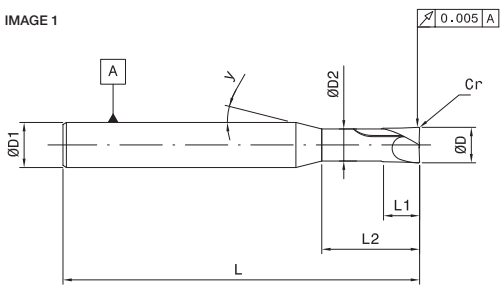
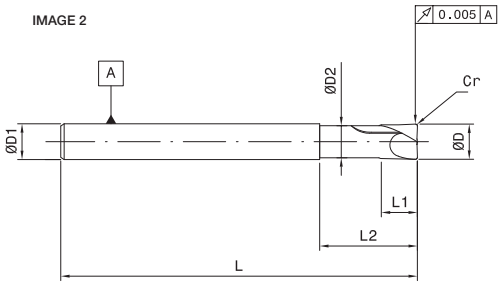


IMAGE 2



N1-N7

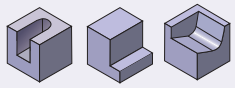
Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
Standard										
3.00	2.50	2.50	9.00	78.00	6.00	0.30	2	25	1	FBK0505977
3.00	2.50	2.50	15.00	78.00	6.00	0.30	2	25	1	FBK0505978
3.00	2.50	2.50	9.00	78.00	6.00	0.50	2	25	1	FBK0505979
3.00	2.50	2.50	15.00	78.00	6.00	0.50	2	25	1	FBK0505980
4.00	2.50	3.50	12.00	78.00	6.00	0.30	2	25	1	FBK0505981
4.00	2.50	3.50	20.00	78.00	6.00	0.30	2	25	1	FBK0505982
4.00	2.50	3.50	12.00	78.00	6.00	0.50	2	25	1	FBK0505983
4.00	2.50	3.50	20.00	78.00	6.00	0.50	2	25	1	FBK0505984
5.00	3.00	4.40	15.00	78.00	6.00	0.30	2	25	1	FBK0505985
5.00	3.00	4.40	25.00	78.00	6.00	0.30	2	25	1	FBK0505986
5.00	3.00	4.40	15.00	78.00	6.00	0.50	2	25	1	FBK0505987
5.00	3.00	4.40	25.00	78.00	6.00	0.50	2	25	1	FBK0505988
6.00	6.00	5.40	18.00	102.00	6.00	0.30	2	-	2	FBK0505989
6.00	6.00	5.40	30.00	102.00	6.00	0.30	2	-	2	FBK0505990
6.00	6.00	5.40	18.00	102.00	6.00	0.50	2	-	2	FBK0505991
6.00	6.00	5.40	30.00	102.00	6.00	0.50	2	-	2	FBK0505992
6.00	6.00	5.40	18.00	102.00	6.00	1.00	2	-	2	FBK0505993
6.00	6.00	5.40	30.00	102.00	6.00	1.00	2	-	2	FBK0505994
8.00	7.00	7.20	24.00	102.00	8.00	0.30	2	-	2	FBK0505995
8.00	7.00	7.20	24.00	102.00	8.00	0.50	2	-	2	FBK0505996
8.00	7.00	7.20	24.00	102.00	8.00	1.00	2	-	2	FBK0505997
10.00	8.00	9.00	30.00	102.00	10.00	0.50	2	-	2	FBK0505998
10.00	8.00	9.00	30.00	102.00	10.00	1.00	2	-	2	FBK0505999
12.00	9.00	11.00	36.00	107.00	12.00	0.50	2	-	2	FBK0506000
12.00	9.00	11.00	36.00	107.00	12.00	1.00	2	-	2	FBK0506001

Application data on page no 2.083

2 Flute

Centre cutting high performance diamond tipped end mill with corner radius



N1-N7

IMAGE 1

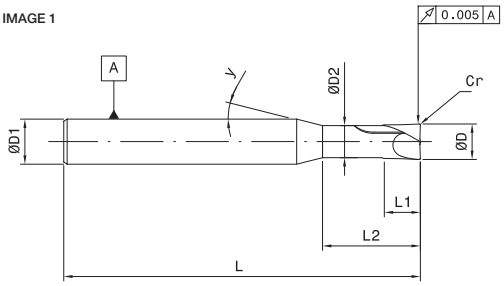
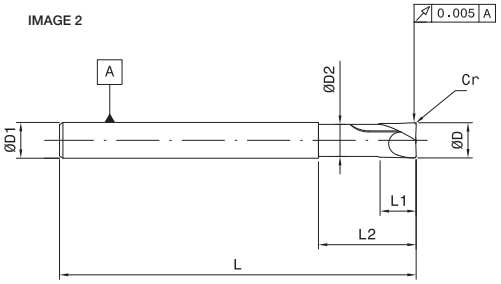


IMAGE 2



Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
Long										
3.00	3.00	2.80	9.00	78.00	6.00	0.30	2	15	1	FBK0506002
3.00	3.00	2.80	9.00	78.00	6.00	0.50	2	15	1	FBK0506003
4.00	4.00	3.80	12.00	78.00	6.00	0.30	2	15	1	FBK0506004
4.00	4.00	3.80	12.00	78.00	6.00	0.50	2	15	1	FBK0506005
5.00	5.00	4.80	15.00	78.00	6.00	0.50	2	15	1	FBK0506006
5.00	5.00	4.80	15.00	78.00	6.00	1.00	2	15	1	FBK0506007
6.00	6.00	5.80	18.00	78.00	6.00	0.50	2	-	2	FBK0506008
6.00	6.00	5.80	18.00	78.00	6.00	1.00	2	-	2	FBK0506009
8.00	8.00	7.80	24.00	78.00	8.00	0.50	2	-	2	FBK0506010
8.00	8.00	7.80	24.00	78.00	8.00	1.00	2	-	2	FBK0506011
10.00	10.00	9.80	30.00	78.00	10.00	1.00	2	-	2	FBK0506012
12.00	12.00	11.80	30.00	78.00	12.00	1.00	2	-	2	FBK0506013

Application data on page no 2.083

2 Flute

Centre cutting high performance diamond tipped ball nose end mill

IMAGE 1

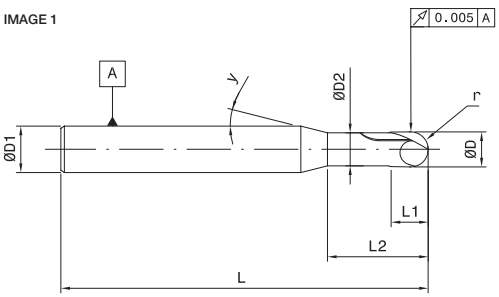
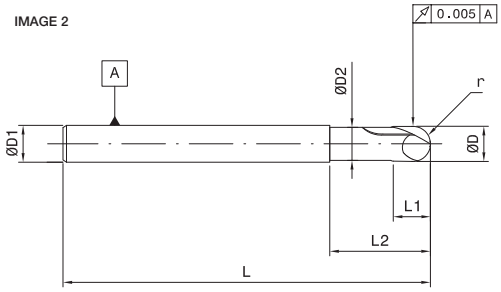


IMAGE 2



N1-N7

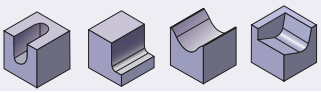
Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No
Standard										
3.00	2.50	2.50	9.00	78.00	6.00	1.50	2	25	1	FBK0506014
3.00	2.50	2.50	15.00	78.00	6.00	1.50	2	25	1	FBK0506015
4.00	2.50	3.50	12.00	78.00	6.00	2.00	2	25	1	FBK0506016
4.00	2.50	3.50	20.00	78.00	6.00	2.00	2	25	1	FBK0506017
5.00	3.00	4.40	15.00	78.00	6.00	2.50	2	25	1	FBK0506018
5.00	3.00	4.40	25.00	78.00	6.00	2.50	2	25	1	FBK0506019
6.00	6.00	5.40	18.00	102.00	6.00	3.00	2	-	2	FBK0506020
6.00	6.00	5.40	30.00	102.00	6.00	3.00	2	-	2	FBK0506021
8.00	7.00	7.20	24.00	102.00	8.00	4.00	2	-	2	FBK0506022
8.00	7.00	7.20	40.00	102.00	8.00	4.00	2	-	2	FBK0506023
10.00	8.00	9.00	30.00	102.00	10.00	5.00	2	-	2	FBK0506024
10.00	8.00	9.00	50.00	102.00	10.00	5.00	2	-	2	FBK0506025
12.00	9.00	11.00	36.00	107.00	12.00	6.00	2	-	2	FBK0506026
12.00	9.00	11.00	60.00	107.00	12.00	6.00	2	-	2	FBK0506027

Available in special dimensions on request.
Application data on page no 2.083

2 Flute

Centre cutting high performance diamond tipped ball nose end mill



N1-N7

IMAGE 1

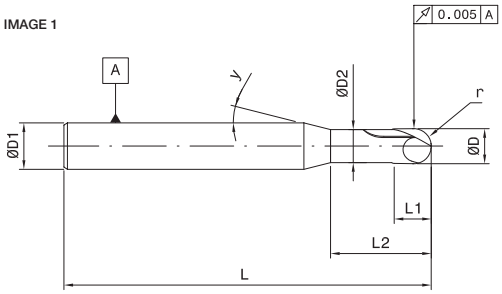
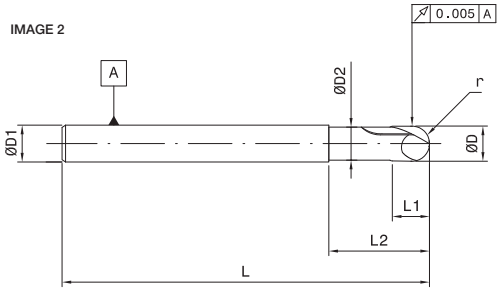


IMAGE 2



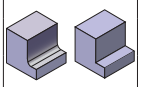
Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No
Long										
3.00	3.00	2.80	9.00	78.00	6.00	1.50	2	15	1	FBK0506028
4.00	4.00	3.80	12.00	78.00	6.00	2.00	2	15	1	FBK0506029
5.00	5.00	4.80	15.00	78.00	6.00	2.50	2	15	1	FBK0506030
6.00	6.00	5.80	18.00	78.00	6.00	3.00	2	-	2	FBK0506031
8.00	8.00	7.80	24.00	78.00	8.00	4.00	2	-	2	FBK0506032
10.00	10.00	9.80	30.00	78.00	10.00	5.00	2	-	2	FBK0506033
12.00	12.00	11.80	30.00	78.00	12.00	6.00	2	-	2	FBK0506034

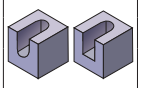
Available in special dimensions on request.
Application data on page no 2.083

Cutting parameters

- Center cutting diamond tipped high performance end mill with corner radius - 3.0 mm to 12.0 mm
- Center cutting diamond tipped high performance ball nose - 3.0 mm to 12.0 mm

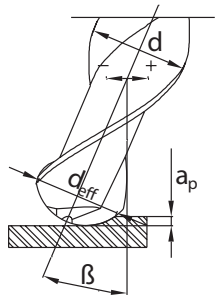
Material Group			Cutting Speed (Vc) m/min for Shoulder Milling  ap <0.65D ae/D 40%	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)													
							Diameter in mm													
							mm	3.0		4.0		5.0		6.0		8.0		10.0		12.0	
					min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Non Ferrous	N	1	650	Emulsion/ DRY	300	650	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120
		2	500		200	500	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120
		3	500		350	500	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120
		4	1000		400	1000	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120
		5	1000		400	1000	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120
		6	1000		700	1000	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120
		7	1000		700	1000	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120

- Center cutting diamond tipped high performance endmill with corner radius - 3.0 mm to 12.0 mm

Material Group			Cutting Speed (Vc) m/min for Slot Milling  ap =0.2D ae/D 100%	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)													
							Diameter in mm													
							mm	3.0		4.0		5.0		6.0		8.0		10.0		12.0	
					min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Non Ferrous	N	1	300	Emulsion/ DRY	300	650	fz	0.010	0.020	0.020	0.040	0.030	0.045	0.040	0.060	0.050	0.070	0.060	0.080	0.080	0.100
		2	200		200	500	fz	0.010	0.020	0.020	0.040	0.030	0.045	0.040	0.060	0.050	0.070	0.060	0.080	0.080	0.100
		3	350		350	500	fz	0.010	0.020	0.020	0.040	0.030	0.045	0.040	0.060	0.050	0.070	0.060	0.080	0.080	0.100
		4	400		400	1000	fz	0.010	0.020	0.020	0.040	0.030	0.045	0.040	0.060	0.050	0.070	0.060	0.080	0.080	0.100
		5	400		400	1000	fz	0.010	0.020	0.020	0.040	0.030	0.045	0.040	0.060	0.050	0.070	0.060	0.080	0.080	0.100
		6	700		700	1000	fz	0.010	0.020	0.020	0.040	0.030	0.045	0.040	0.060	0.050	0.070	0.060	0.080	0.080	0.100
		7	700		700	1000	fz	0.010	0.020	0.020	0.040	0.030	0.045	0.040	0.060	0.050	0.070	0.060	0.080	0.080	0.100

- Center cutting diamond tipped high performance end mill with corner radius - 3.0 mm to 12.0 mm
- Center cutting diamond tipped high performance ball nose - 3.0 mm to 12.0 mm

Material Group			Cutting Speed (Vc) m/min for Profile Milling ap =0.2D ae/D=10%	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)													
							Diameter in mm													
							mm	3.0		4.0		5.0		6.0		8.0		10.0		12.0	
					min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Non Ferrous	N	1	650	Emulsion/ DRY	300	650	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120
		2	500		200	500	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120
		3	500		350	500	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120
		4	1000		400	1000	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120
		5	1000		400	1000	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120
		6	1000		700	1000	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120
		7	1000		700	1000	fz	0.020	0.030	0.030	0.045	0.050	0.060	0.050	0.070	0.060	0.080	0.070	0.100	0.080	0.120



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1

* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D-ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D-2 \times ADOC}{D}\right)\right]$$

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Case studies

FBK0506008
Workpiece material: T800 M21
Hardness: Aerospace material

	Competitor	Totem
Ø	6mm	6mm
Z	2 Flute	2 Flute
vc	283 m/min	283 m/min
n	15000 rpm	15000 rpm
fz	0.10 mm/t	0.10 mm/t
vf	3000 mm/min	3000 mm/min
ap	4.0 mm	4.0 mm
ae	6.0 mm	6.0 mm
Coolant	emulsion	dry

Q	72 cm^3/min	72 cm^3/min
Toollife	94 min	214 min

FBK0506033
Workpiece material: Hextool
Hardness: Aerospace material

	Competitor	Totem
Ø	10mm	10mm
Z	2 Flute	2 Flute
vc	377 m/min	314 m/min
n	10000 rpm	10000 rpm
fz	0.10 mm/t	0.15 mm/t
vf	2600 mm/min	3000 mm/min
ap	0.35 mm	0.35 mm
ae	0.35 mm	0.35 mm
Coolant	dry	dry

Q	0.32 cm^3/min	0.37 cm^3/min
Toollife	5 h 33 min	14 h 10 min

TOTEM®

High Performance Cutting Tools

HIGH PERFORMANCE END MILLS

FOR

GRAPHITE MILLING

PRODUCT RANGE

- Standard 0.1mm- 16mm available in stub/ standard/long/extra long
- Specials 0.1mm- 20mm available in stub/ standard/long/extra long/ long reach

PORTFOLIO

- Center cutting high performance rougher for graphite
- Center cutting high performance 3 flute end mill for graphite
- Center cutting high performance end mill with corner radius for graphite
- Center cutting high performance ball nose for graphite
- Center cutting high performance micro end mill with corner radius for graphite
- Center cutting high performance micro ball nose for graphite

Success stories

Challenge	Reduction in Cycle time
Component	Graphite Mould Inserts
Competiton	J.J Tools Korea
Solution	FBK0504674- EM 16.0 (FHGR 2 160 150 16 02) PHD
Cutting data	Machine : Makino- VMC, Shrinkfit- Totem, Coolant – Dry Existing Vc - 350 Proposed Vc - 600 Existing Ap - 5, Proposed Ap -15mm Existing Ae - 1, Proposed Ae - 3mm Existing Tool Life – 15 Hours Achieved Tool Life – 27 Hours
Result	180% improvement in Tool life
Benefit	Reduction in Cycle time by 7 times

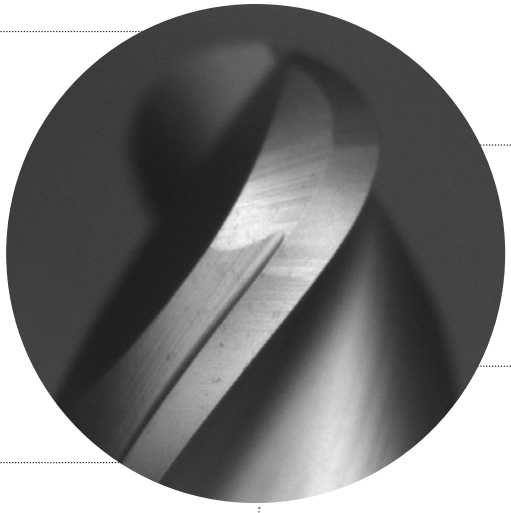
Challenge	Reduction in CPC & Chatter
Component	Die Casting HK12
Competiton	ZECHA
Solution	EM 5.00MMX5XREL65X100 SH6 CR0.5 4FLT DI
Cutting data	Machine : MakinoE33-HSKA40 VMC, Shrinkfit- Totem, Coolant – Vacuum RPM 4000, Feed 1800 Depth 0.12mm Existing Tool Life – 35Hours Achieved Tool Life – 35 Hours
Result	Similar Tool life
Benefit	Reduction in CPC

Challenge	Reduction in Cycle time
Component	Semiconductor - Reppler
Competiton	Cogo
Solution	BEM 6.00(+0.01)MMX15X100 SH6 2FLT DI
Cutting data	Machine : Okuma- VMC, Shrinkfit- Totem, Coolant – Vacuum RPM 6000, Feed 2500 Existing Tool Life – 10Hours Achieved Tool Life – 10 Hours
Result	Similar Tool life
Benefit	Reduction in CPC

Challenge	Reduction in CPC & Chatter
Component	Die Casting HK12
Competiton	ZECHA
Solution	EM 4.00MMX5XREL65X100 SH6 CR0.5 4FLT DI
Cutting data	Machine : MakinoE33-HSKA40 VMC, Shrinkfit- Totem, Coolant – Vacuum RPM 4000, Feed 1800 Depth 0.12mm Existing Tool Life – 35Hours Achieved Tool Life – 35 Hours
Result	Similar Tool life
Benefit	Reduction in CPC

Diamond coated end mills for applications on graphite

End mills for graphite milling
- Accuracy
- Process times
- Smooth surface finish
- Toollife
- Technology to minimize droplets
- Superior accuracy and tolerances
- Improved performance and toollife



Advantages
- Better toollife
- Excellent accuracy
- High production efficiency
- Excellent surface finish

Program
- Center cutting high performance rougher for graphite
- Center cutting high performance 3 flute end mill for graphite
- Center cutting high performance end mill with corner radius for graphite
- Center cutting high performance ball nose for graphite
- Center cutting high performance micro end mill with corner radius for graphite
- Center cutting high performance micro ball nose for graphite

FBK0504670
Workpiece material: SGL Graphite
Hardness: R8500

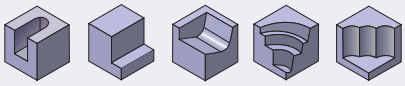
	Competitor	Totem
Ø	8mm	8mm
Z	2 Flutes	2 Flutes
vc	302 m/min	503 m/min
n	12,000 rpm	20,000 rpm
fz	0.167 mm/t	0.113 mm/t
vf	4,000 mm/min	4,500 mm/min
ap	1.5 mm	8.0 mm
ae	12 mm	8 mm
Coolant	air	air

Q	72 cm^3/min	288 cm^3/min

Higher productivity

2 Flute

Centre cutting high performance 2 flute rougher for graphite



HVM | 25° | 0 - 0.1 | 6535 HA | h5 | D

N5-N7

IMAGE 1

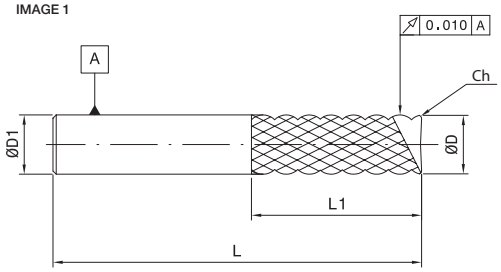
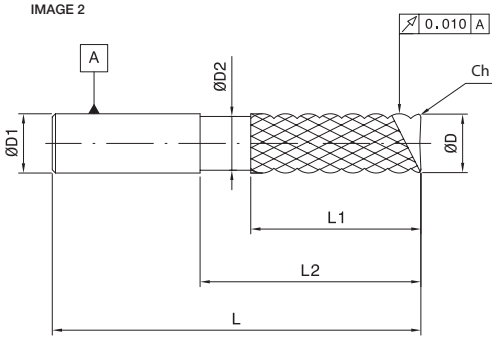


IMAGE 2



Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Ch (mm)	z	γ (°)	Image	EDP No
Standard										
4.00	12.00	-	-	60.00	4.00	0.25	2	-	1	FBK0504668
6.00	18.00	-	-	78.00	6.00	0.30	2	-	1	FBK0504669
8.00	24.00	-	-	78.00	8.00	0.35	2	-	1	FBK0504670
10.00	30.00	-	-	78.00	10.00	0.40	2	-	1	FBK0504671
12.00	36.00	-	-	89.00	12.00	0.50	2	-	1	FBK0504672
12.00	36.00	11.40	50.00	150.00	12.00	0.50	2	-	2	FBK0504673
16.00	36.00	15.20	70.00	150.00	16.00	0.50	2	-	2	FBK0504674

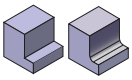
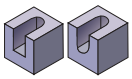
Tolerance chart

Diameter range	Shank	Cutting diameter	Cutting diameter	Cutting diameter	Cutting diameter
	ØD1-h5	ØD-e8	ØD-f7	ØD-g7	ØFHC
D ≤ 3	0	-0.014	-0.006	-0.002	0
	-0.004	-0.028	-0.016	-0.012	-0.025
3 < D ≤ 6	0	-0.020	-0.010	-0.004	0
	-0.005	-0.038	-0.022	-0.016	-0.030
6 < D ≤ 10	0	-0.025	-0.013	-0.005	0
	-0.006	-0.047	-0.028	-0.02	-0.036
10 < D ≤ 18	0	-0.032	-0.016	-0.006	0
	-0.008	-0.059	-0.034	-0.024	-0.043
18 < D ≤ 30	0	-0.040	-0.020	-0.006	0
	-0.009	-0.073	-0.041	-0.024	-0.052

Application data on page no 2.089

Cutting parameters

Centre cutting high performance 2 flute rougher for graphite - 4.0 mm to 16.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling			Cutting Speed (Vc) m/min for Slot Milling	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%													
										Diameter in mm													
										mm	4.0		6.0		8.0		10		12		16	
			ap 2.5D ae/D 10%	ap 2D ae/D 25%	ap 1D ae/D 50%	ap 1D ae/D 100%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Non Ferrous	N	5	600	550	525	500	DRY	500	<600	fz	0.039	0.047	0.071	0.085	0.260	0.151	0.196	0.235	0.283	0.339	0.471	0.566
		6						500	<600	fz	0.039	0.047	0.071	0.085	0.260	0.151	0.196	0.235	0.283	0.339	0.471	0.566
		7						350	500	fz	0.039	0.047	0.071	0.085	0.260	0.151	0.196	0.235	0.283	0.339	0.471	0.566

FBK0504671

Workpiece material: EDM200 Graphite

	Totem
Ø	10mm
Z	2 Flutes
vc	628 m/min
n	20000 rpm
fz	0.15 mm/t
vf	6000 mm/min
ap	12 mm
ae	2 mm
Coolant	air

Q	144 cm^3/min

Higher productivity

To be used for roughing applications on graphite:

Advantages

- High material removal rate.
- Special roughing pitch.
- Designed for high feeds on graphite applications.

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

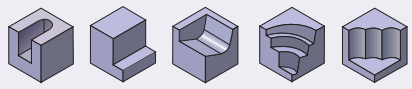
Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

3 Flute

Centre cutting high performance 3 flute end mill for graphite



HPM HSM | 40° | FHC | 6535 HA | h5 | D

IMAGE 1

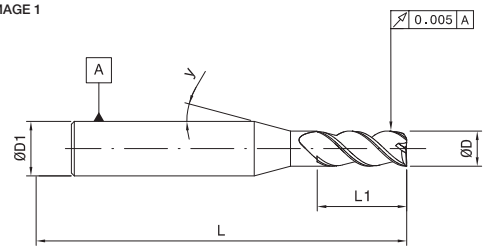
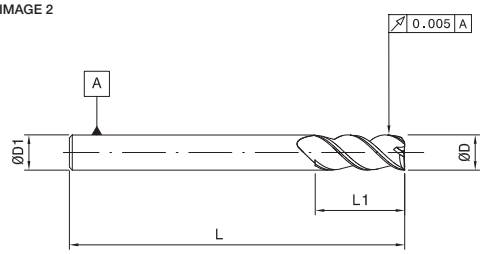


IMAGE 2



N5-N7

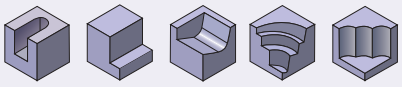
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No
Standard							
2.00	10.00	50.00	3.00	3	15	1	FBK0503940
3.00	10.00	50.00	3.00	3	-	2	FBK0503941
4.00	15.00	60.00	4.00	3	-	2	FBK0503942
5.00	20.00	60.00	5.00	3	-	2	FBK0503943
6.00	30.00	78.00	6.00	3	-	2	FBK0503944
8.00	30.00	78.00	8.00	3	-	2	FBK0503945
10.00	30.00	78.00	10.00	3	-	2	FBK0503946
12.00	30.00	89.00	12.00	3	-	2	FBK0503947

Application data on page no 2.094

Optimum Flutes

Centre cutting high performance end mill with corner radius for graphite



HPM HSM | 2-3-4 | 40° | FHC | 6535 HA | h5 | D

N5-N7

IMAGE 1

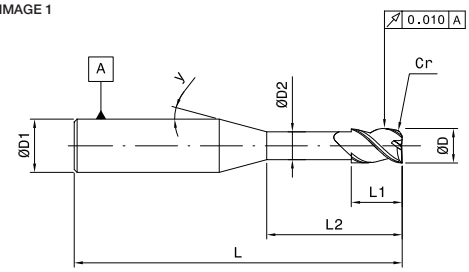
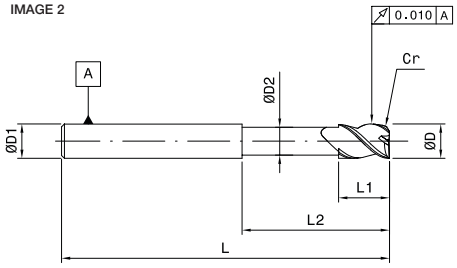


IMAGE 2



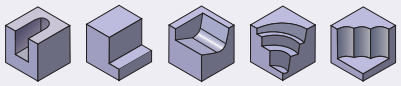
Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
Short										
2.00	3.00	1.80	10.00	50.00	3.00	0.10	2	15	1	FBK0504675
3.00	4.00	2.80	10.00	51.00	6.00	0.10	2	15	1	FBK0504676
4.00	4.00	3.80	10.00	51.00	6.00	0.20	4	15	1	FBK0504677
5.00	5.00	4.70	10.00	51.00	6.00	0.20	4	15	1	FBK0504678
6.00	6.00	5.60	10.00	51.00	6.00	0.30	4	-	2	FBK0504679
8.00	8.00	7.40	15.00	64.00	8.00	0.30	4	-	2	FBK0504680
10.00	10.00	9.40	20.00	78.00	10.00	0.30	4	-	2	FBK0504681
12.00	10.00	11.40	20.00	78.00	12.00	0.30	4	-	2	FBK0504682

Application data on page no 2.094

Optimum Flutes

Centre cutting high performance end mill with corner radius for graphite



HPM HSM | 2-3-4 | 40° | FHC | 6535 HA | h5 | D

N5-N7

IMAGE 1

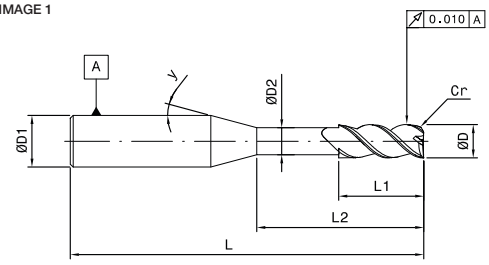


IMAGE 2

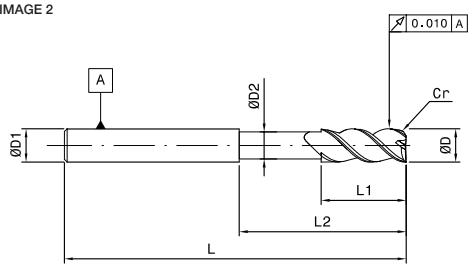


IMAGE 3

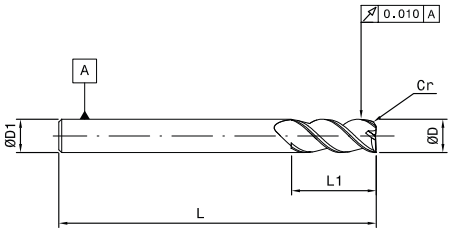
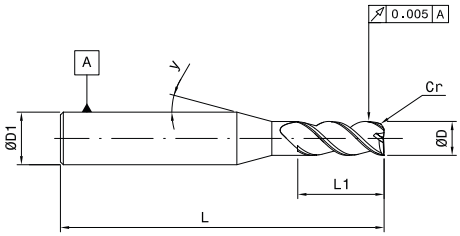


IMAGE 4



Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
Standard										
2.00	10.00	-	-	50.00	2.00	0.10	3	-	3	FBK0504683
2.00	10.00	-	-	50.00	3.00	0.10	3	15	4	FBK0504684
2.00	10.00	1.80	15.00	50.00	3.00	0.10	3	10	1	FBK0504685
2.00	10.00	1.80	20.00	50.00	3.00	0.10	3	15	1	FBK0506035
2.00	10.00	1.80	30.00	65.00	3.00	0.10	3	15	1	FBK0504686
2.00	10.00	1.80	30.00	80.00	3.00	0.10	3	15	1	FBK0504687
3.00	10.00	-	-	50.00	3.00	0.10	3	-	3	FBK0504688
3.00	10.00	2.80	20.00	65.00	3.00	0.10	3	-	2	FBK0506036
3.00	10.00	2.80	30.00	65.00	3.00	0.10	3	-	2	FBK0504689
3.00	10.00	2.80	30.00	80.00	3.00	0.10	3	-	2	FBK0504690
4.00	15.00	-	-	60.00	4.00	0.20	3	-	3	FBK0504691
5.00	20.00	-	-	60.00	5.00	0.20	3	-	3	FBK0504692
6.00	30.00	-	-	78.00	6.00	0.30	3	-	3	FBK0504693
8.00	30.00	-	-	78.00	8.00	0.30	3	-	3	FBK0504694
10.00	30.00	-	-	78.00	10.00	0.30	3	-	3	FBK0504695
12.00	30.00	-	-	89.00	12.00	0.30	3	-	3	FBK0504696

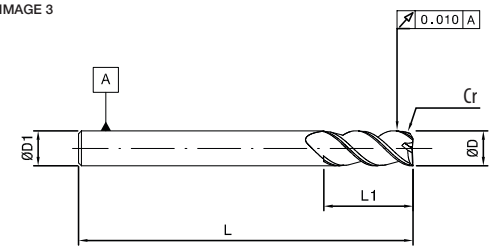
Application data on page no 2.094

Optimum Flutes

Centre cutting high performance end mill with corner radius for graphite

HPM HSM | 2-3-4 | 40° | FHC | 6535 HA | h5 | D

IMAGE 3



N5-N7

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
Long										
4.00	10.00	-	-	102.00	4.00	0.30	2	-	3	FBK0504697
5.00	13.00	-	-	102.00	5.00	0.50	2	-	3	FBK0504698
6.00	42.00	-	-	102.00	6.00	0.50	2	-	3	FBK0504699
6.00	26.00	-	-	150.00	6.00	0.50	2	-	3	FBK0504700
8.00	41.00	-	-	150.00	8.00	0.50	2	-	3	FBK0504701
10.00	42.00	-	-	150.00	10.00	0.50	2	-	3	FBK0504702

Application data on page no 2.094

Cutting parameters

- Center cutting high performance 3 flute end mill for graphite - 2.0 mm to 5.0 mm
- Center cutting high performance end mill with corner radius for graphite - 2.0 mm to 5.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling			Slot Milling		Cutting Speed (Vc) m/min			Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%								
											Diameter in mm								
											mm	2.0		3.0		4.0		5.0	
			1.6	1.4	1.2	1					Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.								
			ap 2D ae/D 10%	ap 1.5D ae/D 15%	ap 1D ae/D 20%	ap 1D ae/D 100%	Lubrication	min	max	Range	min	max	min	max	min	max	min	max
Non Ferrous	N	5	600	550	525	500	DRY	500	<600	fz	0.010	0.030	0.015	0.040	0.025	0.050	0.035	0.060
		6						500	<600	fz	0.010	0.030	0.015	0.040	0.025	0.050	0.035	0.060
		7						350	500	fz	0.010	0.030	0.015	0.040	0.025	0.050	0.035	0.060

- Center cutting high performance 3 flute end mill for graphite - 6.0 mm to 12.0 mm
- Center cutting high performance end mill with corner radius for graphite - 6.0 mm to 12.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling			Slot Milling		Cutting Speed (Vc) m/min			Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%								
											Diameter in mm								
											mm	6.0		8.0		10.0		12.0	
			1.6	1.4	1.2	1					Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.								
			ap 2D ae/D 10%	ap 1.5D ae/D 15%	ap 1D ae/D 20%	ap 1D ae/D 100%	Lubrication	min	max	Range	min	max	min	max	min	max	min	max
Non Ferrous	N	5	600	550	525	500	DRY	500	<600	fz	0.045	0.080	0.055	0.100	0.075	0.120	0.090	0.140
		6						500	<600	fz	0.045	0.080	0.055	0.100	0.075	0.120	0.090	0.140
		7						350	500	fz	0.045	0.080	0.055	0.100	0.075	0.120	0.090	0.140

FBK0503944
Workpiece material: Graphite

	Competitor	Totem
Ø	6 mm	6 mm
Z	3 Flutes	3 Flutes
vc	547 m/min	547 m/min
n	29000 rpm	29000 rpm
fz	0.005 mm/t	0.023 mm/t
vf	580 mm/min	2000 mm/min
ap	3 mm	3 mm
ae	0.5 mm	0.5 mm
Coolant	air	air

Q	0.87 cm^3/min	3.00 cm^3/min
Toollife	2 h 37 min	7 h 14 min

Higher tool life

FBK0504691
Workpiece material: EDM-3 Graphite

	Totem
Ø	4 mm
Z	3 Flutes
vc	440 m/min
n	35000 rpm
Fz	0.049 mm/t
vf	5145 mm/min
ap	0.8 mm
ae	1.6 mm
Coolant	air

Q	6.60 cm^3/min

Higher MRR

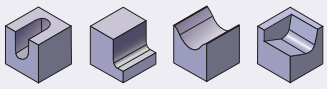
Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Optimum Flutes

Centre cutting high performance ball nose for graphite



HPM HSM | 2-3 | 40° | FHC | 6535 HA | h5 | D

IMAGE 1

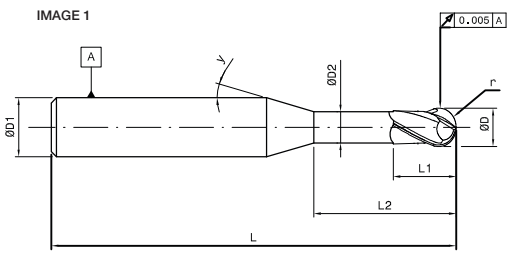
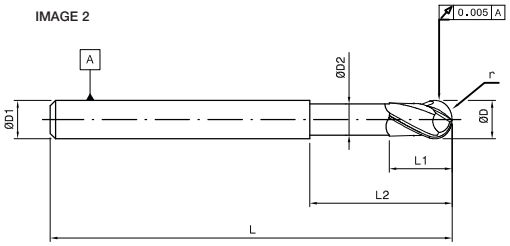


IMAGE 2



N5-N7

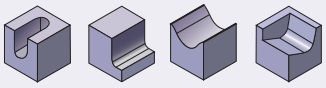
Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No
Short										
2.00	3.00	1.80	10.00	50.00	3.00	1.00	2	15	1	FBK0504272
3.00	4.00	2.80	10.00	51.00	6.00	1.50	2	15	1	FBK0504273
4.00	4.00	3.80	10.00	51.00	6.00	2.00	4	15	1	FBK0504274
5.00	5.00	4.70	10.00	51.00	6.00	2.50	4	15	1	FBK0504275
6.00	6.00	5.60	10.00	51.00	6.00	3.00	4	-	2	FBK0504276
8.00	8.00	7.40	15.00	64.00	8.00	4.00	4	-	2	FBK0504277
10.00	10.00	9.40	20.00	78.00	10.00	5.00	4	-	2	FBK0504278
12.00	10.00	11.40	20.00	78.00	12.00	6.00	4	-	2	FBK0504279

Application data on page no 2.098

Optimum Flutes

Centre cutting high performance ball nose for graphite



HPM HSM | 2-3 | 40° | FHC | 6535 HA | h5 | D

IMAGE 1

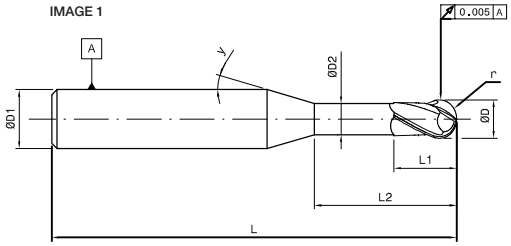


IMAGE 2

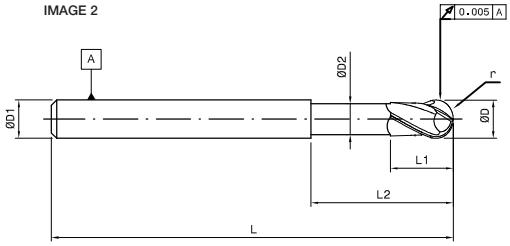


IMAGE 3

N5-N7

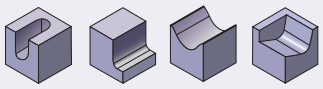
Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No
Standard										
2.00	10.00	-	-	50.00	2.00	1.00	3	-	3	FBK0504280
2.00	10.00	-	-	50.00	3.00	1.00	3	15	1	FBK0504281
2.00	10.00	1.80	15.00	50.00	3.00	1.00	3	15	1	FBK0506037
2.00	10.00	1.80	20.00	50.00	3.00	1.00	3	15	1	FBK0506038
2.00	10.00	1.80	30.00	65.00	3.00	1.00	3	15	1	FBK0506039
3.00	10.00	-	-	50.00	3.00	1.50	3	-	3	FBK0504282
3.00	10.00	2.80	15.00	50.00	3.00	1.50	3	-	2	FBK0506040
3.00	10.00	2.80	20.00	50.00	3.00	1.50	3	-	2	FBK0506041
3.00	10.00	2.80	30.00	50.00	3.00	1.50	3	-	2	FBK0506042
4.00	15.00	-	-	60.00	4.00	2.00	3	-	3	FBK0504283
5.00	20.00	-	-	60.00	5.00	2.50	3	-	3	FBK0504284
6.00	30.00	-	-	78.00	6.00	3.00	3	-	3	FBK0504285
8.00	30.00	-	-	78.00	8.00	4.00	3	-	3	FBK0504286
10.00	30.00	-	-	78.00	10.00	5.00	3	-	3	FBK0504287
12.00	30.00	-	-	89.00	12.00	6.00	3	-	3	FBK0504288

Application data on page no 2.098

Optimum Flutes

Centre cutting high performance ball nose for graphite



HPM HSM | 2-3 | 40° | FHC | 6535 HA | h5 | D

IMAGE 1

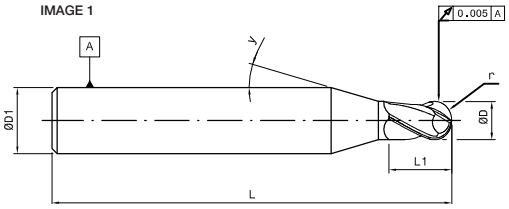


IMAGE 2

N5-N7

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No
Long										
2.00	6.00	-	-	102.00	3.00	1.00	2	15	1	FBK0504289
3.00	16.00	-	-	102.00	3.00	1.50	2	-	2	FBK0504290
4.00	16.00	-	-	102.00	4.00	2.00	2	-	2	FBK0504291
6.00	42.00	-	-	102.00	6.00	3.00	2	-	2	FBK0504292
6.00	42.00	-	-	150.00	6.00	3.00	2	-	2	FBK0504293
8.00	42.00	-	-	102.00	8.00	4.00	2	-	2	FBK0504294
8.00	42.00	-	-	150.00	8.00	4.00	2	-	2	FBK0504295
10.00	45.00	-	-	150.00	10.00	5.00	2	-	2	FBK0504296
12.00	65.00	-	-	150.00	12.00	6.00	2	-	2	FBK0504297

Application data on page no 2.098

Cutting parameters

Centre cutting high performance ball nose for graphite - 2.0 mm to 5.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling		Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)								
			Roughing	Finishing				Diameter in mm								
								mm	2.0		3.0		4.0		5.0	
			ap 2D ae/D 20%	ap 2D ae/D 10%		min	max	Range	min	max	min	max	min	max	min	max
Non Ferrous	N	5	600	550	DRY	500	<600	fz	0.012	0.036	0.018	0.048	0.030	0.060	0.042	0.072
		6				500	<600	fz	0.012	0.036	0.018	0.048	0.030	0.060	0.042	0.072
		7				350	500	fz	0.012	0.036	0.018	0.048	0.030	0.060	0.042	0.072

Centre cutting high performance ball nose for graphite - 6.0 mm to 12.0 mm

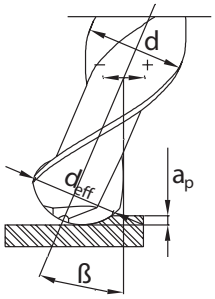
Material Group			Cutting Speed (Vc) m/min for Shoulder Milling		Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)								
			Roughing	Finishing				Diameter in mm								
								mm	6.0		8.0		10.0		12.0	
			ap 2D ae/D 20%	ap 2D ae/D 10%		min	max	Range	min	max	min	max	min	max	min	max
Non Ferrous	N	5	600	550	DRY	500	<600	fz	0.054	0.096	0.066	0.120	0.090	0.144	0.108	0.168
		6				500	<600	fz	0.054	0.096	0.066	0.120	0.090	0.144	0.108	0.168
		7				350	500	fz	0.054	0.096	0.066	0.120	0.090	0.144	0.108	0.168

FBK0504283

Workpiece material: ISO 63

	Totem
Ø	4mm
Z	3 Flutes
vc	276 m/min
n	22000 rpm
fz	0.121 mm/t
vf	8000 mm/min
ap	5.0 mm
ae	0.1 mm
Coolant	air

Q	4.0 cm^3/min



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1

* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D\text{-}ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D\text{-}2 \times ADOC}{D}\right)\right]$$

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

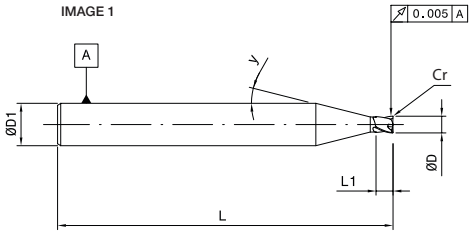
Disclaimer

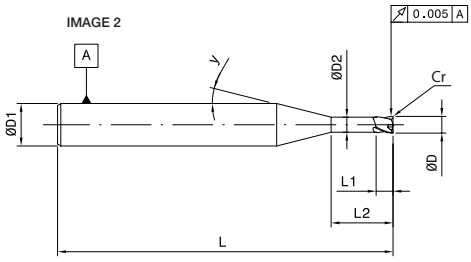
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

2 Flute

Centre cutting high performance micro end mill with corner radius for graphite

HPM HSM | 40° | FHC | 6535 HA | h5 | D





N5-N7

Unit : mm

ØD	L1	ØD2	L2	L	ØD1	Cr	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	mm	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
0.30	1.00	-	-	64.00	6.00	0.05	2	7	1	1.743	1.896	2.304	2.944	FBK0504298
0.30	1.50	0.28	2.50	64.00	6.00	0.05	2	7	2	2.908	3.148	3.771	4.710	FBK0504299
0.30	1.50	0.28	5.00	64.00	6.00	0.05	2	8	2	5.562	5.967	6.988	8.436	FBK0504300
0.40	1.50	-	-	64.00	6.00	0.05	2	6	1	1.744	1.900	2.319	2.985	FBK0504301
0.40	1.50	0.38	2.50	64.00	6.00	0.05	2	7	2	2.912	3.156	3.797	4.773	FBK0504302
0.40	1.50	0.38	5.00	64.00	6.00	0.05	2	8	2	5.568	5.982	7.029	8.529	FBK0504303
0.50	1.50	-	-	64.00	6.00	0.05	2	6	1	2.286	2.492	3.043	3.918	FBK0504304
0.50	1.50	0.48	3.50	64.00	6.00	0.05	2	7	2	3.984	4.310	5.158	6.429	FBK0504305
0.50	1.50	0.48	7.00	64.00	6.00	0.05	2	8	2	7.671	8.192	9.480	11.256	FBK0504306
0.50	1.50	0.48	10.00	64.00	6.00	0.05	2	10	2	10.772	11.375	12.813	14.671	FBK0504307
0.60	1.50	-	-	64.00	6.00	0.05	2	6	1	2.890	3.157	3.878	5.036	FBK0504308
0.60	2.00	0.55	3.50	64.00	6.00	0.05	2	7	2	4.185	4.534	5.442	6.815	FBK0504309
0.60	2.00	0.55	7.00	64.00	6.00	0.05	2	8	2	7.864	8.405	9.750	11.614	FBK0504310
0.60	2.00	0.55	10.00	64.00	6.00	0.05	2	10	2	10.959	11.582	13.07	15.001	FBK0504311
0.80	2.00	-	-	64.00	6.00	0.05	2	6	1	3.435	3.760	4.642	6.078	FBK0504312
0.80	2.00	0.75	5.00	64.00	6.00	0.05	2	7	2	5.787	6.253	7.456	9.240	FBK0504313
0.80	2.00	0.75	7.50	64.00	6.00	0.05	2	8	2	8.402	8.987	10.447	12.478	FBK0504314
0.80	2.00	0.75	10.00	64.00	6.00	0.05	2	9	2	10.978	11.629	13.195	15.253	FBK0504315
0.80	2.00	0.75	15.00	64.00	6.00	0.05	2	13	2	16.043	16.674	18.099	19.794	FBK0504316
1.00	2.50	-	-	64.00	6.00	0.05	2	6	1	3.982	4.368	5.423	7.163	FBK0504317
1.00	3.00	0.95	5.00	64.00	6.00	0.05	2	7	2	5.805	6.294	7.572	9.512	FBK0504318
1.00	3.00	0.95	7.50	64.00	6.00	0.05	2	8	2	8.422	9.036	10.581	12.772	FBK0504319
1.00	3.00	0.95	10.00	64.00	6.00	0.05	2	9	2	10.999	11.680	13.333	15.537	FBK0504320
1.00	3.00	0.95	15.00	64.00	6.00	0.05	2	13	2	16.057	16.716	18.212	20.005	FBK0504321
1.00	3.00	0.95	20.00	64.00	6.00	0.05	2	18	2	21.124	21.741	23.091	24.621	FBK0504322
1.20	3.00	1.15	5.00	64.00	6.00	0.05	2	7	2	5.950	6.475	7.869	10.037	FBK0504323
1.20	3.00	1.15	10.00	64.00	6.00	0.05	2	9	2	11.183	11.907	13.683	16.087	FBK0504324
1.50	3.00	1.45	5.00	64.00	6.00	0.05	2	6	2	5.978	6.548	8.094	10.609	FBK0504325
1.50	3.00	1.45	7.50	64.00	6.00	0.05	2	7	2	8.618	9.326	11.166	13.921	FBK0504326
1.50	3.00	1.45	10.00	64.00	6.00	0.05	2	8	2	11.215	11.996	13.941	16.647	FBK0504327
1.50	3.00	1.45	15.00	64.00	6.00	0.05	2	12	2	16.319	17.069	18.798	20.921	FBK0504328
1.50	3.00	1.45	20.00	64.00	6.00	0.05	2	15	2	21.448	22.194	23.854	25.785	FBK0504329

Application data on page no 2.100

Cutting parameters

Center cutting high performance micro end mill with corner radius for graphite (Shoulder Milling) - 0.3 mm to 1.5 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling ap 2D ae/D 10%	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)															
							Diameter in mm															
							mm	0.3		0.4		0.5		0.6		0.8		1.0		1.2		1.5	
					min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Non Ferrous	N	5	600	DRY	500	<600	fz	0.007	0.014	0.010	0.018	0.012	0.024	0.014	0.026	0.018	0.030	0.022	0.036	0.024	0.042	0.030	0.048
		6			500	<600	fz	0.007	0.014	0.010	0.018	0.012	0.024	0.014	0.026	0.018	0.030	0.022	0.036	0.024	0.042	0.030	0.048
		7			350	500	fz	0.007	0.014	0.010	0.018	0.012	0.024	0.014	0.026	0.018	0.030	0.022	0.036	0.024	0.042	0.030	0.048

Center cutting high performance micro end mill with corner radius for graphite (Slot Milling) - 0.3 mm to 1.5 mm

Material Group			Cutting Speed (Vc) m/min for Slot Milling ap 0.2D ae/D 100%	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)															
							Diameter in mm															
							mm	0.3		0.4		0.5		0.6		0.8		1.0		1.2		1.5	
					min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Non Ferrous	N	5	550	DRY	500	<600	fz	0.006	0.012	0.008	0.015	0.010	0.020	0.012	0.022	0.015	0.025	0.018	0.030	0.020	0.035	0.025	0.040
		6			500	<600	fz	0.006	0.012	0.008	0.015	0.010	0.020	0.012	0.022	0.015	0.025	0.018	0.030	0.020	0.035	0.025	0.040
		7			350	500	fz	0.006	0.012	0.008	0.015	0.010	0.020	0.012	0.022	0.015	0.025	0.018	0.030	0.020	0.035	0.025	0.040

Advantages

- Excellent accuracy and tolerances
- Optimized surface finish on workpiece
- Leading diamond coating technology
- Superior toollife

Cutting speed Vc is based on max. 40,000 rpm.
Given conditions are based on micro short length endmills; when using endmills with longer L2-length, reduce fz according to the below table.

L2-Length	Reduction in Feed/Tooth (fz)
1-5 x D	0%
5-10 x D	30%
10 ~	50%

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

2 Flute

Centre cutting high performance micro ball nose for graphite

HPM HSM | 40° | FHC | 6535 HA | h5 | D

N5-N7

IMAGE 1

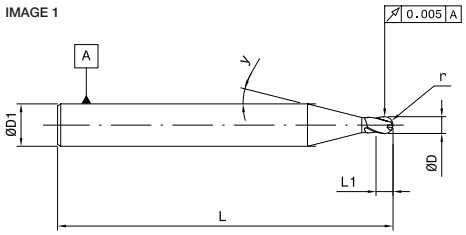
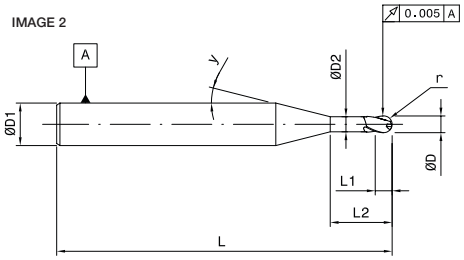


IMAGE 2



Unit : mm

ØD	L1	ØD2	L2	L	ØD1	r	z	γ	Image	Effective length compared with Inclined Angle				EDP No
(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		(°)		0.5°	1°	2°	3°	
0.3	1.0	-	-	64	6	0.15	2	6	1	1.736	1.886	2.292	2.946	FBK0504330
0.3	1.5	0.28	2.5	64	6	0.15	2	7	2	2.901	3.131	3.731	4.635	FBK0504331
0.3	1.5	0.28	5.0	64	6	0.15	2	8	2	5.555	5.953	6.953	8.373	FBK0504332
0.4	1.5	-	-	64	6	0.20	2	6	1	1.731	1.880	2.283	2.942	FBK0504333
0.4	1.5	0.38	2.5	64	6	0.20	2	7	2	2.900	3.131	3.735	4.656	FBK0504334
0.4	1.5	0.38	5.0	64	6	0.20	2	8	2	5.557	5.959	6.976	8.432	FBK0504335
0.5	1.5	-	-	64	6	0.25	2	6	1	2.272	2.472	3.020	3.928	FBK0504336
0.5	1.5	0.48	3.5	64	6	0.25	2	7	2	3.968	4.277	5.078	6.280	FBK0504337
0.5	1.5	0.48	7.0	64	6	0.25	2	8	2	7.658	8.164	9.417	11.143	FBK0504338
0.5	1.5	0.48	10	64	6	0.25	2	10	2	10.761	11.353	12.762	14.584	FBK0504339
0.6	1.5	-	-	64	6	0.30	2	6	1	2.871	3.131	3.849	5.055	FBK0504340
0.6	2.0	0.55	3.5	64	6	0.30	2	7	2	4.166	4.492	5.341	6.624	FBK0504341
0.6	2.0	0.55	7.0	64	6	0.30	2	8	2	7.848	8.371	9.670	11.470	FBK0504342
0.6	2.0	0.55	10	64	6	0.30	2	10	2	10.946	11.554	13.006	14.890	FBK0504343
0.8	2.0	-	-	64	6	0.40	2	6	1	3.413	3.731	4.625	6.177	FBK0504344
0.8	2.0	0.75	5.0	64	6	0.40	2	7	2	5.761	6.196	7.320	8.987	FBK0504345
0.8	2.0	0.75	7.5	64	6	0.40	2	8	2	8.379	8.938	10.332	12.273	FBK0504346
0.8	2.0	0.75	10	64	6	0.40	2	9	2	10.958	11.587	13.100	15.089	FBK0504347
0.8	2.0	0.75	15	64	6	0.40	2	13	2	16.029	16.646	18.039	19.695	FBK0504348
1.0	2.5	-	-	64	6	0.50	2	5	1	3.958	4.341	5.437	7.410	FBK0504349
1.0	3.0	0.95	5.0	64	6	0.50	2	7	2	5.770	6.218	7.388	9.164	FBK0504350
1.0	3.0	0.95	7.5	64	6	0.50	2	8	2	8.392	8.970	10.427	12.491	FBK0504351
1.0	3.0	0.95	10	64	6	0.50	2	9	2	10.973	11.624	13.205	15.313	FBK0504352
1.0	3.0	0.95	15	64	6	0.50	2	13	2	16.040	16.679	18.131	19.872	FBK0504353
1.0	3.0	0.95	20	64	6	0.50	2	18	2	21.111	21.715	23.035	24.532	FBK0504354
1.2	3.0	1.15	5.0	64	6	0.60	2	7	2	5.905	6.378	7.630	9.579	FBK0504355
1.2	3.0	1.15	10	64	6	0.60	2	9	2	11.149	11.836	13.518	15.796	FBK0504356
1.5	3.0	1.45	5.0	64	6	0.75	2	6	2	5.917	6.413	7.761	9.953	FBK0504357
1.5	3.0	1.45	7.5	64	6	0.75	2	7	2	8.564	9.210	10.889	13.401	FBK0504358
1.5	3.0	1.45	10	64	6	0.75	2	8	2	11.169	11.898	13.713	16.238	FBK0504359
1.5	3.0	1.45	15	64	6	0.75	2	12	2	16.288	17.004	18.656	20.684	FBK0504360
1.5	3.0	1.45	20	64	6	0.75	2	15	2	21.425	22.145	23.749	25.615	FBK0504361

Application data on page no 2.102

Cutting parameters

Center cutting high performance micro end mill for graphite - 2.0 mm to 5.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling ap 1D ae/D 10%	Cutting Speed (Vc) m/min for Profile Milling ap 0.1D ae/D 10%	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz) / for slot milling reduce fz by 20%								
								Diameter in mm								
								mm	2.0		3.0		4.0		5.0	
						min	max	Range	min	max	min	max	min	max	min	max
Non Ferrous	N	5	600	550	DRY	500	<600	fz	0.007	0.014	0.010	0.018	0.012	0.024	0.014	0.026
		6				500	<600	fz	0.007	0.014	0.010	0.018	0.012	0.024	0.014	0.026
		7				350	500	fz	0.007	0.014	0.010	0.018	0.012	0.024	0.014	0.026

Center cutting high performance micro end mill for graphite - 6.0 mm to 12.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling ap 1D ae/D 10%	Cutting Speed (Vc) m/min for Profile Milling ap 0.1D ae/D 10%	Lubrication	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz) / for slot milling reduce fz by 20%								
								Diameter in mm								
								mm	6.0		8.0		10.0		12.0	
						min	max	Range	min	max	min	max	min	max	min	max
Non Ferrous	N	5	600	550	DRY	500	<600	fz	0.018	0.030	0.022	0.036	0.024	0.042	0.030	0.048
		6				500	<600	fz	0.018	0.030	0.022	0.036	0.024	0.042	0.030	0.048
		7				350	500	fz	0.018	0.030	0.022	0.036	0.024	0.042	0.030	0.048

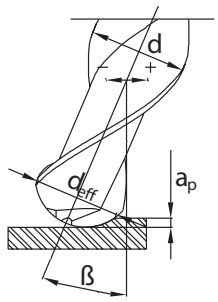
FBK0504349
Workpiece material: Poco Graphite
Hardness: 1700

	Competiton	Totem
Ø	1mm	1mm
Z	2 Flutes	2 Flutes
vc	126 m/min	126 m/min
n	40000 rpm	40000 rpm
Fz	0.010 mm/t	0.013 mm/t
vf	800 mm/min	1000 mm/min
ap	0.05 mm	0.05 mm
ae	0.10 mm	0.10 mm
Coolant	air	air
Q	4.0 mm^3/min	5.0 mm^3/min

Excellent surface finish

Cutting speed Vc is based on max. 40,000 rpm.
Given conditions are based on micro short length endmills; when using endmills with longer L2-length, reduce fz according table.

L2-Length	Reduction
1-5 x d	0%
5-10 x d	30%
10 ~	50%



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1
* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D-ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D-2 \times ADOC}{D}\right)\right]$$

Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Proton plus (45-62 HRc)

Features
- Superior nano grain structure raw material
- Wear resistant grade
- Ideal chip flow geometry
- Close tolerance end mills for finishing for higher accuracy

Functions
- Operates at high cutting speeds on hardened materials
- Polishing for hardened dies can be minimized
- No need of multiple setups, Job can be finished with single setup with high accuracy

Benefits
- Higher Tool Life and consistency

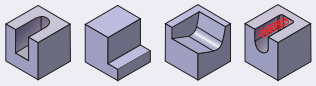
FBK0504268
Workpiece material: ISO 63

	Competitor	Totem
Ø	6mm	6mm
Z	2 Flutes	2 Flutes
Vc	226 m/min	226 m/min
n	12000 rpm	12000 rpm
fz	0.08 mm/tooth	0.08 mm/tooth
Vf	2000mm/min	2000mm/min
ap	0.15mm	0.15mm
ae	0.15mm	0.15mm
Coolant	Air	Air
Q	45mm3/min	45mm3/min
Tool Life	13 Hrs	21 Hrs

Higher productivity

4 Flute

Centre cutting proton plus end mill for 45-62 HRc steel



Carbide | REG | 30° | 6535 HA | 0.1X45° | Above 45 HRC | Proton Plus

P5-P6
H1-H4

IMAGE 1

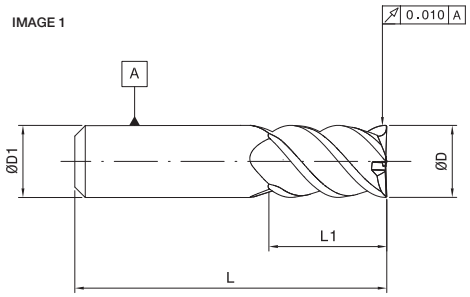
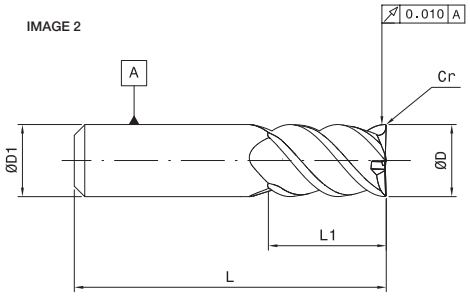


IMAGE 2



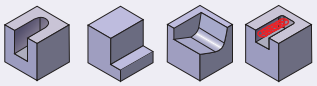
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	Ø D1 (mm)	Cr (mm)	z	Image	EDP No
3.00	12.00	38.00	3.00	-	4	1	FBK0503424
3.00	12.00	38.00	3.00	0.50	4	2	FBK0503425
3.00	12.00	38.00	3.00	1.00	4	2	FBK0503426
4.00	14.00	51.00	4.00	-	4	1	FBK0503427
4.00	14.00	51.00	4.00	0.50	4	2	FBK0503428
4.00	14.00	51.00	4.00	1.00	4	2	FBK0503429
5.00	15.00	60.00	5.00	-	4	1	FBK0503430
5.00	15.00	60.00	5.00	0.50	4	2	FBK0503431
5.00	15.00	60.00	5.00	1.00	4	2	FBK0503432
6.00	15.00	60.00	6.00	-	4	1	FBK0503433
6.00	15.00	60.00	6.00	0.50	4	2	FBK0503434
6.00	15.00	60.00	6.00	1.00	4	2	FBK0503435
8.00	19.00	60.00	8.00	-	4	1	FBK0503436
8.00	19.00	60.00	8.00	0.50	4	2	FBK0503437
8.00	19.00	60.00	8.00	1.00	4	2	FBK0503438
10.00	22.00	75.00	10.00	-	4	1	FBK0503439
10.00	22.00	75.00	10.00	0.50	4	2	FBK0503440
10.00	22.00	75.00	10.00	1.00	4	2	FBK0503441
12.00	22.00	76.00	12.00	-	4	1	FBK0503442
12.00	22.00	76.00	12.00	0.50	4	2	FBK0503443
12.00	22.00	76.00	12.00	1.00	4	2	FBK0503444
16.00	32.00	100.00	16.00	-	4	1	FBK0503445
16.00	32.00	100.00	16.00	0.50	4	2	FBK0503446
16.00	32.00	100.00	16.00	1.00	4	2	FBK0503447

Application data on page no 2.113

4 Flute

Centre cutting proton plus end mill 45-62 HRc for steel



Carbide | LONG | 30° | 6535 HA | 0.1X45° | Above 45 HRC | Proton Plus

IMAGE 1

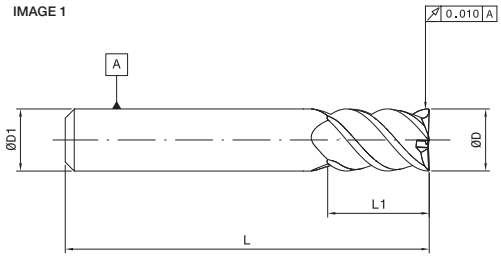
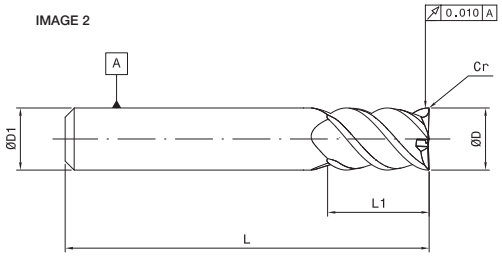


IMAGE 2



P5-P6
H1-H4

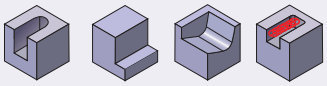
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	Ø D1 (mm)	Cr (mm)	z	Image	EDP No
3.00	12.00	60.00	3.00	-	4	1	FBK0503448
3.00	12.00	60.00	3.00	0.50	4	2	FBK0503449
3.00	12.00	60.00	3.00	1.00	4	2	FBK0503450
4.00	14.00	76.00	4.00	-	4	1	FBK0503451
4.00	14.00	76.00	4.00	0.50	4	2	FBK0503452
4.00	14.00	76.00	4.00	1.00	4	2	FBK0503453
5.00	15.00	76.00	5.00	-	4	1	FBK0503454
5.00	15.00	76.00	5.00	0.50	4	2	FBK0503455
5.00	15.00	76.00	5.00	1.00	4	2	FBK0503456
6.00	20.00	80.00	6.00	-	4	1	FBK0503457
6.00	20.00	80.00	6.00	0.50	4	2	FBK0503458
6.00	20.00	80.00	6.00	1.00	4	2	FBK0503459
8.00	25.00	80.00	8.00	-	4	1	FBK0503460
8.00	25.00	80.00	8.00	0.50	4	2	FBK0503461
8.00	25.00	80.00	8.00	1.00	4	2	FBK0503462
10.00	25.00	100.00	10.00	-	4	1	FBK0503463
10.00	25.00	100.00	10.00	0.50	4	2	FBK0503464
10.00	25.00	100.00	10.00	1.00	4	2	FBK0503465
12.00	30.00	102.00	12.00	-	4	1	FBK0503466
12.00	30.00	102.00	12.00	0.50	4	2	FBK0503467
12.00	30.00	102.00	12.00	1.00	4	2	FBK0503468
16.00	40.00	150.00	16.00	-	4	1	FBK0503469
16.00	40.00	150.00	16.00	0.50	4	2	FBK0503470
16.00	40.00	150.00	16.00	1.00	4	2	FBK0503471

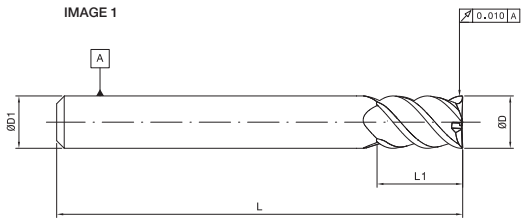
Application data on page no 2.113

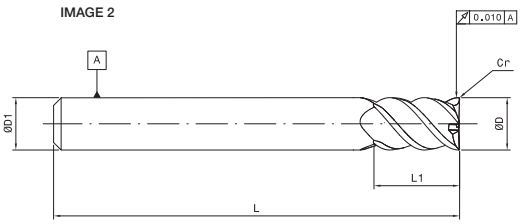
4 Flute

Centre cutting proton plus end mill for 45-62 HRc



Carbide | LONG REACH | 30° | 6535 HA | 0.1X45° | Above 45 HRC | Proton Plus





P5-P6
H1-H4

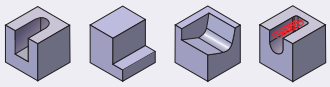
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	Image	EDP No
6.00	25.00	100.00	6.00	-	4	1	FBK0503472
6.00	25.00	100.00	6.00	0.50	4	2	FBK0503473
6.00	25.00	100.00	6.00	1.00	4	2	FBK0503474
8.00	25.00	100.00	8.00	-	4	1	FBK0503475
8.00	25.00	100.00	8.00	0.50	4	2	FBK0503476
8.00	25.00	100.00	8.00	1.00	4	2	FBK0503477
10.00	30.00	150.00	10.00	-	4	1	FBK0503478
10.00	30.00	150.00	10.00	0.50	4	2	FBK0503479
10.00	30.00	150.00	10.00	1.00	4	2	FBK0503480
12.00	30.00	150.00	12.00	-	4	1	FBK0503481
12.00	30.00	150.00	12.00	0.50	4	2	FBK0503482
12.00	30.00	150.00	12.00	1.00	4	2	FBK0503483

Application data on page no 2.113

4 Flute

Centre cutting proton plus end mill for 45-62 HRc with 50⁰ helix



Carbide | REG | 50⁰ | 6535 HA | 0.1X45⁰ | Above 45 HRC | Proton Plus

IMAGE 1

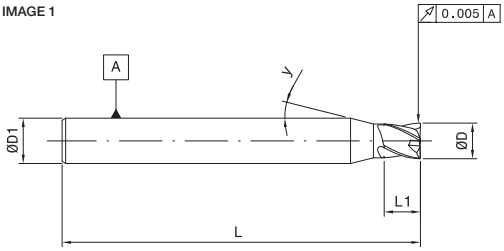
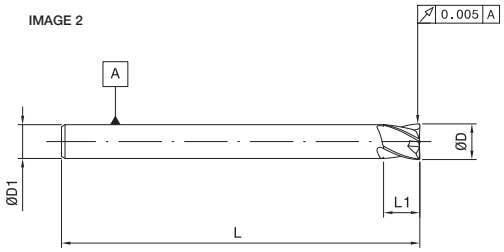


IMAGE 2



P5-P6

H1-H4

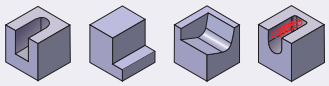
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No
3.00	5.00	50.00	6.00	4	10	1	FBK0508765
4.00	6.00	50.00	6.00	4	10	1	FBK0508766
5.00	8.00	50.00	6.00	4	10	1	FBK0508767
6.00	9.00	50.00	6.00	4	-	2	FBK0508768
8.00	12.00	63.00	8.00	4	-	2	FBK0508769
10.00	15.00	76.00	10.00	4	-	2	FBK0508770
12.00	18.00	76.00	12.00	4	-	2	FBK0508771
16.00	24.00	89.00	16.00	4	-	2	FBK0508772
20.00	30.00	104.00	20.00	4	-	2	FBK0508773
25.00	38.00	121.00	25.00	5	-	2	FBK0508774

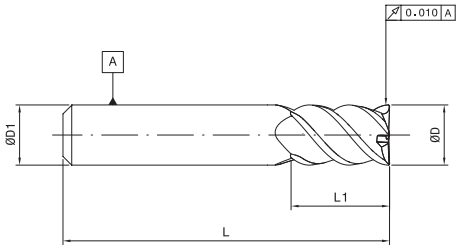
Application data on page no 2.113

4 Flute

Centre cutting proton plus end mill for 45-62 HRc with 50⁰ helix



Carbide | LONG | 50⁰ | 6535 HA | 0.1X45⁰ | Above 45 HRC | Proton Plus



P5-P6
H1-H4

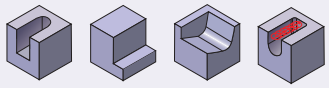
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP No
6.00	21.00	76.00	6.00	4	FBK0508775
8.00	28.00	100.00	8.00	4	FBK0508776
10.00	35.00	100.00	10.00	5	FBK0508777
12.00	42.00	125.00	12.00	6	FBK0508778
16.00	56.00	125.00	16.00	6	FBK0508779
20.00	70.00	150.00	20.00	6	FBK0508780
25.00	88.00	150.00	25.00	6	FBK0508781

Application data on page no 2.113

4 Flute

Centre cutting proton plus end mill for 45-62 HRc with 50⁰ helix



Carbide | REG | 50⁰ | 6535 HA | Above 45 HRC | Proton Plus

IMAGE 1

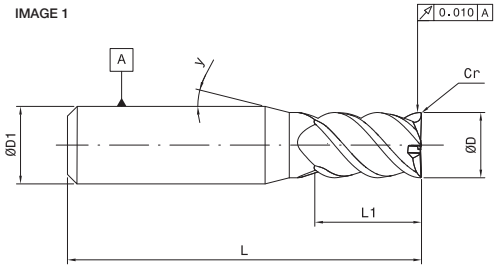
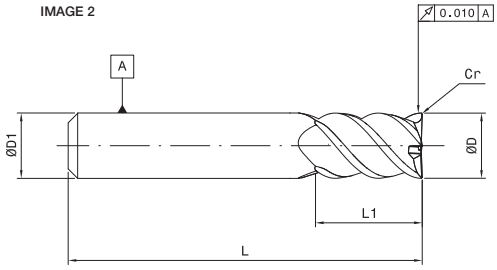


IMAGE 2



P5-P6
H1-H4

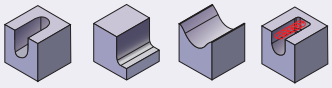
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	γ (°)	Image	EDP No
3.00	4.50	50.00	6.00	0.25	4	10	1	FBK0508851
3.00	4.50	50.00	6.00	0.50	4	10	1	FBK0508852
4.00	6.00	50.00	6.00	0.25	4	10	1	FBK0508853
4.00	6.00	50.00	6.00	0.50	4	10	1	FBK0508854
5.00	8.00	50.00	6.00	0.25	4	10	1	FBK0508855
5.00	8.00	50.00	6.00	0.50	4	10	1	FBK0508856
6.00	6.00	50.00	6.00	0.25	4	-	2	FBK0508857
6.00	6.00	50.00	6.00	0.50	4	-	2	FBK0508858
6.00	6.00	50.00	6.00	0.75	4	-	2	FBK0508859
6.00	6.00	50.00	6.00	1.00	4	-	2	FBK0508860
8.00	12.00	63.00	8.00	0.50	4	-	2	FBK0508861
8.00	12.00	63.00	8.00	0.75	4	-	2	FBK0508862
8.00	12.00	63.00	8.00	1.00	4	-	2	FBK0508863
8.00	12.00	63.00	8.00	1.50	4	-	2	FBK0508864
10.00	15.00	76.00	10.00	0.50	4	-	2	FBK0508865
10.00	15.00	76.00	10.00	1.00	4	-	2	FBK0508866
10.00	15.00	76.00	10.00	1.50	4	-	2	FBK0508867
10.00	15.00	76.00	10.00	2.00	4	-	2	FBK0508868
12.00	18.00	76.00	12.00	0.50	4	-	2	FBK0508869
12.00	18.00	76.00	12.00	1.00	4	-	2	FBK0508870
12.00	18.00	76.00	12.00	1.50	4	-	2	FBK0508871
12.00	18.00	76.00	12.00	2.00	4	-	2	FBK0508872
16.00	24.00	89.00	16.00	0.50	4	-	2	FBK0508873
16.00	24.00	89.00	16.00	1.50	4	-	2	FBK0508874
16.00	24.00	89.00	16.00	2.00	4	-	2	FBK0508875
20.00	30.00	104.00	20.00	0.50	4	-	2	FBK0508876
20.00	30.00	104.00	20.00	1.00	4	-	2	FBK0508877
20.00	30.00	104.00	20.00	2.00	4	-	2	FBK0508878

Application data on page no 2.113

2 Flute

Centre cutting proton plus ball nose end mill for 45-62 HRc Steel



Carbide | REG | 30° | 6535 HA | Above 45 HRC | Proton Plus

IMAGE 1

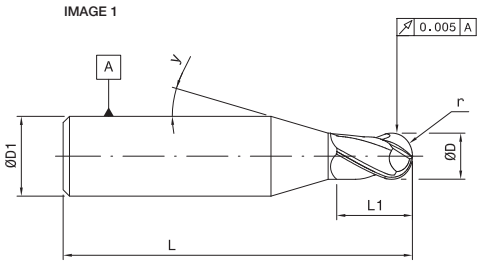
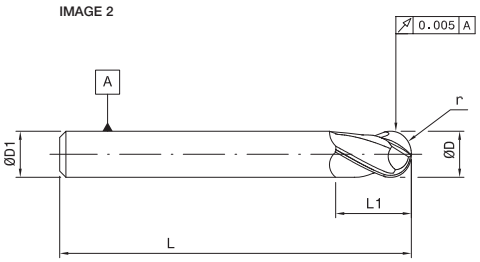


IMAGE 2



P5-P6
H1-H4

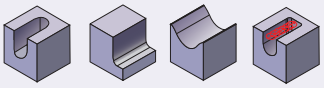
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r	z	γ (°)	Image	EDP No
1.00	2.00	60.00	4.00	0.50	2	10	1	FBK0501561
1.50	3.00	60.00	4.00	0.75	2	10	1	FBK0501562
2.00	4.00	60.00	4.00	1.00	2	10	1	FBK0501563
2.50	4.00	60.00	4.00	1.25	2	10	1	FBK0501564
3.00	5.00	60.00	6.00	1.50	2	10	1	FBK0501565
4.00	6.00	60.00	6.00	2.00	2	10	1	FBK0501566
5.00	4.00	80.00	6.00	2.50	2	10	1	FBK0501571
6.00	10.00	60.00	6.00	3.00	2	-	2	FBK0501553
8.00	16.00	60.00	8.00	4.00	2	-	2	FBK0501554
10.00	19.00	75.00	10.00	5.00	2	-	2	FBK0501555
12.00	22.00	80.00	12.00	6.00	2	-	2	FBK0501556

Application data on page no 2.113

2 Flute

Centre cutting proton plus ball nose end mill for 45-62 HRc



Carbide | LONG | 30° | 6535 HA | Above 45 HRC | Proton Plus

IMAGE 1

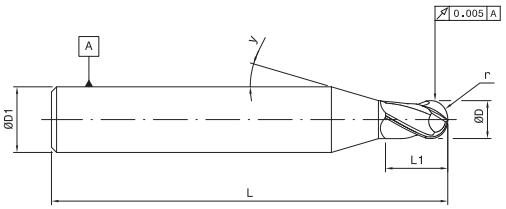
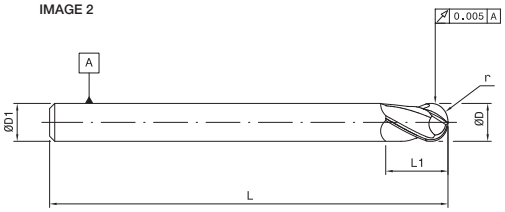


IMAGE 2



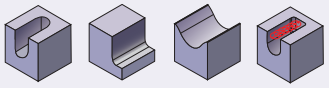
P5-P6
H1-H4

Unit : mm

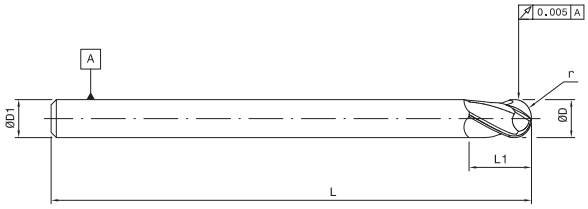
ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r	z	γ (°)	Image	EDP No
1.00	2.00	80.00	4.00	0.50	2	10	1	FBK0501567
2.00	3.00	80.00	4.00	1.00	2	10	1	FBK0501568
3.00	4.00	80.00	6.00	1.50	2	10	1	FBK0501569
4.00	4.00	80.00	6.00	2.00	2	10	1	FBK0501570
6.00	10.00	80.00	6.00	3.00	2	-	2	FBK0501557
8.00	16.00	80.00	8.00	4.00	2	-	2	FBK0503390
10.00	19.00	100.00	10.00	5.00	2	-	2	FBK0501559
10.00	25.00	102.00	10.00	5.00	2	-	2	FBK0503513
12.00	22.00	100.00	12.00	6.00	2	-	2	FBK0501560

Application data on page no 2.113

2 Flute — Centre cutting proton plus ball nose end mill for 45-62 HRc



Carbide | LONG REACH | 30° | 6535 HA | Above 45 HRC | Proton Plus



P5-P6
H1-H4

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r	z	EDP No
6.00	12.00	102.00	6.00	3.00	2	FBK0503367
8.00	16.00	100.00	8.00	4.00	2	FBK0501558
10.00	32.00	152.00	10.00	5.00	2	FBK0503912
12.00	32.00	152.00	12.00	6.00	2	FBK0503913

Application data on page no 2.113

Cutting parameters

Centre cutting proton plus ball nose end mill for 45-62 HRc - 1.0 mm to 12.0 mm

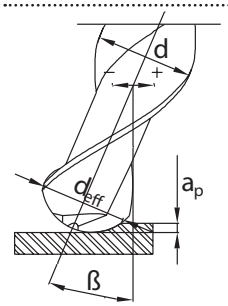
Material Group			Cutting Speed (Vc) m/min for Profile Milling	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)																			
						Diameter in mm																			
						mm	1.0		1.5		2.0		3.0		4.0		5.0		6.0		8.0		10.0		12.0	
			ap 0.02D ae/D 5%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	5	157	157	262	fz	0.011	0.013	0.012	0.015	0.013	0.016	0.020	0.025	0.026	0.033	0.034	0.043	0.038	0.048	0.042	0.052	0.044	0.055	0.047	0.059
		6	157	157	252	fz	0.009	0.012	0.011	0.013	0.011	0.014	0.019	0.023	0.025	0.031	0.031	0.039	0.034	0.043	0.037	0.046	0.039	0.049	0.042	0.052
Hardened Steel	H	1	141	141	211	fz	0.009	0.012	0.010	0.013	0.011	0.014	0.017	0.021	0.022	0.028	0.028	0.035	0.032	0.039	0.034	0.042	0.036	0.045	0.038	0.048
		2	126	126	189	fz	0.008	0.011	0.009	0.012	0.010	0.013	0.015	0.019	0.020	0.025	0.025	0.032	0.028	0.035	0.030	0.038	0.032	0.040	0.035	0.043
		3	110	110	166	fz	0.008	0.010	0.009	0.011	0.010	0.012	0.015	0.019	0.020	0.025	0.025	0.031	0.027	0.034	0.030	0.037	0.032	0.040	0.032	0.040
		4	110	110	151	fz	0.007	0.009	0.009	0.011	0.009	0.011	0.014	0.017	0.018	0.022	0.022	0.028	0.025	0.031	0.027	0.033	0.029	0.036	0.029	0.037

Centre cutting Proton Plus 4 Flute and corner radius end mill for 45-62 HRc - 1.0 mm to 5.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)											
						Diameter in mm											
						mm	1.0		1.5		2.0		3.0		4.0		5.0	
			ap 0.1D ae/D 5%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	5	151	151	245	fz	0.003	0.003	0.004	0.005	0.005	0.006	0.007	0.009	0.009	0.012	0.011	0.014
		6	119	119	195	fz	0.002	0.003	0.003	0.004	0.004	0.005	0.006	0.008	0.009	0.011	0.010	0.013
Hardened Steel	H	1	80	80	129	fz	0.002	0.003	0.003	0.004	0.004	0.005	0.006	0.008	0.009	0.011	0.010	0.013
		2	64	64	101	fz	0.002	0.002	0.002	0.003	0.003	0.004	0.005	0.006	0.007	0.008	0.008	0.010
		3	50	50	82	fz	0.001	0.002	0.002	0.002	0.003	0.003	0.004	0.005	0.005	0.007	0.006	0.008
		4	39	39	70	fz	0.001	0.002	0.002	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.007

Centre cutting Proton Plus 4 Flute and corner radius end mill for 45-62 HRc - 6.0mm to 20.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)											
						Diameter in mm											
						mm	6.0		8.0		10.0		12.0		16.0		20.0	
			ap 0.1D ae/D 5%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	5	151	151	245	fz	0.013	0.016	0.017	0.021	0.020	0.024	0.023	0.029	0.027	0.033	0.029	0.036
		6	119	119	195	fz	0.012	0.015	0.015	0.019	0.018	0.022	0.021	0.026	0.025	0.031	0.027	0.034
Hardened Steel	H	1	80	80	129	fz	0.012	0.015	0.015	0.019	0.018	0.022	0.021	0.026	0.024	0.031	0.028	0.034
		2	64	64	101	fz	0.009	0.011	0.011	0.014	0.013	0.016	0.016	0.020	0.018	0.023	0.021	0.026
		3	50	50	82	fz	0.007	0.009	0.009	0.011	0.011	0.013	0.012	0.016	0.015	0.018	0.017	0.021
		4	39	39	70	fz	0.006	0.008	0.007	0.009	0.009	0.011	0.010	0.013	0.012	0.016	0.014	0.018



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1

* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D\text{-}ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D\text{-}2 \times ADOC}{D}\right)\right]$$

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

HSM series (32-45 HRc)

Features
- Superior micro grain structure raw material
- Wear resistant grade
- Same tool for Roughing and Finishing for Mould Machining
- Ideal to machine upto 42 HRc

Functions
- Operates at high cutting speeds on Moulds

Benefits
- Higher Tool Life and consistency

4 Flute

Centre cutting HSM end mill for 32-45 HRc steel

Carbide | REG | 30° | 6535 HA | 30 - 45 HRC | TiAlN

IMAGE 1

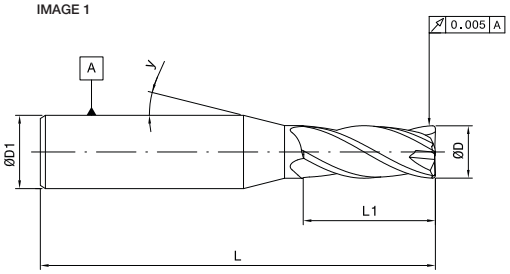
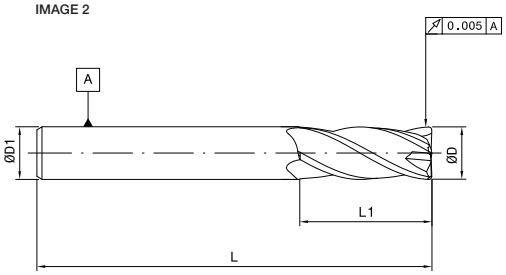


IMAGE 2



P3-P4
M1

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No
1.00	3.00	38.00	3.00	4	10	1	FBK0501970
1.50	6.00	38.00	3.00	4	10	1	FBK0501971
2.00	9.00	38.00	3.00	4	10	1	FBK0501972
2.50	12.00	38.00	3.00	4	10	1	FBK0501973
3.00	12.00	38.00	3.00	4	-	2	FBK0501200
4.00	14.00	51.00	4.00	4	-	2	FBK0501974
5.00	20.00	51.00	5.00	4	-	2	FBK0501326
6.00	20.00	64.00	6.00	4	-	2	FBK0501366
8.00	20.00	64.00	8.00	4	-	2	FBK0501975
10.00	25.00	70.00	10.00	4	-	2	FBK0500846
12.00	25.00	76.00	12.00	4	-	2	FBK0500942
14.00	30.00	89.00	14.00	4	-	2	FBK0501017
16.00	30.00	89.00	16.00	4	-	2	FBK0501048
20.00	38.00	102.00	20.00	4	-	2	FBK0501125

Application data on page no 2.119

2 Flute
Centre cutting HSM end mill for 32-45 HRc Steel

Carbide | REG | 30° | 6535 HA | 30 - 45 HRC | TiAlN

P3-P4
M1

IMAGE 1

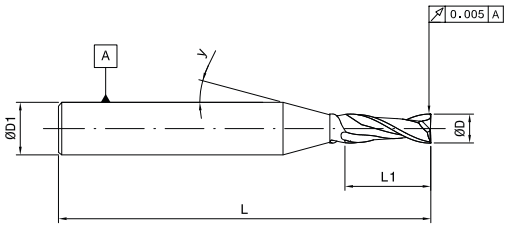
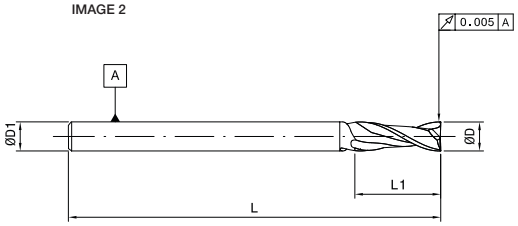


IMAGE 2



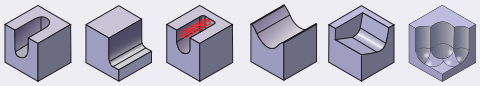
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No
1.00	3.00	38.00	3.00	2	10	1	FBK0501982
1.50	6.00	38.00	3.00	2	10	1	FBK0501983
2.00	9.00	38.00	3.00	2	10	1	FBK0501984
2.50	12.00	38.00	3.00	2	10	1	FBK0501985
3.00	12.00	38.00	3.00	2	-	2	FBK0501196
4.00	14.00	51.00	4.00	2	-	2	FBK0501986
5.00	20.00	51.00	5.00	2	-	2	FBK0501318
6.00	20.00	64.00	6.00	2	-	2	FBK0501987
8.00	20.00	64.00	8.00	2	-	2	FBK0501441
10.00	25.00	70.00	10.00	2	-	2	FBK0500834
12.00	25.00	76.00	12.00	2	-	2	FBK0500932
14.00	30.00	89.00	14.00	2	-	2	FBK0501015
16.00	30.00	89.00	16.00	2	-	2	FBK0501046
20.00	38.00	102.00	20.00	2	-	2	FBK0501122

Application data on page no 2.119

4 Flute

Centre cutting HSM ball nose end mill for 32-45 HRc Steel



Carbide | 4 | 2 | REG | 30° | 6535 HA | 30 - 45 HRC | TiAlN

IMAGE 1

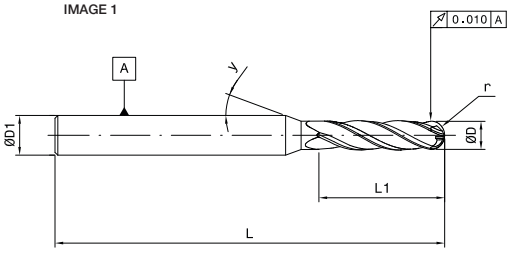
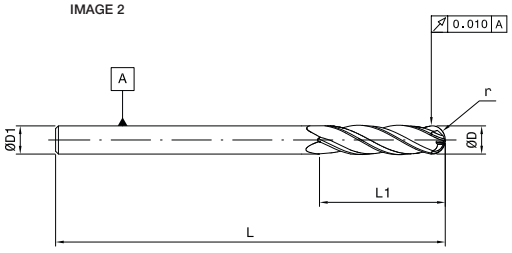


IMAGE 2



P3-P4
M1

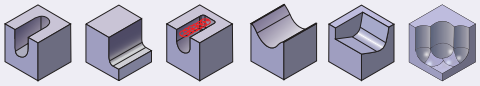
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No
1.00	3.00	38.00	3.00	0.50	4	10	1	FBK0501976
1.50	6.00	38.00	3.00	0.75	4	10	1	FBK0501977
2.00	9.00	38.00	3.00	1.00	4	10	1	FBK0501978
2.50	12.00	38.00	3.00	1.25	4	10	1	FBK0501979
3.00	12.00	38.00	3.00	1.50	4	-	2	FBK0501198
4.00	14.00	51.00	4.00	2.00	4	-	2	FBK0501980
5.00	20.00	51.00	5.00	2.50	4	-	2	FBK0501322
6.00	20.00	64.00	6.00	3.00	4	-	2	FBK0501361
8.00	20.00	64.00	8.00	4.00	4	-	2	FBK0501448
10.00	25.00	70.00	10.00	5.00	4	-	2	FBK0500838
12.00	25.00	76.00	12.00	6.00	4	-	2	FBK0500937
16.00	30.00	89.00	16.00	8.00	4	-	2	FBK0501047
20.00	38.00	102.00	20.00	10.00	4	-	2	FBK0501981

Application data on page no 2.119

2 Flute

Centre cutting HSM ball nose end mill for 32-45 HRc



Carbide | REG | 30° | 6535 HA | 30 - 45 HRC | TiAlN

IMAGE 1

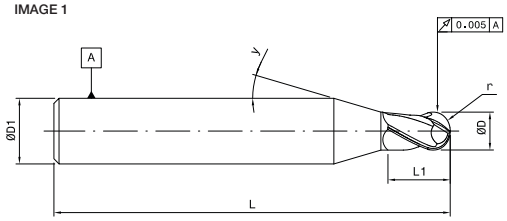
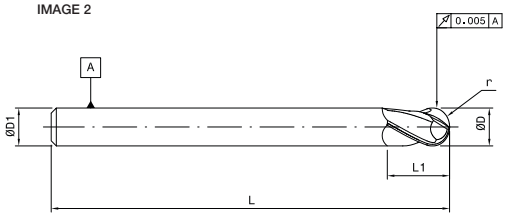


IMAGE 2



P2-P4

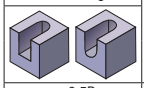
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No
1.00	3.00	38.00	3.00	0.50	2	10	1	FBK0501988
1.50	6.00	38.00	3.00	0.75	2	10	1	FBK0501989
2.00	9.00	38.00	3.00	1.00	2	10	1	FBK0501990
2.50	12.00	38.00	3.00	1.25	2	10	1	FBK0501991
3.00	12.00	38.00	3.00	1.50	2	-	2	FBK0501195
4.00	14.00	51.00	4.00	2.00	2	-	2	FBK0501241
5.00	20.00	51.00	5.00	2.50	2	-	2	FBK0501320
6.00	20.00	64.00	6.00	3.00	2	-	2	FBK0501992
8.00	20.00	64.00	8.00	4.00	2	-	2	FBK0501437
10.00	25.00	70.00	10.00	5.00	2	-	2	FBK0501993
12.00	25.00	76.00	12.00	6.00	2	-	2	FBK0501994
16.00	30.00	89.00	16.00	8.00	2	-	2	FBK0501045
20.00	38.00	102.00	20.00	10.00	2	-	2	FBK0501995

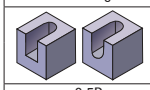
Application data on page no 2.119

Cutting parameters

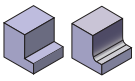
Centre cutting HSM end mill for 32-45 HRc steel - 2 Flute Flat / 4 Flute Flat & Ball - 1.0 mm to 6.0 mm

Material Group			Cutting Speed (Vc) m/min for Slot Milling 	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)															
						Diameter in mm															
						mm	1.0		1.5		2.0		3.0		4.0		5.0		6.0		
			ap 0.5D ae/D 100%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	
Steel	P	3	45	45	72	fz	0.004	0.005	0.006	0.008	0.008	0.010	0.012	0.015	0.016	0.020	0.020	0.025	0.029	0.036	
		4	40	40	68	fz	0.003	0.004	0.005	0.006	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.024	0.030	
Stainless Steel	M	1	27	27	45	fz	0.002	0.003	0.004	0.005	0.005	0.006	0.007	0.009	0.010	0.012	0.012	0.015	0.019	0.024	

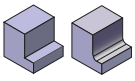
Centre cutting HSM end mill for 32-45 HRc steel - 2 Flute Flat / 4 Flute Flat & Ball - 8.0 mm to 20.0 mm

Material Group			Cutting Speed (Vc) m/min for Slot Milling 	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)											
						Diameter in mm											
						mm	8.0		10.0		12.0		14.0		16.0		20.0	
			ap 0.5D ae/D 100%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	3	45	45	72	fz	0.038	0.048	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
		4	40	40	68	fz	0.032	0.040	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100
Stainless Steel	M	1	27	27	45	fz	0.026	0.032	0.032	0.040	0.038	0.048	0.045	0.056	0.051	0.064	0.064	0.080

Centre cutting HSM end mill for 32-45 HRc - 4 Flute Flat/Ball - 1.0 mm to 6.0 mm

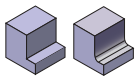
Material Group			Cutting Speed (Vc) m/min for Shoulder Milling 	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)															
						Diameter in mm															
						mm	1.0		1.5		2.0		3.0		4.0		5.0		6.0		
			ap 1D ae/D 10%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	
Steel	P	3	90	90	120	fz	0.004	0.005	0.006	0.008	0.008	0.010	0.012	0.015	0.016	0.020	0.020	0.025	0.029	0.036	
		4	75	75	90	fz	0.003	0.004	0.005	0.006	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.024	0.030	
Stainless Steel	M	1	60	60	75	fz	0.002	0.003	0.004	0.005	0.005	0.006	0.007	0.009	0.010	0.012	0.012	0.015	0.019	0.024	

Centre cutting HSM end mill for 32-45 HRc - 4 Flute Flat/Ball - 8.0 mm to 20.0 mm

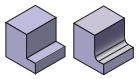
Material Group			Cutting Speed (Vc) m/min for Shoulder Milling 	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)											
						Diameter in mm											
						mm	8.0		10.0		12.0		14.0		16.0		20.0	
			ap 1D ae/D 10%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	3	90	90	120	fz	0.038	0.048	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
		4	75	75	90	fz	0.032	0.040	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100
Stainless Steel	M	1	60	60	75	fz	0.026	0.032	0.032	0.040	0.038	0.048	0.045	0.056	0.051	0.064	0.064	0.080

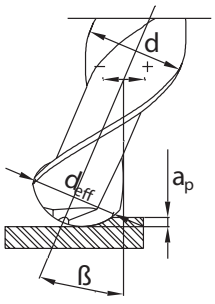
Cutting parameters

Centre cutting HSM end mill for 32-45 HRc - 2 Flute Ball - 1.0 mm to 6.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling 	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)															
						Diameter in mm															
						mm	1.0		1.5		2.0		3.0		4.0		5.0		6.0		
			ap 0.2D ae/D 30%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	3	90	90	120	fz	0.009	0.011	0.013	0.017	0.018	0.022	0.026	0.033	0.035	0.044	0.044	0.055	0.058	0.072
		4	75	75	90	fz	0.007	0.009	0.011	0.014	0.014	0.018	0.022	0.027	0.029	0.036	0.036	0.045	0.048	0.060
Hardened Steel	M	1	60	60	75	fz	0.007	0.009	0.011	0.014	0.014	0.018	0.022	0.027	0.029	0.036	0.036	0.045	0.048	0.060

Centre cutting HSM end mill for 32-45 HRc - 2 Flute Ball - 8.0 mm to 20.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling 	Cutting Speed (Vc) m/min		Recommended Feed/Tooth (fz)													
						Diameter in mm													
						mm	8.0		10.0		12.0		14.0		16.0		20.0		
			ap 0.2D ae/D 30%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	3	90	90	120	fz	0.077	0.096	0.096	0.120	0.115	0.144	0.134	0.168	0.154	0.192	0.192	0.240
		4	75	75	90	fz	0.064	0.080	0.080	0.100	0.096	0.120	0.112	0.140	0.128	0.160	0.160	0.200
Hardened Steel	M	1	60	60	75	fz	0.064	0.080	0.080	0.100	0.096	0.120	0.112	0.140	0.128	0.160	0.160	0.200



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1

* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D-ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D-2 \times ADOC}{D}\right)\right]$$

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

TOTEM®
High Performance Cutting Tools

END MILLING SOLUTIONS FOR AEROSPACE INDUSTRY & DIFFICULT TO MACHINE MATERIALS

FEATURES

- Variable helix angle and variable flute spacing
- Stable core geometry
- Optimized centre cutting geometry
- New generation coating
- Available in 4 flutes, 5 flutes, 6 flutes and 7 flutes
- Available in neck options

FUNCTIONS & BENEFITS

- Higher productivity
- Reinforced core geometry for higher rigidity at elevated parameters
- Superior tool life
- Excellent surface finish
- High MRR

TOTEM®
High Performance Cutting Tools

PRODUCT RANGE

- Turbo End Mill Range (F177TR/ NF177TR/ F178TR GOLD/ F178TR BLACK/ F179TR/ F179TRL/ F180TR/ NF180TR)for Stainless Steel/ Titanium/ Super Alloys/ Steel /Cast Iron)
- VR End Mill Range(5VR/6VR) for Trochoidal Milling for Structural parts for Titanium/ Stainless Steel/ PH/ Super Alloys/ Steel)
- Roughing Chip Breaker End Mill Range (F192CB/ F193CB/NF193CB/F193CBL/F194CB) for Steel/ Stainless Steel/ Titanium/ Super Alloys)

DIAMETER RANGE

- F177TR 3mm-20mm
- NF177TR with neck- 6mm-20mm
- F179TR – Ball nose -4mm-20mm
- F179TRL – Ball nose -6mm-20mm
- F178TR BLACK 4mm-20mm
- F178TR GOLD 4mm-20mm
- F180TR 10mm-16mm
- NF180TR 10mm-16mm
- NF180TR with neck 10mm-16mm
- 5VR- 6mm-20mm
- 6VR- 6mm-20mm

* Special as per Drawing on request

CASE STUDIES

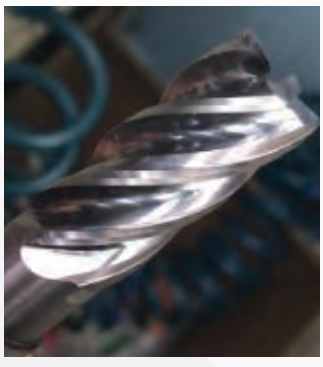
12MM END MILL FOR MACHINING A STRUCTURAL SUPPORT FOR BOEING AND AIRBUS

CHALLENGE : Reduction in CPC
COMPONENT : Side Plate (ASGRCS-1082)
COMPETITON : Global Competitor
SOLUTION : EM 8.00MMX19X63 SH8 4FLT CR0.8 TR ALT- FBK0510611
CUTTING DATA : Machine : Makino Slim twin Spindle VMC, Shrink-fit- BT40-Regofix, Coolant – Emulsion
RPM = 3183, Feed = 1300mm/min
Ap = 12mm, Ae = 2-3mm
Existing Tool Life – 32 Parts
Achieved Tool Life – 104 Parts
RESULT : Tool Life Benefit
BENEFIT : Reduction in CPC by 66%

Material – 15-5 PH – 40 HRC

TROCHOIDAL MILLING 16MM END MILL FOR A VENDOR OF BOEING

CHALLENGE : Reduction in CPC
COMPONENT : Boeing Floor to Frame Fitting
COMPETITON : Global Competitor
SOLUTION : EM 16.00MMX34X48X100SH16 6F CR3 5FLTALT
CUTTING DATA : Machine : Mitsubishi DH80 HMC
Holder BT50 Side-lock
Totem , Coolant – Soluble Oil
RPM = 1200 Feed = 420
Ap = 30mm, Ae = 4mm
Existing Tool Life – 240 minutes
Achieved Tool Life – 344 minutes
RESULT : Tool Life Benefit
BENEFIT : Reduction in CPC by 30%



Material – Ti6Al4V

Turbo - TR

Features

- Variable pitch and Variable helix
- Stable core geometry
- Optimized centre cutting geometry
- New generation coating
- Available in 4 flutes,5 flutes, 6 flutes and 7 flutes
- Available with neck options

Functions & Benefits

- Higher productivity
- Reinforced core gives the ability to work at higher parameters
- Superior tool life
- Excellent surface finish
- High MRR

4 Flute

Centre cutting high performance end mill for roughing & finishing

Carbide | REG | 35/38° | 6535 HA | Cr Base

P1-P6
K1-K3
S1-S4
M1-M3
H1

IMAGE 1

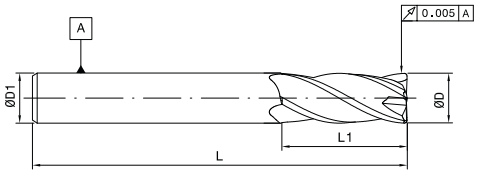


IMAGE 2

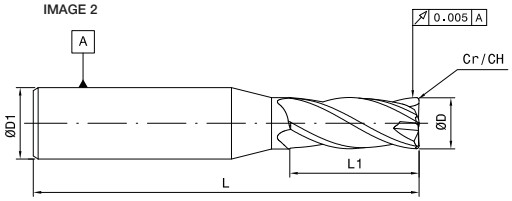


IMAGE 3

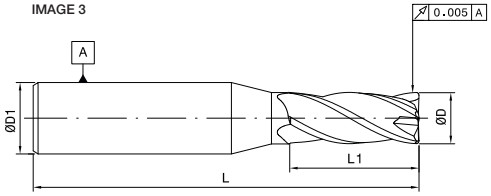
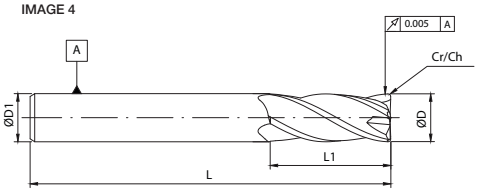


IMAGE 4



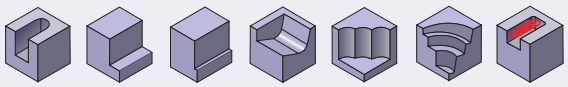
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	CH (mm)	z	γ (°)	Image	EDP No
3.00	6.00	38.00	3.00			4	-	1	FBK0503876
4.00	11.00	55.00	6.00	0.20		4	10	2	FBK0508737
4.00	11.00	55.00	6.00		0.40	4	10	2	FBK0508921
4.00	11.00	55.00	6.00			4	10	3	FBK0508738
4.00	14.00	51.00	4.00			4	-	1	FBK0503954
4.00	20.00	51.00	4.00			4	-	1	FBK0503955
5.00	20.00	51.00	5.00			4	-	1	FBK0503956
6.00	13.00	57.00	6.00	0.20		4	-	4	FBK0508739
6.00	13.00	57.00	6.00		0.40	4	-	4	FBK0508922
6.00	13.00	57.00	6.00			4	-	1	FBK0508740
6.00	20.00	64.00	6.00			4	-	1	FBK0503484
8.00	19.00	63.00	8.00	0.20		4	-	4	FBK0508741
8.00	19.00	63.00	8.00		0.40	4	-	4	FBK0508923
8.00	19.00	63.00	8.00			4	-	1	FBK0508742
8.00	20.00	64.00	8.00			4	-	1	FBK0503485
10.00	22.00	72.00	10.00	0.30		4	-	4	FBK0508743

Application data on page no 2.129

4 Flute

Centre cutting high performance end mill for roughing & finishing



Carbide | REG | 35/38° | 6535 HA | Cr Base

P1-P6
K1-K3
S1-S4
M1-M3
H1

IMAGE 1

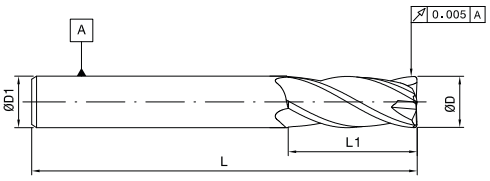
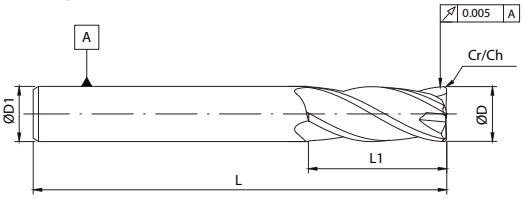


IMAGE 2



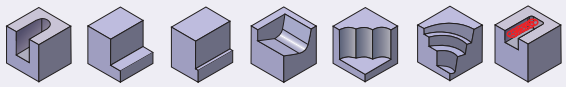
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	CH (mm)	z	γ (°)	Image	EDP No
10.00	22.00	72.00	10.00		0.50	4	-	2	FBK0508924
10.00	22.00	72.00	10.00			4	-	1	FBK0508744
10.00	25.00	70.00	10.00			4	-	1	FBK0503486
12.00	26.00	83.00	12.00	0.30		4	-	2	FBK0508745
12.00	26.00	83.00	12.00		0.50	4	-	2	FBK0508925
12.00	26.00	83.00	12.00			4	-	1	FBK0508746
12.00	25.00	76.00	12.00			4	-	1	FBK0503487
14.00	30.00	89.00	14.00			4	-	1	FBK0503488
16.00	32.00	92.00	16.00	0.30		4	-	2	FBK0508747
16.00	32.00	92.00	16.00		0.50	4	-	2	FBK0508926
16.00	32.00	92.00	16.00			4	-	1	FBK0508748
16.00	30.00	89.00	16.00			4	-	1	FBK0503489
20.00	38.00	104.00	20.00	0.30		4	-	2	FBK0508749
20.00	38.00	104.00	20.00		0.50	4	-	2	FBK0508927
20.00	38.00	104.00	20.00			4	-	1	FBK0508750
20.00	35.00	102.00	20.00			4	-	1	FBK0503490

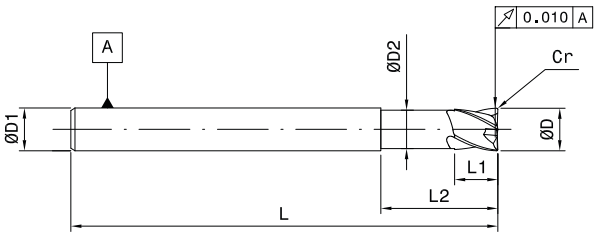
Application data on page no 2.129

4 Flute

Centre cutting high performance end mill for roughing & finishing



Carbide | LONG | 35/38° | 6535 HA | Cr Base



P1-P6
K1-K3
S1-S4
M1-M3
H1

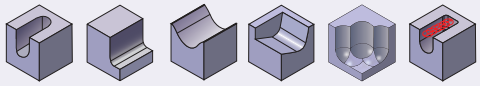
Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	ØCr (mm)	z	EDP No
6.00	12.00	5.50	42.00	100.00	6.00	0.40	4	FBK0508731
8.00	16.00	7.30	62.00	100.00	8.00	0.40	4	FBK0508732
10.00	20.00	9.10	60.00	100.00	10.00	0.50	4	FBK0508733
12.00	24.00	11.00	73.00	125.00	12.00	0.50	4	FBK0508734
16.00	32.00	14.56	100.00	150.00	16.00	0.50	4	FBK0508735
20.00	40.00	18.20	100.00	175.00	20.00	0.50	4	FBK0508736

Application data on page no 2.129

4 Flute

Centre cutting high performance ball nose end mill for roughing & finishing



Carbide | REG | 35/38° | 6535 HA | Cr Base

IMAGE 1

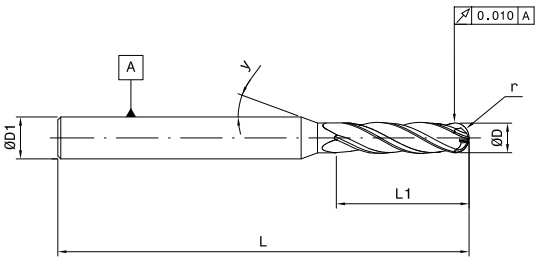
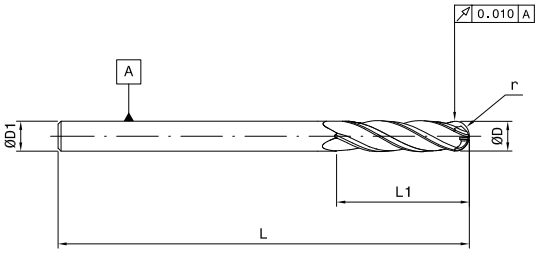


IMAGE 2



P1-P6
K1-K3
S1-S4
M1-M3
H1

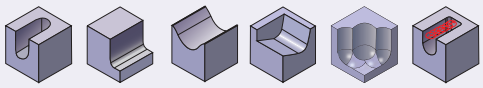
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No
3.00	6.00	38.00	6.00	1.50	4	10	1	FBK0503958
4.00	15.00	64.00	6.00	2.00	4	10	1	FBK0503888
6.00	16.00	64.00	6.00	3.00	4	-	2	FBK0503889
8.00	20.00	64.00	8.00	4.00	4	-	2	FBK0503890
10.00	20.00	70.00	10.00	5.00	4	-	2	FBK0503891
12.00	25.00	76.00	12.00	6.00	4	-	2	FBK0503892
16.00	30.00	89.00	16.00	8.00	4	-	2	FBK0503893
18.00	35.00	102.00	18.00	9.00	4	-	2	FBK0503894

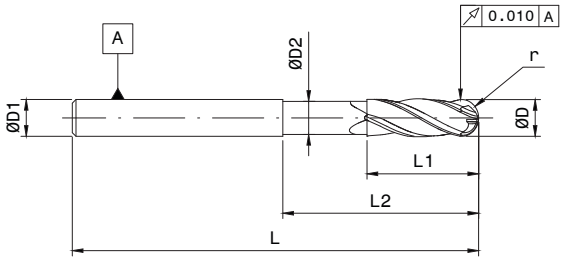
Application data on page no 2.129

4 Flute

Centre cutting high performance ball nose end mill for roughing & finishing



Carbide | LONG | 35/38° | 6535 HA | Cr Base



P1-P6
K1-K3
S1-S4
M1-M3
H1

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	EDP No
6.00	9.00	5.80	32.00	101.00	6.00	3.00	4	FBK0510487
8.00	12.00	7.60	42.00	101.00	8.00	4.00	4	FBK0510625
10.00	15.00	9.60	52.00	127.00	10.00	5.00	4	FBK0510626
12.00	18.00	11.40	62.00	152.00	12.00	6.00	4	FBK0510627
16.00	24.00	15.20	82.00	152.00	16.00	8.00	4	FBK0510628

Application data on page no 2.129

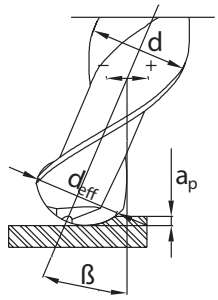
Cutting parameters

Centre cutting high performance end mill / ball nose for roughing & finishing - F177 TR/ NF177 TR / F179 TR / F179 TRL - 4.0 mm to 20.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling							Cutting Speed (Vc) m/min for Slot Milling		Recommended Feed/Tooth (fz=mm/th) for shoulder milling/slot milling, reduce fz by 20%													
			5	2.3	1.6	1.4	1.2	1.1	1	1		Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.													
			CT NCT	CT NCT	CT NCT	CT NCT	CT NCT	CT	CT	CT		Cutting Speed (Vc) m/min		Diameter in mm											
			ap max ae 1%	ap max ae 5%	ap 2D ae 10%	ap 1.5D ae 15%	ap 1.25D ae 20%	ap 1D ae 30%	ap 1D ae 50%	ap 1D ae/D 100%	Cutting Speed (Vc) m/min for Slot Milling	min	max	mm Range	4.0 min	4.0 max	6.0 min	6.0 max	8.0 min	8.0 max	10.0 min	10.0 max	12.0 min	12.0 max	16.0 min	16.0 max	20.0 min	20.0 max
Steel	P	1	315	248	225	210	203	195	188	1XD	175	150	315	fz	0.022	0.028	0.035	0.044	0.048	0.060	0.058	0.072	0.066	0.083	0.081	0.101	0.091	0.114
		2	294	231	210	196	189	182	175	1XD	165	140	294	fz	0.022	0.028	0.035	0.044	0.048	0.060	0.058	0.072	0.066	0.083	0.081	0.101	0.091	0.114
		3	252	198	180	168	162	156	150	1XD	140	120	252	fz	0.018	0.023	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101
		4	189	149	135	126	122	117	113	0.75XD	120	90	189	fz	0.017	0.021	0.026	0.033	0.036	0.045	0.043	0.054	0.050	0.062	0.062	0.077	0.070	0.088
		5	126	99	90	84	81	78	75	1XD	80	60	126	fz	0.015	0.019	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081
		6	105	83	75	70	68	65	63	0.75XD	62.5	50	105	fz	0.013	0.016	0.020	0.025	0.027	0.034	0.032	0.040	0.038	0.047	0.046	0.057	0.052	0.065
Stainless Steel	M	1	189	149	135	126	122	117	113	1XD	102.5	90	189	fz	0.018	0.023	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101
		2	126	99	90	84	81	78	75	1XD	70	60	126	fz	0.015	0.019	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081
		3	126	99	90	84	81	78	75	1XD	65	60	126	fz	0.013	0.016	0.020	0.025	0.027	0.034	0.032	0.040	0.038	0.047	0.046	0.057	0.052	0.065
Cast Iron	K	1	252	198	180	168	162	156	150	1XD	135	120	252	fz	0.022	0.028	0.035	0.044	0.048	0.060	0.058	0.072	0.066	0.083	0.081	0.101	0.091	0.114
		2	231	182	165	154	149	143	138	1XD	120	110	231	fz	0.018	0.023	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101
		3	210	165	150	140	135	130	125	1XD	115	100	210	fz	0.015	0.019	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081
Super Alloys	S	1	105	83	75	70	68	65		0.3XD	70	50	105	fz	0.018	0.023	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101
		2	53	41	38	35	34	33		0.3XD	32.5	25	53	fz	0.010	0.013	0.015	0.019	0.021	0.026	0.026	0.032	0.030	0.037	0.037	0.046	0.043	0.054
		3	126	99	90	84	81	78	75	1XD	70	60	126	fz	0.015	0.019	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081
		4	105	83	75	70	68	65	63	1XD	55	50	105	fz	0.013	0.016	0.021	0.026	0.030	0.037	0.036	0.045	0.042	0.052	0.051	0.064	0.059	0.074
Hard Materials	H	1	168	132	120	112	108	104	100	0.75XD	110	80	168	fz	0.017	0.021	0.026	0.033	0.036	0.045	0.043	0.054	0.050	0.062	0.062	0.077	0.070	0.088

		4 Flute Flat	4 Flute Flat/ Neck	4 Flute Ball
CT	Standard	**F177TR**	**NF177TR**	**F179TR**
NCT	Long	**NF179TR**		

CT- indicates that when using these end mills – use the Chip load multiplication factor
NCT- Indicates that when using these end mills- do not use the chip load multiplication factor



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1
* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D-ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D-2 \times ADOC}{D}\right)\right]$$

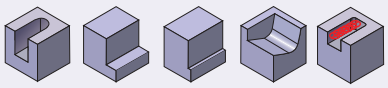
Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

5 Flute

Centre cutting high performance end mill for roughing & finishing



Carbide | REG | 35/38° | 6535 HA | Cr Base

IMAGE 1

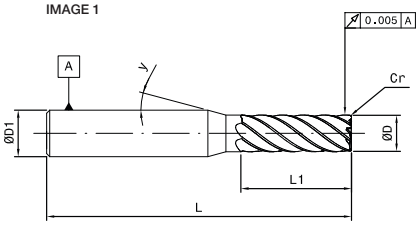


IMAGE 2

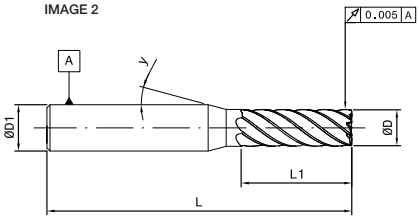


IMAGE 3

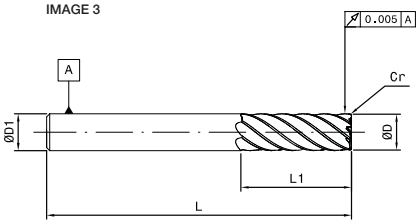
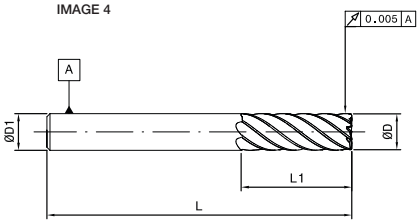


IMAGE 4



P1-P6
K1-K3
S1-S4
M1-M3
H1

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	ØCr (mm)	z	γ (°)	Image	EDP No BLACK	EDP No GOLD
4.00	11.00	55.00	6.00	0.25	5	10	1	FBK0508717	FBK0510616
4.00	11.00	55.00	6.00		5	10	2	FBK0508718	FBK0510617
6.00	13.00	57.00	6.00	0.40	5	-	3	FBK0508719	FBK0510414
6.00	13.00	57.00	6.00		5	-	4	FBK0508720	FBK0510618
6.00	20.00	64.00	6.00		5	-	4	FBK0503491	-
8.00	19.00	63.00	8.00	0.50	5	-	3	FBK0508721	FBK0510338
8.00	19.00	63.00	8.00		5	-	4	FBK0508722	FBK0510619
8.00	20.00	64.00	8.00		5	-	4	FBK0503492	-
10.00	22.00	72.00	10.00	0.50	5	-	3	FBK0508723	FBK0510339
10.00	22.00	72.00	10.00		5	-	4	FBK0508724	FBK0510620
10.00	25.00	70.00	10.00		5	-	4	FBK0503493	-
12.00	26.00	83.00	12.00	0.75	5	-	3	FBK0508725	FBK0510340
12.00	26.00	83.00	12.00		5	-	4	FBK0508726	FBK0510621
12.00	25.00	76.00	12.00		5	-	4	FBK0503494	-
14.00	30.00	89.00	14.00		5	-	4	FBK0503495	-
16.00	32.00	92.00	16.00	0.75	5	-	3	FBK0508727	FBK0510341
16.00	32.00	92.00	16.00		5	-	4	FBK0508728	FBK0510622
16.00	30.00	89.00	16.00		5	-	4	FBK0503496	-
20.00	38.00	104.00	20.00	0.75	5	-	3	FBK0508729	FBK0510623
20.00	38.00	104.00	20.00		5	-	4	FBK0508730	FBK0510624
20.00	35.00	102.00	20.00		5	-	4	FBK0503497	-

Application data on page no 2.131

Cutting parameters

Centre cutting high performance 5 flute end mill for roughing & finishing - F178 TR Black/Gold - 4.0 mm to 20.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling for Rough and Semi Finish							Cutting Speed (Vc) m/min for Slot Milling					Recommended Feed/Tooth (fz=mm/th) for shoulder milling/slot milling, reduce fz by 20%															
			5	2.3	1.6	1.4	1.2	1.1	1						Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.															
			ap Max	ap Max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap 1D	Cutting Speed (Vc) m/min for Slot Milling	Cutting Speed (Vc) m/min		mm	Diameter in mm															
															4.0		6.0		8.0		10.0		12.0		16.0		20.0			
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max		
Steel	P	1	315	248	225	210	203	195	188	1xD	175	150	315	fz	0.022	0.028	0.035	0.044	0.048	0.060	0.058	0.072	0.066	0.083	0.081	0.101	0.091	0.114		
		2	294	231	210	196	189	182	175	1xD	165	140	294	fz	0.022	0.028	0.035	0.044	0.048	0.060	0.058	0.072	0.066	0.083	0.081	0.101	0.091	0.114		
		3	252	198	180	168	162	156	150	1xD	140	120	252	fz	0.018	0.023	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101		
		4	189	149	135	126	122	117	113	0.75XD	120	90	189	fz	0.017	0.021	0.026	0.033	0.036	0.045	0.043	0.054	0.050	0.062	0.062	0.077	0.070	0.088		
		5	126	99	90	84	81	78	75	1xD	80	60	126	fz	0.015	0.019	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081		
		6	105	83	75	70	68	65	63	0.75XD	62.5	50	105	fz	0.013	0.016	0.020	0.025	0.027	0.034	0.032	0.040	0.038	0.047	0.046	0.057	0.052	0.065		
Stainless Steel	M	1	189	149	135	126	122	117	113	1xD	102.5	90	189	fz	0.018	0.023	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101		
		2	126	99	90	84	81	78	75	1xD	70	60	126	fz	0.015	0.019	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081		
		3	126	99	90	84	81	78	75	1xD	65	60	126	fz	0.013	0.016	0.020	0.025	0.027	0.034	0.032	0.040	0.038	0.047	0.046	0.057	0.052	0.065		
Cast Iron	K	1	252	198	180	168	162	156	150	1xD	135	120	252	fz	0.022	0.028	0.035	0.044	0.048	0.060	0.058	0.072	0.066	0.083	0.081	0.101	0.091	0.114		
		2	231	182	165	154	149	143	138	1xD	120	110	231	fz	0.018	0.023	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101		
		3	210	165	150	140	135	130	125	1xD	115	100	210	fz	0.015	0.019	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081		
Super Alloys	S	1	105	83	75	70	68	65		0.3XD	70	50	105	fz	0.018	0.023	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101		
		2	53	41	38	35	34	33		0.3XD	32.5	25	53	fz	0.010	0.013	0.015	0.019	0.021	0.026	0.026	0.032	0.030	0.037	0.037	0.046	0.043	0.054		
		3	126	99	90	84	81	78	75	1xD	70	60	126	fz	0.015	0.019	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081		
		4	105	83	75	70	68	65	63	1xD	55	50	105	fz	0.013	0.016	0.021	0.026	0.030	0.037	0.036	0.045	0.042	0.052	0.051	0.064	0.059	0.074		
Hard Materials	H	1	168	132	120	112	108	104	100	0.75XD	110	80	168	fz	0.017	0.021	0.026	0.033	0.036	0.045	0.043	0.054	0.050	0.062	0.062	0.077	0.070	0.088		

F178TR Gold to be used on Stainless Steel and Steel as first preferance/ SuperAlloys, Cast Iron and Hard Steel as a second preferance
F178TR Black to be used on Titanium and Super Alloys as a frist preferance/ Stainless Steel/ Steel/ Cast Iron and Hard Steel as the second preferance

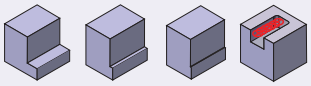
Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

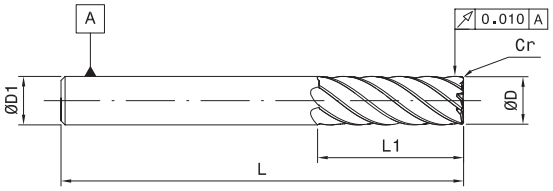
Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

7 Flute

Centre cutting high performance end mill for roughing & finishing



Carbide | 7 | REG | 35/38° | 6535 HA | Cr Base

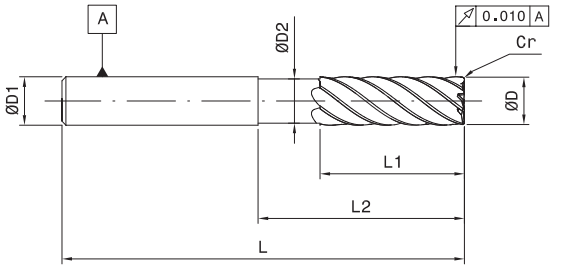


P1-P6
S1-S4
M1-M3
H1-H2

F180TR

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	ØCr (mm)	z	EDP No
10.00	30.00	76.00	10.00	0.50	7	FBK0508808
12.00	36.00	100.00	12.00	0.50	7	FBK0508809
16.00	48.00	110.00	16.00	0.50	7	FBK0508810

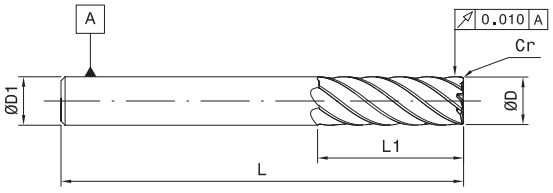


P1-P6
S1-S4
M1-M3
H1-H2

NF180TR

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Corner Radius Ø Cr	z	EDP No
10.00	22.00	9.40	30.00	76.00	10.00	0.50	7	FBK0508811
12.00	26.00	11.28	36.00	100.00	12.00	0.50	7	FBK0508812
16.00	32.00	15.04	48.00	110.00	16.00	0.50	7	FBK0508813



P1-P6
S1-S4
M1-M3
H1-H2

F180TRL

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD2 (mm)	Corner Radius ØCr	z	EDP No
10.00	50.00	100.00	10.00	0.50	7	FBK0511263
12.00	60.00	125.00	12.00	0.50	7	FBK0511264
16.00	80.00	141.00	16.00	0.50	7	FBK0511265

Application data on page no 2.133

Cutting parameters

Centre cutting high performance 7 flute end mill for roughing & finishing - F180TR/NF 180TR Semi Finishing - 10.0 mm to 16.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling							Recommended Feed/Tooth (fz)						
			5	2.3	1.6	1.4	1.2				Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.					
			ap Max	ap 2.5D	ap 2.5D	ap 2D	ap 2D	Cutting Speed (Vc) m/min			Diameter in mm					
										mm	10.0		12.0		16.0	
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	min	max	Range	min	max	min	max	min	max
Steel	P	1	500	393	750	333	298	238	500	fz	0.048	0.060	0.052	0.065	0.064	0.080
		2	240	189	360	160	143	115	240	fz	0.048	0.060	0.052	0.065	0.064	0.080
		3	150	118	225	100	89	72	150	fz	0.043	0.054	0.050	0.062	0.062	0.077
		4	150	118	225	100	89	72	150	fz	0.043	0.054	0.050	0.062	0.062	0.077
		5	100	78	150	67	59	48	100	fz	0.038	0.048	0.045	0.056	0.056	0.070
Stainless Steel	M	1	115	90	173	77	69	55	115	fz	0.049	0.061	0.056	0.070	0.070	0.087
		2	80	63	120	53	48	38	80	fz	0.038	0.048	0.045	0.056	0.056	0.070
		3	70	55	105	47	42	34	70	fz	0.032	0.040	0.038	0.047	0.046	0.057
Super Alloys	S	1	90	71	135	60	54	43	90	fz	0.049	0.061	0.056	0.070	0.070	0.087
		2	40	31	60	27	24	19	40	fz	0.026	0.032	0.030	0.037	0.037	0.046
		3	80	63	120	53	48	38	80	fz	0.038	0.048	0.045	0.056	0.056	0.070
		4	60	47	90	40	36	29	60	fz	0.036	0.045	0.042	0.052	0.051	0.064
Hard Materials	H	1	140	110	210	93	83	67	140	fz	0.043	0.054	0.050	0.062	0.062	0.077
		2	120	94	180	80	71	57	120	fz	0.032	0.040	0.038	0.047	0.046	0.057

Centre cutting high performance 7 flute end mill for roughing & finishing - F180TR/NF 180TR Finishing - 10.0 mm to 16.0 mm

Material Group			Cutting Speed (Vc) m/min for Milling/Finishing			Recommended Feed/Tooth (fz)					
			Cutting Speed (Vc) m/min			Diameter in mm					
			ap Max	ap Max	mm	10.0		12.0		16.0	
			ae/D 1%	ae/D 6%	Range	min	max	min	max	min	max
Steel	P	1	500	238	fz	0.048	0.060	0.052	0.065	0.064	0.080
		2	240	115	fz	0.048	0.060	0.052	0.065	0.064	0.080
		3	150	72	fz	0.043	0.054	0.050	0.062	0.062	0.077
		4	150	72	fz	0.043	0.054	0.050	0.062	0.062	0.077
		5	100	48	fz	0.038	0.048	0.045	0.056	0.056	0.070
Stainless Steel	M	1	115	55	fz	0.049	0.061	0.056	0.070	0.070	0.087
		2	80	38	fz	0.038	0.048	0.045	0.056	0.056	0.070
		3	70	34	fz	0.032	0.040	0.038	0.047	0.046	0.057
Super Alloys	S	1	90	43	fz	0.049	0.061	0.056	0.070	0.070	0.087
		2	40	19	fz	0.026	0.032	0.030	0.037	0.037	0.046
		3	80	38	fz	0.038	0.048	0.045	0.056	0.056	0.070
		4	60	29	fz	0.036	0.045	0.042	0.052	0.051	0.064
Hard Materials	H	1	140	67	fz	0.043	0.054	0.050	0.062	0.062	0.077
		2	120	57	fz	0.032	0.040	0.038	0.047	0.046	0.057

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Trochoidal milling

Features
- Robust Core Design
- Multiflutes for High Productivity
- Available with alternate coating

Functions
- Operates at high cutting speeds
- Geometry programmed to suit adequate material removal at various enagemnet angles

Benefits
- Highest dynamic speed rates
- Highest material removal rate
- Least cutting forces
- Prolonged tool life due to reduced shock
- High savings in cycle time when compared to the conventional milling strategy

5 Flute

Centre cutting end mill for roughing and finishing steel and super alloys

Carbide | VARI | 6535 HA | TiAlN

IMAGE 1

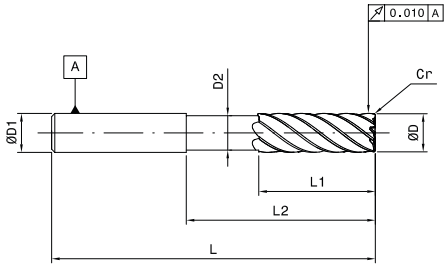
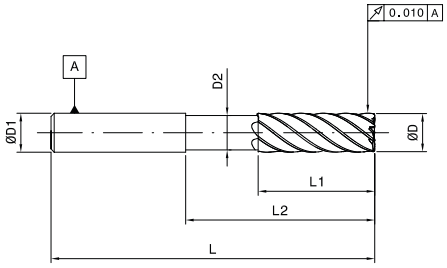


IMAGE 2



P1-P6
K1-K3
S1-S4
M1-M3
H1

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	ØCr (mm)	z	Image	EDP No
6.00	13.00	5.64	18.00	64.00	6.00	0.50	5	1	FBK0508649
6.00	13.00	5.64	18.00	64.00	6.00	1.00	5	1	FBK0508650
6.00	13.00	5.64	18.00	64.00	6.00	1.50	5	1	FBK0508651
6.00	14.00	5.64	18.00	64.00	6.00	–	5	2	FBK0508652
8.00	19.00	7.52	24.00	76.00	8.00	0.50	5	1	FBK0508653
8.00	19.00	7.52	24.00	76.00	8.00	1.00	5	1	FBK0508654
8.00	18.00	7.52	24.00	76.00	8.00	–	5	2	FBK0508655
10.00	22.00	9.40	30.00	76.00	10.00	0.50	5	1	FBK0508656
10.00	22.00	9.40	30.00	76.00	10.00	1.00	5	1	FBK0508657
10.00	22.00	9.40	30.00	76.00	10.00	2.00	5	1	FBK0508658
10.00	22.00	9.40	30.00	76.00	10.00	3.00	5	1	FBK0510260
10.00	22.00	9.40	30.00	76.00	10.00	–	5	2	FBK0508659
12.00	26.00	11.28	36.00	84.00	12.00	0.50	5	1	FBK0508660
12.00	26.00	11.28	36.00	84.00	12.00	1.00	5	1	FBK0510270
12.00	26.00	11.28	36.00	84.00	12.00	2.00	5	1	FBK0510271
12.00	26.00	11.28	36.00	84.00	12.00	3.00	5	1	FBK0510259
12.00	26.00	11.28	36.00	84.00	12.00	–	5	2	FBK0508663
16.00	32.00	15.04	48.00	100.00	16.00	0.50	5	1	FBK0508664
16.00	32.00	15.04	48.00	100.00	16.00	1.00	5	1	FBK0508665
16.00	32.00	15.04	48.00	100.00	16.00	2.00	5	1	FBK0508666
16.00	32.00	15.04	48.00	100.00	16.00	3.00	5	1	FBK0510261
16.00	32.00	15.04	48.00	100.00	16.00	5.00	5	1	FBK0510269
16.00	32.00	15.04	48.00	100.00	16.00	–	5	2	FBK0508668

Features

- 5 Flutes
- Variable helix
- Variable pitch
- Effective for machining steel/ stainless (wet) / super alloys (wet)
- Also available with more flutes/ neck and through coolant as a special option

Functions

- Effective for trochoidal milling and I-machining
- High MRR
- Optimal flutes as per diameter of tool

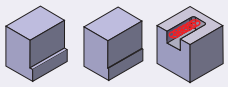
Benefits

- Stable cutting edge at elevated cutting conditions
- Superior tool life

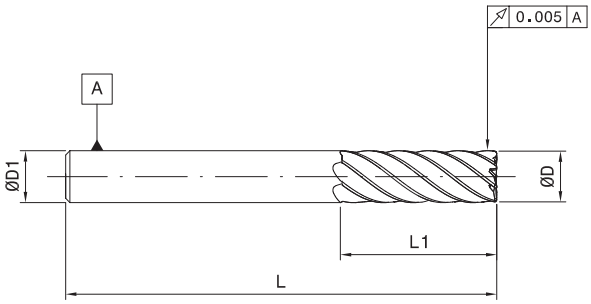
Application data on page no 2.137

6 Flute

Centre cutting high performance 6 flute end mill for trochoidal milling



Carbide | 45° | 6535 HA | TiAlN



P1-P6
K1-K3
S1-S4
M1-M3
H1

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP No
6.00	13.00	57.00	6.00	6	FBK0508789
8.00	19.00	63.00	8.00	6	FBK0508790
10.00	22.00	72.00	10.00	6	FBK0508791
12.00	26.00	83.00	12.00	6	FBK0508792
16.00	32.00	92.00	16.00	6	FBK0508793
20.00	38.00	104.00	20.00	6	FBK0508794

Features
- 6 Flutes
- 45^0 Helix
- Good geometry for finishing
- Effective for machining steel/ stainless (wet) / super alloys (wet)
- Also available with more flutes/ neck and through coolant as a special option

Functions
- Effective for trochoidal milling and l-machining
- High MRR
- Optimal flutes as per diameter of tool

Benefits
- Stable cutting edge at elevated cutting conditions
- Superior tool life

Application data on page no 2.137

Cutting parameters

Centre cutting 5 flute end mill for finishing steel and super alloys for Trochoidal milling - 5VR- 4.0 mm to 20.0 mm

Material Group			Cutting Speed (Vc) m/min for Shoulder Milling for Rough and Semi Finish							Cutting Speed (Vc) m/min for Slot Milling				Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%													
			5	2.3	1.6	1.4	1.2	1.1	1					Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.													
			ap Max	ap Max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap 1D	Cutting Speed (Vc) m/min for Slot Milling	Cutting Speed (Vc) m/min		mm	Diameter in mm												
															4.0		6.0		8.0		10.0		12.0		16.0		20.0	
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	1	315	248	225	210	203	195	188	1xD	175	150	315	fz	0.022	0.028	0.035	0.044	0.048	0.060	0.058	0.072	0.066	0.083	0.081	0.101	0.091	0.114
		2	294	231	210	196	189	182	175	1xD	165	140	294	fz	0.022	0.028	0.035	0.044	0.048	0.060	0.058	0.072	0.066	0.083	0.081	0.101	0.091	0.114
		3	252	198	180	168	162	156	150	1xD	140	120	252	fz	0.018	0.023	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101
		4	189	149	135	126	122	117	113	0.75XD	120	90	189	fz	0.017	0.021	0.026	0.033	0.036	0.045	0.043	0.054	0.050	0.062	0.062	0.077	0.070	0.088
		5	126	99	90	84	81	78	75	1xD	80	60	126	fz	0.015	0.019	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081
		6	105	83	75	70	68	65	63	0.75XD	62.5	50	105	fz	0.013	0.016	0.020	0.025	0.027	0.034	0.032	0.040	0.038	0.047	0.046	0.057	0.052	0.065
Stainless Steel	M	1	189	149	135	126	122	117	113	1xD	102.5	90	189	fz	0.018	0.023	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101
		2	126	99	90	84	81	78	75	1xD	70	60	126	fz	0.015	0.019	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081
		3	126	99	90	84	81	78	75	1xD	65	60	126	fz	0.013	0.016	0.020	0.025	0.027	0.034	0.032	0.040	0.038	0.047	0.046	0.057	0.052	0.065
Cast Iron	K	1	252	198	180	168	162	156	150	1xD	135	120	252	fz	0.022	0.028	0.035	0.044	0.048	0.060	0.058	0.072	0.066	0.083	0.081	0.101	0.091	0.114
		2	231	182	165	154	149	143	138	1xD	120	110	231	fz	0.018	0.023	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101
		3	210	165	150	140	135	130	125	1xD	115	100	210	fz	0.015	0.019	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081
Super Alloys	S	1	105	83	75	70	68	65		0.3XD	70	50	105	fz	0.018	0.023	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101
		2	53	41	38	35	34	33		0.3XD	32.5	25	53	fz	0.010	0.013	0.015	0.019	0.021	0.026	0.026	0.032	0.030	0.037	0.037	0.046	0.043	0.054
		3	126	99	90	84	81	78	75	1xD	70	60	126	fz	0.015	0.019	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081
		4	105	83	75	70	68	65	63	1xD	55	50	105	fz	0.013	0.016	0.021	0.026	0.030	0.037	0.036	0.045	0.042	0.052	0.051	0.064	0.059	0.074
Hard Materials	H	1	168	132	120	112	108	104	100	0.75XD	110	80	168	fz	0.017	0.021	0.026	0.033	0.036	0.045	0.043	0.054	0.050	0.062	0.062	0.077	0.070	0.088

Centre cutting high performance 6 flute end mill for Trochoidal milling - 6VR - 6.0 mm to 20.0 mm

Material			Cutting Speed (Vc) m/min for Shoulder Milling			Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%														
			5	2.3		Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finish														
			ap max	ap 1.5D	Cutting Speed (Vc) m/min		mm	Diameter in mm												
								6.0		8.0		10.0		12.0		16.0		20.0		
			ae/D 1%	ae/D 5%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	
Steel	P	1	315	248	150	315	fz	0.035	0.044	0.048	0.060	0.058	0.072	0.066	0.083	0.081	0.101	0.091	0.114	
		2	294	231	140	294	fz	0.035	0.044	0.048	0.060	0.058	0.072	0.066	0.083	0.081	0.101	0.091	0.114	
		3	252	198	120	252	fz	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101	
		4	189	149	90	189	fz	0.026	0.033	0.036	0.045	0.043	0.054	0.050	0.062	0.062	0.077	0.070	0.088	
		5	126	99	60	126	fz	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081	
		6	105	83	50	105	fz	0.020	0.025	0.027	0.034	0.032	0.040	0.038	0.047	0.046	0.057	0.052	0.065	
Stain-less Steel	M	1	168	132	80	168	fz	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101	
		2	126	99	60	126	fz	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081	
		3	126	99	60	126	fz	0.020	0.025	0.027	0.034	0.032	0.040	0.038	0.047	0.046	0.057	0.052	0.065	
Cast Iron	K	1	252	198	120	252	fz	0.035	0.044	0.048	0.060	0.058	0.072	0.066	0.083	0.081	0.101	0.091	0.114	
		2	231	182	110	231	fz	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101	
		3	210	165	100	210	fz	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081	
Special Alloys	S	1	105	83	50	105	fz	0.029	0.036	0.040	0.050	0.049	0.061	0.056	0.070	0.070	0.087	0.081	0.101	
		2	42	33	20	42	fz	0.015	0.019	0.021	0.026	0.026	0.032	0.030	0.037	0.037	0.046	0.043	0.054	
		3	105	83	50	105	fz	0.023	0.029	0.032	0.040	0.038	0.048	0.045	0.056	0.056	0.070	0.065	0.081	
		4	95	74	45	95	fz	0.021	0.026	0.030	0.037	0.036	0.045	0.042	0.052	0.051	0.064	0.059	0.074	
Hard-ened Steel	H	1	168	132	80	168	fz	0.026	0.033	0.036	0.045	0.043	0.054	0.050	0.062	0.062	0.077	0.070	0.088	

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

TOTEM®

High Performance Cutting Tools

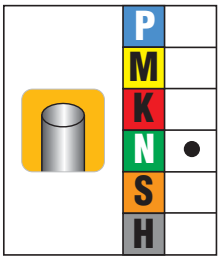
RAZORCUT™

SOLID CARBIDE END MILLING SOLUTIONS FOR MACHINING NON FERROUS MATERIALS FOR AEROSPACE & AUTOMOBILE INDUSTRY

ROUGHER SERIES
CBC/ CBCH/ NCBCH

FINISHER SERIES
2FWF/3FWF/3FWFXL/3FWFCR/3F

ROUTER SERIES
1F



FEATURES, FUNCTIONS AND BENEFITS

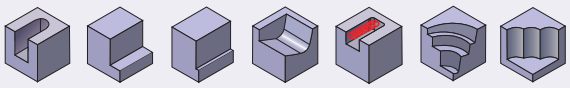
- Designed for Aluminium Alloys (Works excellent on Al6061 & Al7075)
- Designed to maximize metal removal rates and deliver superior wall and floor finishes on the part.
- Designed to be used in roughing, semi-finishing, finishing and super finishing applications
- Designed with a strong core geometry and flute form to tackle corners at elevated cutting conditions without chattering.
- 3FWF incorporates unequal flute spacing which helps to eliminate chatter while running at elevated parameters
- 3FWF tools come with a Wiper Flat Geometry with a wide gash which helps in ensuring excellent floor finish during the finish cycle.
- 3FWF tools are excellent in profiling operations up to 0.5D radial x 1.5D axial depth of cut
- The 3 Flute Razorcut™ generates less vibration and less deflection, enabling higher metal removal rates
- The 3 Flute Razorcut™ 3FWFXL/3FWFCR are available with neck for deep pocketing operations
- The 3 Flute Razorcut™ 3FWF Excellent performance in thin wall applications as the geometry exerts very less radial force
- The 3 Flute Razorcut™ CBCH incorporates a 40 degree helix which will ensure a better surface finish with its chamfered chip breaker and be used directly for semi finishing Aluminium
- The 3 Flute Razorcut™ 3FWF and the Razorcut™ CBCH and Razorcut™ CBC can be used in trochoidal milling with and Ae/D ratio of 30% with at least 35% improvement in cycle time over conventional strategy with improved parameters
- The Razorcut™ 1F tool is a first choice for Routing Aluminium, Organic Materials, Thermo-plastics, Thermosets, Delerine, Nylon. These tools can be offered with HardCarbon™ coating for atleast 30% higher productivity.
- Razorcut™ is an excellent program for slotting operations up to a 1 x D axial depth of cut
- Razorcut™ is available in 1,2 and 3 Flute Styles
- Effective throughout the full range of machine speeds, from 3000 to 50000 RPM
- The entire Razorcut™ family of tools can be offered with a TiCN coating for machining Cast Aluminium
- The entire program is available with various corner radii and alternate lengths as a special

TARGET MARKET SEGMENTS

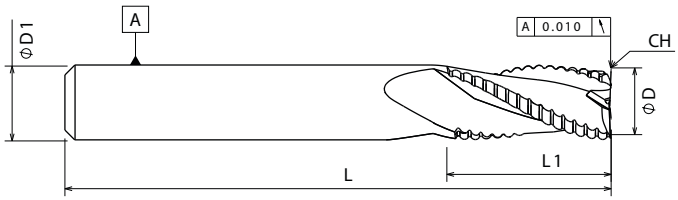
- Especially useful in airframe machining and other aerospace applications (Al2024, 6061 & Al7075).
- Can be used in general engineering, machine tool, and automotive casting (AlSi9, ADC6, ADC12)
- Designed for customers machining a large volume of aluminium products.
- Effective in high-speed machining, conventional milling, and MQL applications.

3 Flute

Centre cutting high performance chip breaker end mill with corner chamfer for roughing of aluminium



Carbide | REG | 30° | 6535 HA | BF



N1-N2

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	CH (mm)	z	EDP Code
6.00	13.00	57.00	6.00	0.5	3	FBK0508672
8.00	16.00	63.00	8.00	1	3	FBK0508673
10.00	22.00	72.00	10.00	1	3	FBK0508674
12.00	26.00	83.00	12.00	1	3	FBK0508675
16.00	32.00	92.00	16.00	1	3	FBK0508676
20.00	38.00	104.00	20.00	1	3	FBK0508677
25.00	45.00	121.00	25.00	1	3	FBK0508678

Features
- 3 Flutes
- Center cutting
- Coarse pitch
- Roughing for aluminium
- Uncoated

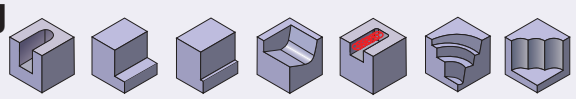
Functions
- High MRR
- Excellent for roughing and finishing of alumnium

Benefits
- Superior tool life

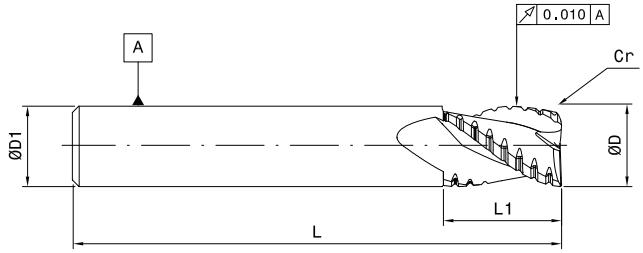
Application data on page no 2.151

3 Flute

Centre cutting high performance chip breaker end mill with corner radius for roughing of aluminium



Carbide | REG | 40° | 6535 HA | BF

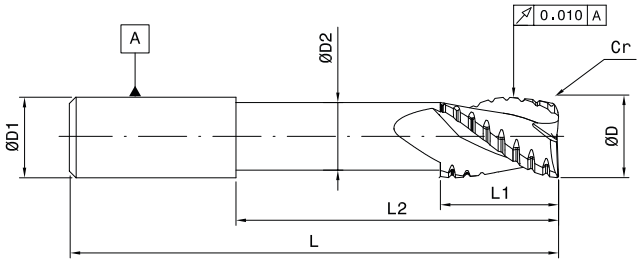


N1-N5

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	EDP Code
6.00	13.00	57.00	6.00	0.25	3	FBK0508701
8.00	16.00	63.00	8.00	0.25	3	FBK0508702
10.00	22.00	72.00	10.00	0.50	3	FBK0508703
12.00	26.00	83.00	12.00	0.50	3	FBK0508704
16.00	32.00	110.00	16.00	1.00	3	FBK0508705
20.00	38.00	104.00	20.00	1.00	3	FBK0508706
25.00	45.00	121.00	25.00	1.50	3	FBK0508707

REG | 40° | 6535 HA | BF



N1-N5

Razor cut - NCBCH

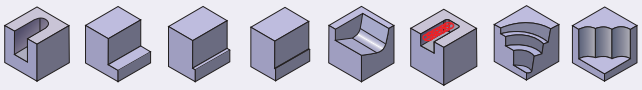
Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	Cr (mm)	z	EDP Code
6.00	8.00	5.00	18.00	57.00	6.00	0.25	3	FBK0509069
8.00	10.00	7.00	24.00	63.00	8.00	0.25	3	FBK0509070
10.00	12.00	9.00	30.00	72.00	10.00	0.50	3	FBK0509071
12.00	15.00	11.00	36.00	83.00	12.00	0.50	3	FBK0509072
16.00	20.00	15.00	48.00	110.00	16.00	1.00	3	FBK0509073
20.00	24.00	19.00	60.00	104.00	20.00	1.00	3	FBK0509074

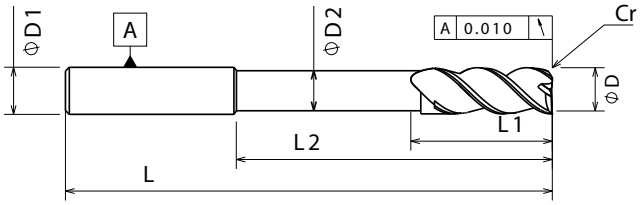
Application data on page no 2.151

3 Flute

Centre cutting high performance end mill with wiper technology for non ferrous materials



Carbide | LONG REACH | 38° | 6535 HA | BF



N1-N2

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	ØCr (mm)	z	EDP Code
6.00	10.00	5.50	42.00	100.00	6.00	0.20	3	FBK0508679
8.00	13.00	7.30	48.00	100.00	8.00	0.20	3	FBK0508680
10.00	16.00	9.10	60.00	125.00	10.00	0.20	3	FBK0508681
12.00	20.00	11.00	73.00	125.00	12.00	0.20	3	FBK0508682
16.00	26.00	14.56	100.00	150.00	16.00	0.20	3	FBK0508683
20.00	32.00	18.20	100.00	150.00	20.00	0.20	3	FBK0508684

Features
- 3 Flutes
- Unequal flute design
- Center cutting
- Wiper technology for excellent floor finish
- Uncoated

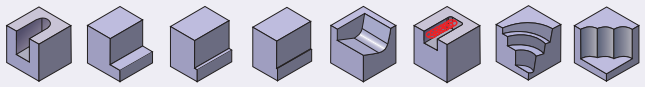
Functions
- High MRR
- Excellent for finishing of alumnium

Benefits
- Superior tool life
- Excellent floor finish

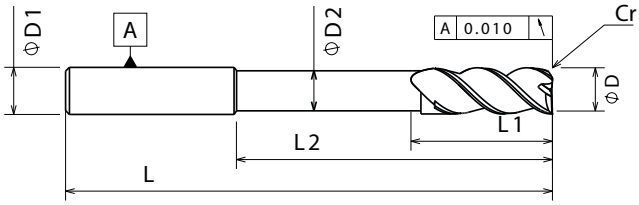
Application data on page no 2.151

3 Flute

Centre cutting high performance end mill with wiper technology for non ferrous materials



Carbide | REG | 38° | 6535 HA | BF



N1-N2

Unit : mm

ØD (mm)	L1 (mm)	ØD2 (mm)	L2 (mm)	L (mm)	ØD1 (mm)	ØCr (mm)	z	EDP Code
6.00	9.00	5.40	18.00	63.00	6.00	0.20	3	FBK0508685
6.00	9.00	5.40	18.00	63.00	6.00	0.50	3	FBK0508686
6.00	9.00	5.40	18.00	63.00	6.00	1.00	3	FBK0508687
8.00	12.00	7.20	24.00	76.00	8.00	0.20	3	FBK0508688
8.00	12.00	7.20	24.00	76.00	8.00	0.50	3	FBK0508689
8.00	12.00	7.20	24.00	76.00	8.00	1.00	3	FBK0508690
10.00	15.00	9.00	30.00	89.00	10.00	0.20	3	FBK0508691
10.00	15.00	9.00	30.00	89.00	10.00	0.50	3	FBK0508692
10.00	15.00	9.00	30.00	89.00	10.00	1.00	3	FBK0508693
12.00	18.00	10.80	36.00	100.00	12.00	0.20	3	FBK0508694
12.00	18.00	10.80	36.00	100.00	12.00	0.50	3	FBK0508695
12.00	18.00	10.80	36.00	100.00	12.00	1.00	3	FBK0508696
16.00	24.00	14.40	48.00	110.00	16.00	0.20	3	FBK0508697
16.00	24.00	14.40	48.00	110.00	16.00	0.50	3	FBK0508698
16.00	24.00	14.40	48.00	110.00	16.00	1.00	3	FBK0508699
16.00	24.00	14.40	48.00	110.00	16.00	2.00	3	FBK0508700

Features
- 3 Flutes
- Unequal flute design
- Center cutting
- Wiper technology for excellent floor finish
- Uncoated

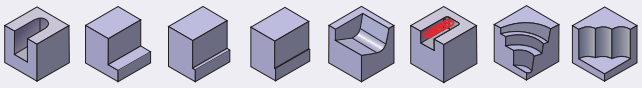
Functions
- High MRR
- Excellent for finishing of alumnium

Benefits
- Superior tool life
- Excellent floor finish

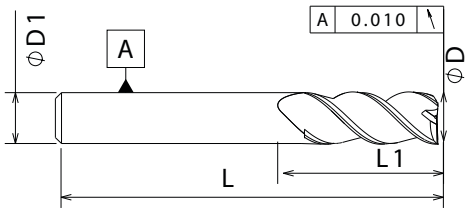
Application data on page no 2.151

3 Flute

Centre cutting high performance end mill with wiper technology for non ferrous materials



Carbide | REG | 38° | 6535 HA | BF



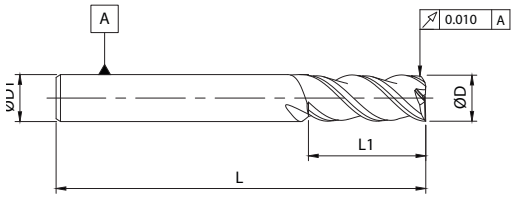
N1-N2

Razor cut - 3FWF
With Wiper Technology

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP Code
3.00	12.00	38.00	3.00	3	FBK0508708
4.00	12.00	51.00	4.00	3	FBK0508709
5.00	14.00	51.00	5.00	3	FBK0508710
6.00	16.00	50.00	6.00	3	FBK0508711
8.00	20.00	63.00	8.00	3	FBK0508712
10.00	22.00	76.00	10.00	3	FBK0508713
12.00	25.00	76.00	12.00	3	FBK0508714
16.00	32.00	89.00	16.00	3	FBK0508715
20.00	38.00	104.00	20.00	3	FBK0508716

Carbide | REG | 45° | 6535 HA | BF



N1-N2

Razor cut - 3F
Without Wiper Technology

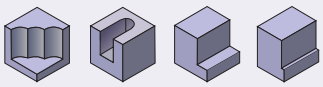
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP Code
3.00	12.00	38.00	3.00	3	FBK0509996
4.00	12.00	50.00	4.00	3	FBK0509997
5.00	14.00	50.00	5.00	3	FBK0509998
6.00	16.00	50.00	6.00	3	FBK0509999
8.00	20.00	63.00	8.00	3	FBK0510000
10.00	22.00	76.00	10.00	3	FBK0510001
12.00	25.00	76.00	12.00	3	FBK0510002
16.00	32.00	89.00	16.00	3	FBK0510003
20.00	38.00	104.00	20.00	3	FBK0510004

Application data on page no 2.151

2 Flute

Centre cutting high performance end mill with wiper technology for non ferrous materials



Carbide | REG | 45° | 6535 HA | BF

IMAGE 1

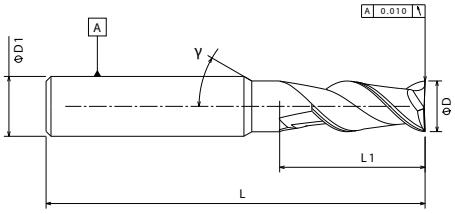
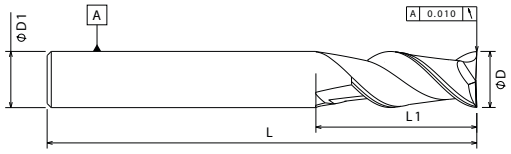


IMAGE 2



N1-N2

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP Code
1.50	6.00	38.00	3.00	2		1	FBK0508795
2.00	8.00	38.00	3.00	2		1	FBK0508796
2.50	9.00	38.00	3.00	2		1	FBK0508797
3.00	12.00	38.00	3.00	2	-	2	FBK0508798
4.00	12.00	50.00	4.00	2	-	2	FBK0508799
5.00	14.00	50.00	5.00	2	-	2	FBK0508800
5.00	14.00	50.00	6.00	2		1	FBK0508801
6.00	16.00	50.00	6.00	2	-	2	FBK0508802
8.00	20.00	63.00	8.00	2	-	2	FBK0508803
10.00	22.00	76.00	10.00	2	-	2	FBK0508804
12.00	25.00	76.00	12.00	2	-	2	FBK0508805
16.00	32.00	89.00	16.00	2	-	2	FBK0508806
20.00	38.00	104.00	20.00	2	-	2	FBK0508807

Features
- 2 Flutes
- 45 degree helix
- Center cutting
- Wiper technology for excellent floor finish
- Uncoated

Functions
- High MRR
- Stable cutting at high cutting speeds

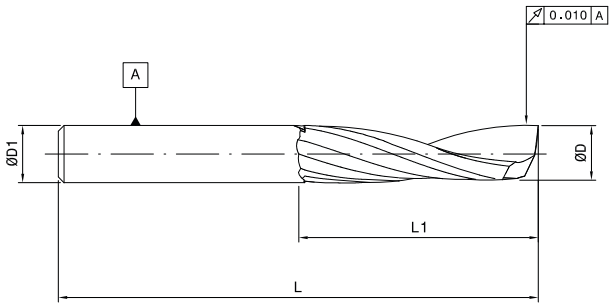
Benefits
- Superior tool life

Application data on page no 2.151

1 Flute

Razor cut 1F for machining alumnium and plastics

Carbide | REG | 30° | 6535 HA | BF



N1-N2

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP Code
3.00	12.00	50.00	3.00	1	FBK0509238
4.00	15.00	60.00	4.00	1	FBK0509239
5.00	17.00	60.00	5.00	1	FBK0509240
6.00	20.00	65.00	6.00	1	FBK0509241
8.00	25.00	65.00	8.00	1	FBK0509242
10.00	25.00	75.00	10.00	1	FBK0509243

Application data on page no 2.151

Cutting parameters for razor cut

Centre cutting high performance 3 flute chip breaker end mill for roughing of aluminium with corner chamfer - Razorcut CBC - 6.0 mm to 25.0 mm

Material			Cutting speed (Vc) m/min for Shoulder Milling (rough and semi finish). If high power spindle is available, you can increase Vc upto 2 times							Cutting speed (Vc) m/min for slot milling					Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%													
			5	2.3	1.6	1.4	1.2	1.1	1						Multiply fz by this multiplication factor based on ae. For excellant floor finish, use the standard fz per chart below. Only add chip thinning multiplication factor when roughing or semi-finishing.													
			ap Max	ap Max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap	ap	Cutting Speed (Vc) m/min		mm	Diameter in mm													
															6.0		8.0		10.0		12.0		16.0		20.0		25.0	
			ae 1%	ae 5%	ae 10%	ae 15%	ae 20%	ae 30%	ae 50%	0.75XD	1xD	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Non Ferrous	N	1	1050	825	750	700	675	650	625	1000	1250	500	2000	fz	0.053	0.066	0.070	0.088	0.088	0.110	0.106	0.132	0.141	0.176	0.176	0.220	0.220	0.275
		2	1050	825	750	700	675	650	625	800	1000	500	1500	fz	0.047	0.059	0.063	0.079	0.079	0.099	0.095	0.119	0.126	0.158	0.158	0.198	0.198	0.248

If you are using Trochoidal Strategy with the Razorcut CBC. Program the helix as 30 degrees, use the starting hm value as given in the catalogue section, Use an engagement angle starting value of 53.13 degrees to get good results.

Centre cutting high performance 3 flute chip breaker end mill for roughing of aluminium with corner radius - Razorcut CBCH/NCBCH - 6.0 mm to 25.0 mm

Material			Cutting speed (Vc) m/min for Shoulder Milling (rough and semi finish). If high power spindle is available, you can increase Vc upto 2 times							Cutting speed (Vc) m/min for slot milling					Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%													
			5	2.3	1.6	1.4	1.2	1.1	1						Multiply fz by this multiplication factor based on ae. For excellant floor finish, use the standard fz per chart below. Only add chip thinning multiplication factor when roughing or semi-finishing.													
			ap Max	ap Max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap	ap	Cutting Speed (Vc) m/min		mm	Diameter in mm													
															6.0		8.0		10.0		12.0		16.0		20.0		25.0	
			ae 1%	ae 5%	ae 10%	ae 15%	ae 20%	ae 30%	ae 50%	0.75XD	1xD	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Non Ferrous	N	1	1050	825	750	700	675	650	625	1000	1250	500	2000	fz	0.058	0.072	0.077	0.096	0.096	0.120	0.115	0.144	0.154	0.192	0.192	0.240	0.208	0.260
		2	1050	825	750	700	675	650	625	800	1000	500	1500	fz	0.052	0.065	0.069	0.086	0.086	0.108	0.104	0.130	0.138	0.173	0.173	0.216	0.192	0.240
		3	1050	825	750	700	675	650	625	800	1000	500	1500	fz	0.040	0.050	0.054	0.067	0.067	0.084	0.081	0.101	0.107	0.134	0.134	0.168	0.144	0.180
		4	840	660	600	560	540	520	500	460	575	400	750	fz	0.046	0.058	0.062	0.077	0.077	0.096	0.092	0.115	0.123	0.154	0.154	0.192	0.164	0.205
		5	525	413	375	350	338	325	313	500	625	250	1000	fz	0.052	0.065	0.069	0.086	0.086	0.108	0.104	0.130	0.138	0.173	0.173	0.216	0.187	0.234

If you are using Trochoidal Strategy with the Razorcut CBCH/NCBCH. Program the helix as 40 degrees, use the starting hm value as given in the catalogue section, Use an engagement angle starting value of 53.13 degrees to get good results.

Razor Cut 1F for machining alumnium and plastics - 3.0 mm to 10.0 mm

Material			Cutting speed (Vc) m/min for Shoulder Milling (rough and semi finish). If high power spindle is available, you can increase Vc upto 2 times							Cutting speed (Vc) m/min for slot milling		Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%												
			ap Max	ap Max	ap 1.2D	ap 1.2D	ap 1.1D	ap 1D	ap 1D	ap	ap	Cutting Speed (Vc) m/min		mm	Diameter in mm											
															3.0		4.0		5.0		6.0		8.0		10.0	
			ae 1%	ae 5%	ae 10%	ae 15%	ae 20%	ae 30%	ae 50%	1XD	0.5XD	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Non Ferrous	N	1	1050	825	750	700	675	650	625	1000	1250	500	2000	fz	0.017	0.021	0.022	0.028	0.028	0.035	0.034	0.042	0.045	0.056	0.056	0.070
		2	1050	825	750	700	675	650	625	800	1000	500	1500	fz	0.014	0.017	0.018	0.022	0.022	0.028	0.027	0.034	0.036	0.045	0.045	0.056

For better finish reduce the feed rate.

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Cutting parameters for razor cut

Centre cutting high performance end mill for non ferrous materials with wiper technology - Razorcut 2FWF - 1.5 mm to 20.0 mm

Material			Cutting speed (Vc) m/min for Shoulder Milling (rough and semi finish). If high power spindle is available, you can increase Vc upto 2 times							Cutting speed (Vc) m/min for slot milling					Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%															
			5	2.3	1.6	1.4	1.2	1.1	1						Multiply fz by this multiplication factor based on ae. For excellant floor finish, use the standard fz per chart below. Only add chip thinning multiplication factor when roughing or semi-finishing.																	
			ap Max	ap Max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap	ap	Cutting Speed (Vc) m/min		mm	Diameter in mm															
															1.5		2.0		4.0		6.0		8.0		10.0		12.0		16.0		20.0	
			ae 1%	ae 5%	ae 10%	ae 15%	ae 20%	ae 30%	ae 50%	1XD	0.5XD	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Non Ferrous	N	1	1050	825	750	700	675	650	625	1000	1250	500	2000	fz	0.011	0.014	0.014	0.018	0.029	0.036	0.043	0.054	0.058	0.072	0.072	0.090	0.086	0.108	0.115	0.144	0.144	0.180
		2	1050	825	750	700	675	650	625	800	1000	500	1500	fz	0.010	0.012	0.013	0.016	0.026	0.032	0.039	0.049	0.052	0.065	0.065	0.081	0.078	0.097	0.104	0.130	0.130	0.162

Centre cutting high performance 3 flute end mill for non ferrous materials with wiper technology - Razorcut 3FWF/3F - 3.0 mm to 20.0 mm

Material			Cutting speed (Vc) m/min for Shoulder Milling (rough and semi finish). If high power spindle is available, you can increase Vc upto 2 times							Cutting speed (Vc) m/min for slot milling					Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%															
			5	2.3	1.6	1.4	1.2	1.1	1						Multiply fz by this multiplication factor based on ae. For excellant floor finish, use the standard fz per chart below. Only add chip thinning multiplication factor when roughing or semi-finishing.																	
			ap Max	ap Max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap	ap	Cutting Speed (Vc) m/min		mm	Diameter in mm															
															3.0		6.0		8.0		10.0		12.0		16.0		20.0			
			ae 1%	ae 5%	ae 10%	ae 15%	ae 20%	ae 30%	ae 50%	0.75XD	1xD	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Non Ferrous	N	1	1050	825	750	700	675	650	625	1000	1250	500	2000	fz	0.022	0.027	0.043	0.054	0.058	0.072	0.072	0.090	0.086	0.108	0.115	0.144	0.144	0.180		
		2	1050	825	750	700	675	650	625	800	1000	500	1500	fz	0.019	0.024	0.039	0.049	0.052	0.065	0.065	0.081	0.078	0.097	0.104	0.130	0.130	0.162		

If you are using Trochoidal Strategy with the Razorcut 3FWF. Program the helix as 38 degrees, use the starting hm value as given in the catalogue section, Use an engagement angle starting value of 53.13 degrees to get good results.

Centre cutting high performance 3 flute end mill for non ferrous materials with wiper technology - Razorcut 3FWFXL/3FWFCR - 6.0 mm to 20.0 mm

Material			Cutting speed (Vc) m/min for Shoulder Milling (rough and semi finish). If high power spindle is available, you can increase Vc upto 2 times							Cutting speed (Vc) m/min for slot milling					Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%															
			5	2.3	1.6	1.4	1.2	1.1	1						Multiply fz by this multiplication factor based on ae. For excellant floor finish, use the standard fz per chart below. Only add chip thinning multiplication factor when roughing or semi-finishing.																	
			ap Max	ap Max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap	ap	Cutting Speed (Vc) m/min		mm	Diameter in mm															
															6.0		8.0		10.0		12.0		16.0		20.0					
			ae 1%	ae 5%	ae 10%	ae 15%	ae 20%	ae 30%	ae 50%	0.75XD	1xD	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max		
Non Ferrous	N	1	1050	825	750	700	675	650	625	1000	1250	500	2000	fz	0.048	0.060	0.064	0.080	0.080	0.100	0.096	0.120	0.128	0.160	0.160	0.200		
		2	1050	825	750	700	675	650	625	800	1000	500	1500	fz	0.043	0.054	0.058	0.072	0.072	0.090	0.086	0.108	0.115	0.144	0.144	0.180		

If you are using Trochoidal Strategy with the Razorcut 3FWFCR. Program the helix as 38 degrees, use the starting hm value as given in the catalogue section, Use an engagement angle starting value of 66.42 degrees to get good results.

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

TOTEM®

High Performance Cutting Tools

ROUGHER END MILLS (CHIP BREAKER)

TOTEM®
High Performance Cutting Tools

ROUGHER END MILLS (CHIP BREAKER)

FEATURES

- 3-4 Flutes
- Center cutting
- Sinosoidal pitch / hot chip breaker
- Superior coating

FUNCTIONS & BENEFITS

- High MRR
- Stable cutting at high cutting speeds
- Superior tool life

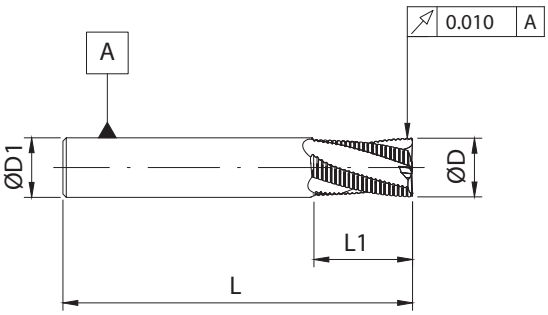
RANGE

- Standard 6mm - 25mm available in standard
- Specials 6mm - 25.4mm available in standard

3/4 Flute

Sinusoidal regular length chip breaker end mill

Carbide | 3-4 | STUB | 20° | 0.1X45° | TiAlN



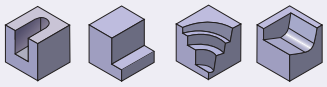
P0-P6
K1-K3
S1-S4
M1-M3
H1-H2

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP No
8.00	8.00	51.00	8.00	3	FBK0504087
10.00	10.00	51.00	10.00	4	FBK0504088
12.00	12.00	64.00	12.00	4	FBK0504090
16.00	16.00	76.00	16.00	4	FBK0504092
20.00	20.00	76.00	20.00	4	FBK0504093

Application data on page no 2.161

3/4 Flute Sinusoidal regular length chip breaker end mill



Carbide | 3-4 | REG | 20° | 0.1X45° | TiAlN

IMAGE 1

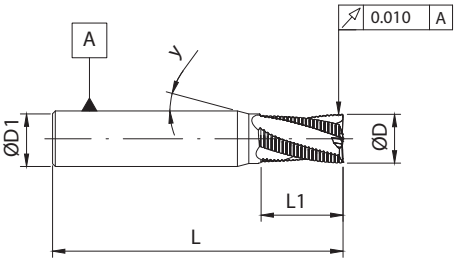
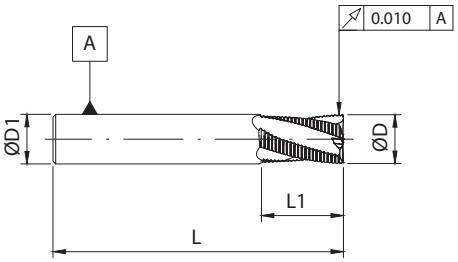


IMAGE 2



P1-P5
K1-K3
S1
S3
M1-M3
H1

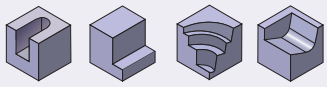
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No
4.00	11.00	55.00	6.00	3	10	1	FBK0511189
5.00	13.00	57.00	6.00	3	10	1	FBK0511266
6.00	13.00	57.00	6.00	3	-	2	FBK0508669
8.00	16.00	64.00	8.00	3	-	2	FBK0504029
10.00	20.00	70.00	10.00	4	-	2	FBK0504089
12.00	25.00	76.00	12.00	4	-	2	FBK0504091
12.00	26.00	83.00	12.00	4	-	2	FBK0508670
16.00	32.00	89.00	16.00	4	-	2	FBK0508671
16.00	35.00	89.00	16.00	4	-	2	FBK0503359
20.00	38.00	102.00	20.00	4	-	2	FBK0504094

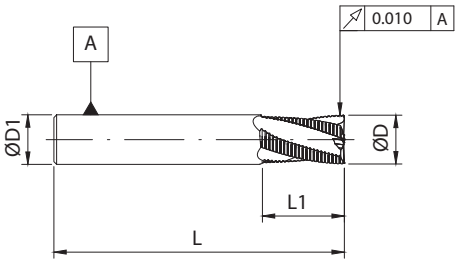
Application data on page no 2.161

3/4 Flute

Sinusoidal regular length chip breaker end mill



Carbide | 3-4 | LONG | 20° | 0.1X45° | TiAlN



P1-P5
K1-K3
S1
S3
M1-M3
H1

Unit : mm

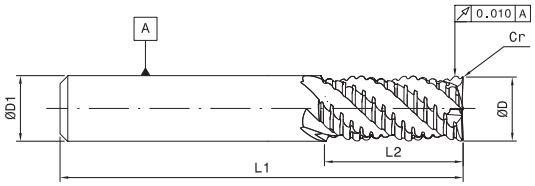
ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	Image	EDP No
6.00	40.00	100.00	6.00	3	2	FBK0509263
8.00	40.00	100.00	8.00	3	2	FBK0509264
10.00	45.00	100.00	10.00	4	2	FBK0509266
12.00	50.00	100.00	12.00	4	2	FBK0509268

Application data on page no 2.161

4/6 Flute

Flat pitch regular length chip breaker end mill with corner radius

Carbide | 4-6 | REG | 45° | TiAlN



P3-P6
K1-K3
S1-S4
M1-M3
H1-H3

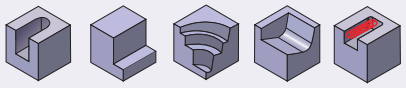
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	Cr (mm)	EDP No
6.00	8.00	57.00	6.00	4	0.75	FBK0510347
8.00	10.00	63.00	8.00	4	0.75	FBK0510348
10.00	12.00	72.00	10.00	4	0.75	FBK0510349
12.00	14.00	83.00	12.00	4	1.00	FBK0510350
16.00	18.00	92.00	16.00	6	1.00	FBK0510351
20.00	22.00	104.00	20.00	6	1.25	FBK0511267
25.00	27.00	121.00	25.00	6	1.25	FBK0511268

Application data on page no 2.162

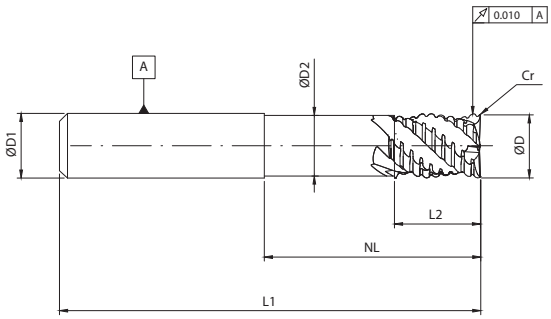
4/6 Flute

Flat pitch regular length chip breaker end mill with corner radius



Carbide | 4-6 | REG | 45° | TiAlN

END MILLS

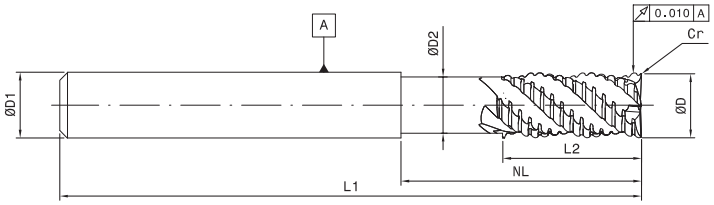


NF193CB

P3-P6
K1-K3
S1-S4
M1-M3
H1-H3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	L2 (mm)	ØD2 (mm)	ØD1 (mm)	z	Cr (mm)	EDP No
6.00	8.00	57.00	21.00	5.50	6.00	4	0.75	FBK0510352
8.00	10.00	63.00	28.00	7.30	8.00	4	0.75	FBK0510353
10.00	12.00	72.00	35.00	9.10	10.00	4	0.75	FBK0510354
12.00	14.00	83.00	42.00	11.00	12.00	4	1.00	FBK0510355
16.00	18.00	92.00	56.00	14.50	16.00	6	1.00	FBK0510356
20.00	22.00	104.00	70.00	18.20	20.00	6	1.25	FBK0511269
25.00	27.00	121.00	80.00	23.20	25.00	6	1.25	FBK0511270



NF193CBL

P3-P6
K1-K3
S1-S4
M1-M3
H1-H3

Unit : mm

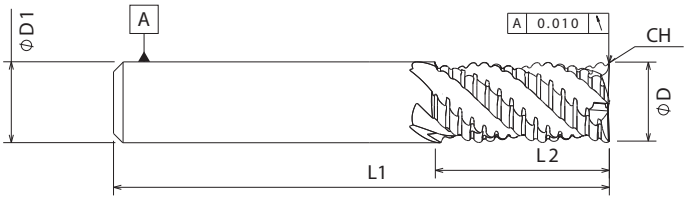
ØD (mm)	L2 (mm)	L1 (mm)	NL (mm)	ØD2 (mm)	ØD1 (mm)	z	Cr (mm)	EDP No
6.00	8.00	100	42.00	5.50	6.00	4	0.75	FBK0510555
8.00	10.00	100	42.00	7.30	8.00	4	0.75	FBK0510556
10.00	12.00	100	42.00	9.10	10.00	4	0.75	FBK0510557
12.00	14.00	125	42.00	11.00	12.00	4	1.00	FBK0510558
16.00	18.00	125	56.00	14.56	16.00	6	1.00	FBK0510559

Application data on page no 2.162

4/6 Flute

Flat pitch regular length chip breaker end mill with corner chamfer

Carbide | 4-6 | REG | 45° | TiAlN



P3-P6
K1-K3
S1-S4
M1-M3
H1-H3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	CH (mm)	EDP No
6.00	13.00	57.00	6.00	4	0.25	FBK0510342
8.00	16.00	63.00	8.00	4	0.25	FBK0510343
10.00	22.00	72.00	10.00	4	0.25	FBK0510344
12.00	26.00	83.00	12.00	4	0.35	FBK0510345
16.00	32.00	92.00	16.00	6	0.35	FBK0510346
20.00	38.00	104.00	20.00	6	0.35	FBK0511271
25.00	45.00	121.00	25.00	6	0.50	FBK0511272

Features
- 4-6 Flutes
- Center cutting
- Flat pitch
- Superior coating
- 45HX

Functions
- High MRR
- Stable cutting at high cutting speeds

Benefits
- Superior tool life

Application data on page no 2.162

Cutting parameters

Sinusoidal regular length 3/4 flute chip breaker end mill - F192CB/NF192CB/F192CBL - 6.0 mm to 25.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling / Rough and Semi Finish							Slot Milling				Recommended Feed/Tooth (fz=mm/th) for shoulder milling/slot milling, reduce fz by 20%													
			5	2.3	1.6	1.4	1.2	1.1	1	1	1				Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.													
			CT NCT	CT NCT	CT NCT	CT NCT	CT NCT	CT	CT	CT	CT				Diameter in mm													
			ap Max	ap Max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap 1D	Cutting Speed (Vc) m/min for Slot Milling	Cutting Speed (Vc) m/min		mm	6.0		8.0		10.0		12.0		16.0		20.0		25.0	
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%	ae/D 100%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	1	315	248	225	210	203	195	188	1 x D	175	150	315	fz	0.033	0.041	0.039	0.049	0.047	0.059	0.058	0.072	0.070	0.087	0.074	0.093	0.078	0.098
		2	294	231	210	196	189	182	175	1 x D	165	140	294	fz	0.033	0.041	0.039	0.049	0.047	0.059	0.058	0.072	0.070	0.087	0.074	0.093	0.078	0.098
		3	252	198	180	168	162	156		0.75 D	140	120	252	fz	0.026	0.033	0.033	0.041	0.039	0.049	0.049	0.061	0.060	0.075	0.066	0.082	0.070	0.087
		4	189	149	135	126	122	117		0.5 x D	120	90	189	fz	0.023	0.029	0.030	0.037	0.035	0.044	0.043	0.054	0.053	0.066	0.058	0.072	0.061	0.076
		5	126	99	90	84	81	78		0.75 XD	80	60	126	fz	0.020	0.025	0.026	0.033	0.031	0.039	0.039	0.049	0.048	0.06	0.052	0.065	0.056	0.07
Stainless Steel	M	1	168	132	120	112	108	104		0.75 x D	90	80	168	fz	0.026	0.033	0.033	0.041	0.039	0.049	0.049	0.061	0.060	0.075	0.066	0.082	0.070	0.087
		2	126	99	90	84	81	78		0.75 x D	70	60	126	fz	0.020	0.025	0.026	0.033	0.031	0.039	0.039	0.049	0.048	0.06	0.052	0.065	0.056	0.07
		3	126	99	90	84	81	78		0.75 x D	70	60	126	fz	0.014	0.018	0.021	0.026	0.026	0.032	0.031	0.039	0.038	0.048	0.042	0.052	0.045	0.056
Cast Iron	K	1	252	198	180	168	162	156	150	1 x D	140	120	252	fz	0.033	0.041	0.039	0.049	0.047	0.059	0.058	0.072	0.070	0.087	0.074	0.093	0.078	0.098
		2	231	182	165	154	149	143		1 x D	125	110	231	fz	0.026	0.033	0.033	0.041	0.039	0.049	0.049	0.061	0.060	0.075	0.066	0.082	0.070	0.087
		3	210	165	150	140	135	130		1 x D	115	100	210	fz	0.020	0.025	0.026	0.033	0.031	0.039	0.039	0.049	0.048	0.06	0.052	0.065	0.056	0.07
Super Alloys	S	1	105	83	75	70	68	65		0.75 xD	70	50	105	fz	0.026	0.033	0.033	0.041	0.039	0.049	0.049	0.061	0.060	0.075	0.066	0.082	0.070	0.087
		3	105	83	75	70	68	65		0.75 xD	65	50	105	fz	0.020	0.025	0.026	0.033	0.031	0.039	0.039	0.049	0.048	0.06	0.052	0.065	0.056	0.07
Hard Materials	H	1	168	132	120	112	108	104		0.75 xD	110	80	168	fz	0.023	0.029	0.030	0.037	0.035	0.044	0.043	0.054	0.053	0.066	0.058	0.072	0.061	0.076

		3 Flute 4 Flute
CT	Stub	**F192CBS**
CT	Standard	**F192CB**
NCT	Long	**F192CBL**

CT- indicates that when using these end mills – use the Chip load multiplication factor
NCT- Indicates that when using these end mills- do not use the chip load multiplication factor

Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Cutting parameters

Flat pitch regular length 4/6 flute chip breaker end mill with corner radius - F193CB/NF 193CB/F193CBL - 6.0 mm to 25.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling / Rough and Semi Finish							Slot Milling		Cutting Speed (Vc) m/min			Recommended Feed/Tooth (fz=mm/th) for shoulder milling/slot milling, reduce fz by 20%											
			5	2.3	1.6	1.4	1.2	1.1	1	1	1				Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.											
			CT NCT	CT NCT	CT NCT	CT NCT	CT NCT	CT	CT	CT	CT				Diameter in mm											
			ap Max	ap Max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap 1D	Cutting Speed (Vc) m/min for Slot Milling	Cutting Speed (Vc) m/min		mm	6.0		8.0		10.0		12.0		16.0		20.0		25.0	
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%		min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	3	252	198	180	168	162	156	150	0.75xD	140	120	252	fz	0.025	0.031	0.034	0.043	0.041	0.051	0.050	0.063	0.062	0.078	0.081	0.101	0.091	0.114
		4	189	149	135	126	122	117		0.5xD	120	90	189	fz	0.022	0.028	0.030	0.038	0.037	0.046	0.045	0.056	0.055	0.069	0.070	0.088	0.078	0.098
		5	126	99	90	84	81	78	75	0.75xD	80	60	126	fz	0.020	0.025	0.027	0.034	0.033	0.041	0.041	0.051	0.050	0.063	0.065	0.081	0.073	0.091
		6	105	83	75	70	68	65		0.5xD	63	50	105	fz	0.017	0.021	0.023	0.029	0.027	0.034	0.034	0.042	0.041	0.051	0.052	0.065	0.057	0.071
Stainless Steel	M	1	168	132	120	112	108	104	100	0.75xD	90	80	168	fz	0.025	0.031	0.034	0.043	0.041	0.051	0.050	0.063	0.062	0.078	0.081	0.101	0.091	0.114
		2	126	99	90	84	81	78		0.75xD	70	60	126	fz	0.020	0.025	0.027	0.034	0.033	0.041	0.041	0.051	0.050	0.063	0.065	0.081	0.073	0.091
		3	126	99	90	84	81	78		0.75xD	70	60	126	fz	0.017	0.021	0.023	0.029	0.027	0.034	0.034	0.042	0.041	0.051	0.052	0.065	0.057	0.071
Cast Iron	K	1	252	198	180	168	162	156	150	0.75xD	140	120	252	fz	0.030	0.037	0.041	0.051	0.049	0.061	0.060	0.075	0.073	0.091	0.091	0.114	0.099	0.124
		2	231	182	165	154	149	143	138	0.75xD	125	110	231	fz	0.025	0.031	0.034	0.043	0.041	0.051	0.050	0.063	0.062	0.078	0.081	0.101	0.091	0.114
		3	210	165	150	140	135	130		0.75xD	115	100	210	fz	0.020	0.025	0.027	0.034	0.033	0.041	0.041	0.051	0.050	0.063	0.065	0.081	0.073	0.091
Super Alloys	S	1	105	83	75	70	68	65		0.75xD	70	50	105	fz	0.025	0.031	0.034	0.043	0.041	0.051	0.050	0.063	0.062	0.078	0.081	0.101	0.091	0.114
		2	42	33	30	28	27	26		0.3xD	30	20	42	fz	0.014	0.017	0.018	0.022	0.022	0.027	0.026	0.033	0.034	0.042	0.043	0.054	0.049	0.061
		3	105	83	75	70	68	65		0.75xD	65	50	105	fz	0.020	0.025	0.027	0.034	0.033	0.041	0.041	0.051	0.050	0.063	0.065	0.081	0.073	0.091
		4	95	74	68	63	61	59		0.5xD	55	45	95	fz	0.018	0.022	0.025	0.031	0.030	0.038	0.037	0.046	0.046	0.058	0.059	0.074	0.067	0.084
Hard Materials	H	1	168	132	120	112	108	104	100	0.5xD	110	80	168	fz	0.022	0.028	0.030	0.038	0.037	0.046	0.045	0.056	0.055	0.069	0.070	0.088	0.078	0.098
		2	147	116	105	98	95			0.3xD	95	70	147	fz	0.017	0.021	0.023	0.029	0.027	0.034	0.034	0.042	0.041	0.051	0.052	0.065	0.057	0.071
		3	126	99	90	84	81			0.2xD	75	60	126	fz	0.014	0.017	0.018	0.023	0.022	0.027	0.027	0.034	0.033	0.041	0.042	0.052	0.046	0.057

Note: For endmills with 6 flutes use ap 60% of table values

Flat pitch regular length 4/6 flute chip breaker end mill with corner chamfer - F194CB - 6.0 mm to 25.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling / Rough and Semi Finish							Slot Milling		Cutting Speed (Vc) m/min			Recommended Feed/Tooth (fz=mm/th) for shoulder milling/slot milling, reduce fz by 20%											
			5	2.3	1.6	1.4	1.2	1.1	1	1	1				Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.											
			ap Max	ap Max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap 1D	Cutting Speed (Vc) m/min for Slot Milling	Cutting Speed (Vc) m/min		mm	Diameter in mm											
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%		min	max	Range	6.0		8.0		10.0		12.0		16.0		20.0		25.0	
Steel	P	3	252	198	180	168	162	156	150	0.75xD	140	120	252	fz	0.025	0.031	0.034	0.043	0.041	0.051	0.050	0.063	0.062	0.078	0.081	0.101	0.091	0.114
		4	189	149	135	126	122	117	113	0.4xD	120	90	189	fz	0.022	0.028	0.030	0.038	0.037	0.046	0.045	0.056	0.055	0.069	0.070	0.088	0.078	0.098
		5	126	99	90	84	81	78	75	0.5xD	80	60	126	fz	0.020	0.025	0.027	0.034	0.033	0.041	0.041	0.051	0.050	0.063	0.065	0.081	0.073	0.091
		6	105	83	75	70	68	65		0.4xD	63	50	105	fz	0.017	0.021	0.023	0.029	0.027	0.034	0.034	0.042	0.041	0.051	0.052	0.065	0.057	0.071
Stainless Steel	M	1	168	132	120	112	108	104	100	0.5xD	90	80	168	fz	0.025	0.031	0.034	0.043	0.041	0.051	0.050	0.063	0.062	0.078	0.081	0.101	0.091	0.114
		2	126	99	90	84	81	78	75	0.5xD	70	60	126	fz	0.020	0.025	0.027	0.034	0.033	0.041	0.041	0.051	0.050	0.063	0.065	0.081	0.073	0.091
		3	126	99	90	84	81	78	75	0.5xD	70	60	126	fz	0.017	0.021	0.023	0.029	0.027	0.034	0.034	0.042	0.041	0.051	0.052	0.065	0.057	0.071
Cast Iron	K	1	252	198	180	168	162	156	150	0.5xD	140	120	252	fz	0.030	0.037	0.041	0.051	0.049	0.061	0.060	0.075	0.073	0.091	0.091	0.114	0.099	0.124
		2	231	182	165	154	149	143	138	0.5xD	125	110	231	fz	0.025	0.031	0.034	0.043	0.041	0.051	0.050	0.063	0.062	0.078	0.081	0.101	0.091	0.114
		3	210	165	150	140	135	130	125	0.5xD	115	100	210	fz	0.020	0.025	0.027	0.034	0.033	0.041	0.041	0.051	0.050	0.063	0.065	0.081	0.073	0.091
Super Alloys	S	1	105	83	75	70	68	65		0.3xD	70	50	105	fz	0.025	0.031	0.034	0.043	0.041	0.051	0.050	0.063	0.062	0.078	0.081	0.101	0.091	0.114
		2	42	33	30	28	27	26		0.3xD	30	20	42	fz	0.014	0.017	0.018	0.022	0.022	0.027	0.026	0.033	0.034	0.042	0.043	0.054	0.049	0.061
		3	105	83	75	70	68	65	63	0.4xD	65	50	105	fz	0.020	0.025	0.027	0.034	0.033	0.041	0.041	0.051	0.050	0.063	0.065	0.081	0.073	0.091
		4	95	74	68	63	61	59	56	0.4xD	55	45	95	fz	0.018	0.022	0.025	0.031	0.030	0.038	0.037	0.046	0.046	0.058	0.059	0.074	0.067	0.084
Hard Materials	H	1	168	132	120	112	108	104		0.3xD	110	80	168	fz	0.022	0.028	0.030	0.038	0.037	0.046	0.045	0.056	0.055	0.069	0.070	0.088	0.078	0.098
		2	147	116	105	98	95			0.2xD	95	70	147	fz	0.017	0.021	0.023	0.029	0.027	0.034	0.034	0.042	0.041	0.051	0.052	0.065	0.057	0.071
		3	126	99	90	84	81			0.2xD	75	60	126	fz	0.014	0.017	0.018	0.023	0.022	0.027	0.027	0.034	0.033	0.041	0.042	0.052	0.046	0.057

		4 Flute/ 6 Flute	
		Flat/ Cr	Flat/ CH
CT	Standard	**F193CB**	**F194CB**
CT	Standard	**NF193CB**	
NCT	Long	**NF193CBL**	

CT- indicates that when using these end mills – use the Chip load multiplication factor
NCT- Indicates that when using these end mills- do not use the chip load multiplication factor

Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)
Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

TOTEM®

High Performance Cutting Tools

GENERAL PURPOSE & ECONOMY SERIES END MILLS

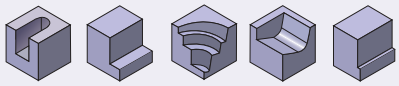
GENERAL PURPOSE END MILLS

SERIES	FLUTE	LENGTH	CORNER STYLE	PAGES
F111 GP	4	Regular	Square End	2.162
F163 GP	4	Stub	Square End	2.163
F122 GP	4	Long Length	Square End	2.164
F187 GP	4	Extra Long	Square End	2.165
F181 GP	4	Long Reach	Square End	2.166
F116 GP	3	Regular	Square End	2.167
F164 GP	2	Stub	Square End	2.168
F121 GP	2	Regular	Square End	2.169
F123 GP	2	Long Length	Square End	2.170
F183 GP	2	Long reach	Square End	2.171
F165 GP	4	Stub	Ball Nose	2.172
F140 GP	4	Regular	Ball Nose	2.173
F184 GP	4	Long Reach	Ball Nose	2.174
F150 GP	2	Regular	Ball Nose	2.175
F166 GP	2	Stub	Ball Nose	2.176
F186 GP	2	Long Reach	Ball Nose	2.177
F125 GP	4	Long Length	Ball Nose	2.178
F126 GP	2	Long Length	Ball Nose	2.179
F188 GP	4	Extra Long	Ball Nose	2.180
F114 GP	4	Regular	Chip Breaker	2.183
F132 GP	4	Long Length	Chip Breaker	2.184

ECONOMY RANGE END MILLS

SERIES	FLUTE	LENGTH	CORNER STYLE	PAGES
F121 XL	2	Regular	Square End	2.186
F111 XL	4	Regular	Square End	2.187
F150 XL	2	Regular	Ball nose	2.188
F140 XL	4	Regular	Ball nose	2.189
F123 XL	2	Long Length	Square End	2.190
F122 XL	4	Long Length	Square End	2.191
F125 XL	4	Long Length	Ball nose	2.192

4 Flute Centre cutting regular length end mill



Carbide | REG | 30° | 6535 HA | TiAlN

IMAGE 1

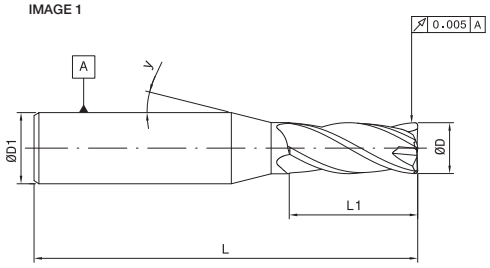
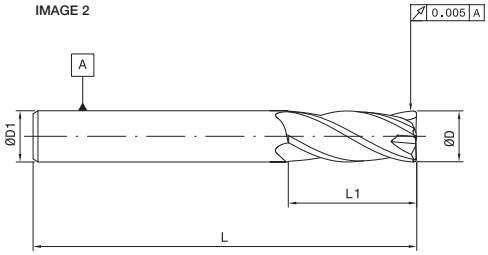


IMAGE 2



P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

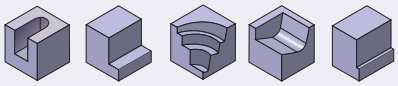
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No Uncoated	EDP No TiN Coated	EDP No TiAlN Coated
1.00	3.00	38.00	3.00	4	10	1	FBK0500001	FBK0500002	FBK0500003
1.50	6.00	38.00	3.00	4	10	1	FBK0500004	FBK0500005	FBK0500006
2.00	9.00	38.00	3.00	4	10	1	FBK0500007	FBK0500008	FBK0500009
2.50	12.00	38.00	3.00	4	10	1	FBK0500010	FBK0500011	FBK0500012
3.00	12.00	38.00	3.00	4	-	2	FBK0500013	FBK0500014	FBK0500015
3.50	12.00	51.00	4.00	4	10	1	FBK0500016		FBK0500017
4.00	14.00	51.00	4.00	4	-	2	FBK0500018	FBK0500019	FBK0500020
4.50	14.00	51.00	5.00	4	10	1	FBK0500021	FBK0500022	FBK0500023
5.00	20.00	51.00	5.00	4	-	2	FBK0500024	FBK0500025	FBK0500026
5.50	20.00	64.00	6.00	4	10	1	FBK0500027	FBK0500028	FBK0500029
6.00	20.00	64.00	6.00	4	-	2	FBK0500030	FBK0500031	FBK0500032
6.50	20.00	64.00	8.00	4	10	1	FBK0500033	FBK0500034	FBK0500035
7.00	20.00	64.00	8.00	4	10	1	FBK0500036		FBK0500037
8.00	20.00	64.00	8.00	4	-	2	FBK0500038	FBK0500039	FBK0500040
9.00	20.00	64.00	9.00	4	-	2	FBK0500041	FBK0500042	FBK0500043
10.00	25.00	70.00	10.00	4	-	2	FBK0500044	FBK0500045	FBK0500046
11.00	25.00	70.00	11.00	4	-	2	FBK0500047		FBK0500048
12.00	25.00	76.00	12.00	4	-	2	FBK0500049	FBK0500050	FBK0500051
13.00	30.00	89.00	13.00	4	-	2	FBK0500052		FBK0500053
14.00	30.00	89.00	14.00	4	-	2	FBK0500054	FBK0500055	FBK0500056
15.00	30.00	89.00	15.00	4	-	2	FBK0500057	FBK0500058	FBK0500059
16.00	30.00	89.00	16.00	4	-	2	FBK0500060	FBK0500061	FBK0500062
18.00	35.00	102.00	18.00	4	-	2	FBK0500063	FBK0500064	FBK0500065
20.00	35.00	102.00	20.00	4	-	2	FBK0500066	FBK0500067	FBK0500068
22.00	40.00	102.00	22.00	4	-	2	FBK0500069		FBK0500070
25.00	40.00	102.00	25.00	4	-	2	FBK0500071		FBK0500072

Application data on page no 2.181

Also available in uncoated & TiN

4 Flute Centre cutting stub length end mill



Carbide | STUB | 30° | 6535 HA | TiAlN

IMAGE 1

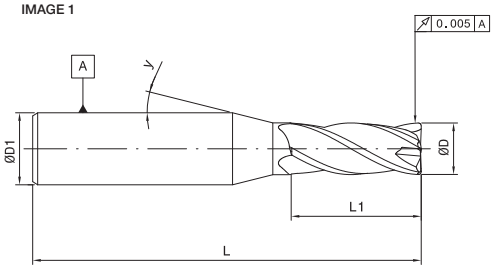
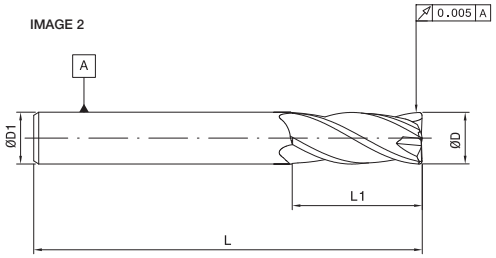


IMAGE 2



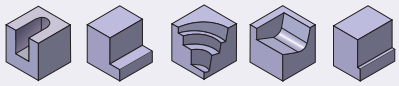
P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

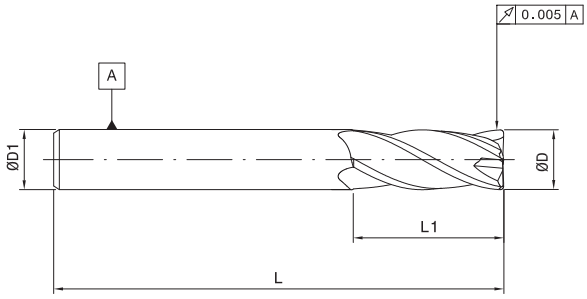
ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No Uncoated	EDP No Coated
1.00	2.00	38.00	3.00	4	10	1	FBK0502013	FBK0502014
1.50	3.00	38.00	3.00	4	10	1	FBK0500532	FBK0500533
2.00	4.00	38.00	3.00	4	10	1	FBK0500534	FBK0500535
2.50	5.00	38.00	3.00	4	10	1	FBK0500536	FBK0500537
3.00	6.00	38.00	3.00	4	-	2	FBK0500538	FBK0500539
4.00	8.00	51.00	4.00	4	-	2	FBK0500540	FBK0500541
5.00	11.00	51.00	5.00	4	-	2	FBK0500542	FBK0500543
6.00	13.00	51.00	6.00	4	-	2	FBK0500544	FBK0500545
8.00	13.00	51.00	8.00	4	-	2	FBK0500546	FBK0500547
10.00	14.00	51.00	10.00	4	-	2	FBK0500548	FBK0500549
12.00	16.00	64.00	12.00	4	-	2	FBK0500550	FBK0500551
14.00	18.00	70.00	14.00	4	-	2	FBK0500552	FBK0500553
16.00	20.00	76.00	16.00	4	-	2	FBK0500554	FBK0500555
20.00	25.00	76.00	25.00	4	-	2	FBK0500556	FBK0500557

Application data on page no 2.181

4 Flute Centre cutting long length end mill



Carbide | LONG | 30° | 6535 HA | TiAlN



P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

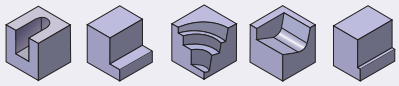
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP No Uncoated	EDP No TiN Coated	EDP No TiAlN Coated
3.00	25.00	64.00	3.00	4	FBK0500334	FBK0500335	FBK0500336
4.00	25.00	64.00	4.00	4	FBK0500337	FBK0500338	FBK0500339
5.00	25.00	64.00	5.00	4	FBK0500340	FBK0500341	FBK0500342
6.00	30.00	76.00	6.00	4	FBK0500343	FBK0500344	FBK0500345
7.00	30.00	83.00	8.00	4	FBK0500346		FBK0500347
8.00	35.00	83.00	8.00	4	FBK0500348	FBK0500349	FBK0500350
9.00	35.00	89.00	10.00	4	FBK0500351		FBK0500352
10.00	40.00	89.00	10.00	4	FBK0500353	FBK0500354	FBK0500355
11.00	40.00	102.00	12.00	4	FBK0500356		FBK0500357
12.00	50.00	102.00	12.00	4	FBK0500358	FBK0500359	FBK0500360
14.00	65.00	117.00	14.00	4	FBK0500361		FBK0500362
16.00	65.00	117.00	16.00	4	FBK0500363	FBK0500364	FBK0500365
20.00	80.00	152.00	20.00	4	FBK0500366	FBK0500367	FBK0500368
25.00	80.00	152.00	25.00	4	FBK0500369		FBK0500370

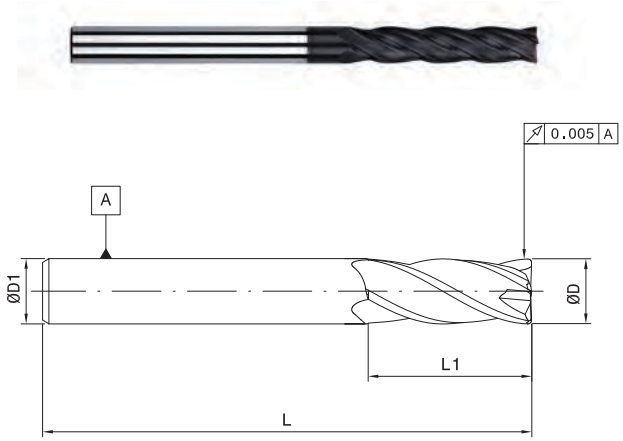
Application data on page no 2.181

4 Flute

Centre cutting extra long end mill



Carbide | EXTRA LONG | 30° | 6535 HA | TiAIN



P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

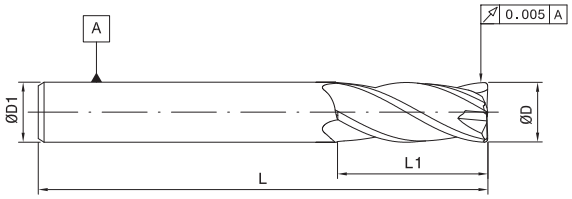
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP No TiAIN Coated
3.00	40.00	100.00	3.00	4	FBK0502681
4.00	40.00	100.00	4.00	4	FBK0502682
5.00	40.00	100.00	5.00	4	FBK0502683
6.00	40.00	100.00	6.00	4	FBK0502684
8.00	50.00	100.00	8.00	4	FBK0502685
8.00	75.00	150.00	8.00	4	FBK0501481
10.00	40.00	100.00	10.00	4	FBK0500888
10.00	75.00	152.00	10.00	4	FBK0502686
12.00	75.00	152.00	12.00	4	FBK0502687
16.00	75.00	152.00	16.00	4	FBK0502688
20.00	75.00	152.00	20.00	4	FBK0502689

Application data on page no 2.181

4 Flute Centre cutting long reach end mill

Carbide | LONG REACH | 30° | 6535 HA | TiAlN



P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP No Uncoated	EDP No TiAlN Coated
3.00	6.00	60.00	3.00	4	FBK0500454	FBK0500455
4.00	9.00	76.00	4.00	4	FBK0500456	FBK0500457
5.00	15.00	76.00	5.00	4	FBK0500458	FBK0500459
6.00	15.00	76.00	6.00	4	FBK0500460	FBK0500461
8.00	20.00	101.00	8.00	4	FBK0500462	FBK0500463
10.00	25.00	101.00	10.00	4	FBK0500464	FBK0500465
12.00	25.00	152.00	12.00	4	FBK0500466	FBK0500467
16.00	30.00	152.00	16.00	4	FBK0500468	FBK0500469
18.00	40.00	152.00	18.00	4	FBK0500470	FBK0500471
20.00	40.00	152.00	20.00	4	FBK0500472	FBK0500473

Application data on page no 2.181

3 Flute Centre cutting regular length end mill

Carbide | REG | 30° | 6535 HA | TiAlN

IMAGE 1

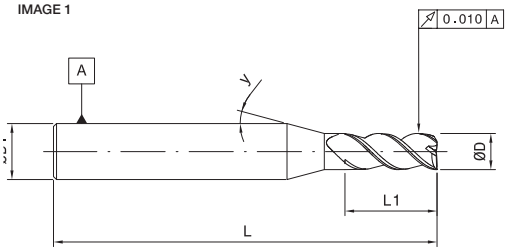
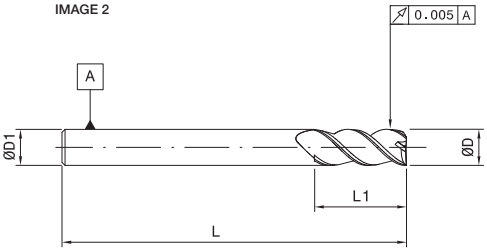


IMAGE 2



P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

ØD (mm)	L2 (mm)	L1 (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No Uncoated	EDP No TiN Coated	EDP No TiAlN Coated
1.00	3.00	38.00	3.00	3	10	1	FBK0500138	FBK0500139	FBK0500140
1.50	6.00	38.00	3.00	3	10	1	FBK0500141	FBK0500142	FBK0500143
2.00	9.00	38.00	3.00	3	10	1	FBK0500144	FBK0500145	FBK0500146
2.50	12.00	38.00	3.00	3	10	1	FBK0500147	FBK0500148	FBK0500149
3.00	12.00	38.00	3.00	3	-	2	FBK0500150	FBK0500151	FBK0500152
3.50	12.00	51.00	4.00	3	10	1	FBK0500153		FBK0500154
4.00	14.00	51.00	4.00	3	-	2	FBK0500155	FBK0500156	FBK0500157
4.50	20.00	51.00	5.00	3	10	1	FBK0500158		FBK0500159
5.00	20.00	51.00	5.00	3	-	2	FBK0500160	FBK0500161	FBK0500162
6.00	20.00	63.00	6.00	3	-	2	FBK0500163	FBK0500164	FBK0500165
6.50	20.00	64.00	8.00	3	10	1	FBK0500166	FBK0500167	FBK0500168
8.00	20.00	63.00	8.00	3	-	2	FBK0500169	FBK0500170	FBK0500171
9.00	20.00	64.00	9.00	3	-	2	FBK0500172		FBK0500173
10.00	25.00	70.00	10.00	3	-	2	FBK0500174	FBK0500175	FBK0500176
11.00	25.00	70.00	11.00	3	-	2	FBK0500177		FBK0500178
12.00	25.00	76.00	12.00	3	-	2	FBK0500179	FBK0500180	FBK0500181
14.00	30.00	89.00	14.00	3	-	2	FBK0500182	FBK0500183	FBK0500184
15.00	30.00	89.00	15.00	3	-	2	FBK0500185		FBK0500186
16.00	30.00	89.00	16.00	3	-	2	FBK0500187	FBK0500188	FBK0500189
18.00	35.00	102.00	18.00	3	-	2	FBK0500190	FBK0500191	FBK0500192
20.00	38.00	102.00	20.00	3	-	2	FBK0500193	FBK0500194	FBK0500195
25.00	40.00	102.00	25.00	3	-	2	FBK0500196	FBK0500197	FBK0500198

Application data on page no 2.181

2 Flute Centre cutting stub length end mill

Carbide | STUB | 30° | 6535 HA | TiAIN

IMAGE 1

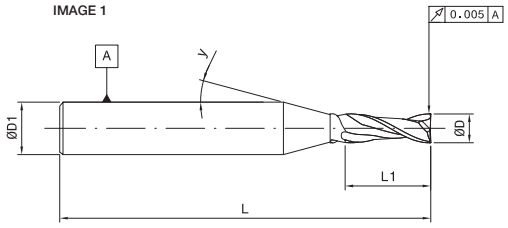
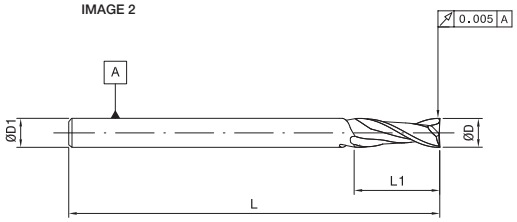


IMAGE 2



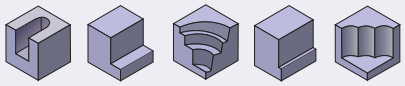
P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No Uncoated	EDP No TiAIN Coated
1.00	2.00	38.00	3.00	2	10	1	FBK0502015	FBK0502016
1.50	3.00	38.00	3.00	2	10	1	FBK0500558	FBK0500559
2.00	4.00	38.00	3.00	2	10	1	FBK0500560	FBK0500561
2.50	5.00	38.00	3.00	2	10	1	FBK0500562	FBK0500563
3.00	6.00	38.00	3.00	2	-	2	FBK0500564	FBK0500565
4.00	8.00	51.00	4.00	2	-	2	FBK0500566	FBK0500567
5.00	11.00	51.00	5.00	2	-	2	FBK0500568	FBK0500569
6.00	13.00	51.00	6.00	2	-	2	FBK0500570	FBK0500571
8.00	13.00	51.00	8.00	2	-	2	FBK0500572	FBK0500573
10.00	14.00	51.00	10.00	2	-	2	FBK0500574	FBK0500575
12.00	16.00	64.00	12.00	2	-	2	FBK0500576	FBK0500577
14.00	18.00	70.00	14.00	2	-	2	FBK0500578	FBK0500579
16.00	20.00	76.00	16.00	2	-	2	FBK0500580	FBK0500581
20.00	25.00	76.00	25.00	2	-	2	FBK0500582	FBK0500583

Application data on page no 2.181

2 Flute Centre cutting regular length end mill



Carbide | REG | 30° | 6535 HA | TiAlN

IMAGE 1

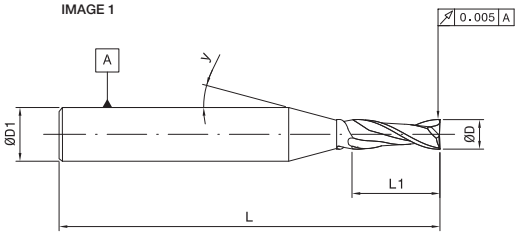
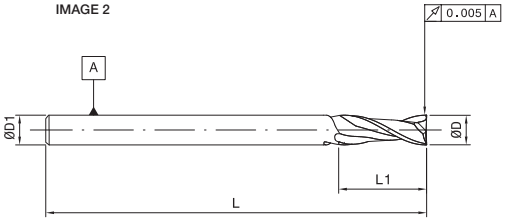


IMAGE 2



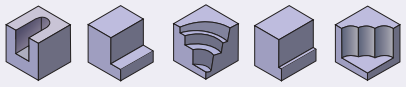
P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No Uncoated	EDP No TiN Coated	EDP No TiAlN Coated
1.00	3.00	38.00	3.00	2	10	1	FBK0500073	FBK0500074	FBK0500075
1.50	6.00	38.00	3.00	2	10	1	FBK0500076	FBK0500077	FBK0500078
2.00	9.00	38.00	3.00	2	10	1	FBK0500079	FBK0500080	FBK0500081
2.50	12.00	38.00	3.00	2	10	1	FBK0500082	FBK0500083	FBK0500084
3.00	12.00	38.00	3.00	2	-	2	FBK0500085	FBK0500086	FBK0500087
3.50	12.00	51.00	4.00	2	10	1	FBK0500088		FBK0500089
4.00	14.00	51.00	4.00	2	-	2	FBK0500090	FBK0500091	FBK0500092
4.50	20.00	51.00	5.00	2	10	1	FBK0500093		FBK0500094
5.00	20.00	51.00	5.00	2	-	2	FBK0500095	FBK0500096	FBK0500097
5.50	20.00	64.00	6.00	2	10	1	FBK0500098		FBK0500099
6.00	20.00	64.00	6.00	2	-	2	FBK0500100	FBK0500101	FBK0500102
6.50	20.00	64.00	8.00	2	10	1	FBK0500103		FBK0500104
7.00	20.00	64.00	8.00	2	10	1	FBK0500105		FBK0500106
8.00	20.00	64.00	8.00	2	-	2	FBK0500107	FBK0500108	FBK0500109
9.00	20.00	64.00	9.00	2	-	2	FBK0500110		FBK0500111
10.00	25.00	70.00	10.00	2	-	2	FBK0500112	FBK0500113	FBK0500114
11.00	25.00	70.00	11.00	2	-	2	FBK0500115		FBK0500116
12.00	25.00	76.00	12.00	2	-	2	FBK0500117	FBK0500118	FBK0500119
14.00	30.00	89.00	14.00	2	-	2	FBK0500120	FBK0500121	FBK0500122
15.00	30.00	89.00	15.00	2	-	2	FBK0500123		FBK0500124
16.00	30.00	89.00	16.00	2	-	2	FBK0500125	FBK0500126	FBK0500127
18.00	35.00	102.00	18.00	2	-	2	FBK0500128	FBK0500129	FBK0500130
20.00	35.00	102.00	20.00	2	-	2	FBK0500131	FBK0500132	FBK0500133
22.00	35.00	102.00	22.00	2	-	2	FBK0500134		FBK0500135
25.00	35.00	102.00	25.00	2	-	2	FBK0500136		FBK0500137

Application data on page no 2.181

2 Flute Centre cutting long length end mill



Carbide | LONG | 30° | 6535 HA | TiAlN

IMAGE 1

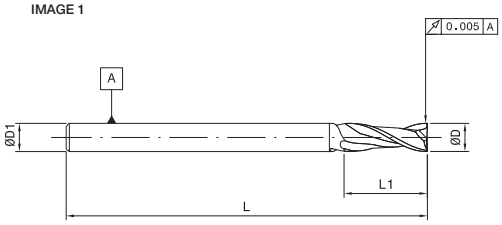
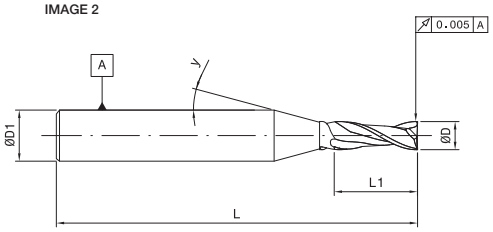


IMAGE 2



P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

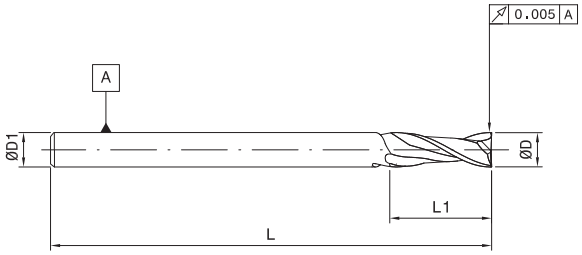
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No Uncoated	EDP No TiN Coated	EDP No TiAlN Coated
3.00	25.00	64.00	3.00	2	-	1	FBK0500371		FBK0500372
4.00	25.00	64.00	4.00	2	-	1	FBK0500373	FBK0500374	FBK0500375
5.00	25.00	64.00	5.00	2	-	1	FBK0500376	FBK0500377	FBK0500378
6.00	30.00	76.00	6.00	2	-	1	FBK0500379		FBK0500380
7.00	30.00	83.00	8.00	2	10	2	FBK0500381		FBK0500382
8.00	35.00	83.00	8.00	2	-	1	FBK0500383	FBK0500384	FBK0500385
9.00	35.00	89.00	10.00	2	10	2	FBK0500386		FBK0500387
10.00	40.00	89.00	10.00	2	-	1	FBK0500388	FBK0500389	FBK0500390
12.00	50.00	102.00	12.00	2	-	1	FBK0500391	FBK0500392	FBK0500393
16.00	65.00	117.00	16.00	2	-	1	FBK0500394	FBK0500395	FBK0500396
20.00	80.00	152.00	20.00	2	-	1	FBK0500397		FBK0500398

Application data on page no 2.181

2 Flute Centre cutting long reach end mill

Carbide | LONG REACH | 30° | 6535 HA | TiAIN



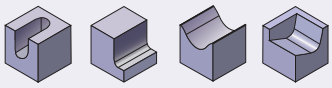
P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP No Uncoated	EDP No TiAIN Coated
3.00	6.00	64.00	3.00	2	FBK0500474	FBK0500475
4.00	9.00	76.00	4.00	2	FBK0500476	FBK0500477
5.00	15.00	76.00	5.00	2	FBK0500478	FBK0500479
6.00	15.00	76.00	6.00	2	FBK0500480	FBK0500481
8.00	20.00	101.00	8.00	2	FBK0500482	FBK0500483
10.00	25.00	101.00	10.00	2	FBK0500484	FBK0500485
12.00	25.00	152.00	12.00	2	FBK0500486	FBK0500487
16.00	30.00	152.00	16.00	2	FBK0500488	FBK0500489
20.00	40.00	152.00	20.00	2	FBK0500490	FBK0500491

Application data on page no 2.181

4 Flute Centre cutting ball nose stub length end mill



Carbide | STUB | 30° | 6535 HA | TiAIN

IMAGE 1

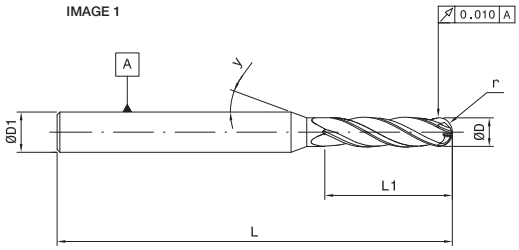
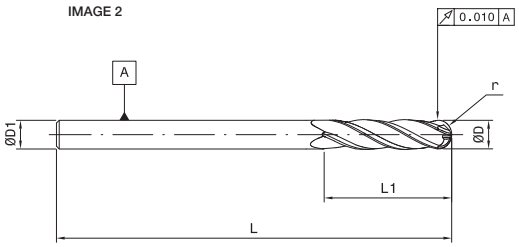


IMAGE 2



P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

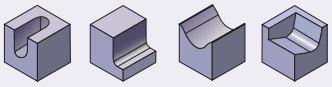
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No Uncoated	EDP No TiAIN Coated
1.00	2.00	38.00	3.00	0.50	4	10	1	FBK0502017	FBK0502018
1.50	3.00	38.00	3.00	0.75	4	10	1	FBK0500584	FBK0500585
2.00	4.00	38.00	3.00	1.00	4	10	1	FBK0500586	FBK0500587
2.50	5.00	38.00	3.00	1.25	4	10	1	FBK0500588	FBK0500589
3.00	6.00	38.00	3.00	1.50	4	-	2	FBK0500590	FBK0500591
4.00	8.00	51.00	4.00	2.00	4	-	2	FBK0500592	FBK0500593
5.00	11.00	51.00	5.00	2.50	4	-	2	FBK0500594	FBK0500595
6.00	13.00	51.00	6.00	3.00	4	-	2	FBK0500596	FBK0500597
8.00	13.00	51.00	8.00	4.00	4	-	2	FBK0500598	FBK0500599
10.00	14.00	51.00	10.00	5.00	4	-	2	FBK0500600	FBK0500601
12.00	16.00	64.00	12.00	6.00	4	-	2	FBK0500602	FBK0500603
14.00	18.00	70.00	14.00	7.00	4	-	2	FBK0500604	FBK0500605
16.00	20.00	76.00	16.00	8.00	4	-	2	FBK0500606	FBK0500607
20.00	25.00	76.00	25.00	10.00	4	-	2	FBK0500608	FBK0500609

Application data on page no 2.181

4 Flute

Centre cutting ball nose regular length end mill



Carbide | REG | 30° | 6535 HA | TiAlN

IMAGE 1

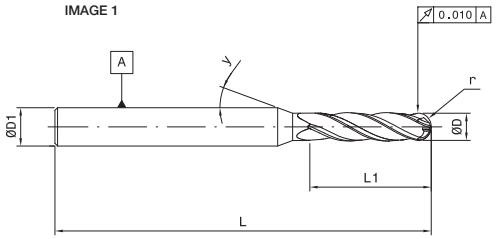
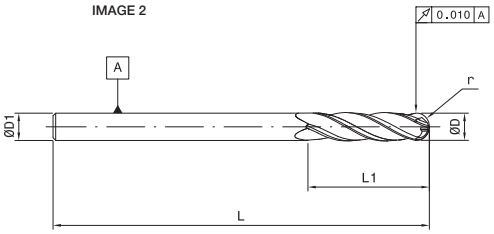


IMAGE 2



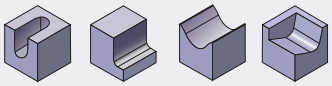
P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

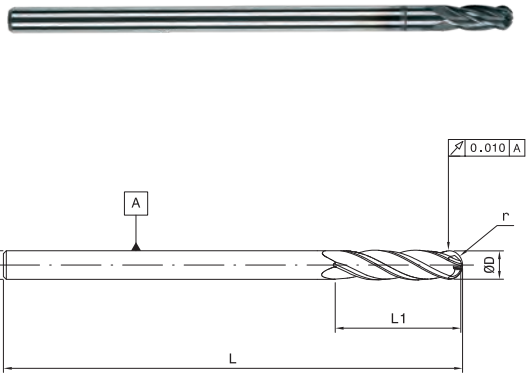
ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No Uncoated	EDP No TiN Coated	EDP No TiAlN Coated
1.00	3.00	38.00	3.00	0.50	4	10	1	FBK0500199	FBK0500200	FBK0500201
1.50	6.00	38.00	3.00	0.75	4	10	1	FBK0500202	FBK0500203	FBK0500204
2.00	9.00	38.00	3.00	1.00	4	10	1	FBK0500205	FBK0500206	FBK0500207
2.50	12.00	38.00	3.00	1.25	4	10	1	FBK0500208	FBK0500209	FBK0500210
3.00	12.00	38.00	3.00	1.50	4	-	2	FBK0500211	FBK0500212	FBK0500213
3.50	12.00	51.00	4.00	1.75	4	10	1	FBK0500214	FBK0500215	FBK0500216
4.00	14.00	51.00	4.00	2.00	4	-	2	FBK0500217	FBK0500218	FBK0500219
4.50	20.00	51.00	5.00	2.25	4	10	1	FBK0500220	FBK0500221	FBK0500222
5.00	20.00	51.00	5.00	2.50	4	-	2	FBK0500223	FBK0500224	FBK0500225
5.50	20.00	64.00	6.00	2.75	4	10	1	FBK0500226	FBK0500227	FBK0500228
6.00	20.00	64.00	6.00	3.00	4	-	2	FBK0500229	FBK0500230	FBK0500231
6.50	20.00	64.00	8.00	3.25	4	10	1	FBK0500232	FBK0500233	FBK0500234
7.00	20.00	64.00	8.00	3.50	4	10	1	FBK0500235	FBK0500236	FBK0500237
8.00	20.00	64.00	8.00	4.00	4	-	2	FBK0500238	FBK0500239	FBK0500240
9.00	20.00	64.00	9.00	4.50	4	-	2	FBK0500241		FBK0500242
10.00	25.00	70.00	10.00	5.00	4	-	2	FBK0500243	FBK0500244	FBK0500245
11.00	25.00	70.00	11.00	5.50	4	-	2	FBK0500246		FBK0500247
12.00	25.00	76.00	12.00	6.00	4	-	2	FBK0500248	FBK0500249	FBK0500250
13.00	30.00	89.00	13.00	6.50	4	-	2	FBK0500251		FBK0500252
14.00	30.00	89.00	14.00	7.00	4	-	2	FBK0500253	FBK0500254	FBK0500255
15.00	30.00	89.00	15.00	7.50	4	-	2	FBK0500256		FBK0500257
16.00	30.00	89.00	16.00	8.00	4	-	2	FBK0500258	FBK0500259	FBK0500260
18.00	35.00	102.00	18.00	9.00	4	-	2	FBK0500261	FBK0500262	FBK0500263
20.00	35.00	102.00	20.00	10.00	4	-	2	FBK0500264	FBK0500265	FBK0500266
22.00	35.00	102.00	22.00	11.00	4	-	2	FBK0500267		FBK0500268
25.00	35.00	102.00	25.00	12.50	4	-	2	FBK0500269		FBK0500270

Application data on page no 2.181

4 Flute
Centre cutting ball nose long reach end mill



Carbide | LONG REACH | 30° | 6535 HA | TiAlN



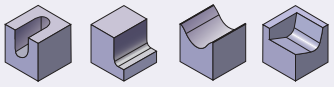
P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	EDP No Uncoated	EDP No TiAlN Coated
3.00	6.00	64.00	3.00	1.50	4	FBK0500492	FBK0500493
4.00	9.00	76.00	4.00	2.00	4	FBK0500494	FBK0500495
5.00	15.00	76.00	5.00	2.50	4	FBK0500496	FBK0500497
6.00	15.00	76.00	6.00	3.00	4	FBK0500498	FBK0500499
8.00	20.00	101.00	8.00	4.00	4	FBK0500500	FBK0500501
10.00	25.00	101.00	10.00	5.00	4	FBK0500502	FBK0500503
12.00	25.00	152.00	12.00	6.00	4	FBK0500504	FBK0500505
16.00	30.00	152.00	16.00	8.00	4	FBK0500506	FBK0500507
18.00	40.00	152.00	18.00	9.00	4	FBK0500508	FBK0500509
20.00	40.00	152.00	20.00	10.00	4	FBK0500510	FBK0500511

Application data on page no 2.181

2 Flute Centre cutting ball nose regular length end mill



Carbide | REG | 30° | 6535 HA | TiAIN

IMAGE 1

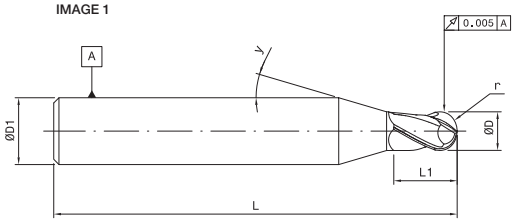


IMAGE 2

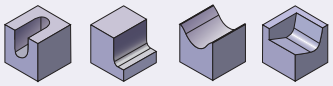
P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No Uncoated	EDP No TiN Coated	EDP No TiAlN Coated
1.00	3.00	38.00	3.00	0.50	2	10	1	FBK0500271	FBK0500272	FBK0500273
1.50	6.00	38.00	3.00	0.75	2	10	1	FBK0500274	FBK0500275	FBK0500276
2.00	9.00	38.00	3.00	1.00	2	10	1	FBK0500277	FBK0500278	FBK0500279
2.50	12.00	38.00	3.00	1.25	2	10	1	FBK0500280	FBK0500281	FBK0500282
3.00	12.00	38.00	3.00	1.50	2	-	2	FBK0500283	FBK0500284	FBK0500285
3.50	12.00	51.00	4.00	1.75	2	10	1	FBK0500286		FBK0500287
4.00	14.00	51.00	4.00	2.00	2	-	2	FBK0500288	FBK0500289	FBK0500290
4.50	20.00	51.00	5.00	2.25	2	10	1	FBK0500291		FBK0500292
5.00	20.00	51.00	5.00	2.50	2	-	2	FBK0500293	FBK0500294	FBK0500295
5.50	20.00	64.00	6.00	2.75	2	10	1	FBK0500296		FBK0500297
6.00	20.00	64.00	6.00	3.00	2	-	2	FBK0500298	FBK0500299	FBK0500300
6.50	20.00	64.00	8.00	3.25	2	10	1	FBK0500301		FBK0500302
7.00	20.00	64.00	8.00	3.50	2	10	1	FBK0500303		FBK0500304
8.00	20.00	64.00	8.00	4.00	2	-	2	FBK0500305	FBK0500306	FBK0500307
9.00	20.00	64.00	9.00	4.50	2	-	2	FBK0500308		FBK0500309
10.00	25.00	70.00	10.00	5.00	2	-	2	FBK0500310	FBK0500311	FBK0500312
11.00	25.00	70.00	11.00	5.50	2	-	2	FBK0500313		FBK0500314
12.00	25.00	76.00	12.00	6.00	2	-	2	FBK0500315	FBK0500316	FBK0500317
14.00	30.00	89.00	14.00	7.00	2	-	2	FBK0500318	FBK0500319	FBK0500320
16.00	30.00	89.00	16.00	8.00	2	-	2	FBK0500321	FBK0500322	FBK0500323
18.00	35.00	102.00	18.00	9.00	2	-	2	FBK0500324	FBK0500325	FBK0500326
20.00	35.00	102.00	20.00	10.00	2	-	2	FBK0500327	FBK0500328	FBK0500329
22.00	35.00	102.00	22.00	11.00	2	-	2	FBK0500330		FBK0500331
25.00	35.00	102.00	25.00	12.50	2	-	2	FBK0500332		FBK0500333

Application data on page no 2.181

2 Flute Centre cutting ball nose stub length end mill



Carbide | STUB | 30° | 6535 HA | TiAlN

IMAGE 1

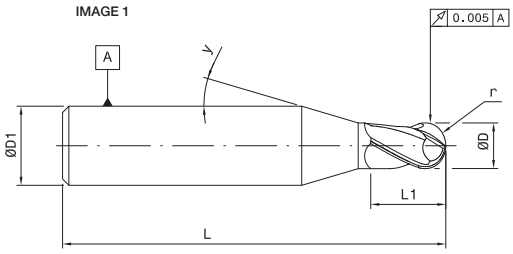
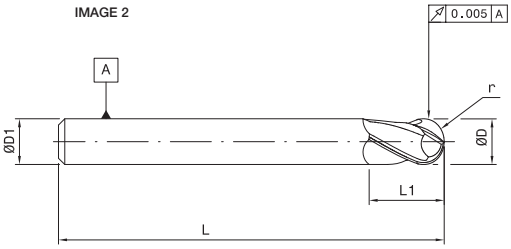


IMAGE 2



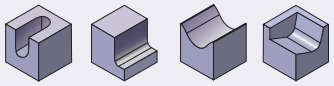
P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

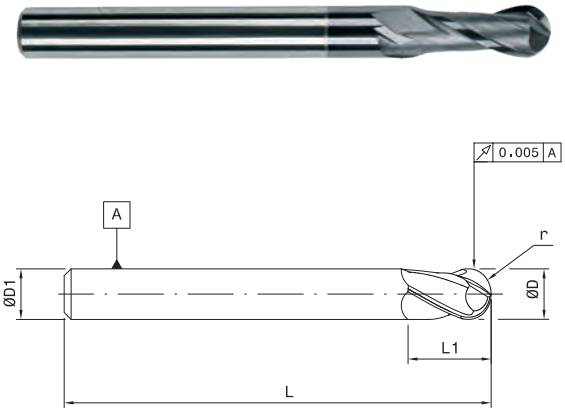
ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No Uncoated	EDP No TiAlN Coated
1.00	2.00	38.00	3.00	0.50	2	10	1	FBK0502019	FBK0502020
1.50	3.00	38.00	3.00	0.75	2	10	1	FBK0500610	FBK0500611
2.00	4.00	38.00	3.00	1.00	2	10	1	FBK0500612	FBK0500613
2.50	5.00	38.00	3.00	1.25	2	10	1	FBK0500614	FBK0500615
3.00	6.00	38.00	3.00	1.50	2	-	2	FBK0500616	FBK0500617
4.00	8.00	51.00	4.00	2.00	2	-	2	FBK0500618	FBK0500619
5.00	11.00	51.00	5.00	2.50	2	-	2	FBK0500620	FBK0500621
6.00	13.00	51.00	6.00	3.00	2	-	2	FBK0500622	FBK0500623
8.00	13.00	51.00	8.00	4.00	2	-	2	FBK0500624	FBK0500625
10.00	14.00	51.00	10.00	5.00	2	-	2	FBK0500626	FBK0500627
12.00	16.00	64.00	12.00	6.00	2	-	2	FBK0500628	FBK0500629
14.00	18.00	70.00	14.00	7.00	2	-	2	FBK0500630	FBK0500631
16.00	20.00	76.00	16.00	8.00	2	-	2	FBK0500632	FBK0500633
20.00	25.00	76.00	25.00	10.00	2	-	2	FBK0500634	FBK0500635

Application data on page no 2.181

2 Flute Centre cutting ball nose long reach end mill



Carbide | LONG REACH | 30° | 6535 HA | TiAIN



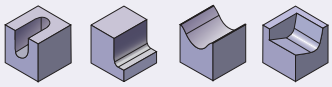
P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

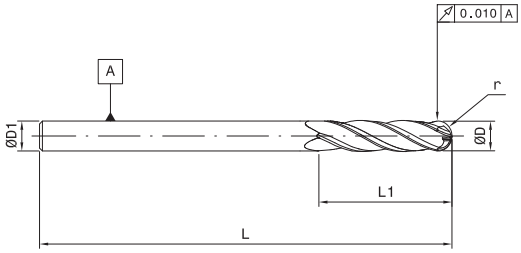
ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	EDP No Uncoated	EDP No TiAIN Coated
3.00	6.00	64.00	3.00	1.50	2	FBK0500512	FBK0500513
4.00	9.00	76.00	4.00	2.00	2	FBK0500514	FBK0500515
5.00	15.00	76.00	5.00	2.50	2	FBK0500516	FBK0500517
6.00	15.00	76.00	6.00	3.00	2	FBK0500518	FBK0500519
8.00	20.00	101.00	8.00	4.00	2	FBK0500520	FBK0500521
10.00	25.00	101.00	10.00	5.00	2	FBK0500522	FBK0500523
12.00	25.00	152.00	12.00	6.00	2	FBK0500524	FBK0500525
16.00	30.00	152.00	16.00	8.00	2	FBK0500526	FBK0500527
18.00	40.00	152.00	18.00	9.00	2	FBK0500528	FBK0500529
20.00	40.00	152.00	20.00	10.00	2	FBK0500530	FBK0500531

Application data on page no 2.181

4 Flute Centre cutting ball nose long length end mill



Carbide | LONG LENGTH | 30° | 6535 HA | TiAIN



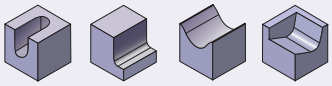
P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

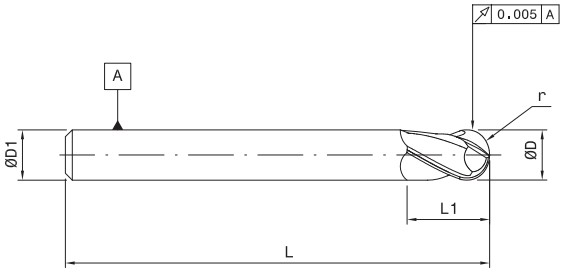
ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	EDP No Uncoated	EDP No TiN Coated	EDP No TiAlN Coated
3.00	25.00	64.00	3.00	1.50	4	FBK0500399	FBK0500400	FBK0500401
4.00	25.00	64.00	4.00	2.00	4	FBK0500402	FBK0500403	FBK0500404
5.00	25.00	64.00	5.00	2.50	4	FBK0500405	FBK0500406	FBK0500407
6.00	30.00	76.00	6.00	3.00	4	FBK0500408	FBK0500409	FBK0500410
8.00	35.00	83.00	8.00	4.00	4	FBK0500411	FBK0500412	FBK0500413
10.00	40.00	89.00	10.00	5.00	4	FBK0500414	FBK0500415	FBK0500416
12.00	50.00	102.00	12.00	6.00	4	FBK0500417	FBK0500418	FBK0500419
16.00	65.00	117.00	16.00	8.00	4	FBK0500420	FBK0500421	FBK0500422
20.00	80.00	133.00	20.00	10.00	4	FBK0500423	FBK0500424	FBK0500425

Application data on page no 2.181

2 Flute Centre cutting ball nose long length end mill



Carbide | LONG LENGTH | 30° | 6535 HA | TiAIN



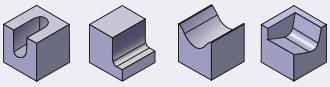
P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

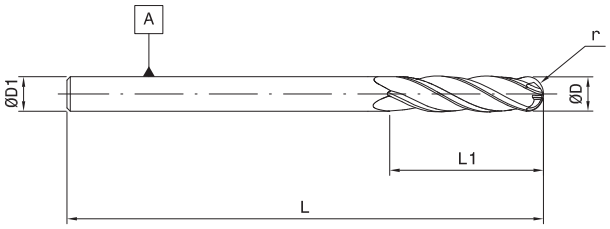
ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	EDP No Uncoated	EDP No TiN Coated	EDP No TiAIN Coated
3.00	25.00	64.00	3.00	1.50	2	FBK0500428	FBK0500429	FBK0500430
4.00	25.00	64.00	4.00	2.00	2	FBK0500431	FBK0500432	FBK0500433
5.00	25.00	64.00	5.00	2.50	2	FBK0500434	FBK0500435	FBK0500436
6.00	30.00	76.00	6.00	3.00	2	FBK0500437	FBK0500438	FBK0500439
8.00	35.00	83.00	8.00	4.00	2	FBK0500440	FBK0500441	FBK0500442
10.00	40.00	89.00	10.00	5.00	2	FBK0500443	FBK0500444	FBK0500445
12.00	50.00	102.00	12.00	6.00	2	FBK0500446		FBK0500447
16.00	65.00	117.00	16.00	8.00	2	FBK0500448		FBK0500449
20.00	80.00	133.00	20.00	10.00	2	FBK0500450		FBK0500451
25.00	80.00	152.00	25.00	12.50	2	FBK0500452		FBK0500453

Application data on page no 2.181

4 Flute Centre cutting ball nose extra long end mill



Carbide | EXTRA LONG | 30° | 6535 HA | TiAlN



P0-P4
K1-K3
S1-S4
H1-H3
N1-N3
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	EDP No Coated
3.00	40.00	100.00	3.00	1.50	4	FBK0502690
4.00	40.00	100.00	4.00	2.00	4	FBK0502691
5.00	40.00	100.00	5.00	2.50	4	FBK0502961
6.00	40.00	100.00	6.00	3.00	4	FBK0502692
8.00	50.00	100.00	8.00	4.00	4	FBK0502693
8.00	75.00	150.00	8.00	4.00	4	FBK0501480
10.00	40.00	100.00	10.00	5.00	4	FBK0500887
10.00	75.00	152.00	10.00	5.00	4	FBK0502694
12.00	75.00	152.00	12.00	6.00	4	FBK0502695
16.00	75.00	152.00	16.00	8.00	4	FBK0502696
20.00	75.00	152.00	20.00	10.00	4	FBK0502697

Application data on page no 2.181

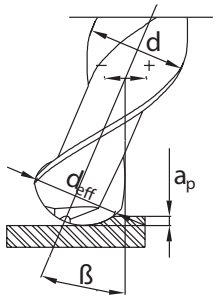
Cutting parameters

CT- Chip Thinning — Series F111/163/116/164/121/165/140/150/166 GP, Metric - 1.0 mm to 8.0 mm
NCT- No Chip Thinning — Series F123/F126/F122/F125/F183/F186/F181/F184/F187/F188 GP, Metric - 1.0 mm to 8.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling / Rough and Semi Finish							Slot Milling			Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%													
			CT NCT	CT NCT	CT NCT	CT NCT	CT NCT	CT	CT	CT NCT	CT NCT	CT														
			5	2.3	1.6	1.4	1.2	1.1	1	1	1	1	Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.													
			ap Max	ap 2D	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap 0.25D	ap 0.5D	ap 1D	Cutting Speed (Vc) m/min			Diameter in mm											
															mm	1.0		2.0		3.0		4.0		5.0		6.0		8.0	
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%	ae/D 100%	ae/D 100%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	0	210	165	150	140	135	130	125	120	110	100	100	210	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		1	210	165	150	140	135	130	125	120	110	100	100	210	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	180	141	129	120	116	111	107	103	94	86	86	180	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	180	141	129	120	116	111	107	103	94	86	86	180	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		4	150	118	107	100	96	93	89	86	79	71	71	150	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
Stainless Steel	M	1	115	90	82	77	74	71	68	66	60	55	55	115	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	80	63	57	53	51	50	48	46	42	38	38	80	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	75	59	54	50	48	46	45	43	39	36	36	75	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
Cast Iron	K	1	150	118	107	100	96	93	89	86	79	71	71	150	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	140	110	100	93	90	87	83	80	73	67	67	140	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	100	79	71	67	64	62	60	57	52	48	48	100	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
Non-Ferrous	N	1	1000	786	714	667	643	619	595	571	524	476	476	1000	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	750	589	536	500	482	464	446	429	393	357	357	750	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	750	589	536	500	482	464	446	429	393	357	357	750	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
Super Alloys	S	1	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.019	0.024
		2	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.019	0.024
		3	70	55	50	47	45	43	42	40	37	33	33	70	fz	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.019	0.024
		4	63	50	45	42	41	39	38	36	33	30	30	60	fz	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.019	0.024
Hard Materials	H	1	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.002	0.003	0.005	0.006	0.007	0.009	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032
		2	63	50	45	42	41	39	38	36	33	30	30	63	fz	0.002	0.003	0.005	0.006	0.007	0.009	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032
		3	53	41	38	35	34	33	31	30	28	25	25	53	fz	0.002	0.003	0.005	0.006	0.007	0.009	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032

		2flute		3flute		4flute	
		Flat/ Cr	Ball	Flat/ Cr	Ball	Flat/ Cr	Ball
CT	Stub Length	**F164**	**F166**			**F163**	**F165**
CT	Standard	**F121**	**F150**	**F116**		**F111**	**F140**
NCT	Long Length	**F123**	**F126**			**F122**	**F125**
NCT	Long Reach	**F183**	**F186**			**F181**	**F184**
NCT	Extra Long					**F187**	**F188**

CT- indicates that when using these end mills – use the Chip load multiplication factor
NCT- Indicates that when using these end mills- do not use the chip load multiplication factor



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1
* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D\text{-}ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D\text{-}2 \times ADOC}{D}\right)\right]$$

Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

* * Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

* For TiN Coated ToolS Decrease RPM by 5%

* For Uncoated Tools Decrease RPM by 20%

Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

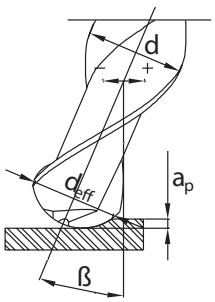
Cutting parameters

CT- Chip Thinning — Series F111/163/116/164/121/165/140/150/166 GP, Metric - 10.0 mm to 25.0 mm
NCT- No Chip Thinning — Series F123/F126/F122/F125/F183/F186/F181/F184/F187/F188 GP, Metric- 10.0 mm to 25.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling / Rough and Semi Finish							for Slot Milling			Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%											
			CT NCT	CT NCT	CT NCT	CT NCT	CT NCT	CT	CT	CT NCT	CT NCT	CT												
			5	2.3	1.6	1.4	1.2	1.1	1	1	1	1	Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.											
			ap Max	ap 2D	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap 0.25D	ap 0.5D	ap 1D	Cutting Speed (Vc) m/min		mm	Diameter in mm									
																10.0		12.0		14.0		16.0		20.0		25.0	
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%	ae/D 100%	ae/D 100%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	0	210	165	150	140	135	130	125	120	110	100	100	210	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		1	210	165	150	140	135	130	125	120	110	100	100	210	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		2	180	141	129	120	116	111	107	103	94	86	86	180	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		3	180	141	129	120	116	111	107	103	94	86	86	180	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		4	150	118	107	100	96	93	89	86	79	71	71	150	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
Stainless Steel	M	1	115	90	82	77	74	71	68	66	60	55	55	115	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		2	80	63	57	53	51	50	48	46	42	38	38	80	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		3	75	59	54	50	48	46	45	43	39	36	36	75	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
Cast Iron	K	1	150	118	107	100	96	93	89	86	79	71	71	150	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		2	140	110	100	93	90	87	83	80	73	67	67	140	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		3	100	79	71	67	64	62	60	57	52	48	48	100	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
Non-Ferrous	N	1	1000	786	714	667	643	619	595	571	524	476	476	1000	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		2	750	589	536	500	482	464	446	429	393	357	357	750	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		3	750	589	536	500	482	464	446	429	393	357	357	750	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
Super Alloys	S	1	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.024	0.030	0.029	0.036	0.034	0.042	0.038	0.048	0.048	0.060	0.060	0.075
		2	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.024	0.030	0.029	0.036	0.034	0.042	0.038	0.048	0.048	0.060	0.060	0.075
		3	70	55	50	47	45	43	42	40	37	33	33	70	fz	0.024	0.030	0.029	0.036	0.034	0.042	0.038	0.048	0.048	0.060	0.060	0.075
		4	63	50	45	42	41	39	38	36	33	30	30	60	fz	0.024	0.030	0.029	0.036	0.034	0.042	0.038	0.048	0.048	0.060	0.060	0.075
Hard Materials	H	1	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.032	0.040	0.038	0.048	0.045	0.056	0.051	0.064	0.064	0.080	0.080	0.100
		2	63	50	45	42	41	39	38	36	33	30	30	63	fz	0.032	0.040	0.038	0.048	0.045	0.056	0.051	0.064	0.064	0.080	0.080	0.100
		3	53	41	38	35	34	33	31	30	28	25	25	53	fz	0.032	0.040	0.038	0.048	0.045	0.056	0.051	0.064	0.064	0.080	0.080	0.100

		2flute		3flute		4flute	
		Flat/ Cr	Ball	Flat/ Cr	Ball	Flat/ Cr	Ball
CT	Stub Length	**F164**	**F166**			**F163**	**F165**
CT	Standard	**F121**	**F150**	**F116**		**F111**	**F140**
NCT	Long Length	**F123**	**F126**			**F122**	**F125**
NCT	Long Reach	**F183**	**F186**			**F181**	**F184**
NCT	Extra Long					**F187**	**F188**

CT- indicates that when using these end mills – use the Chip load multiplication factor
NCT- Indicates that when using these end mills- do not use the chip load multiplication factor



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1
* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D-ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D-2 \times ADOC}{D}\right)\right]$$

Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

* * Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

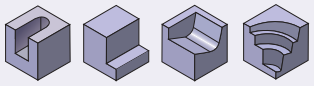
* For TiN Coated ToolS Decrease RPM by 5%

* For Uncoated Tools Decrease RPM by 20%

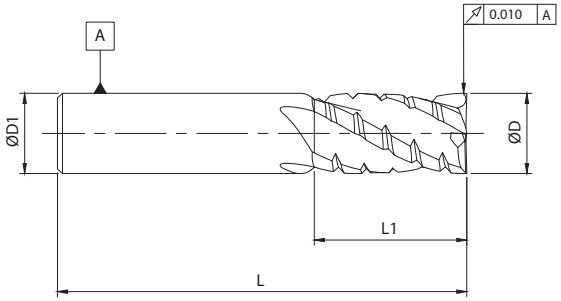
Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

4 Flute

Centre cutting regular length chip breaker end mill



Carbide | REG | 30° | 6535 HA | TiAIN



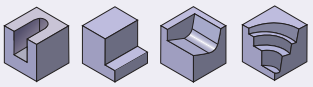
P0-P6
K1-K3
S1-S4
H1-H4
M1-M3

Unit : mm

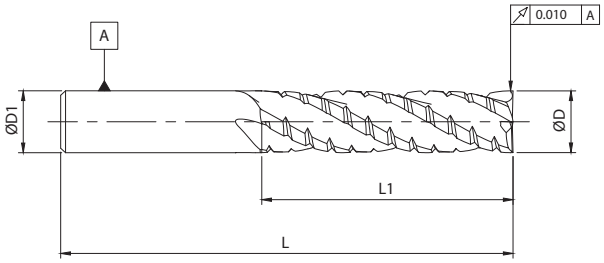
ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP No Uncoated	EDP No TiAIN Coated
4.00	14.00	51.00	4.00	4	FBK0500636	FBK0504095
5.00	20.00	51.00	5.00	4	FBK0500637	FBK0500638
6.00	20.00	64.00	6.00	4	FBK0500639	FBK0500640
8.00	20.00	64.00	8.00	4	FBK0500642	FBK0500643
9.00	20.00	64.00	9.00	4	FBK0500644	FBK0500645
10.00	25.00	70.00	10.00	4	FBK0500646	FBK0500647
12.00	25.00	76.00	12.00	4	FBK0500648	FBK0500649
14.00	30.00	89.00	14.00	4	FBK0500650	FBK0500651
16.00	30.00	89.00	16.00	4	FBK0500652	FBK0500653
18.00	35.00	102.00	18.00	4	FBK0500654	FBK0504096
20.00	38.00	102.00	20.00	4	FBK0500655	FBK0503975

Application data on page no 2.185

4 Flute
Centre cutting long length chip breaker end mill



Carbide | LONG | 30° | 6535 HA



P0-P6
K1-K3
S1-S4
H1-H4
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP No Uncoated	EDP No TiAlN Coated
6.00	30.00	76.00	6.00	4	FBK0500656	FBK0500657
8.00	35.00	83.00	8.00	4	FBK0500658	FBK0500659
10.00	40.00	89.00	10.00	4	FBK0500660	FBK0500661
12.00	50.00	102.00	12.00	4	FBK0500662	FBK0500663
16.00	65.00	117.00	16.00	4	FBK0500664	FBK0503024

Application data on page no 2.185

Cutting parameters

F114CB/132CB/ Metric - 1.0 mm to 8.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling / Rough and Semi Finish							Slot Milling			Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%							
			CT NCT	CT NCT	CT NCT	CT NCT	CT NCT	CT	CT	CT NCT	CT NCT	CT NCT								
			5	2.3	1.6	1.4	1.2	1.1	1	1	1	1	Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.							
			ap max	ap max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap 0.25D	ap 0.5D	ap 1D	Cutting Speed (Vc) m/min		mm	4.0		5.0		6.0		8.0	
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%	ae/D 100%	ae/D 100%	min	max	Range	min	max	min	max	min	max	min	max
Steel	P	0	210	165	150	140	135	130	125	120	110	100	100	210	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
		1	210	165	150	140	135	130	125	120	110	120	100	210	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
		2	180	141	129	120	116	111	107	103	94	103	86	180	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
		3	180	141	129	120	116	111	107	103	94	103	86	180	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
		4	150	118	107	100	96	93	89	86	79	86	71	150	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
Stainless Steel	M	1	115	90	82	77	74	71	68	66	60	66	55	115	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
		2	80	63	57	53	51	50	48	46	42	46	38	80	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
		3	75	59	54	50	48	46	45	43	39	43	36	75	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
Cast Iron	K	1	150	118	107	100	96	93	89	86	79	86	71	150	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
		2	140	110	100	93	90	87	83	80	73	80	67	140	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
		3	100	79	71	67	64	62	60	57	52	57	48	100	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
Non-Ferrous	N	1	1000	786	714	667	643	619	595	571	524	571	476	1000	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
		2	750	589	536	500	482	464	446	429	393	429	357	750	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
		3	750	589	536	500	482	464	446	429	393	429	357	750	fz	0.016	0.020	0.020	0.025	0.024	0.030	0.038	0.048
Super Alloys	S	1	74	58	53	49	47	46	44	42	39	42	35	75	fz	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032
		2	74	58	53	49	47	46	44	42	39	42	35	75	fz	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032
		3	70	55	50	47	45	43	42	40	37	40	33	70	fz	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032
		4	63	50	45	42	41	39	38	36	33	36	30	60	fz	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032
Hard Materials	H	1	74	58	53	49	47	46	44	42	39	42	35	75	fz	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	63	50	45	42	41	39	38	36	33	36	30	63	fz	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	53	41	38	35	34	33	31	30	28	30	25	53	fz	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040

F114CB/132CB/ Metric - 10.0 mm to 25.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling / Rough and Semi Finish							Slot Milling			Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%											
			CT NCT	CT NCT	CT NCT	CT NCT	CT NCT	CT	CT	CT NCT	CT NCT	CT NCT												
			5	2.3	1.6	1.4	1.2	1.1	1	1	1	1	Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.											
			ap max	ap max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap 0.25D	ap 0.5D	ap 1D	Cutting Speed (Vc) m/min		mm	10.0		12.0		14.0		16.0		20.0	
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%	ae/D 100%	ae/D 100%	min	max	Range	min	max	min	max	min	max	min	max	min	max
Steel	P	0	210	165	150	140	135	130	125	120	110	100	100	210	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
		1	210	165	150	140	135	130	125	120	110	120	100	210	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
		2	180	141	129	120	116	111	107	103	94	103	86	180	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
		3	180	141	129	120	116	111	107	103	94	103	86	180	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
		4	150	118	107	100	96	93	89	86	79	86	71	150	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
Stainless Steel	M	1	115	90	82	77	74	71	68	66	60	66	55	115	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
		2	80	63	57	53	51	50	48	46	42	46	38	80	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
		3	75	59	54	50	48	46	45	43	39	43	36	75	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
Cast Iron	K	1	150	118	107	100	96	93	89	86	79	86	71	150	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
		2	140	110	100	93	90	87	83	80	73	80	67	140	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
		3	100	79	71	67	64	62	60	57	52	57	48	100	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
Non-Ferrous	N	1	1000	786	714	667	643	619	595	571	524	571	476	1000	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
		2	750	589	536	500	482	464	446	429	393	429	357	750	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
		3	750	589	536	500	482	464	446	429	393	429	357	750	fz	0.048	0.060	0.058	0.072	0.067	0.084	0.077	0.096	0.096	0.120
Super Alloys	S	1	74	58	53	49	47	46	44	42	39	42	35	75	fz	0.032	0.040	0.038	0.048	0.045	0.056	0.051	0.064	0.064	0.080
		2	74	58	53	49	47	46	44	42	39	42	35	75	fz	0.032	0.040	0.038	0.048	0.045	0.056	0.051	0.064	0.064	0.080
		3	70	55	50	47	45	43	42	40	37	40	33	70	fz	0.032	0.040	0.038	0.048	0.045	0.056	0.051	0.064	0.064	0.080
		4	63	50	45	42	41	39	38	36	33	36	30	60	fz	0.032	0.040	0.038	0.048	0.045	0.056	0.051	0.064	0.064	0.080
Hard Materials	H	1	74	58	53	49	47	46	44	42	39	42	35	75	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100
		2	63	50	45	42	41	39	38	36	33	36	30	63	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100
		3	53	41	38	35	34	33	31	30	28	30	25	53	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100

#RPM(N) = Vc(m/min) X 318.18/Tool Dia.

#Vf(mm/min) = RPM(N) X frev (mm/rev)

		4flute
		Flat
CT	Standard	**F114CB**
NCT	Long Length	**F132CB**

ae > .3D use < 1D ap
ae < .2D use < 1.5 D ap
ae > .1D use < 2D ap
ae < .05D use < L1 Max

CT- indicates that when using these end mills – use the Chip load multiplication factor
NCT- Indicates that when using these end mills- do not use the chip load multiplication factor

CT- Chip Thinning
NCT- No Chip Thinning

Note

When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer

* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

2 Flute F121 XL

Carbide | REG | 30° | 6535 HA | 0.1X45° | TiAIN

IMAGE 1

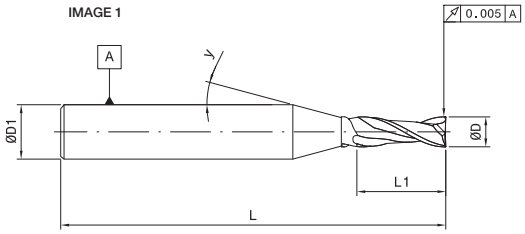
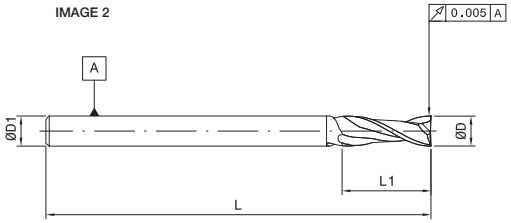


IMAGE 2



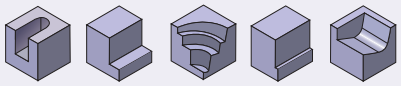
P0-P6
K1-K3
S1-S4
H1-H4
N1-N6
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No TiAIN Coated
1.00	3.00	38.00	3.00	2	10	1	FBK0500705
1.50	6.00	38.00	3.00	2	10	1	FBK0500706
2.00	9.00	38.00	3.00	2	10	1	FBK0500707
2.50	12.00	38.00	3.00	2	10	1	FBK0500708
3.00	12.00	38.00	3.00	2	-	2	FBK0500709
4.00	14.00	51.00	4.00	2	-	2	FBK0500710
5.00	20.00	51.00	5.00	2	-	2	FBK0500711
6.00	20.00	64.00	6.00	2	-	2	FBK0500712
8.00	20.00	64.00	8.00	2	-	2	FBK0500713
10.00	25.00	70.00	10.00	2	-	2	FBK0500714
12.00	25.00	76.00	12.00	2	-	2	FBK0500715
16.00	30.00	89.00	16.00	2	-	2	FBK0500716
20.00	38.00	102.00	20.00	2	-	2	FBK0500717

Application data on page no 2.193

4 Flute F111 XL



Carbide | REG | 30° | 6535 HA | 0.1X45° | TiAIN

IMAGE 1

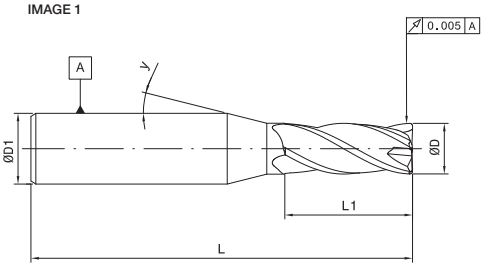
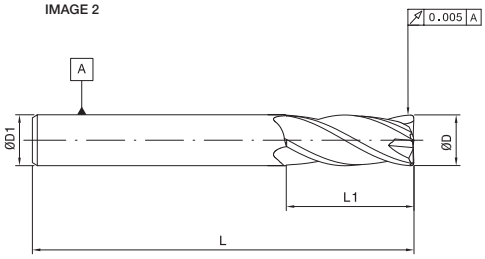


IMAGE 2



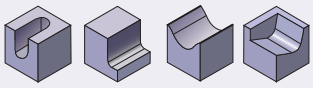
P0-P6
K1-K3
S1-S4
H1-H4
N1-N6
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	γ (°)	Image	EDP No TiAIN Coated
1.00	3.00	38.00	3.00	4	10	1	FBK0500718
1.50	6.00	38.00	3.00	4	10	1	FBK0500719
2.00	9.00	38.00	3.00	4	10	1	FBK0500720
2.50	12.00	38.00	3.00	4	10	1	FBK0500721
3.00	12.00	38.00	3.00	4	-	2	FBK0500722
4.00	14.00	51.00	4.00	4	-	2	FBK0500723
5.00	20.00	51.00	5.00	4	-	2	FBK0500724
6.00	20.00	64.00	6.00	4	-	2	FBK0500725
8.00	20.00	64.00	8.00	4	-	2	FBK0500726
10.00	25.00	70.00	10.00	4	-	2	FBK0500727
12.00	25.00	76.00	12.00	4	-	2	FBK0500728
16.00	30.00	89.00	16.00	4	-	2	FBK0500729
20.00	38.00	102.00	20.00	4	-	2	FBK0500730

Application data on page no 2.193

2 Flute F150 XL



Carbide | REG | 30° | 6535 HA | TiAIN

IMAGE 1

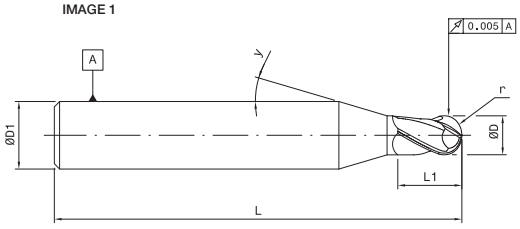
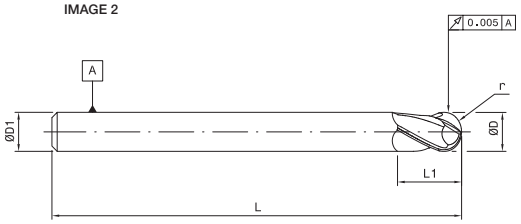


IMAGE 2



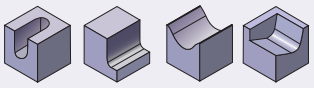
P0-P6
K1-K3
S1-S4
H1-H4
N1-N6
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No TiAIN Coated
1.00	3.00	38.00	3.00	0.50	2	10	1	FBK0500731
1.50	6.00	38.00	3.00	0.75	2	10	1	FBK0500732
2.00	9.00	38.00	3.00	1.00	2	10	1	FBK0500733
2.50	12.00	38.00	3.00	1.25	2	10	1	FBK0500734
3.00	12.00	38.00	3.00	1.50	2	-	2	FBK0500735
4.00	14.00	51.00	4.00	2.00	2	-	2	FBK0500736
5.00	20.00	51.00	5.00	2.50	2	-	2	FBK0500737
6.00	20.00	64.00	6.00	3.00	2	-	2	FBK0500738
8.00	20.00	64.00	8.00	4.00	2	-	2	FBK0500739
10.00	25.00	70.00	10.00	5.00	2	-	2	FBK0500740
12.00	25.00	76.00	12.00	6.00	2	-	2	FBK0500741
16.00	30.00	89.00	16.00	8.00	2	-	2	FBK0500742
20.00	38.00	102.00	20.00	10.00	2	-	2	FBK0500743

Application data on page no 2.193

4 Flute F140 XL



Carbide | REG | 30° | 6535 HA | TiAIN

IMAGE 1

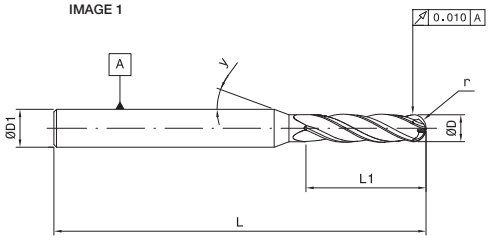
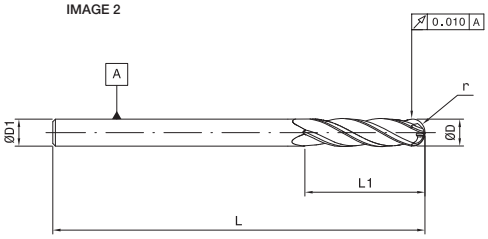


IMAGE 2



P0-P6
K1-K3
S1-S4
H1-H4
N1-N6
M1-M3

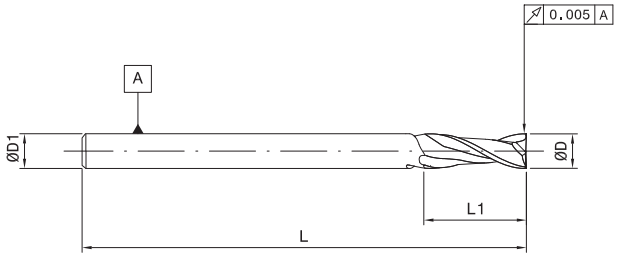
Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	γ (°)	Image	EDP No TiAIN Coated
1.00	3.00	38.00	3.00	0.50	4	10	1	FBK0500744
1.50	6.00	38.00	3.00	0.75	4	10	1	FBK0500745
2.00	9.00	38.00	3.00	1.00	4	10	1	FBK0500746
2.50	12.00	38.00	3.00	1.25	4	10	1	FBK0500747
3.00	12.00	38.00	3.00	1.50	4	-	2	FBK0500748
4.00	14.00	51.00	4.00	2.00	4	-	2	FBK0500749
5.00	20.00	51.00	5.00	2.50	4	-	2	FBK0500750
6.00	20.00	64.00	6.00	3.00	4	-	2	FBK0500751
8.00	20.00	64.00	8.00	4.00	4	-	2	FBK0500752
10.00	25.00	70.00	10.00	5.00	4	-	2	FBK0500753
12.00	25.00	76.00	12.00	6.00	4	-	2	FBK0500754
16.00	30.00	89.00	16.00	8.00	4	-	2	FBK0500755
20.00	38.00	102.00	20.00	10.00	4	-	2	FBK0500756

Application data on page no 2.193

2 Flute F123XL

Carbide | LONG | 30° | 6535 HA | 0.1X45° | TiAlN



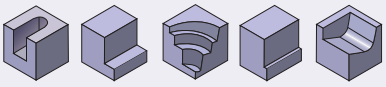
P0-P6
K1-K3
S1-S4
H1-H4
N1-N6
M1-M3

Unit : mm

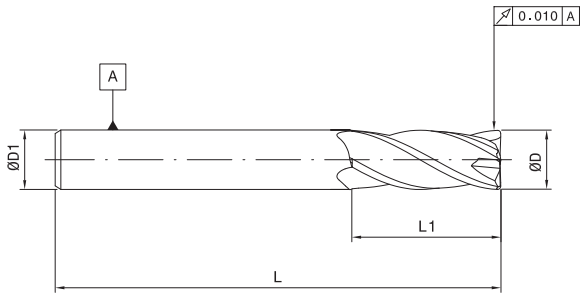
ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP No TiAlN Coated
3.00	25.00	64.00	3.00	2	FBK0500757
4.00	25.00	64.00	4.00	2	FBK0500758
5.00	25.00	64.00	5.00	2	FBK0500759
6.00	30.00	76.00	6.00	2	FBK0500760
8.00	35.00	83.00	8.00	2	FBK0500761
10.00	40.00	89.00	10.00	2	FBK0500762
12.00	50.00	102.00	12.00	2	FBK0500763
16.00	65.00	117.00	16.00	2	FBK0500764
20.00	80.00	133.00	20.00	2	FBK0500765

Application data on page no 2.193

4 Flute F122 XL



Carbide | 4 | 2 | LONG | 30° | 6535 HA | 0.1X45° | TiAIN



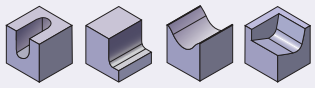
P0-P6
K1-K3
S1-S4
H1-H4
N1-N6
M1-M3

Unit : mm

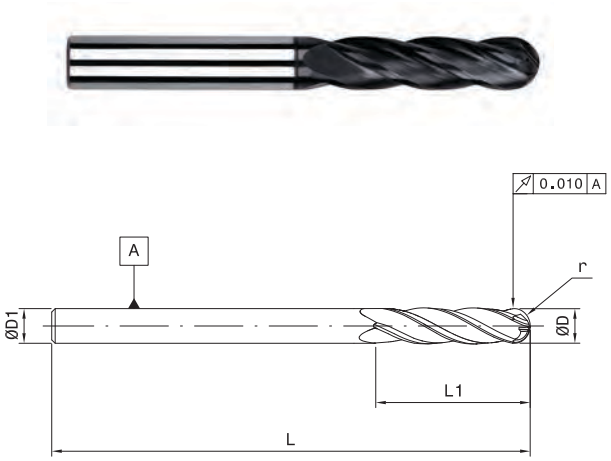
ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	EDP No TiAIN Coated
3.00	25.00	64.00	3.00	4	FBK0500766
4.00	25.00	64.00	4.00	4	FBK0500767
5.00	25.00	64.00	5.00	4	FBK0500768
6.00	30.00	76.00	6.00	4	FBK0500769
8.00	35.00	83.00	8.00	4	FBK0500770
10.00	40.00	89.00	10.00	4	FBK0500771
12.00	50.00	102.00	12.00	4	FBK0500772
16.00	65.00	117.00	16.00	4	FBK0500773
20.00	80.00	133.00	20.00	4	FBK0500774

Application data on page no 2.193

4 Flute F125 XL



Carbide | LONG | 30° | 6535 HA | TiAIN



P0-P6
K1-K3
S1-S4
H1-H4
N1-N6
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	r (mm)	z	EDP No TiAIN Coated
3.00	25.00	64.00	3.00	1.50	4	FBK0503374
4.00	25.00	64.00	4.00	2.00	4	FBK0503375
5.00	25.00	64.00	5.00	2.50	4	FBK0503376
6.00	30.00	76.00	6.00	3.00	4	FBK0503377
8.00	35.00	83.00	8.00	4.00	4	FBK0503378
10.00	40.00	89.00	10.00	5.00	4	FBK0503379
12.00	50.00	102.00	12.00	6.00	4	FBK0503380
16.00	65.00	117.00	16.00	8.00	4	FBK0503381
20.00	80.00	133.00	20.00	10.00	4	FBK0503382

Application data on page no 2.193

Cutting parameters

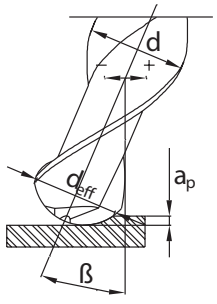
F121XL/F150XL/F111XL/F140XL/F123XL/F122XL/F125XL Metric - 1.0 mm to 8.0 mm

Material Group			Cutting Speed (Vc) m/min: Shoulder Milling / Rough and Semi Finish							Slot Milling			Cutting Speed (Vc)			Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%											
			CT NCT	CT NCT	CT NCT	CT NCT	CT NCT	CT	CT	CT NCT	CT NCT	CT NCT				Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.											
			5	2.3	1.6	1.4	1.2	1.1	1	1	1	1															
			ap max	ap max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap 0.25D	ap 0.5D	ap 1D				Diameter in mm											
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%	ae/D 100%	ae/D 100%	min	max	Range	1.0		2.0		3.0		4.0		5.0		6.0		8.0	
																min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	0	210	165	150	140	135	130	125	120	110	100	100	210	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		1	210	165	150	140	135	130	125	120	110	100	100	210	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	180	141	129	120	116	111	107	103	94	86	86	180	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	180	141	129	120	116	111	107	103	94	86	86	180	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		4	150	118	107	100	96	93	89	86	79	71	71	150	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
Stainless Steel	M	1	115	90	82	77	74	71	68	66	60	55	55	115	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	80	63	57	53	51	50	48	46	42	38	38	80	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	75	59	54	50	48	46	45	43	39	36	36	75	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
Cast Iron	K	1	150	118	107	100	96	93	89	86	79	71	71	150	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	140	110	100	93	90	87	83	80	73	67	67	140	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	100	79	71	67	64	62	60	57	52	48	48	100	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
Non-Ferrous	N	1	1000	786	714	667	643	619	595	571	524	476	476	1000	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	750	589	536	500	482	464	446	429	393	357	357	750	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	750	589	536	500	482	464	446	429	393	357	357	750	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
Super Alloys	S	1	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.019	0.024
		2	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.019	0.024
		3	70	55	50	47	45	43	42	40	37	33	33	70	fz	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.019	0.024
		4	63	50	45	42	41	39	38	36	33	30	30	60	fz	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.019	0.024
Hard Materials	H	1	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.002	0.003	0.005	0.006	0.007	0.009	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032
		2	63	50	45	42	41	39	38	36	33	30	30	63	fz	0.002	0.003	0.005	0.006	0.007	0.009	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032
		3	53	41	38	35	34	33	31	30	28	25	25	53	fz	0.002	0.003	0.005	0.006	0.007	0.009	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032

		4flute		4flute	
		Flat	Ball	Flat	Ball
CT	Standard	**F121XL**	**F150XL**	**F111XL**	**F140XL**
NCT	Long Length	**F123XL**		**F122XL**	**F125XL**

ae > .3D use < 1D ap
ae < .2D use < 1.5 D ap
ae > .1D use < 2D ap
ae < .05D use < L1 Max

CT- indicates that when using these end mills – use the Chip load multiplication factor
NCT- Indicates that when using these end mills- do not use the chip load multiplication factor



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1
* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D-ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D-2 \times ADOC}{D}\right)\right]$$

Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

* * Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

* For TiN Coated ToolS Decrease RPM by 5%

* For Uncoated Tools Decrease RPM by 20%

Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Cutting parameters

F121XL/F150XL/F111XL/F140XL/F123XL/F122XL/F125XL Metric - 10.0 mm to 25.0 mm

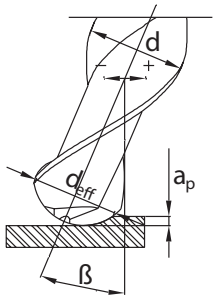
Material Group			Cutting Speed (Vc) m/min: Shoulder Milling / Rough and Semi Finish							Slot Milling			Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%											
			CT NCT	CT NCT	CT NCT	CT NCT	CT NCT	CT	CT	CT NCT	CT NCT	CT NCT												
			5	2.3	1.6	1.4	1.2	1.1	1	1	1	1	Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.											
			ap max	ap max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap 0.25D	ap 0.5D	ap 1D	Cutting Speed (Vc)		mm	Diameter in mm									
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%	ae/D 100%	ae/D 100%	min	max	Range	10.0		12.0		14.0		16.0		20.0		25.0	
																min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	0	210	165	150	140	135	130	125	120	110	100	100	210	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		1	210	165	150	140	135	130	125	120	110	100	100	210	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		2	180	141	129	120	116	111	107	103	94	86	86	180	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		3	180	141	129	120	116	111	107	103	94	86	86	180	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		4	150	118	107	100	96	93	89	86	79	71	71	150	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
Stainless Steel	M	1	115	90	82	77	74	71	68	66	60	55	55	115	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		2	80	63	57	53	51	50	48	46	42	38	38	80	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		3	75	59	54	50	48	46	45	43	39	36	36	75	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
Cast Iron	K	1	150	118	107	100	96	93	89	86	79	71	71	150	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		2	140	110	100	93	90	87	83	80	73	67	67	140	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		3	100	79	71	67	64	62	60	57	52	48	48	100	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
Non-Ferrous	N	1	1000	786	714	667	643	619	595	571	524	476	476	1000	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		2	750	589	536	500	482	464	446	429	393	357	357	750	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
		3	750	589	536	500	482	464	446	429	393	357	357	750	fz	0.040	0.050	0.048	0.060	0.056	0.070	0.064	0.080	0.080	0.100	0.100	0.125
Super Alloys	S	1	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.024	0.030	0.029	0.036	0.034	0.042	0.038	0.048	0.048	0.060	0.060	0.075
		2	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.024	0.030	0.029	0.036	0.034	0.042	0.038	0.048	0.048	0.060	0.060	0.075
		3	70	55	50	47	45	43	42	40	37	33	33	70	fz	0.024	0.030	0.029	0.036	0.034	0.042	0.038	0.048	0.048	0.060	0.060	0.075
		4	63	50	45	42	41	39	38	36	33	30	30	60	fz	0.024	0.030	0.029	0.036	0.034	0.042	0.038	0.048	0.048	0.060	0.060	0.075
Hard Materials	H	1	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.032	0.040	0.038	0.048	0.045	0.056	0.051	0.064	0.064	0.080	0.080	0.100
		2	63	50	45	42	41	39	38	36	33	30	30	63	fz	0.032	0.040	0.038	0.048	0.045	0.056	0.051	0.064	0.064	0.080	0.080	0.100
		3	53	41	38	35	34	33	31	30	28	25	25	53	fz	0.032	0.040	0.038	0.048	0.045	0.056	0.051	0.064	0.064	0.080	0.080	0.100

#RPM(N) = Vc(m/min) X 318.18/Tool Dia. #Vf(mm/min) = RPM(N) X frev (mm/rev)

		4flute		4flute	
		Flat	Ball	Flat	Ball
CT	Standard	**F121XL**	**F150XL**	**F111XL**	**F140XL**
NCT	Long Length	**F123XL**		**F122XL**	**F125XL**

ae > .3D use < 1D ap
ae < .2D use < 1.5 D ap
ae > .1D use < 2D ap
ae < .05D use < L1 Max

CT- indicates that when using these end mills – use the Chip load multiplication factor
NCT- Indicates that when using these end mills- do not use the chip load multiplication factor



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1

* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D - ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D - 2 \times ADOC}{D}\right)\right]$$

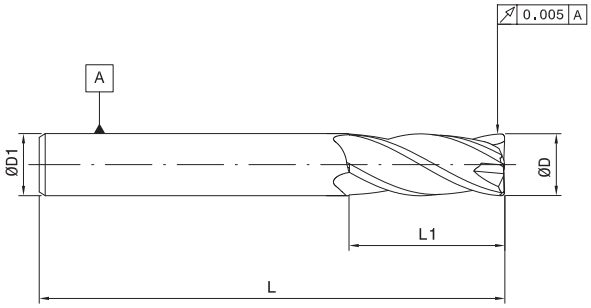
Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

4 Flute EXPRESS CARBIDE END MILLS

Carbide | REG | 30° | TiAIN



P0-P6
K1-K3
S1-S4
H1-H4
N1-N6
M1-M3

Unit : mm

ØD (mm)	L1 (mm)	L (mm)	ØD1 (mm)	z	Description	EDP No TiAIN Coated
1	3	50	4	4	EM 1.00MMX3X50XSH4 4FLT TA EXP	FBK0512195
1.5	4	50	4	4	EM 1.50MMX4X50XSH4 4FLT TA EXP	FBK0512196
2	5	50	4	4	EM 2.00MMX5X50XSH4 4FLT TA EXP	FBK0512197
2.5	7	50	4	4	EM 2.50MMX7X50XSH4 4FLT TA EXP	FBK0512198
3	8	50	3	4	EM 3.00MMX8X50XSH4 4FLT TA EXP	FBK0512199
4	10	50	4	4	EM 4.00MMX10X50XSH4 4FLT TA EXP	FBK0512200
5	13	50	5	4	EM 5.000MMX13X50XSH5 4FLT TA EXP	FBK0512201
6	15	50	6	4	EM 6.00MMX15X50XSH6 4FLT TA EXP	FBK0512202
8	20	60	8	4	EM 8.00MMX20X60XSH8 4FLT TA EXP	FBK0512203
10	25	75	10	4	EM 10.00MMX25X75XSH10 4FLT TA EXP	FBK0512204
12	30	75	12	4	EM 12.00MMX30X75XSH12 4FLT TA EXP	FBK0512205
14	45	100	14	4	EM 14.00MMX45X100XSH14 4FLT TA EXP	FBK0512206
16	45	100	16	4	EM 16.00MMX45X100XSH16 4FLT TA EXP	FBK0512207
20	45	100	20	4	EM 20.00MMX45X100XSH20 4FLT TA EXP	FBK0512208

Cutting parameters

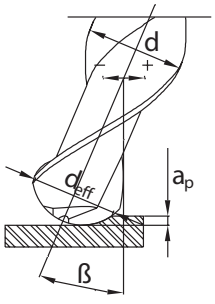
Totem Express Range

Material Group			Cutting Speed (Vc) m/min — Shoulder Milling / Rough and Semi Finish							Slot Milling					Recommended Feed/Tooth (fz=mm/th) for shoulder milling / for slot milling, reduce fz by 20%													
			CT NCT	CT NCT	CT NCT	CT NCT	CT NCT	CT	CT	CT NCT	CT NCT	CT NCT															
			5	2.3	1.6	1.4	1.2	1.1	1	1	1	1			Multiply fz by this X Factor based on ae. When finishing, use the standard fz per chart below. Only add chip thinning when roughing or semi-finishing.													
			ap max	ap max	ap 2D	ap 1.5D	ap 1.25D	ap 1D	ap 1D	ap 0.25D	ap 0.5D	ap 1D	Cutting Speed (Vc)		mm	Diameter in mm												
			1.0		2.0		3.0		4.0		5.0		6.0		8.0													
			ae/D 1%	ae/D 5%	ae/D 10%	ae/D 15%	ae/D 20%	ae/D 30%	ae/D 50%	ae/D 100%	ae/D 100%	ae/D 100%	min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	0	210	165	150	140	135	130	125	120	110	100	100	210	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		1	210	165	150	140	135	130	125	120	110	100	100	210	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	180	141	129	120	116	111	107	103	94	86	86	180	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	180	141	129	120	116	111	107	103	94	86	86	180	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		4	150	118	107	100	96	93	89	86	79	71	71	150	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
Stainless Steel	M	1	115	90	82	77	74	71	68	66	60	55	55	115	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	80	63	57	53	51	50	48	46	42	38	38	80	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	75	59	54	50	48	46	45	43	39	36	36	75	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
Cast Iron	K	1	150	118	107	100	96	93	89	86	79	71	71	150	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	140	110	100	93	90	87	83	80	73	67	67	140	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	100	79	71	67	64	62	60	57	52	48	48	100	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
Non-Ferrous	N	1	1000	786	714	667	643	619	595	571	524	476	476	1000	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		2	750	589	536	500	482	464	446	429	393	357	357	750	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
		3	750	589	536	500	482	464	446	429	393	357	357	750	fz	0.003	0.004	0.006	0.008	0.010	0.012	0.013	0.016	0.016	0.020	0.019	0.024	0.032	0.040
Super Alloys	S	1	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.019	0.024
		2	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.019	0.024
		3	70	55	50	47	45	43	42	40	37	33	33	70	fz	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.019	0.024
		4	63	50	45	42	41	39	38	36	33	30	30	60	fz	0.002	0.002	0.003	0.004	0.005	0.006	0.006	0.008	0.008	0.010	0.010	0.012	0.019	0.024
Hard Materials	H	1	74	58	53	49	47	46	44	42	39	35	35	75	fz	0.002	0.003	0.005	0.006	0.007	0.009	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032
		2	63	50	45	42	41	39	38	36	33	30	30	63	fz	0.002	0.003	0.005	0.006	0.007	0.009	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032
		3	53	41	38	35	34	33	31	30	28	25	25	53	fz	0.002	0.003	0.005	0.006	0.007	0.009	0.010	0.012	0.012	0.015	0.014	0.018	0.026	0.032

		4flute		4flute	
		Flat	Ball	Flat	Ball
CT	Standard	**F121XL**	**F150XL**	**F111XL**	**F140XL**
NCT	Long Length	**F123XL**		**F122XL**	**F125XL**

ae > .3D use < 1D ap
ae < .2D use < 1.5 D ap
ae > .1D use < 2D ap
ae < .05D use < L1 Max

CT- indicates that when using these end mills – use the Chip load multiplication factor
NCT- Indicates that when using these end mills- do not use the chip load multiplication factor



* For ball nose end mills - If axial depth (ap) is less than the ball diameter, the speed is figured using the effective cutting diameter (D_{eff}) Formula 1
* For ball nose end mills - If axial depth (ap) is less than the ball diameter, and tool is tilted by an angle β, the speed is figured using the effective cutting diameter (D_{eff}) Formula 2

Formula 1

$$D_{eff} = 2 \times \sqrt{ADOC \times (D\text{-}ADOC)}$$

Formula 2

$$D_{eff} = D \times \sin\left[\beta + \arccos\left(\frac{D\text{-}2 \times ADOC}{D}\right)\right]$$

Note
When maximum speed of the machine spindle less than value of recommended milling conditions, adjust conditions by calculation as follows.
(Maximum Spindle Speed of Spindle)/(Spindle Speed of Recommended Milling Condition)= Conversion Rate(α)

Feed of Recommended Milling Condition(Vf mm/min) X α = Corrected Vf (mm/min)

* * Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

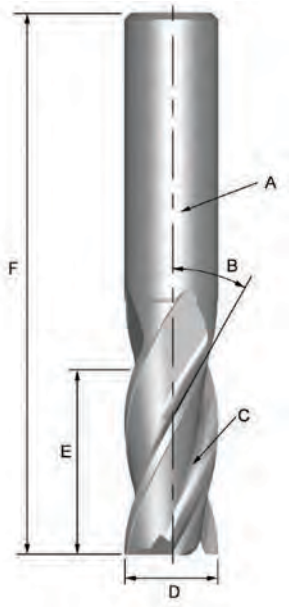
* For TiN Coated ToolS Decrease RPM by 5%

* For Uncoated Tools Decrease RPM by 20%

Disclaimer
* Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

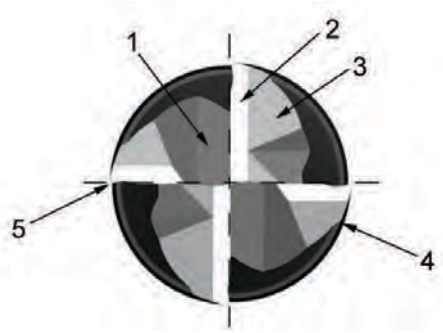
End mill nomenclature

A: Shank
B: Helix Angle
C: Flute
D: Outside Diameter
E: Cutting Length
F: Overall Length



Length of Cut (Flute Length) (E) – Always select the shortest Flute Length possible for your application.
By selecting the shortest Flute Length, you can increase rigidity and allow for higher feed rates.

End Mill Diameter (D) – Always select the largest diameter possible for your milling operation. Increasing your diameter by just 10%, can increase your rigidity by 25%.

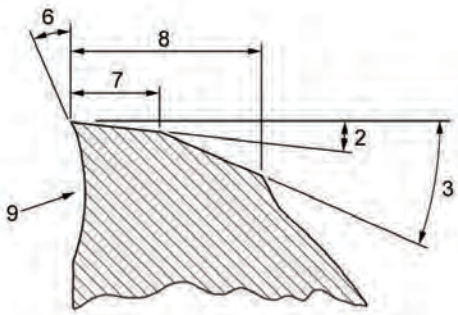


1: Gash
2: Primary Relief Angle
3: Secondary Relief Angle
4: Heel
5: Cutting Edge

Helix Angle – Varies from 0 to 60 degrees. Higher helix angles can increase the number of teeth in a cut, and help in redirecting cutting forces. This is beneficial in harder to machine materials in particular. Changes in helix angle can also greatly affect the flute form of an end mill, and affect chip evacuation.

Rake Angle (B) – The measurement of the curvature of the cutting edge in the face of the flute. A high rake angle will cut more aggressively and make the cutting action smoother, while a lower rake angle will increase the strength of the cutting edge.

Primary & Secondary Relief (2 & 3) – The clearance directly behind the cutting edge. High primary relief angles will allow for more aggressive milling, while lower relief angles will increase the strength of the cutting edge. The primary relief will also affect the wear on a cutting edge. Lower primary relief angles can tend to develop larger wear lands.



6: Rake Angle
7: Width of Primary Relief Land
8: Width of Secondary Relief Land
9: Undercut Face

Web Thickness – The cross section of the fluting of the end mill. Larger webs allow for more rigidity, while smaller webs allow for better chip evacuation. This feature is highly dependent on the material being machined.

How to reduce vibration & chatter in end milling

When chatter occurs, it can be self-sustaining until the problem is corrected. Chatter causes poor finish on the part, and will damage and significantly reduce the life of end mills. Carbide end mills are particularly susceptible to damage.

Typical methods to reduce chatter include reducing cutting forces by:

1. Reducing the number of flutes in cut.
2. Decreasing the chipload per tooth by reducing the feed or increasing the speed or RPM.
3. Reducing the axial or radical depth or cut.

Though these steps will reduce the chatter, slowing down the cutting process is not always the best course of action, and reducing the chipload can be detrimental to the cutter.
It is better to first improve rigidity and stability:

1. Use a larger end mill with a larger core diameter.
2. Use end mills with reduced clearance or a small circular margin.
3. Use the shortest overhang from spindle nose to tip of tool.
4. Use stub length end mills where possible.
5. Use balanced tool holders.
6. Rework fixture to hold the workpiece more securely.
7. Reprogram the cutter path to shift cutting forces into stiffer portions of the workpiece.
8. Look for ways to improve spindle speeds then adjust feed accordingly.

Chatter is common when machining corners. As the end mill enters the corner, the percentage of engagement increases the number of teeth in the cut. This drastically increases the cutting forces, causing chatter.

To reduce chatter when machining corners, consider using circular interpolation to produce a bigger corner radius than indicated by the part print. Then remove the remaining stock with a smaller end mill using circular interpretation.

Reducing Chatter in End Milling

Chatter in the form of vibration and noise is a frequent challenge when end milling. It can cause scalloping and uneven finishes.

To reduce chatter, try the following:

1. Ensure that the starting places for speeds and feeds are correct for the workpiece material and the cut.
2. Decrease the feed, or chipload per tooth/tool.
3. Make the workpiece as secure and rigid as possible.
4. Reduce excess overhang between the workpiece and spindle.
5. Select an end mill with less flutes.
6. Check the tool run-out.
7. Review the tool geometry to ensure the cutting face, relief, fluting and helix angle are appropriate for the workplace material.
8. If conventional, try climb milling.

End Mill Accuracy and Deflection

Because end mills are supported only at the shank end, they are subject to deflection, which can reduce the accuracy of the milled part. Several factors affect the amount of deflection that will occur.

1. Overall Length and Length of Cut: As the length of the mill increases, difficulty in maintaining dimensional accuracy also increases. Rigidity decreases in proportion to length of cut to the 3rd power. Thus, a 4th length of cut is 1/8 as rigid as a 2" length of cut. A regular length end mill cutting 7075 aluminium can deflect <.002", while an extra long end mill can deflect >.006".

2. End Mill Diameter: Rigidity increases in proportion to diameter to the 4th power. A 1" – diameter end mill is 16 times more rigid than a ½" end mill. A 1" – diameter end mill over a 5/8" length of cut in 1040 steel will cut to size, while a 3/8" – diameter end mill may deflect to >.003".

3. End Mill Material Composition: Solid carbide is about three times more rigid and resistant to deflection than high-speed steel end mills, but not as tough.

4. Radial Depth of Cut and Axial Length of Cut: Heavy radical cuts as well as long axial lengths of cuts will deflect the end mill much more. A light-finishing pass is generally required to produce accurate parallel cuts.

Tips:

- Always use the shortest tool possible.
- Shorter tools can reduce chatter.
- Increase coolant.
- Try left-hand spiral end mills.
- Try using higher helix end mills.
- Increase overall system rigidity.
- Reduce overhang.
- Conventional milling can resist deflection better than climb milling.
- Dull tools deflect more than sharp tools.

Surface treatment

STEAM OXIDE:
A black oxided surface (Fe3O4) produced on the surface of a finished tap by means of a steam furnace. This oxidized surface is porous and helps retain cutting fluid in the working portion of the tap. The materials on which steam oxide has shown improvement in performance are stainless steels, steel forgings, tool and die steels, hot and cold rolled steels, and high nickel alloys.

TITANIUM NITRIDE (TiN):
A thin deposit (approx. 0.0001") applied to the surface of a finished tap utilizing PVD coating technology. TiN coating increases the surface hardness and wear resistance. Use of TiN coating on standard tools will help increase tool life in harder materials (up to 32 HRc), such as stainless steels, steel forgings, tool and die steels and hot and cold rolled steels. TiN coating also works very well with water-base cutting fluids.

TITANIUM CARBON NITRIDE (TiCN):
Similar to TiN, TiCN is applied utilizing PVD coating technology. This coating combines high hardness (approx. 2800 vickers) with the anti-seizure properties of Nitride. A lower coefficient of friction helps reduce welding by 75% over TiN coated tools. These features make TiCN especially beneficial in non-ferrous material and hardened steels.

TITANIUM ALUMINUM NITRIDE (TiAlN):
TiAlN is applied using PVD coating technology. The addition of aluminum reduces friction and increases the coating oxidation temperature. As a result, TiAlN has increased resistance to heat and oxidation wear. This makes TiAlN better suited for High Speed/High Heat applications. TiAlN coating is incorporated into many of our tools.

PROTON + COATING :
Proton + coating devised explicitly for solid carbide tools used in roughing and finishing of hardened steels and difficult-to-machine materials.
Major competitive advantages in tool and die-making can be attained by cutting steels with hardness >60 HRc.

Cr BASED COATING
Cr based coating, has made it possible to systematically optimize and decisively improve the key coating properties for milling applications.

Greater abrasion resistance, extra shear strength, lower adhesion tendency, maximum toughness and a very smooth surface achieve a quantum leap in drilling performance.

Material details

Material Group		Material Description	Content	Tensile Strength RM (MPa)*	Hardness (HB)	Hardness (HRc)
Steel	P0	Low-Carbon Steels, Long Chipping	C <0,25%	<530	<125	—
	P1	Low-Carbon Steels, Short Chipping, Free Machining	C <0,25%	<530	<125	—
	P2	Medium- and High-Carbon Steels	C >0,25%	<530	<220	<25
	P3	Alloy Steels and Tool Steels	C >0,25%	600-850	<330	<35
	P4	Alloy Steels and Tool Steels	C >0,25%	850-1400	340–450	35-48
	P5	Ferritic, Martensitic, and PH Stainless Steels	—	600-900	<330	<35
	P6	High-Strength Ferritic, Martensitic, and PH Stainless Steels	—	900-1350	350–450	35-48
Stainless Steel	M1	Austenitic Stainless Steel	—	<600	130-200	-
	M2	High-Strength Austenitic Stainless and Cast Stainless Steels	—	600-800	150–230	<25
	M3	Duplex Stainless Steel	—	<800	135–275	<30
Cast Iron	K1	Grey Cast Iron	—	125-500	120–290	<32
	K2	Low- and Medium-Strength Ductile Irons (Nodular Irons) and Compacted Graphite Irons (CGI)	—	<600	130–260	<28
	K3	High-Strength Ductile Irons and Austempered Ductile Iron (ADI)	—	>600	180–350	<43
Non-Ferrous	N1	Wrought Aluminium	—	—	—	—
	N2	Low-Silicon Aluminium Alloys and Magnesium Alloys	Si <12,2%	—	—	—
	N3	High-Silicon Aluminium Alloys and Magnesium Alloys	Si > 12,2%	—	—	—
	N4	Copper-, Brass-, Zinc-Based on Machinability Index Range of 70–100	—	—	—	—
	N5	Nylon, Plastics, Rubbers, Phenolics, Resins, Fibreglass	—	—	—	—
	N6	Carbon, Graphite Composites, CFRP	—	—	—	—
	N7	Metal Matrix Composites (MMC)	—	—	—	—
Special Alloys	S1	Iron-Based, Heat-Resistant Alloys	—	500-1200	160-260	25-48
	S2	Cobalt-Based, Heat-Resistant Alloys	—	1000-1500	250-450	25-48
	S3	Nickel-Based, Heat-Resistant Alloys	—	600-1700	160-450	<48
	S4	Titanium and Titanium Alloys	—	900-1600	300-400	33-48
Hardened Steel	H1	Hardened Materials	—	—	—	44-48
	H2	Hardened Materials	—	—	—	48-55
	H3	Hardened Materials	—	—	—	56-60
	H4	Hardened Materials	—	—	—	>60

Material details

Material Group		ANSI	DIN
Steel	P0	A36, 1008, 1010, 1018 through 1029; 1108, 1117	
	P1	10L18, 1200 Series, 1213, 12L14	C15, Ck22, ST37-2, S235JR, 9SMnPb28, GS38
	P2	1035, 1045, 10L45, 1050, 10L50, 1080, 1137, 1144, 11L44, 1525, 1545, 1572	ST52, S355JR, C35, GS60, Cf53
	P3	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T	16MnCr5, Ck45, 21CrMoV5-7, 38SMn28
	P4	1300, 2000, 3000, 4000, 5000, 8000, P20, SAE: A, D, H, O, S, M, T	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
	P5	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series	100Cr6, 30CrNiMo8, 42CrMo4, C70W2, S6525, X120Mn12
	P6	15–5 PH, 13–8 PH, 17–4 PH, 400 and 500 Series	X102CrMo17, G-X120Cr29
Stainless Steel	M1	200 Series, 301, 302, 304, 304L, 309	X5CrNi 18 10, X2CrNiMo 17 13 2, G-X25CrNiSi18 9, X15CrNiSi 20 12
	M2	310, 316, 316L, 321, 347, 384 ASTM Cast XM-1, XM-5, XM-7, XM-21	X2CrNiMo 13 4, X5NiCr 32 21, X5CrNiNb 18 10, G-X15CrNi 25-20
	M3	323, 329, F55, 2205, S329000	X8CrNiMo27 5, X2CrNiMoN22 5 3, X20CrNiSi25 4, G-X40CrNiSi27 4
Cast Iron	K1	class 20, 25, 30, 35, 40, 45, 50, 55, 60, G1800, G3000, G3500, G4000	GG15, GG25, GG30, GG40, GTW40
	K2	60-40-18, 65-45-12, 80-55-06, SAE J434:D4018, D4512, D5506, ASTM A47: Grade 32510, 35018, SAE J158: Grade M3210, M4504, M5003, M5503, M7002,ASTM A842: Grade 250, 300, 350, 400, 450	GGG40, GTS35
	K3	ASTM A536:100-70-03, 120-90-02, SAE J434: D7003, SAE J158:Grade M8501AST A897: 125-80-10, 150-100-7, 175-125-4, 200-150-1, 230-185	GGG60, GTW55, GTS65
Non-Ferrous	N1	2025, 5050, 7050, 1000, 2017	AlMg1, Al99.5, AlCuMg1, AlCuBiPb, AlMgSi1, ALMgSiPb
	N2	2024, 6061, 7075	GAlSiCu4, GDAlSi10Mg
	N3	—	G-ALSi12, G-AlSi17Cu4, G-AlSi21CuNiMg
	N4	C81500	CuZn40, Ms60, G-CuSn5ZnPb, CuZn37, CuSi3Mn
	N5	—	LEXAN®, HOSTALEN™, Polystyrol, Makralon®
	N6	Graphite, CFK, CFRP	CFK, GFK
	N7	C63000	—
Special Alloys	S1	INCOLOY® 800 Series, A608, A567, Discaloy™, INVAR®, N-155, 16-25-6, 19-9 DL; Cast: ASTM A-297, A-351, A-567, A-608	X1NiCrMoCu32 28 7, X12NiCrSi36 16, X5NiCrAlTi31 20, X40CoCrNi20 20
	S2	Haynes® 25 (L605), Haynes 188, J-1570, Stellite®, AiResist 213; Cast: AiResist 13, Haynes 21, MAR-M302, MAR-M509, NASA Co-W-Re, WI-52	Haynes® 188, Stelllite® 6,21,31
	S3	Astroloy™, Hastelloy® B/C/ C-276 /X, INCONEL® 600 and 700 Series, IN102,INCOLOY 900 Series, Rene 41, Waspalloy®, Monel®, K-500, MAR-M20, NIMONIC®, UDIMET®	INCONEL® 690, INCONEL 625, Hastelloy®, NIMONIC® 75
	S4	Pure: Ti 98.8, Ti 98.9,Ti 99.9; Alloyed: Ti 5Al-2.5Sn, Ti6Al-4V, Ti6Al-2Sn-4Zr-2Mo,Ti-3Al-8V-6Cr-4Mo-4Zr, Ti-10V-2Fe-3Al, Ti-13V-11Cr-3Al	Ti1, TiAl5Sn2, TiAl6V4, TiAl4Mo4Sn2
Hardened Steel	H1	Tool Steel H10, H11, H13, D2, D3, 4340, P20	GX260NiCr42, GX330NiCr42, GX300CrNiSi952, GX300CrMo153, HARDOX® 400
	H2	Tool Steel H10, H11, H13, D2, D3, 4340, P20	—
	H3	Tool Steel H10, H11, H13, D2, D3, 4340, P20	—
	H4	Tool Steel H10, H11, H13, D2, D3, 4340, P20	—

End mill troubleshooting

Problem	Rigidity	Increase Inches/Tooth	Reduce Inches/Tooth	Material	Recutting Chips	Increase Rake Angle	Handling	Runout	Reduce Speed	Increase Speed	Depth of Cut	Fixturing	Coolant	Finish	Dull Tool	Chip Evaluation	Inadequate Number of Flutes	Insufficient Coolant	Plunge Cutting	Reduce Feed	Increase Feed	Tool Holder	Balance Holder & Tool
Chipping	X		X	X	X		X	X														X	
Chatter	X	X							X		X	X										X	
Built Up Edge		X				X				X			X	X									
Breakage	X		X								X				X	X						X	
Chip Packing																	X	X	X				
Poor Slotting	X	X	X						X		X	X								X			
Premature Wear				X					X	X			X							X	X	X	
Chip Welding			X			X			X				X	X									
Cratering																							X

FORMULAS:-

INCH
RPM = SFM x 3.82/Tool Diameter
IPM = RPM x number of teeth x (inches/tooth)

METRIC
RPM = Vc x 318.057/Tool Diameter
mm/min. = RPM x number of teeth x (mm/tooth)

CONVERSION INCH TO METRIC
Vc = SFM x 0.3048
mm/min. = IPM x 25.4

CONVERSION METRIC TO INCH
SFM = Vc/ . 3048
IPM = (mm/min.)/25.4

SAFETY NOTE:-

Always wear the appropriate personal protective equipment such as safety glasses and protective clothing when using solid carbide or HSS cutting tools. Machines should fully guarded. Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

End mill troubleshooting guide

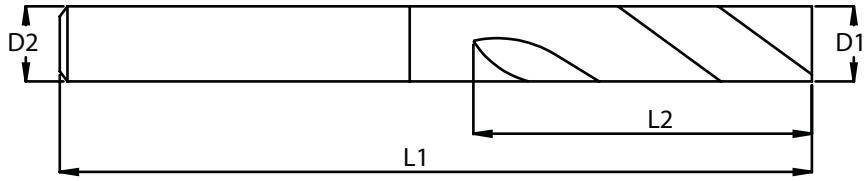
PROBLEM	CAUSE	SOLUTION
Chip packing	Too great a cutting amount	Adjust feed or speed
	Not enough chip room	Use end mill fewer flutes
	Not enough coolant	Apply more coolant. Use air pressure
Rough surface finish	Feed too fast	Slow down to correct feed
	Slow speed	Use higher speed
	Too much wear	Regrind earlier stage
	Chip biting	Cut less amount per pass
	No end tooth concavity	Add margin (touch primary with oilstone)
Burr	Too much wear on primary relief	Regrind sooner
	Incorrect condition	Correct milling condition
	Improper cutting angle	Change to correct cutting angle
No dimensional accuracy	Too tough condition	Change to easier condition
	Lack of accuracy (machine & holder)	Repair machine or holder
	Not enough rigidity (machine & holder)	Change machine or holder or condition
	Not sufficient number of flutes	Use end mill with greater number of flutes
No perpendicular side	Feed too fast	Slow down to correct feed
	Too great a cutting amount	Reduce cutting amount
	Too long a flute length or long overall length	Use proper length tool. Hold shank deeper
	Not sufficient number of flutes	Use end mill with greater number of flutes
Chipping	Feed too fast	Slow down to proper feed
	Feed too fast on first cut	Slow down on first bite
	Not enough rigidity of machine tool & holder	Change rigid machine tool or holder
	Loose holder	Tighten tool holder
	Loose holder (workpiece)	Tighten workpiece fixture
	Lack of rigidity (tool)	Use shortest end mill available. Hold shank deeper. Try down cut
	Teeth too sharp	Change to lower cutting angle, primary relief
Wear	Speed too fast	Slow down, use more coolant
	Hard material	Use higher grade tool material, add surface treatment
	Biting chips	Change feed speed to change chip size or clear chips with coolant or air pressure
	Improper feed speed (too slow)	Increase feed speed. Try down cut
	Improper cutting angle	Change to correct cutting angle
	Too low a primary relief angle	Change to larger relief angle
Breakage	Feed too fast	Slow down feed
	Too large cutting amount	Adjust to smaller cutting amount per teeth
	Too long flute length or long overall length	Hold shank deeper, use shorter end mill
	Too much wear	Regrind at earlier stage
Chattering	Feed and speed too fast	Correct feed and speed
	Not enough rigidity (machine & holder)	Use better machine tool or holder or change condition
	Too much relief angle	Change to smaller relief angle. Add margin (touch primary with oil stone)
	Loose holder (workpiece)	Hold workpiece tighter
	Cutting too deep	Correct to smaller cutting depth
	Too long flute length or long overall length	Hold shank deeper, use shorter end mill or try down cut

Custom tool request form

Fill in information requested on drawing.
(*Required Fields)

☐ Request Approval Drawing

D1 = _____
D2 = _____
L1 = _____
L2 = _____



***Material**
☐ Solid Carbide
☐ Carbide Coolant Thru

***Number of Flutes**
_____

***Flute Form**
☐ Straight
☐ Helical _____ ° Helix

***Flute Form**
☐ Cylindrical
☐ Shank Flat
Flat Style _____

***Flute Form**
☐ Corner Radius _____ +/-.002"
☐ Corner Chamfer _____ x _____ °
☐ Chipbreaker

***Coating**
☐ TiN
☐ TiCN
☐ TiAlN
☐ None
Other _____

Note:
This information enables us to engineer and manufacture a tool for your specific requirments.

Customer Name: _____

Phone: _____

* Work Material Machined:

Hardness: _____

Distributor: _____

Quantities: _____

Note: Trial tool/custom tool request form can be downloaded from our website www.forbesprecision.co.in

Trial tool results form

Customer Name		Ref No.	
Address		Date	
		Sales Engineer Name:	
		Contact No.:	
Contact Person :		Trial PO OA No:	
Tool Diameter :			
Component Details:		**Operation Details:**	
Name		End Milling Depth	
Material		No of Passes	
Material Hardness		Slotting/Profiling/Ramping	
Machine Make /Model/No.		Roughing/Finishing	
Tool No.		Tol/Finish required :	
Machining Details :			
Parameters	**Existing**	**Proposed**	
Holding			
M/c.Type			
Cycle Time			
Coolant			
Coolant Press.			
Tool Data:			
Parameters	**Existing**	**Trial 1**	**Trial 2**
Make			
Ext/Thru cool			
Cutting Speed (Vc) m/min			
RPM			
Feed			
Depth of cut			
Life Obtained (TIME)			
Kind of Failure			
Cost Data:			
Tool Cost (Rs.)			
Cost/Component (Rs.)			
Remarks:-			
Customer Benefit:-1.			
Customer Benefit:-2.			

Sales Engineer
FORBES PRECISION TOOLS AND MACHINE PARTS LIMITED

Authorised Signatory
CUSTOMER

Note: Trial tool/custom tool request form can be downloaded from our website www.forbesprecision.co.in

Milling formulas and definitions

Below are the complied list of milling formulas and definitions that are used in milling process, milling cutters, milling techniques etc. This will help you to calculate correct cutting speed, feed per tooth or metal removal rate in any milling operation.

METRIC	IMPERIAL
Table feed, F (mm/min) $F = f_z \times n \times Z$	Table feed, F (inch/min) $F = f_z \times n \times Z$
Cutting speed, v_c (m/min) $V_c = \frac{\pi \times D \times n}{1000}$	Cutting speed, v_c (ft/min) $V_c = \frac{\pi \times D \times n}{12}$
Spindle speed, n (r/min) $n = \frac{V_c \times 1000}{\pi \times D}$	Spindle speed, n (rpm) $n = \frac{V_c \times 12}{\pi \times D}$
Feed per tooth, f_z (mm) $f_z = \frac{F}{n \times Z}$	Feed per tooth, f_z (inch) $f_z = \frac{F}{n \times Z}$
Feed per revolution, f_{rev} (mm/rev) $f_{rev} = \frac{F}{n}$	Feed per revolution, f_{rev} (inch/rev) $f_{rev} = \frac{F}{n}$
Metal removal rate, Q (cm^3/min) $Q = \frac{ap \times ae \times F}{1000}$	Metal removal rate, Q ($inch^3$/min) $Q = ap \times ae \times F$
Net power, P (kW) $Q = \frac{ae \times ap \times F \times K_c}{60 \times 10^6}$	Net power, P (HP) $Q = \frac{ae \times ap \times F \times K_c}{396 \times 10^3}$
Torque, M_c (Nm) $M_c = \frac{P \times 30 \times 10^3}{\pi \times n}$	Torque, M_c (lbf ft) $M_c = \frac{P \times 16501}{\pi \times n}$

Symbol	Designation/Definition	Metric	Imperial
ae	Radial depth of cut	mm	inch
ap	Axial depth of cut	mm	inch
D	Cutting diameter at cutting depth ap	mm	inch
f_z	Feed per tooth	mm	inch
f_{rev}	Feed per revolution	mm/r	inch
n	Spindle speed	rpm	rpm
V_c	Cutting speed	m/min	ft/min
V_e	Effective cutting speed	mm/min	inch/min
F	Table feed	mm/min	inch/min
z	Number of effective teeth	pcs	pcs
h_{ex}	Maximum chip thickness	mm	inch
hm	Average chip thickness	mm	inch
k_c	Specific cutting force	N/mm^2	$N/inch^2$
P	Net power	kW	HP
M_c	Torque	Nm	lbf ft
Q	Metal removal rate	cm^3/min	$inch^3$/min

MILLING TECHNIQUES – DEFINITIONS

Linear ramping
A simultaneous straight movement in axial and radial feed directions.

Circular milling
A circular tool path on a constant z-level (circular interpolation).

Circular ramping
A circular ramping tool path (helical interpolation).

Waterline milling
Milling on a constant z-level.

Point milling
A shallow radial cut with round insert or ball nose cutters in which the cutting zone is moved away from the tool centre.

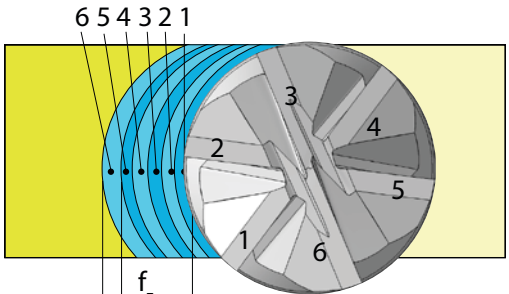
Scallop
A configuration with cusps that occurs when producing sculptured surfaces.

Milling formulas and definitions

THE MILLING PROCESS – DEFINITIONS

Cutting speed, V_c

Indicates the surface speed at which the cutting edge machines the workpiece.



$$f_z = \frac{V_f}{n \times Z_c}$$

Spindle speed, n

The number of revolutions the milling tool makes per minute on the spindle. This is a machine oriented value, which is calculated from the recommended cutting speed value for an operation.

Feed per tooth, f_z

A value for calculating the table feed. The feed per tooth value is calculated from the recommended maximum chip thickness value.

Feed per revolution, f_{rev}

Auxiliary value indicating how far the tool moves during one complete rotation. It is used specifically for feed calculations and often to determine the finishing capability of a cutter.

Average chip thickness, h_m

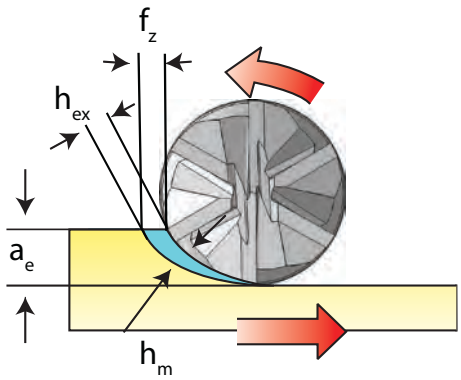
A useful value in determining the specific cutting force, used for net power calculations.

Feed per minute, F

Also known as the table feed, machine feed or feed speed. It is the feed of the tool in relation to the workpiece in distance per time-unit related to feed per tooth and number of teeth in the cutter. The number of available cutter teeth in the tool (zn) varies considerably and is used to determine the table feed while the effective number of teeth (z) is the number of effective teeth in cut. Feed per revolution (f_{rev}) in mm/rev (inch/rev) is a value used specifically for feed calculations and often to determine the finishing capability of a cutter.

Maximum chip thickness, h_{ex}

This value is a result of the cutter engagement as it is related to (f_z), (ae). The chip thickness is an important consideration when deciding the feed per tooth, to ensure that the most productive table feed is employed.



Metal removal rate, Q (cm^3/min)

The volume of metal removed in cubic mm per minute ($inch^3$/minute). It is established using the values for cutting depth, width and feed.

Specific cutting force, k_c

A material constant which is a factor used for power calculations, expressed in N/mm^2

Machining time, T_c (min)

Machining length (l_m) divided by the table feed (F).

Net power, P and efficiency, ηmt

Machine tool oriented values, which assist in calculating the net power to ensure that the machine can handle the cutter and operation.

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TOTEM®

High Performance Cutting Tools

THREAD MILLS

CONTENTS

SERIES	PAGE
Designs	3.004
Designs	3.005
Nomenclature	3.006
Regular Helical Flute Solid Thread Mills for Internal Threading of ISO Metric Thread	3.007
Regular Helical Flute Coolant Thread Mills for Internal Threading of ISO Metric Thread	3.008
Regular Helical Flute Solid Thread Mills for Internal Threading of Unified Thread	3.009
Regular Helical Flute Coolant Thread Mills for Internal Threading of Unified Thread	3.010
Regular Helical Flute Taper Solid Thread Mills for Internal / External Threading of NPT Threads	3.011
Regular Helical Flute Taper Coolant Thread Mills for Internal / External Threading of NPT Threads	3.011
Regular Helical Flute Taper Solid Thread Mills For Internal / External Threading of NPTF Threads	3.012
Regular Helical Flute Taper Coolant Thread Mills For Internal / External Threading of NPTF Threads	3.012
Regular Helical Flute Solid Thread Mills for Internal / External Threading of BSP (G) Threads	3.013
Regular Helical Flute Coolant Thread Mills for Internal / External Threading of BSP (G) Threads	3.013
Regular Helical Flute Taper Solid Thread Mills for Internal / External Threading of BSPT (Rc) Threads	3.014
Regular Helical Flute Taper Coolant Thread Mills for Internal / External Threading of BSPT (Rc) Threads	3.014
Single Tooth Partial Profile Thread Mills for Internal / External Threading	3.015
Multi Tooth 2D Thread Mills for Internal Threading of ISO Metric Threads	3.016
Multi Tooth 3D-4D Thread Mills for Internal Threading of ISO Metric Threads	3.017
Multi Tooth 2D Thread Mills for Internal Threading of Unified Threads	3.018
Multi Tooth 3D-4D Thread Mills for Internal Threading of Unified Threads	3.019

CONTENTS

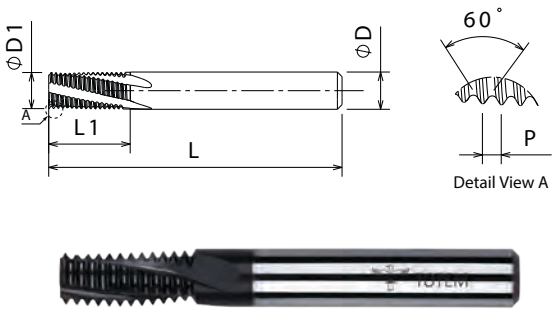
SERIES	PAGE
Multi Tooth 3D for Aerospace Applications Thread Mills for Internal Threading of Unified Threads	3.020
Multi Tooth 3D for Aerospace Applications Thread Mills for Internal Threading of ISO Metric Threads	3.020
Multi Tooth 2D for Hard Part Thread Mills for Internal Threading of ISO Metric Threads	3.021
Multi Tooth 3D for Hard Part Thread Mills for Internal Threading of ISO Metric Threads	3.021
Multi Tooth 2D for Hard Part Thread Mills for Internal Threading of Unified Threads	3.022
Multi Tooth 3D for Hard Part Thread Mills for Internal Threading of Unified Threads	3.022
Regular Straight Flute Solid Thread Mills for Internal Threading of ISO Metric Threads	3.023
Regular Straight Flute Solid Thread Mills for Internal Threading of Unified Threads	3.024
Regular Straight Flute Taper Solid Thread Mills for Internal / External Threading of NPT	3.025
Regular Straight Flute Taper Solid Thread Mills for Internal / External Threading of NPTF	3.025
Regular Straight Flute Solid Thread Mills for Internal / External Threading of BSP (G)Threads	3.026
Regular Straight Flute Taper Solid Thread Mills for Internal / External Threading of BSPT (Rc) Threads	3.026
Short Chamfer Tool 90 Degrees	3.027
Long Chamfer Tool 90 Degrees	3.027
Taper Preparation End Mill For Taper Threads (NPT, NPTF, BSPT)	3.028
Technical Details	3.029

TOTEM®

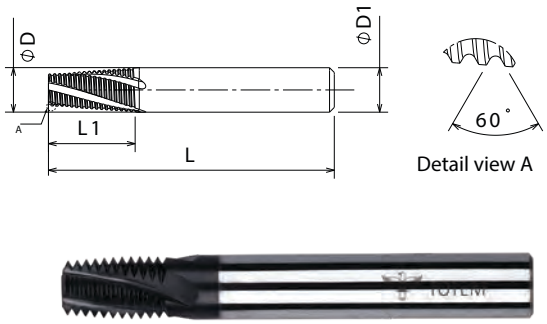
High Performance Cutting Tools

SOLID THREAD MILLING TOOLS

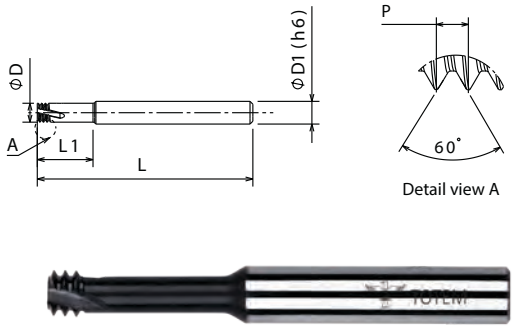
RHS: REGULAR HELICAL FLUTE SOLID



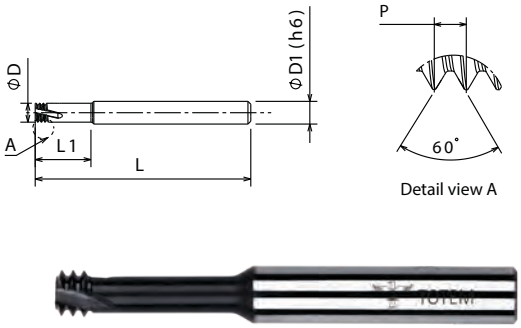
RHTS: REGULAR HELICAL FLUTE TAPER SOLID



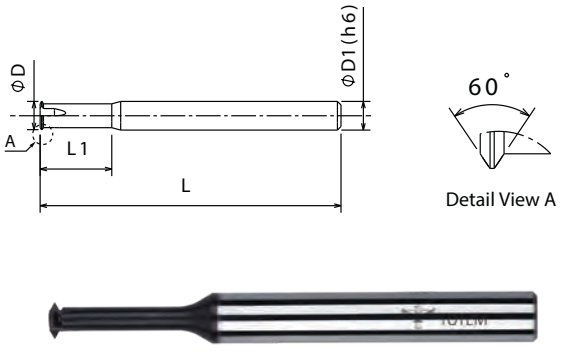
MTH2D: MULTI TOOTH 2D FOR HARD PART
MTH3D: MULTI TOOTH 3D FOR HARD PART



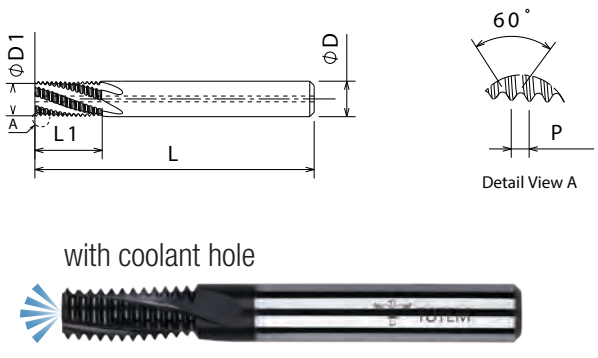
MT2D: MULTI TOOTH 2D
MT3D: MULTI TOOTH 3D
MT4D: MULTI TOOTH 4D



ST P60: SINGLE TOOTH PARTIAL PROFILE



RHC: REGULAR HELICAL FLUTE COOLANT



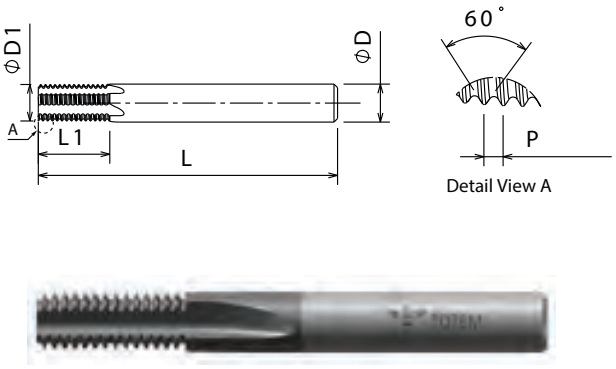
with coolant hole

TOTEM®

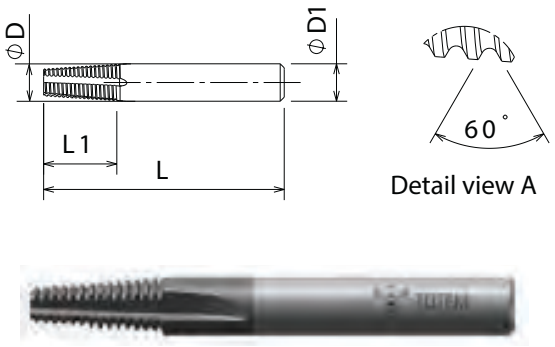
High Performance Cutting Tools

SOLID THREAD MILLING TOOLS

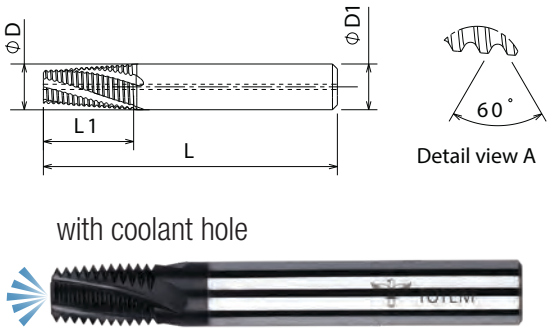
RSS: REGULAR STRAIGHT FLUTE SOLID



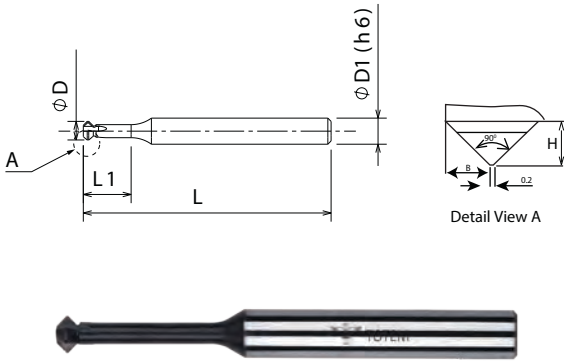
RSTS: REGULAR STRAIGHT FLUTE TAPER SOLID



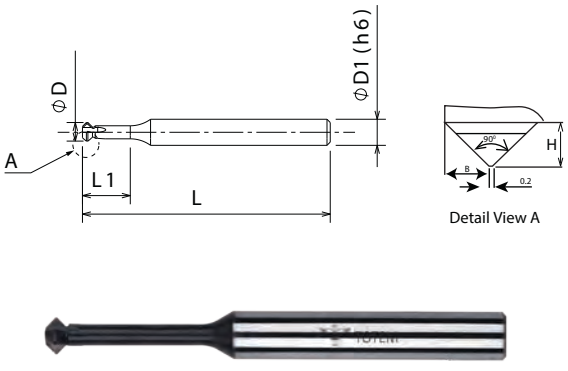
RHTC: REGULAR HELICAL FLUTE TAPER COOLANT



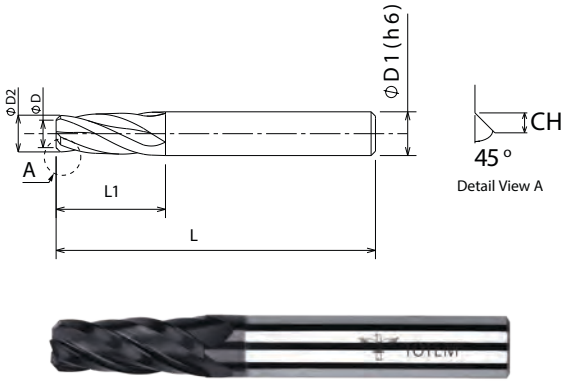
A90S: ANGLE 90 SHORT TOOL



A90L: ANGLE 90 LONG TOOL



CONIC PREPERATION TAPER END MILL



TOOL DESCRIPTION AND NOMENCLATURE

TMRHS-2.0ISO-11.9MMX27X84 SH12 4FL TA																							
TM		RHS		2.0		ISO		11.9MM				27				84		12		4FL		TA	
PRODUCT TYPE		DESIGN TYPE		PITCH		THREAD FORM		CUTTING TOOL DIA				CUTTING LENGTH				TOTAL LENGTH		SHANK DIA		NO OF FLUTES		COATING	
CT	CHAMFER TOOL	ST P60	SINGLE TOOTH PARTIAL PROFILE	METRIC	TPI	ISO	ISO THREAD	0.60	2.45	4.75	7.90	1.5	8.0	15.6	25.0	39	73	3	10	2FL	2 FLUTES	TA	TiAlN
TP	TAPER PREPERATION	MT2D	MULTI TOOTH 2D	0.50	32	NPT	NATIONAL PIPE THREAD	0.72	2.46	4.80	7.95	1.8	8.1	15.8	25.5	51	83	4	12	3FL	3 FLUTES		
TM	THREAD MILL	MT3D	MULTI TOOTH 3D	0.75	28	UN	UNIFIED THREAD	0.90	2.50	4.85	8.00	2.0	8.4	16.0	26.0	57	84	6	16	4FL	4 FLUTES		
		MT4D	MULTI TOOTH 4D	0.80	24	NPTF	NATIONAL PIPE THREAD FINE	1.06	2.57	4.90	8.40	2.5	8.6	16.2	26.2	58	93	8	20	5FL	5 FLUTES		
		MTH2D	MULTI TOOTH 2D FOR HARD PART	1.00	20	UNJ	UNIFIED J THREAD	1.18	2.75	5.00	9.20	2.9	8.8	16.4	26.3	63	100			6FL	6 FLUTES		
		MTH3D	MULTI TOOTH 3D FOR HARD PART	1.25	18	MJ	MJ THREAD	1.20	3.10	5.10	9.30	3.0	9.3	16.5	26.4	64	105						
		RHS	REGULAR HELICAL FLUTE SOLID	1.50	16	BSP	BSP THREAD	1.40	3.15	5.20	9.40	3.1	9.8	16.6	27.0								
		RHTS	REGULAR HELICAL FLUTE TAPER SOLID	1.75	14	BSPT	BSPT THREAD	1.44	3.22	5.40	9.90	3.3	9.9	16.7	28.0								
		RHC	REGULAR HELICAL FLUTE COOLANT	2.00	13			1.50	3.30	5.70	9.95	3.8	10.0	17.3	28.5								
		RHTC	REGULAR HELICAL FLUTE TAPER COOLANT	2.50	12			1.54	3.31	5.90	10.00	3.9	10.1	17.5	29.0								
		RSS	REGULAR STRAIGHT FLUTE SOLID	3.00	11			1.63	3.55	5.95	10.60	4.4	10.2	18.0	29.7								
		RSTS	REGULAR STRAIGHT FLUTE TAPER SOLID		10			1.66	3.60	6.00	11.50	4.5	10.3	18.2	30.0								
		A90S	ANGLE 90 SHORT TOOL		9			1.88	3.70	6.40	11.90	4.6	10.4	18.5	31.0								
		A90L	ANGLE 90 LONG TOOL		8			1.95	3.80	6.65	11.95	4.8	10.5	19.0	31.1								
								1.96	3.90	6.70	12.00	4.9	10.6	19.3	32.1								
								2.00	4.00	6.80	14.30	5.0	10.7	19.4	33.0								
								2.10	4.20	6.90	15.90	5.1	10.8	19.5	34.0								
								2.12	4.50	7.70	19.70	5.3	10.9	19.7	35.2								
								2.40	4.70	7.80	19.90	5.4	11.3	20.0	36.0								
												5.8	11.5	20.5	36.3								
												5.9	12.0	20.8	36.8								
												6.0	12.2	21.0	37.0								
												6.1	12.4	21.8	38.1								
												6.2	12.5	22.0	39.1								
												6.4	12.7	22.5	39.7								
												6.8	13.0	22.7	40.4								
												7.1	13.7	23.0	40.5								
												7.3	14.0	23.5	40.9								
												7.4	14.4	24.0	42.0								
												7.6	14.5	24.2	42.8								
												7.7	15.0	24.3	43.0								
												7.8	15.3	24.4	48.0								
												7.9	15.5	24.5									

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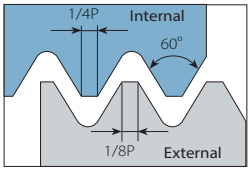
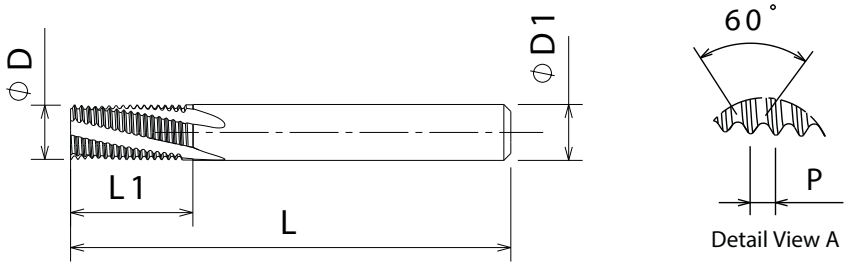
Multi Flute

ISO metric thread
Internal threading



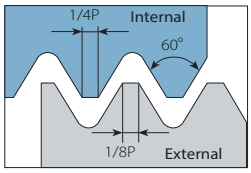
TM RHS M MF IT ISO TiAlN



Thread Size		Pitch mm	Description	D	L1	L	D1	No. of Flutes	EDP No
Coarse	Fine			mm	mm	mm	mm		
	M5	0.5	TMRHS-0.5ISO-3.8MMX10.3X57 SH6 3FL TA	3.8	10.3	57	6	3	FBV0503000
	M7	0.5	TMRHS-0.5ISO-5.9MMX10.2X57 SH6 3FL TA	5.9	10.2	57	6	3	FBV0503001
M4.5	M5	0.75	TMRHS-0.75ISO-3.6MMX10.1X57 SH6 3FL TA	3.6	10.1	57	6	3	FBV0503002
	M8	0.75	TMRHS-0.75ISO-5.9MMX10.8X57 SH6 3FL TA	5.9	10.8	57	6	3	FBV0503003
	M10	0.75	TMRHS-0.75ISO-7.9MMX15.3X63 SH8 4FL TA	7.9	15.3	63	8	4	FBV0503004
M5		0.8	TMRHS-0.8ISO-3.9MMX10X57 SH6 3FL TA	3.9	10	57	6	3	FBV0503005
M6	M7	1	TMRHS-1.0ISO-4.8MMX11.5X57 SH6 3FL TA	4.8	11.5	57	6	3	FBV0503006
M6	M7	1	TMRHS-1.0ISO-4.8MMX14.5X57 SH6 3FL TA	4.8	14.5	57	6	3	FBV0503007
	M8	1	TMRHS-1.0ISO-5.9MMX12.5X57 SH6 3FL TA	5.9	12.5	57	6	3	FBV0503008
	M10	1	TMRHS-1.0ISO-7.9MMX17.5X63 SH8 4FL TA	7.9	17.5	63	8	4	FBV0503009
	M12	1	TMRHS-1.0ISO-9.9MMX20.5X73 SH10 4FL TA	9.9	20.5	73	10	4	FBV0503010
M8	M9	1.25	TMRHS-1.25ISO-5.9MMX14.4X57 SH6 3FL TA	5.9	14.4	57	6	3	FBV0503011
M8	M9	1.25	TMRHS-1.25ISO-5.9MMX19.5X57 SH6 3FL TA	5.9	19.5	57	6	3	FBV0503012
M10	M11	1.5	TMRHS-1.5ISO-7.9MMX18.5X63 SH8 3FL TA	7.9	18.5	63	8	3	FBV0503013
	M13	1.5	TMRHS-1.5ISO-9.9MMX21.8X73 SH10 4FL TA	9.9	21.8	73	10	4	FBV0503014
	M15	1.5	TMRHS-1.5ISO-11.9MMX26.3X84 SH12 4FL TA	11.9	26.3	84	12	4	FBV0503015
	M20	1.5	TMRHS-1.5ISO-15.9MMX35.2X105 SH16 6FL TA	15.9	35.2	105	16	6	FBV0503016
M12		1.75	TMRHS-1.75ISO-9.2MMX21.8X73 SH10 3FL TA	9.2	21.8	73	10	3	FBV0503017
M14		2	TMRHS-2.0ISO-9.9MMX25X73 SH10 3FL TA	9.9	25	73	10	3	FBV0503018
M16		2	TMRHS-2.0ISO-11.9MMX27X84 SH12 4FL TA	11.9	27	84	12	4	FBV0503019
	M20	2	TMRHS-2.0ISO-15.9MMX37X105 SH16 5FL TA	15.9	37	105	16	5	FBV0503020
M20		2.5	TMRHS-2.5ISO-15.9MMX36.3X105 SH16 5FL TA	15.9	36.3	105	16	5	FBV0503021
M24	M27	3	TMRHS-3.0ISO-15.9MMX40.5X105 SH16 3FL TA	15.9	40.5	105	16	3	FBV0503022
M27		3	TMRHS-3.0ISO-19.9MMX43X105 SH20 4FL TA	19.9	43	105	20	4	FBV0503023

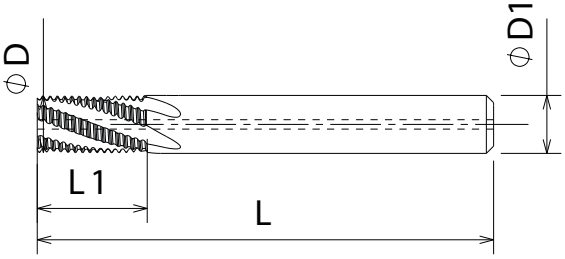
Multi Flute

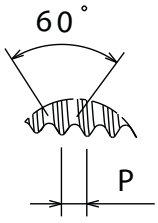
ISO metric thread
Internal threading



TM RHC M MF IT ISO TiAlN

with coolant hole



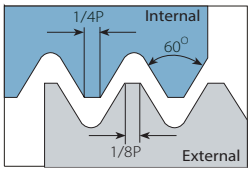


Detail View A

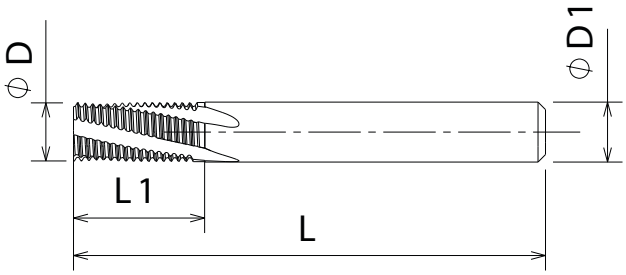
Thread Size		Pitch mm	Description	D	L1	L	D1	No. of Flutes	EDP No
Coarse	Fine			mm	mm	mm	mm		
	M5	0.5	TMRHC-0.5ISO-3.8MMX10.3X57 SH6 3FL TA	3.8	10.3	57	6	3	FBV0503024
	M7	0.5	TMRHC-0.5ISO-5.9MMX10.2X57 SH6 3FL TA	5.9	10.2	57	6	3	FBV0503025
M4.5	M5	0.75	TMRHC-0.75ISO-3.6MMX10.1X57 SH6 3FL TA	3.6	10.1	57	6	3	FBV0503026
	M8	0.75	TMRHC-0.75ISO-5.9MMX10.8X57 SH6 3FL TA	5.9	10.8	57	6	3	FBV0503027
	M10	0.75	TMRHC-0.75ISO-7.9MMX15.3X63 SH8 4FL TA	7.9	15.3	63	8	4	FBV0503028
M5		0.8	TMRHC-0.8ISO-3.9MMX10X57 SH6 3FL TA	3.9	10	57	6	3	FBV0503029
M6	M7	1	TMRHC-1.0ISO-4.8MMX11.5X57 SH6 3FL TA	4.8	11.5	57	6	3	FBV0503030
M6	M7	1	TMRHC-1.0ISO-4.8MMX14.5X57 SH6 3FL TA	4.8	14.5	57	6	3	FBV0503031
	M8	1	TMRHC-1.0ISO-5.9MMX12.5X57 SH6 3FL TA	5.9	12.5	57	6	3	FBV0503032
	M10	1	TMRHC-1.0ISO-7.9MMX17.5X63 SH8 4FL TA	7.9	17.5	63	8	4	FBV0503033
	M12	1	TMRHC-1.0ISO-9.9MMX20.5X73 SH10 4FL TA	9.9	20.5	73	10	4	FBV0503034
M8	M9	1.25	TMRHC-1.25ISO-5.9MMX14.4X57 SH6 3FL TA	5.9	14.4	57	6	3	FBV0503035
M8	M9	1.25	TMRHC-1.25ISO-5.9MMX19.5X57 SH6 3FL TA	5.9	19.5	57	6	3	FBV0503036
M10	M11	1.5	TMRHC-1.5ISO-7.9MMX18.5X63 SH8 3FL TA	7.9	18.5	63	8	3	FBV0503037
	M13	1.5	TMRHC-1.5ISO-9.9MMX21.8X73 SH10 4FL TA	9.9	21.8	73	10	4	FBV0503038
	M15	1.5	TMRHC-1.5ISO-11.9MMX26.3X84 SH12 4FL TA	11.9	26.3	84	12	4	FBV0503039
	M20	1.5	TMRHC-1.5ISO-15.9MMX35.2X105 SH16 6FL TA	15.9	35.2	105	16	6	FBV0503040
M12		1.75	TMRHC-1.75ISO-9.2MMX21.8X73 SH10 3FL TA	9.2	21.8	73	10	3	FBV0503041
M14		2	TMRHC-2.0ISO-9.9MMX25X73 SH10 3FL TA	9.9	25	73	10	3	FBV0503042
M16		2	TMRHC-2.0ISO-11.9MMX27X84 SH12 4FL TA	11.9	27	84	12	4	FBV0503043
	M20	2	TMRHC-2.0ISO-15.9MMX37X105 SH16 5FL TA	15.9	37	105	16	5	FBV0503044
M20		2.5	TMRHC-2.5ISO-15.9MMX36.3X105 SH16 5FL TA	15.9	36.3	105	16	5	FBV0503045
M24	M27	3	TMRHC-3.0ISO-15.9MMX40.5X105 SH16 3FL TA	15.9	40.5	105	16	3	FBV0503046
M27		3	TMRHC-3.0ISO-19.9MMX43X105 SH20 4FL TA	19.9	43	105	20	4	FBV0503047

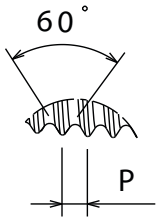
Multi Flute

(UNC, UNF, UNEF) unified thread
Internal threading



TM RHS UNC UNF UNEF IT UNIFIED TiAlN

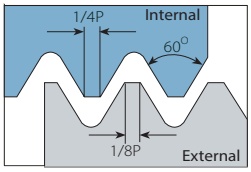




Thread Size			Pitch mm	Description	D	L1	L	D1	No. of Flutes	EDP No
Coarse UNC	Fine UNF	Extra Fine UNEF			mm	mm	mm	mm		
		5/16"	32	TMRHS-32UN-5.9MMX14X57 SH6 3FL TA	5.9	14	57	6	3	FBV0503048
		3/8"	32	TMRHS-32UN-7.9MMX18X63 SH8 3FL TA	7.9	18	63	8	3	FBV0503049
	1/4"		28	TMRHS-28UN-5.1MMX12.2X57 SH6 3FL TA	5.1	12.2	57	6	3	FBV0503050
		7/16"-1/2"	28	TMRHS-28UN-7.9MMX15.8X63 SH8 4FL TA	7.9	15.8	63	8	4	FBV0503051
	5/16"		24	TMRHS-24UN-5.9MMX10.8X57 SH6 3FL TA	5.9	10.8	57	6	3	FBV0503052
	3/8"		24	TMRHS-24UN-7.9MMX15.3X63 SH8 4FL TA	7.9	15.3	63	8	4	FBV0503053
	9/16", 5/8"		24	TMRHS-24UN-11.9MMX22.7X84 SH12 4FL TA	11.9	22.7	84	12	4	FBV0503054
1/4"			20	TMRHS-20UN-4.8MMX12X57 SH6 3FL TA	4.8	12	57	6	3	FBV0503055
	7/16"		20	TMRHS-20UN-7.9MMX19.7X63 SH8 3FL TA	7.9	19.7	63	8	3	FBV0503056
	1/2"		20	TMRHS-20UN-9.9MMX22.5X73 SH10 4FL TA	9.9	22.5	73	10	4	FBV0503057
		3/4"-1"	20	TMRHS-20UN-11.9MMX26X84 SH12 4FL TA	11.9	26	84	12	4	FBV0503058
5/16"			18	TMRHS-18UN-5.7MMX16X57 SH6 3FL TA	5.7	16	57	6	3	FBV0503059
	9/16", 5/8"		18	TMRHS-18UN-9.9MMX23.5X73 SH10 4FL TA	9.9	23.5	73	10	4	FBV0503060
3/8"			16	TMRHS-16UN-6.8MMX18.2X63 SH8 3FL TA	6.8	18.2	63	8	3	FBV0503061
	3/4"		16	TMRHS-16UN-11.9MMX26.2X84 SH12 4FL TA	11.9	26.2	84	12	4	FBV0503062
7/16"			14	TMRHS-14UN-7.8MMX20.8X63 SH8 3FL TA	7.8	20.8	63	8	3	FBV0503063
	7/8"		14	TMRHS-14UN-11.9MMX24.5X84 SH12 4FL TA	11.9	24.5	84	12	4	FBV0503064
1/2"			13	TMRHS-13UN-9.3MMX24.4X73 SH10 3FL TA	9.3	24.4	73	10	3	FBV0503065
9/16"			12	TMRHS-12UN-10.6MMX26.4X84 SH12 4FL TA	10.6	26.4	84	12	4	FBV0503066
	1"		12	TMRHS-12UN-15.9MMX39.1X105 SH16 5FL TA	15.9	39.1	105	16	5	FBV0503067
5/8"			11	TMRHS-11UN-11.5MMX31.1X84 SH12 3FL TA	11.5	31.1	84	12	3	FBV0503068
3/4"			10	TMRHS-10UN-14.3MMX36.8X105 SH16 4FL TA	14.3	36.8	105	16	4	FBV0503069
7/8"			9	TMRHS-9UN-15.9MMX40.9X105 SH16 4FL TA	15.9	40.9	105	16	4	FBV0503070
1"			8	TMRHS-8UN-19.7MMX42.8X105 SH20 4FL TA	19.7	42.8	105	20	4	FBV0503071

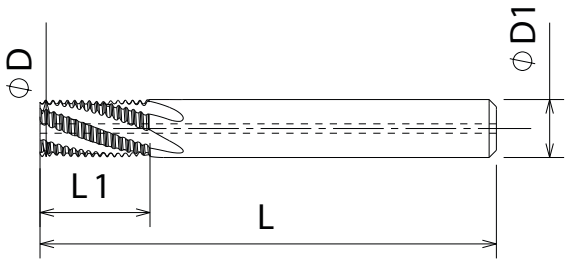
Multi Flute

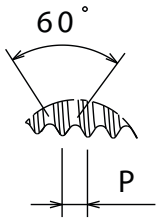
(UNC, UNF, UNEF) unified thread
Internal threading



TM RHC UNC UNF UNEF IT UNIFIED TiAlN

with coolant hole



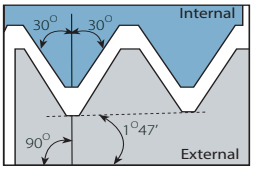


Detail View A

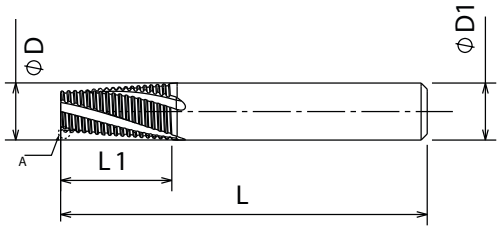
Thread Size			Pitch mm	Description	D	L1	L	D1	No. of Flutes	EDP No
Coarse UNC	Fine UNF	Extra Fine UNEF			mm	mm	mm	mm		
		5/16"	32	TMRHC-32UN-5.9MMX14X57 SH6 3FL TA	5.9	14	57	6	3	FBV0503072
		3/8"	32	TMRHC-32UN-7.9MMX18X63 SH8 3FL TA	7.9	18	63	8	3	FBV0503073
	1/4"		28	TMRHC-28UN-5.1MMX12.2X57 SH6 3FL TA	5.1	12.2	57	6	3	FBV0503074
		7/16"-1/2"	28	TMRHC-28UN-7.9MMX15.8X63 SH8 4FL TA	7.9	15.8	63	8	4	FBV0503075
	5/16"		24	TMRHC-24UN-5.9MMX10.8X57 SH6 3FL TA	5.9	10.8	57	6	3	FBV0503076
	3/8"		24	TMRHC-24UN-7.9MMX15.3X63 SH8 4FL TA	7.9	15.3	63	8	4	FBV0503077
	9/16", 5/8"		24	TMRHC-24UN-11.9MMX22.7X84 SH12 4FL TA	11.9	22.7	84	12	4	FBV0503078
1/4"			20	TMRHC-20UN-4.8MMX12X57 SH6 3FL TA	4.8	12	57	6	3	FBV0503079
	7/16"		20	TMRHC-20UN-7.9MMX19.7X63 SH8 3FL TA	7.9	19.7	63	8	3	FBV0503080
	1/2"		20	TMRHC-20UN-9.9MMX22.5X73 SH10 4FL TA	9.9	22.5	73	10	4	FBV0503081
		3/4"-1"	20	TMRHC-20UN-11.9MMX26X84 SH12 4FL TA	11.9	26	84	12	4	FBV0503082
5/16"			18	TMRHC-18UN-5.7MMX16X57 SH6 3FL TA	5.7	16	57	6	3	FBV0503083
	9/16", 5/8"		18	TMRHC-18UN-9.9MMX23.5X73 SH10 4FL TA	9.9	23.5	73	10	4	FBV0503084
3/8"			16	TMRHC-16UN-6.8MMX18.2X63 SH8 3FL TA	6.8	18.2	63	8	3	FBV0503085
	3/4"		16	TMRHC-16UN-11.9MMX26.2X84 SH12 4FL TA	11.9	26.2	84	12	4	FBV0503086
7/16"			14	TMRHC-14UN-7.8MMX20.8X63 SH8 3FL TA	7.8	20.8	63	8	3	FBV0503087
	7/8"		14	TMRHC-14UN-11.9MMX24.5X84 SH12 4FL TA	11.9	24.5	84	12	4	FBV0503088
1/2"			13	TMRHC-13UN-9.3MMX24.4X73 SH10 3FL TA	9.3	24.4	73	10	3	FBV0503089
9/16"			12	TMRHC-12UN-10.6MMX26.4X84 SH12 4FL TA	10.6	26.4	84	12	4	FBV0503090
	1"		12	TMRHC-12UN-15.9MMX39.1X105 SH16 5FL TA	15.9	39.1	105	16	5	FBV0503091
5/8"			11	TMRHC-11UN-11.5MMX31.1X84 SH12 3FL TA	11.5	31.1	84	12	3	FBV0503092
3/4"			10	TMRHC-10UN-14.3MMX36.8X105 SH16 4FL TA	14.3	36.8	105	16	4	FBV0503093
7/8"			9	TMRHC-9UN-15.9MMX40.9X105 SH16 4FL TA	15.9	40.9	105	16	4	FBV0503094
1"			8	TMRHC-8UN-19.7MMX42.8X105 SH20 4FL TA	19.7	42.8	105	20	4	FBV0503095

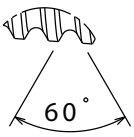
Multi Flute

NPT
Internal/external threading



TM RHTS NPT ET IT NPT TiAlN





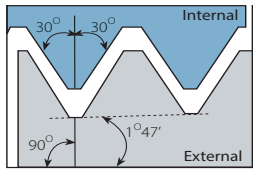
Detail view A

Thread Size	Pitch TPI	Description	D mm	L1 mm	L mm	D1 mm	No. of Flutes	EDP No
1/16"	27	TMRHTS-27NPT-5.9MMX9.8X57 SH6 3FL TA	5.9	9.8	57	6	3	FBV0503096
1/8"	27	TMRHTS-27NPT-7.7MMX10.9X63 SH8 3FL TA	7.7	10.9	63	8	3	FBV0503097
1/4"-3/8"	18	TMRHTS-18NPT-9.9MMX16.4X73 SH10 4FL TA	9.9	16.4	73	10	4	FBV0503098
1/2"	14	TMRHTS-14NPT-11.9MMX20.8X84 SH12 4FL TA	11.9	20.8	84	12	4	FBV0503099
1/2"	14	TMRHTS-14NPT-15.9MMX20.8X93 SH16 4FL TA	15.9	20.8	93	16	4	FBV0503100
1"-2"	11.5	TMRHTS-11.5NPT-19.9X29.7X105 SH20 4F TA	19.9	29.7	105	20	4	FBV0503101
2 1/2"-6"	8	TMRHTS-8NPT-19.9MMX38.1X105 SH20 4FL TA	19.9	38.1	105	20	4	FBV0503102

Defined by: USAS B2.1:1968 I Tolerance class: Standard NPT

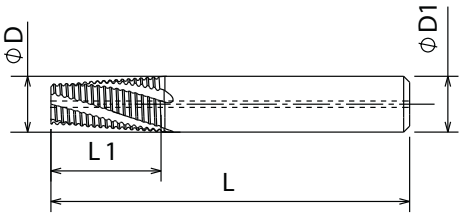
Multi Flute

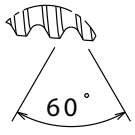
NPT
Internal/external threading



TM RHTC NPT ET IT NPT TiAlN

with coolant hole



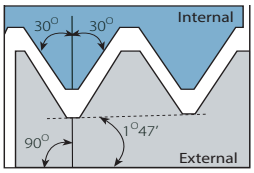


Detail view A

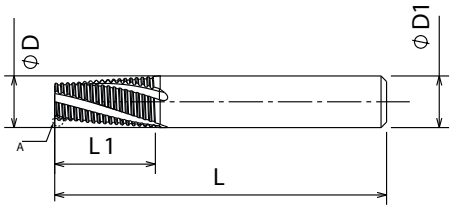
Thread Size	Pitch TPI	Description	D mm	L1 mm	L mm	D1 mm	No. of Flutes	EDP No
1/16"	27	TMRHTC-27NPT-5.9MMX9.8X57 SH6 3FL TA	5.9	9.8	57	6	3	FBV0503103
1/8"	27	TMRHTC-27NPT-7.7MMX10.9X63 SH8 3FL TA	7.7	10.9	63	8	3	FBV0503104
1/4"-3/8"	18	TMRHTC-18NPT-9.9MMX16.4X73 SH10 4FL TA	9.9	16.4	73	10	4	FBV0503105
1/2"	14	TMRHTC-14NPT-11.9MMX20.8X84 SH12 4FL TA	11.9	20.8	84	12	4	FBV0503106
1/2"	14	TMRHTC-14NPT-15.9MMX20.8X93 SH16 4FL TA	15.9	20.8	93	16	4	FBV0503107
1"-2"	11.5	TMRHTC-11.5NPT-19.9X29.7X105 SH20 4F TA	19.9	29.7	105	20	4	FBV0503108
2 1/2"-6"	8	TMRHTC-8NPT-19.9MMX38.1X105 SH20 4FL TA	19.9	38.1	105	20	4	FBV0503109

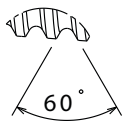
Multi Flute

NPTF
Internal/external threading



TM RHTS NPTF IT ET NPT TiAlN





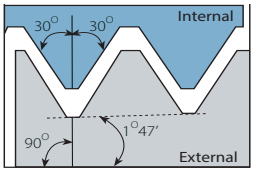
Detail view A

Thread Size	Pitch TPI	Description	D	L1	L	D1	No. of Flutes	EDP No
			mm	mm	mm	mm		
1/16"	27	TMRHTS-27NPTF-5.9MMX9.9X57 SH6 3FL TA	5.9	9.9	57	6	3	FBV0503110
1/8"	27	TMRHTS-27NPTF-7.7MMX10.8X63 SH8 3FL TA	7.7	10.8	63	8	3	FBV0503111
1/4"-3/8"	18	TMRHTS-18NPTF-9.9MMX16.2X73 SH10 4FL TA	9.9	16.2	73	10	4	FBV0503112
1/2"	14	TMRHTS-14NPTF-11.9MMX20.8X84 SH12 4F TA	11.9	20.8	84	12	4	FBV0503113
1"-2"	11.5	TMRHTS-11.5NPTF-19.9MMX29.7X105SH204FTA	19.9	29.7	105	20	4	FBV0503114
2 1/2"-6"	8	TMRHTS-8NPTF-19.9MMX38.1X105 SH20 4F TA	19.9	38.1	105	20	4	FBV0503115

Defined by: ANSI 1.20.3-1976 I Tolerance class: Standard NPTF

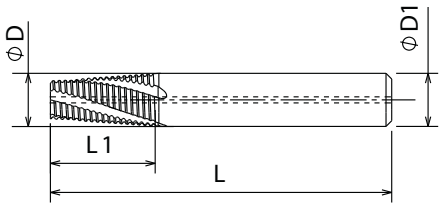
Multi Flute

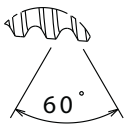
NPTF
Internal/External Threading



TM RHTC NPTF IT ET NPTF TiAlN

with coolant hole





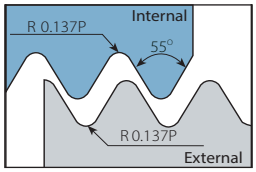
Detail view A

Thread Size	Pitch TPI	Description	D	L1	L	D1	No. of Flutes	EDP No
			mm	mm	mm	mm		
1/16"	27	TMRHTC-27NPTF-5.9MMX9.9X57 SH6 3FL TA	5.9	9.9	57	6	3	FBV0503116
1/8"	27	TMRHTC-27NPTF-7.7MMX10.8X63 SH8 3FL TA	7.7	10.8	63	8	3	FBV0503117
1/4"-3/8"	18	TMRHTC-18NPTF-9.9MMX16.2X73 SH10 4FL TA	9.9	16.2	73	10	4	FBV0503118
1/2"	14	TMRHTC-14NPTF-11.9MMX20.8X84 SH12 4F TA	11.9	20.8	84	12	4	FBV0503119
1"-2"	11.5	TMRHTC-11.5NPTF-19.9MMX29.7X105SH204FTA	19.9	29.7	105	20	4	FBV0503120
2 1/2"-6"	8	TMRHTC-8NPTF-19.9MMX38.1X105 SH20 4F TA	19.9	38.1	105	20	4	FBV0503121

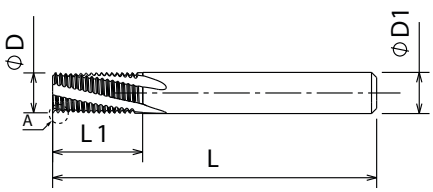
Defined by: B.S.2779:1956 I Tolerance class: Medium class

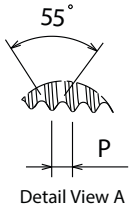
Multi Flute

BSP (G)
Internal/external threading



TM | RHS | BSP | IT | ET | BS | TiAlN





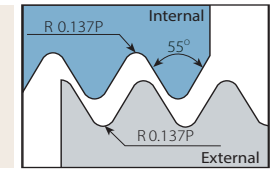
Detail View A

Thread Size	Pitch TPI	Description	D	L1	L	D1	No. of Flutes	EDP No
			mm	mm	mm	mm		
1/16"	28	TMRHS-28BSP-5.9MMX11.3X57 SH6 3FL TA	5.9	11.3	57	6	3	FBV0503122
1/8"	28	TMRHS-28BSP-7.9MMX14X63 SH8 3FL TA	7.9	14.0	63	8	3	FBV0503123
1/4"-3/8"	19	TMRHS-19BSP-9.9MMX16.6X73 SH10 4FL TA	9.9	16.6	73	10	4	FBV0503124
1/2"-7/8"	14	TMRHS-14BSP-11.9MMX22.7X84 SH12 4FL TA	11.9	22.7	84	12	4	FBV0503125
1"-2"	11	TMRHS-11BSP-15.9MMX32.1X105 SH16 4F TA	15.9	32.1	105	16	4	FBV0503126
1"-6"	11	TMRHS-11BSP-19.9MMX40.4X105 SH20 5F TA	19.9	40.4	105	20	5	FBV0503127

Defined by: B.S.2779:1956 I Tolerance class: Medium class

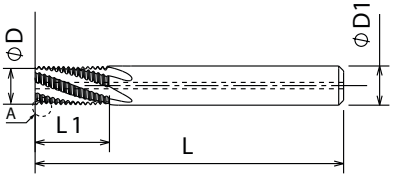
Multi Flute

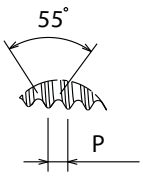
BSP (G)
Internal/external threading



TM | RHC | BSP | IT | ET | BS | TiAlN

with coolant hole





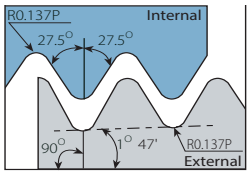
Detail View A

Thread Size	Pitch TPI	Description	D	L1	L	D1	No. of Flutes	EDP No
			mm	mm	mm	mm		
1/16"	28	TMRHC-28BSP-5.9MMX11.3X57 SH6 3FL TA	5.9	11.3	57	6	3	FBV0503128
1/8"	28	TMRHC-28BSP-7.9MMX14X63 SH8 3FL TA	7.9	14.0	63	8	3	FBV0503129
1/4"-3/8"	19	TMRHC-19BSP-9.9MMX16.6X73 SH10 4FL TA	9.9	16.6	73	10	4	FBV0503130
1/2"-7/8"	14	TMRHC-14BSP-11.9MMX22.7X84 SH12 4FL TA	11.9	22.7	84	12	4	FBV0503131
1"-2"	11	TMRHC-11BSP-15.9MMX32.1X105 SH16 4F TA	15.9	32.1	105	16	4	FBV0503132
1"-6"	11	TMRHC-11BSP-19.9MMX40.4X105 SH20 5F TA	19.9	40.4	105	20	5	FBV0503133

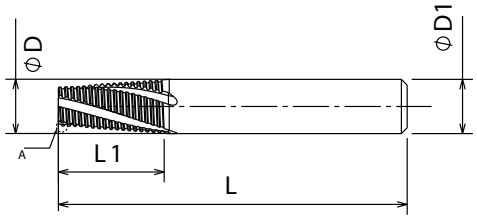
Defined by: B.S.21:1985 I Tolerance class: Tolerance class: Standard BSPT

Multi Flute

BSPT (Rc)
Internal/external threading



TM RHTS BSPT IT ET BS TiAlN



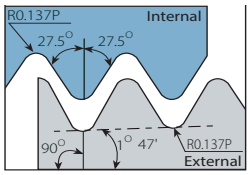
Detail view A

Thread Size	Pitch TPI	Description	D	L1	L	D1	No. of Flutes	EDP No
			mm	mm	mm	mm		
1/16"	28	TMRHTS-28BSPT-5.9MMX11.3X57 SH6 3FL TA	5.9	11.3	57	6	3	FBV0503134
1/8"	28	TMRHTS-28BSPT-7.9MMX14X63 SH8 3FL TA	7.9	14.0	63	8	3	FBV0503135
1/4"-3/8"	19	TMRHTS-19BSPT-9.9MMX16.6X73 SH10 4FL TA	9.9	16.6	73	10	4	FBV0503136
1/2"-7/8"	14	TMRHTS-14BSPT-11.9MMX22.7X84SH12 4FL TA	11.9	22.7	84	12	4	FBV0503137
1"-2"	11	TMRHTS-11BSPT-15.9MMX32.1X105SH16 4F TA	15.9	32.1	105	16	4	FBV0503138
1"-6"	11	TMRHTS-11BSPT-19.9MMX40.4X105SH20 5F TA	19.9	40.4	105	20	5	FBV0503139

Defined by: B.S.21:1985 I Tolerance class: Tolerance class: Standard BSPT

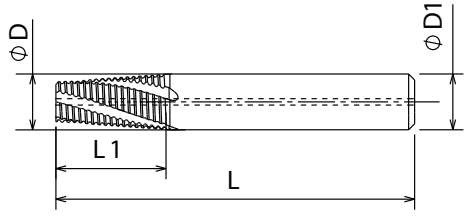
Multi Flute

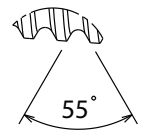
BSPT (Rc)
Internal/external threading



TM RHTC BSPT IT ET BS TiAlN

with coolant hole



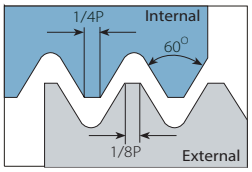


Detail view A

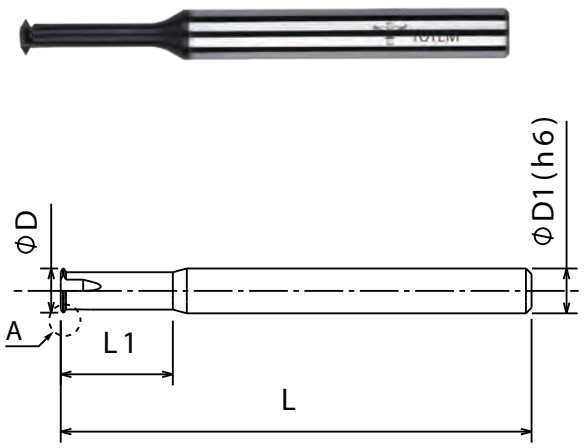
Thread Size	Pitch TPI	Description	D	L1	L	D1	No. of Flutes	EDP No
			mm	mm	mm	mm		
1/16"	28	TMRHTC-28BSPT-5.9MMX11.3X57 SH6 3FL TA	5.9	11.3	57	6	3	FBV0503140
1/8"	28	TMRHTC-28BSPT-7.9MMX14X63 SH8 3FL TA	7.9	14.0	63	8	3	FBV0503141
1/4"-3/8"	19	TMRHTC-19BSPT-9.9MMX16.6X73 SH10 4FL TA	9.9	16.6	73	10	4	FBV0503142
1/2"-7/8"	14	TMRHTC-14BSPT-11.9MMX22.7X84SH12 4FL TA	11.9	22.7	84	12	4	FBV0503143
1"-2"	11	TMRHTC-11BSPT-15.9MMX32.1X105SH16 4F TA	15.9	32.1	105	16	4	FBV0503144
1"-6"	11	TMRHTC-11BSPT-19.9MMX40.4X105SH20 5F TA	19.9	40.4	105	20	5	FBV0503145

Multi Flute

Partial profile 60°
Internal/external threading



TM | STP 60 | UNC | UNF | M | MF | IT | ET | ISO | UNIFIED | TiAlN

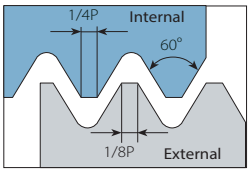


Detail View A

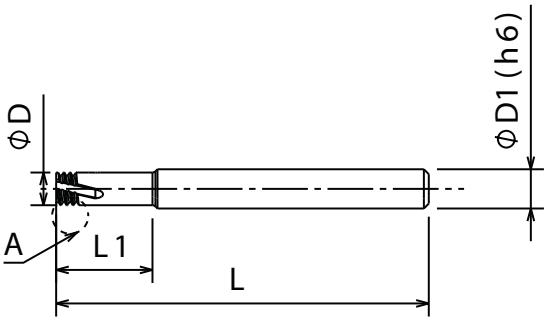
Pitch Range		Description	D	L1	L	D1	No. of Flutes	Minimum Hole Dia	EDP No
mm	TPI		mm	mm	mm	mm			
0.35-0.6	72-40	TMST-P60 1.95MMX6X39 SH3 3FL TA	1.95	6	39	3	3	2.0	FBV0503146
0.5-0.8	48-32	TMST-P60 2.45MMX7.7X39 SH3 3FL TA	2.45	7.7	39	3	3	2.6	FBV0503147
0.5-0.8	48-32	TMST-P60 3.15MMX10X51 SH4 3FL TA	3.15	10	51	4	3	3.3	FBV0503148
0.5-1.0	48-24	TMST-P60 4.00MMX12X51 SH4 3FL TA	4.0	12	51	4	3	4.2	FBV0503149
0.5-1.25	48-20	TMST-P60 4.70MMX15X57 SH6 3FL TA	4.7	15	57	6	3	4.9	FBV0503150
0.5-1.25	48-20	TMST-P60 6.00MMX18X57 SH6 3FL TA	6.0	18	57	6	3	6.3	FBV0503151
0.75-1.5	32-16	TMST-P60 8.00MMX24X63 SH8 3FL TA	8.0	24	63	8	3	8.3	FBV0503152
1.0-2.5	24-10	TMST-P60 10.00MMX30X73 SH10 4FL TA	10.0	30	73	10	4	10.4	FBV0503153
1.0-2.5	24-10	TMST-P60 12.00MMX36X84 SH12 4FL TA	12.0	36	84	12	4	12.5	FBV0503154

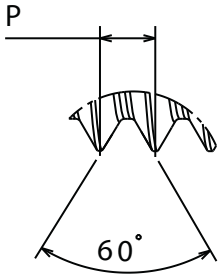
Multi Flute

ISO metric thread
Internal threading upto 2D



TM | MT 2D | M | IT | ISO | TiAlN



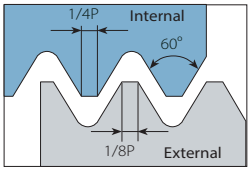


Detail view A

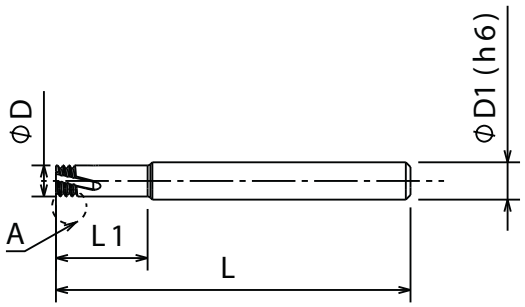
Thread Size	Pitch mm	Description	D mm	L1 mm	L mm	D1 mm	No. of Flutes	EDP No
M1.6	0.35	TMMT2D-0.35-ISO-1.2MMX3.3X39 SH3 3FL TA	1.2	3.3	39	3	3	FBV0503155
M1.6	0.35	TMMT2D-0.35-ISO-1.2MMX3.3X57 SH6 3FL TA	1.2	3.3	57	6	3	FBV0503156
M2	0.4	TMMT2D-0.4-ISO-1.54MMX4.4X39 SH3 3FL TA	1.54	4.4	39	3	3	FBV0503157
M2	0.4	TMMT2D-0.4-ISO-1.54MMX4.4X57 SH6 3FL TA	1.54	4.4	57	6	3	FBV0503158
M2.2	0.45	TMMT2D-0.45-ISO-1.63MMX4.8X39 SH3 3FL TA	1.63	4.8	39	3	3	FBV0503159
M2.5	0.45	TMMT2D-0.45-ISO-1.96MMX5.3X57 SH6 3FL TA	1.96	5.3	57	6	3	FBV0503160
M3	0.5	TMMT2D-0.5-ISO-2.4MMX6.4X57 SH6 3FL TA	2.4	6.4	57	6	3	FBV0503161
M3.5	0.6	TMMT2D-0.6-ISO-2.75MMX7.4X57 SH6 3FL TA	2.75	7.4	57	6	3	FBV0503162
M4	0.7	TMMT2D-0.7-ISO-3.15MMX8.6X57 SH6 3FL TA	3.15	8.6	57	6	3	FBV0503163
M5	0.8	TMMT2D-0.8-ISO-4MMX12D57 SH6 3FL TA	4	12	57	6	3	FBV0503164
M6	1	TMMT2D-1.0-ISO-4.75MMX13X57 SH6 3FL TA	4.75	13	57	6	3	FBV0503165
M8	1.25	TMMT2D-1.25-ISO-5.95MMX17.3X57 SH6 3F TA	5.95	17.3	57	6	3	FBV0503166
M10	1.5	TMMT2D-1.5-ISO-7.90MMX22D63 SH8 3FL TA	7.9	22	63	8	3	FBV0503167
M12	1.75	TMMT2D-1.75-ISO-9.40MMX25.5X73 SH10 3FTA	9.4	25.5	73	10	3	FBV0503168
M14	2	TMMT2D-2.0-ISO-9.95MMX29X73 SH10 3FL TA	9.95	29	73	10	3	FBV0503169
M16	2	TMMT2D-2.0-ISO-11.95MMX33X84 SH12 4FL TA	11.95	33	84	12	4	FBV0503170
M20	2.5	TMMT2D-2.5-ISO-15.90MMX42D105 SH16 5F TA	15.9	42	105	16	5	FBV0503171

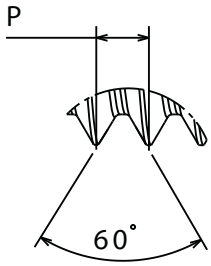
Multi Flute

ISO metric thread
Internal threading upto 3D/4D



TM | MT 3D | MT 4D | M | IT | ISO | TiAlN





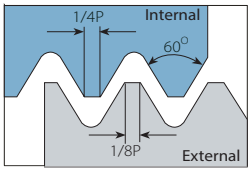
Detail view A

Thread Size	Pitch mm	Description	D mm	L1 mm	L mm	D1 mm	No. of Flutes	EDP No
M0.8	0.20	TMMT3D-0.2-ISO-0.6MMX1.8X39 SH3 3FL TA	0.6	1.8	39	3	3	FBV0503172
M1	0.25	TMMT3D-0.25-ISO-0.72MMX2.9X39 SH3 3FL TA	0.72	2.9	39	3	3	FBV0503173
M1.2	0.25	TMMT3D-0.25-ISO-0.9MMX3X39 SH3 3FL TA	0.9	3	39	3	3	FBV0503174
M1.4	0.30	TMMT3D-0.3-ISO-1.06MMX3.9X39 SH3 3FL TA	1.06	3.9	39	3	3	FBV0503175
M1.6	0.35	TMMT3D-0.35-ISO-1.2MMX5.1X39 SH3 3FL TA	1.2	5.1	39	3	3	FBV0503176
M1.6	0.35	TMMT3D-0.35-ISO-1.2MMX5.1X57 SH6 3FL TA	1.2	5.1	57	6	3	FBV0503177
M2	0.40	TMMT3D-0.4-ISO-1.54MMX6.1X39 SH3 3FL TA	1.54	6.1	39	3	3	FBV0503178
M2	0.40	TMMT3D-0.4-ISO-1.54MMX10X39 SH3 3FL TA	1.54	10	39	3	3	FBV0503179
M2	0.40	TMMT3D-0.4-ISO-1.54MMX6.1X57 SH6 3FL TA	1.54	6.1	57	6	3	FBV0503180
M2	0.40	TMMT4D-0.4-ISO-1.54MMX6.1X100 SH6 3FL TA	1.54	6.1	100	6	3	FBV0503181
M2.5	0.45	TMMT3D-0.45-ISO-1.96MMX7.6X39 SH6 3FL TA	1.96	7.6	39	6	3	FBV0503182
M2.5	0.45	TMMT3D-0.45-ISO-1.96MMX7.6X100 SH6 3F TA	1.96	7.6	100	6	3	FBV0503183
M3	0.50	TMMT3D-0.5-ISO-2.4MMX9.3X57 SH6 3FL TA	2.4	9.3	57	6	3	FBV0503184
M3	0.50	TMMT4D-0.5-ISO-2.4MMX9.3X100 SH6 3FL TA	2.4	9.3	100	6	3	FBV0503185
M3.5	0.60	TMMT3D-0.6-ISO-2.75MMX10.6X57 SH6 3FL TA	2.75	10.6	57	6	3	FBV0503186
M4	0.70	TMMT3D-0.7-ISO-3.15MMX12.4X57 SH6 3FL TA	3.15	12.4	57	6	3	FBV0503187
M4	0.70	TMMT3D-0.7-ISO-3.15MMX16X57 SH6 3FL TA	3.15	16	57	6	3	FBV0503188
M4	0.70	TMMT4D-0.7-ISO-3.15MMX12.4X100 SH6 3F TA	3.15	12.4	100	6	3	FBV0503189
M5	0.80	TMMT3D-0.8-ISO-4MMX15.6X57 SH6 3FL TA	4	15.6	57	6	3	FBV0503190
M5	0.80	TMMT3D-0.8-ISO-4MMX21X57 SH6 3FL TA	4	21	57	6	3	FBV0503191
M5	0.80	TMMT4D-0.8-ISO-4MMX15.6X100 SH6 3FL TA	4	15.6	100	6	3	FBV0503192
M6	1.00	TMMT3D-1.0-ISO-4.75MMX19X57 SH6 3FL TA	4.75	19	57	6	3	FBV0503193
M6	1.00	TMMT4D-1.0-ISO-4.75MMX19X100 SH6 3FL TA	4.75	19	100	6	3	FBV0503194
M6	1.00	TMMT3D-1.0-ISO-4.75MMX24D57 SH6 3FL TA	4.75	24	57	6	3	FBV0503195
M8	1.25	TMMT3D-1.25-ISO-5.95MMX24.3X57 SH6 3F TA	5.95	24.3	57	6	3	FBV0503196
M8	1.25	TMMT4D-1.25-ISO-5.95MMX24.3X100 SH6 3FTA	5.95	24.3	100	6	3	FBV0503197
M10	1.50	TMMT3D-1.5-ISO-7.9MMX31X63 SH8 3FL TA	7.9	31	63	8	3	FBV0503198
M10	1.50	TMMT4D-1.5-ISO-7.90MMX31X100 SH8 3FL TA	7.9	31	100	8	3	FBV0503199
M12	1.75	TMMT3D-1.75-ISO-9.4MMX36X73 SH10 3FL TA	9.4	36	73	10	3	FBV0503200
M16	2.00	TMMT4D-2.0-ISO-11.95MMX48X100 SH12 4F TA	11.95	48	100	12	4	FBV0503201

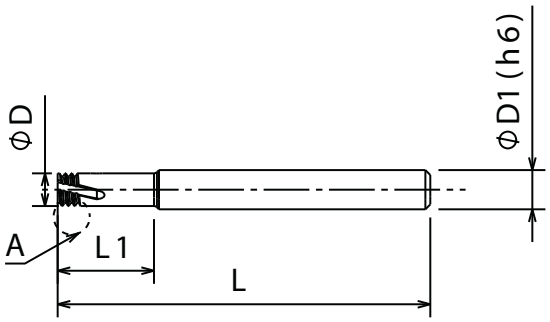
Multi Flute

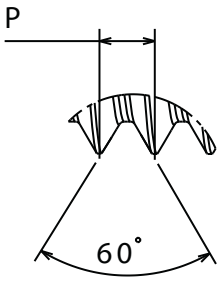
(UNC, UNF) unified thread

Internal threading upto 2D



TM | MT 2D | UNC | UNF | IT | UNIFIED | TiAlN



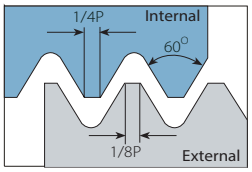


Detail view A

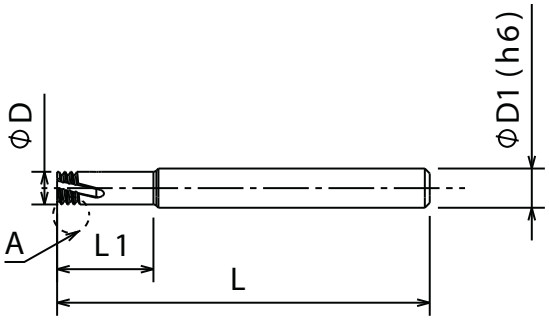
Thread Size		Pitch TPI	Description	D	L1	L	D1	No. of Flutes	EDP No
Coarse	Fine			mm	mm	mm	mm		
	1	72	TMMT2D-72-UN-1.44MMX3.8X39 SH3 3FL TA	1.44	3.8	39	3	3	FBV0503202
1	2	64	TMMT2D-64-UN-1.4MMX3.9X39 SH3 3FL TA	1.40	3.9	39	3	3	FBV0503203
2	3	56	TMMT2D-56-UN-1.66MMX4.6X39 SH3 3FL TA	1.66	4.6	39	3	3	FBV0503204
2	3	56	TMMT2D-56-UN-1.66MMX4.6X57 SH6 3FL TA	1.66	4.6	57	6	3	FBV0503205
3	4	48	TMMT2D-48-UN-1.88MMX5.4X57 SH6 3FL TA	1.88	5.4	57	6	3	FBV0503206
4		40	TMMT2D-40-UN-2.12MMX6.2X57 SH6 3FL TA	2.12	6.2	57	6	3	FBV0503207
5	6	40	TMMT2D-40-UN-2.46MMX7.1X57 SH6 3FL TA	2.46	7.1	57	6	3	FBV0503208
	8	36	TMMT2D-36-UN-3.31MMX8.8X57 SH6 3FL TA	3.31	8.8	57	6	3	FBV0503209
6		32	TMMT2D-32-UN-2.57MMX7.3X57 SH6 3FL TA	2.57	7.3	57	6	3	FBV0503210
8		32	TMMT2D-32-UN-3.22MMX10.1X57 SH6 3FL TA	3.22	10.1	57	6	3	FBV0503211
	10	32	TMMT2D-32-UN-3.7MMX10.5X57 SH6 3FL TA	3.70	10.5	57	6	3	FBV0503212
	12	28	TMMT2D-28-UN-4.2MMX10.9X57 SH6 3FL TA	4.20	10.9	57	6	3	FBV0503213
	1/4"	28	TMMT2D-28-UN-5.2MMX14X57 SH6 3FL TA	5.20	14.0	57	6	3	FBV0503214
10		24	TMMT2D-24-UN-3.55MMX10.4X57 SH6 3FL TA	3.55	10.4	57	6	3	FBV0503215
	5/16"	24	TMMT2D-24-UN-6.65MMX16.7X63 SH8 3FL TA	6.65	16.7	63	8	3	FBV0503216
1/4"	7/16"	20	TMMT2D-20-UN-4.85MMX13.7X57 SH6 3FL TA	4.85	13.7	57	6	3	FBV0503217
	7/16"	20	TMMT2D-20-UN-7.95MMX24X63 SH8 3FL TA	7.95	24.0	63	8	3	FBV0503218
5/16"		18	TMMT2D-18-UN-5.95MMX16.5X57 SH6 3FL TA	5.95	16.5	57	6	3	FBV0503219
	5/8"	18	TMMT2D-18-UN-11.9MMX34X84 SH12 4FL TA	11.90	34.0	84	12	4	FBV0503220
3/8"		16	TMMT2D-16-UN-6.9MMX21X63 SH8 3FL TA	6.90	21.0	63	8	3	FBV0503221
7/16"		14	TMMT2D-14-UN-7.95MMX23.5X63 SH8 3FL TA	7.95	23.5	63	8	3	FBV0503222
1/2"		13	TMMT2D-13-UN-9.3MMX27X73 SH10 3FL TA	9.30	27.0	73	10	3	FBV0503223
9/16"		12	TMMT2D-12-UN-9.95MMX29X63 SH10 3FL TA	9.95	29.0	63	10	3	FBV0503224
5/8"		11	TMMT2D-11-UN-11.5MMX33X84 SH12 3FL TA	11.50	33.0	84	12	3	FBV0503225

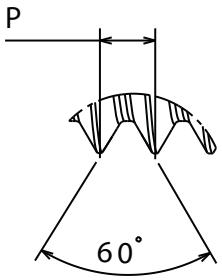
3 Flute

(UNC, UNF) unified thread
Internal threading upto 3D/4D



TM | MT 3D | MT 4D | UNC | UNF | IT | UNIFIED | TiAlN



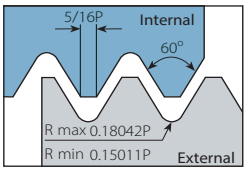


Detail view A

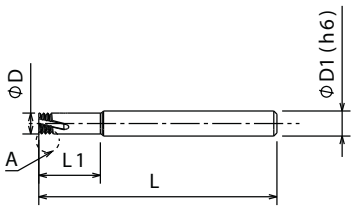
Thread Size		Pitch TPI	Description	D	L1	L	D1	No. of Flutes	EDP No
Coarse	Fine			mm	mm	mm	mm		
	0	80	TMMT3D-80-UN-1.18MMX3.9X39 SH3 3FL TA	1.18	3.9	39	3	3	FBV0503226
	1	72	TMMT3D-72-UN-1.44MMX5.8X39 SH3 3FL TA	1.44	5.8	39	3	3	FBV0503227
	1	72	TMMT3D-72-UN-1.44MMX5.8X57 SH6 3FL TA	1.44	5.8	57	6	3	FBV0503228
2	3	56	TMMT3D-56-UN-1.66MMX6.8X39 SH3 3FL TA	1.66	6.8	39	3	3	FBV0503229
2	3	56	TMMT4D-56-UN-1.66MMX6.8X57 SH6 3FL TA	1.66	6.8	57	6	3	FBV0503230
2	3	56	TMMT3D-56-UN-1.66MMX6.8X100 SH6 3FL TA	1.66	6.8	100	6	3	FBV0503231
4		40	TMMT4D-40-UN-2.12MMX8.1X57 SH6 3FL TA	2.12	8.1	57	6	3	FBV0503232
4		40	TMMT3D-40-UN-2.12MMX8.1X100 SH6 3FL TA	2.12	8.1	100	6	3	FBV0503233
5		40	TMMT3D-40-UN-2.46MMX9.8X57 SH6 3FL TA	2.46	9.8	57	6	3	FBV0503234
6	6	32	TMMT3D-32-UN-2.57MMX10.7X57 SH6 3FL TA	2.57	10.7	57	6	3	FBV0503235
6		32	TMMT4D-32-UN-2.57MMX10.7X100 SH6 3FL TA	2.57	10.7	100	6	3	FBV0503236
8		32	TMMT3D-32-UN-3.22MMX12.7X57 SH6 3FL TA	3.22	12.7	57	6	3	FBV0503237
	10	32	TMMT3D-32-UN-3.7MMX15.5X57 SH6 3FL TA	3.70	15.5	57	6	3	FBV0503238
	10	32	TMMT4D-32-UN-3.7MMX15.5X100 SH6 3FL TA	3.70	15.5	100	6	3	FBV0503239
	12	28	TMMT3D-28-UN-4.2MMX16X57 SH6 3FL TA	4.20	16.0	57	6	3	FBV0503240
	1/4"	28	TMMT3D-28-UN-5.2MMX19.3X57 SH6 3FL TA	5.20	19.3	57	6	3	FBV0503241
	1/4"	28	TMMT4D-28-UN-5.2MMX19.3X100 SH6 3FL TA	5.20	19.3	100	6	3	FBV0503242
	5/16"	24	TMMT3D-24-UN-6.65MMX24.2X63 SH8 3FL TA	6.65	24.2	63	8	3	FBV0503243
1/4"	7/16"	20	TMMT3D-20-UN-4.85MMX19.4X57 SH6 3FL TA	4.85	19.4	57	6	3	FBV0503244
1/4"	7/16"	20	TMMT4D-20-UN-4.85MMX19.4X100 SH6 3FL TA	4.85	19.4	100	6	3	FBV0503245
5/16"		18	TMMT3D-18-UN-5.9MMX23X57 SH6 3FL TA	5.90	23.0	57	6	3	FBV0503246
3/8"		16	TMMT3D-16-UN-6.9MMX28.5X63 SH8 3FL TA	6.90	28.5	63	8	3	FBV0503247

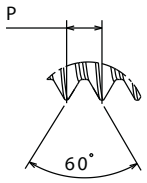
3 Flute

(UNJ) unified thread
Internal threading upto 3D



TM | MT 3D | UNJ | UNJF | IT | UNIFIED | TiAlN



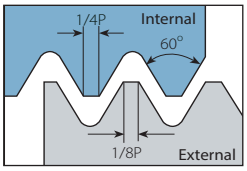


Detail view A

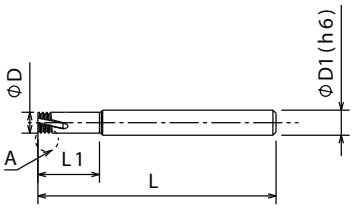
Thread Size		Pitch mm	Description	D	L1	L	D1	No. of Flutes	EDP No
Coarse	Fine			mm	mm	mm	mm		
4	6	40	TMMT3D-40-UNJ-2.1MMX8X57 SH6 3FL TA	2.1	8	57	6	3	FBV0503248
8	10	32	TMMT3D-32-UNJ-3.3MMX13X57 SH6 3FL TA	3.3	12	57	6	3	FBV0503249
	1/4"	28	TMMT3D-28-UNJ-5.4MMX19X57 SH6 3FL TA	5.4	19	57	6	3	FBV0503250
	5/16", 3/8"	24	TMMT3D-24-UNJ-6.7MMX24X63 SH8 3FL TA	6.7	24	63	8	3	FBV0503251
1/4"		20	TMMT3D-20-UNJ-5MMX19X63 SH6 3FL TA	5	19	63	6	3	FBV0503252
	7/16"	20	TMMT3D-20-UNJ-7.9MMX28X63 SH8 3FL TA	7.9	28	63	8	3	FBV0503253
5/16"		18	TMMT3D-18-UNJ-6.4MMX24X63 SH8 3FL TA	6.4	24	63	8	3	FBV0503254
3/8"		16	TMMT3D-16-UNJ-6.9MMX24X63 SH8 3FL TA	6.9	24	63	8	3	FBV0503255
7/16"		14	TMMT3D-14-UNJ-7.9MMX26X63 SH8 3FL TA	7.9	26	63	8	3	FBV0503256
1/2"		13	TMMT3D-13-UNJ-9.9MMX28X73 SH10 3FL TA	9.9	28	73	10	3	FBV0503257

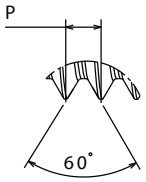
Multi Flute

(MJ) ISO Thread
Internal Threading upto 3D



TM | MT 3D | MJ | IT | MJ | TiAlN



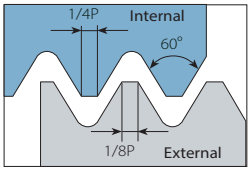


Detail view A

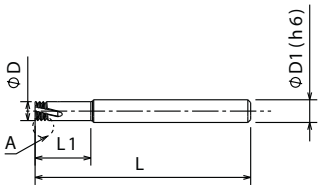
Thread Size	Pitch mm	Description	D	L1	L	D1	No. of Flutes	EDP No
			mm	mm	mm	mm		
MJ4.0	0.70	TMMT3D-0.7-MJ-3.2MMX13X57 SH6 3FL TA	3.2	12	57	6	3	FBV0503258
MJ5.0	0.80	TMMT3D-0.8-MJ-4MMX15X57 SH6 3FL TA	4	15	57	6	3	FBV0503259
MJ6.0	1.00	TMMT3D-1.0-MJ-4.8MMX18X57 SH6 3FL TA	4.8	18	57	6	3	FBV0503260
MJ8.0	1.25	TMMT3D-1.25-MJ-6.5MMX24X63 SH8 3FL TA	6.5	24	63	8	3	FBV0503261
MJ10.0	1.50	TMMT3D-1.5-MJ-7.9MMX31X63 SH8 3FL TA	7.9	31	63	8	3	FBV0503262
MJ12.0	1.75	TMMT3D-1.75-MJ-9.4MMX31X73 SH10 3FL TA	9.4	31	73	10	3	FBV0503263
MJ14.0 , MJ16.0	2.00	TMMT3D-2.0-MJ-9.9MMX36X73 SH10 3FL TA	9.9	36	73	10	3	FBV0503264

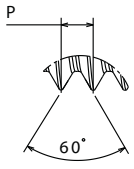
3 Flute

ISO metric thread
Internal threading for hard materials upto 2D



TM | MTH 2D | 62 HRc | M | IT | ISO | TiAlN





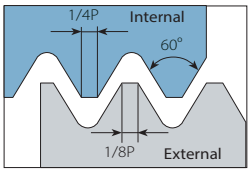
Detail view A

Thread Size	Pitch mm	Description	D mm	L1 mm	L mm	D1 mm	No. of Flutes	EDP No
M1.6	0.35	TMMTH2D-0.35-ISO-1.2MMX3.3X57 SH6 3FL TA	1.2	3.3	57	6	3	FBV0503265
M2	0.40	TMMTH2D-0.4-ISO-1.54MMX4.4X57 SH6 3FL TA	1.54	4.4	57	6	3	FBV0503266
M2.2	0.45	TMMTH2D-0.45-ISO-1.63MMX4.8X57 SH6 3FL TA	1.63	4.8	57	6	3	FBV0503267
M2.5	0.45	TMMTH2D-0.45-ISO-1.96MMX5.3X57 SH6 3FL TA	1.96	5.3	57	6	3	FBV0503268
M3	0.50	TMMTH2D-0.5-ISO-2.4MMX6.4X57 SH6 3FL TA	2.4	6.4	57	6	3	FBV0503269
M3.5	0.60	TMMTH2D-0.6-ISO-2.75MMX7.4X57 SH6 3FL TA	2.75	7.4	57	6	3	FBV0503270
M4	0.70	TMMTH2D-0.7-ISO-3.15MMX8.6X57 SH6 3FL TA	3.15	8.6	57	6	3	FBV0503271
M5	0.80	TMMTH2D-0.8-ISO-4MMX12X57 SH6 3FL TA	4	12	57	6	3	FBV0503272
M6	1.00	TMMTH2D-1-ISO-4.75MMX13X57 SH6 3FL TA	4.75	13	57	6	3	FBV0503273
M8	1.25	TMMTH2D-1.25-ISO-5.95MMX17.3X57 SH6 3FL TA	5.95	17.3	57	6	3	FBV0503274
M10	1.50	TMMTH2D-1.5-ISO-7.9MMX22X63 SH8 3FL TA	7.9	22	63	8	3	FBV0503275

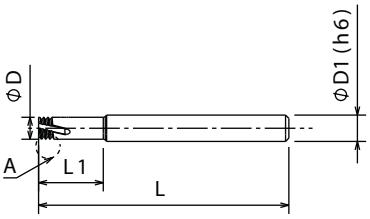
Defined by: R262 (DIN 13) I Tolerance class: 6H

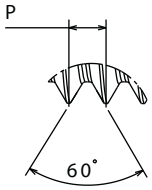
Multi Flute

ISO metric thread
Internal threading for hard materials upto 3D



TM | MTH 3D | 62 HRc | M | IT | ISO | TiAlN





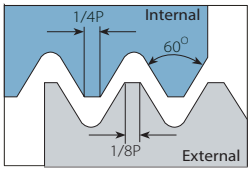
Detail view A

Thread Size	Pitch mm	Description	D mm	L1 mm	L mm	D1 mm	No. of Flutes	EDP No
M1.6	0.35	TMMTH3D-0.35-ISO-1.2MMX5.1X57 SH6 3FL TA	1.2	5.1	57	6	3	FBV0503276
M2	0.4	TMMTH3D-0.4-ISO-1.54MMX6.1X57 SH6 3FL TA	1.54	6.1	57	6	3	FBV0503277
M2.2	0.45	TMMTH3D-0.45-ISO-1.96MMX7.6X57 SH6 3FL TA	1.96	7.6	57	6	3	FBV0503278
M3	0.5	TMMTH3D-0.5-ISO-2.4MMX9.3X57 SH6 3FL TA	2.4	9.3	57	6	3	FBV0503279
M4	0.7	TMMTH3D-0.7-ISO-3.15MMX12.4X57 SH6 3FL TA	3.15	12.4	57	6	3	FBV0503280
M5	0.8	TMMTH3D-0.8-ISO-4MMX15.6X57 SH6 3FL TA	4	15.6	57	6	3	FBV0503281
M6	1	TMMTH3D-1-ISO-4.75MMX19X57 SH6 3FL TA	4.75	19	57	6	3	FBV0503282
M8	1.25	TMMTH3D-1.25-ISO-5.95MMX24.3X57 SH6 3FL TA	5.95	24.3	57	6	3	FBV0503283

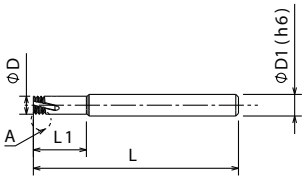
3 Flute

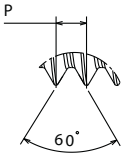
(UN, UNF) unified thread

Internal threading for hard materials upto 2D



TM | MTH 2D | UNC | UNF | 62 HRc | IT | UNIFIED | TiAlN





Detail view A

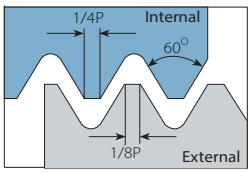
Thread Size		Pitch mm	Description	D	L1	L	D1	No. of Flutes	EDP No
Coarse	Fine			mm	mm	mm	mm		
	1	72	TMMTH2D-72-UN-1.44MMX3.8X57 SH6 3FL TA	1.44	3.8	57	6	3	FBV0503284
1	2	64	TMMTH2D-64-UN-1.4MMX3.9X57 SH6 3FL TA	1.4	3.9	57	6	3	FBV0503285
2	3	56	TMMTH2D-56-UN-1.66MMX4.6X57 SH6 3FL TA	1.66	4.6	57	6	3	FBV0503286
3	4	48	TMMTH2D-48-UN-1.88MMX5.4X57 SH6 3FL TA	1.88	5.4	57	6	3	FBV0503287
4		40	TMMTH2D-40-UN-2.12MMX6.2X57 SH6 3FL TA	2.12	6.2	57	6	3	FBV0503288
5	6	40	TMMTH2D-40-UN-2.46MMX7.1X57 SH6 3FL TA	2.46	7.1	57	6	3	FBV0503289
	8	36	TMMTH2D-36-UN-3.31MMX8.8X57 SH6 3FL TA	3.31	8.8	57	6	3	FBV0503290
6		32	TMMTH2D-32-UN-2.57MMX7.8X57 SH6 3FL TA	2.57	7.8	57	6	3	FBV0503291
8	10	32	TMMTH2D-32-UN-3.22MMX10.3X57 SH6 3FL TA	3.22	10.3	57	6	3	FBV0503292
	1/4"	28	TMMTH2D-28-UN-5.2MMX14X57 SH6 3FL TA	5.2	14	57	6	3	FBV0503293
10		24	TMMTH2D-24-UN-3.55MMX10.4X57 SH6 3FL TA	3.55	10.4	57	6	3	FBV0503294
	5/16"	24	TMMTH2D-24-UN-6.65MMX16.7X64 SH8 3FL TA	6.65	16.7	64	8	3	FBV0503295
1/4"	7/16"	20	TMMTH2D-20-UN-4.85MMX13.7X57 SH6 3FL TA	4.85	13.7	57	6	3	FBV0503296
	7/16"	20	TMMTH2D-20-UN-7.95MMX24X64 SH8 3FL TA	7.95	24	64	8	3	FBV0503297
5/16"		18	TMMTH2D-18-UN-5.95MMX16.5X57 SH6 3FL TA	5.95	16.5	57	6	3	FBV0503298
3/8"		16	TMMTH2D-16-UN-6.9MMX20X63 SH8 3FL TA	6.9	20	63	8	3	FBV0503299
7/16"		14	TMMTH2D-14-UN-7.95MMX23.5X63 SH8 3FL TA	7.95	23.5	63	8	3	FBV0503300

Defined by: ANSI B1.1:74 I Tolerance class: 2B

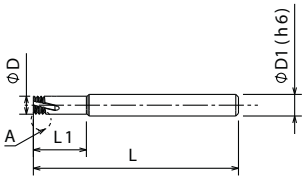
3 Flute

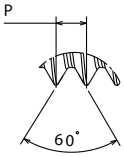
(UN, UNF) Unified Thread

Internal Threading For Hard Materials upto 3D



TM | MTH 3D | UNC | UNF | 62 HRc | IT | UNIFIED | TiAlN



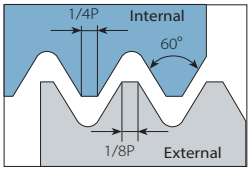


Detail view A

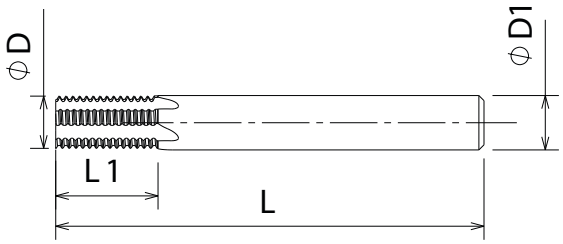
Thread Size		Pitch mm	Description	D	L1	L	D1	No. of Flutes	EDP No
Coarse	Fine			mm	mm	mm	mm		
	1	72	TMMTH3D-72-UN-1.44MMX5.8X57 SH6 3FL TA	1.44	5.8	57	6	3	FBV0503301
5	6	40	TMMTH3D-40-UN-2.46MMX9.8X57 SH6 3FL TA	2.46	9.8	57	6	3	FBV0503302
8	10	32	TMMTH3D-32-UN-3.22MMX12.7X57 SH6 3FL TA	3.22	12.7	57	6	3	FBV0503303
	1/4"	28	TMMTH3D-28-UN-5.2MMX19.3X57 SH6 3FL TA	5.2	19.3	57	6	3	FBV0503304
	5/16"	24	TMMTH3D-24-UN-6.65MMX24.2X63 SH8 3FL TA	6.65	24.2	63	8	3	FBV0503305
1/4"	7/16"	20	TMMTH3D-20-UN-4.85MMX19.4X57 SH6 3FL TA	4.85	19.4	57	6	3	FBV0503306

Multi Flute

ISO metric thread
Internal threading



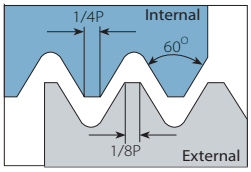
TM RSS M MF IT ISO TiAlN



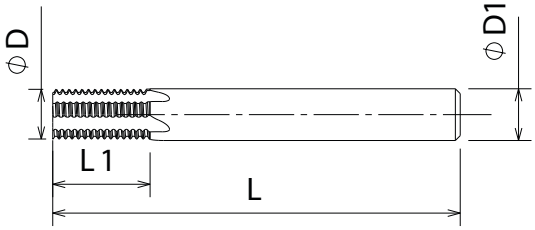
Thread Size		Pitch mm	Description	D	L1	L	D1	No. of Flutes	EDP No
Coarse	Fine			mm	mm	mm	mm		
	M8	0.75	TMRSS-0.75-ISO-5.9MMX10.8X57 SH6 3FL TA	5.9	10.8	57	6	3	FBV0503307
M5		0.80	TMRSS-0.8-ISO-3.9MMX10X57 SH6 3FL TA	3.9	10	57	6	3	FBV0503308
M6	M7	1.00	TMRSS-1-ISO-4.8MMX11.5X57 SH6 3FL TA	4.8	11.5	57	6	3	FBV0503309
	M10	1.00	TMRSS-1-ISO-7.9MMX17.5X63 SH8 4FL TA	7.9	17.5	63	8	4	FBV0503310
	M12	1.00	TMRSS-1-ISO-9.9MMX20.5X73 SH10 4FL TA	9.9	20.5	73	10	4	FBV0503311
M8	M9	1.25	TMRSS-1.25-ISO-5.9MMX14.4X57 SH6 3FL TA	5.9	14.4	57	6	3	FBV0503312
M10	M11	1.50	TMRSS-1.5-ISO-7.9MMX18.5X63 SH8 3FL TA	7.9	18.5	63	8	3	FBV0503313
	M13	1.50	TMRSS-1.5-ISO-9.9MMX21.8X73 SH10 4FL TA	9.9	21.8	73	10	4	FBV0503314
	M15	1.50	TMRSS-1.5-ISO-11.9MMX26.3X84 SH12 4FL TA	11.9	26.3	84	12	4	FBV0503315
M12		1.75	TMRSS-1.75-ISO-7.9MMX18X64 SH8 3FL TA	7.9	18	64	8	3	FBV0503316
M14		2.00	TMRSS-2-ISO-9.9MMX25X73 SH10 3FL TA	9.9	25	73	10	3	FBV0503317
M16		2.00	TMRSS-2-ISO-11.9MMX27X84 SH12 4FL TA	11.9	27	84	12	4	FBV0503318
M20		2.50	TMRSS-2.5-ISO-11.9MMX30X84 SH12 4FL TA	11.9	30	84	12	4	FBV0503319
M24	M27	3.00	TMRSS-3-ISO-11.5MMX40.5X105 SH16 4FL TA	11.5	40.5	105	16	4	FBV0503320

Multi Flute

(UNC, UNF, UNEF) unified thread
Internal threading



TM RSS UNC UNF UNEF IT UNIFIED TiAlN

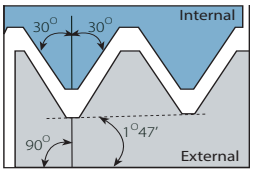


Thread Size			Pitch TPI	Description	D	L1	L	D1	No. of Flutes	EDP No
Coarse UNC	Fine UNF	Extra Fine UNEF			mm	mm	mm	mm		
		5/16"	32	TMRSS-32-UN-5.9MMX14X57 SH6 3FL TA	5.9	14	57	6	3	FBV0503321
	1/4"		28	TMRSS-28-UN-5.1MMX12.2X57 SH6 3FL TA	5.1	12.2	57	6	3	FBV0503322
		7/16"-1/2"	28	TMRSS-28-UN-7.9MMX15.8X63 SH8 4FL TA	7.9	15.8	63	8	4	FBV0503323
	5/16"		24	TMRSS-24-UN-5.9MMX10.8X57 SH6 3FL TA	5.9	10.8	57	6	3	FBV0503324
1/4"			20	TMRSS-20-UN-4.8MMX12X57 SH6 3FL TA	4.8	12	57	6	3	FBV0503325
	7/16"		20	TMRSS-20-UN-7.9MMX19.7X63 SH8 3FL TA	7.9	19.7	63	8	3	FBV0503326
	1/2"		20	TMRSS-20-UN-9.9MMX17.5X73 SH10 4FL TA	9.9	17.5	73	10	4	FBV0503327
5/16"			18	TMRSS-18-UN-5.7MMX16X57 SH6 3FL TA	5.7	16	57	6	3	FBV0503328
	9/16"-5/8"		18	TMRSS-18-UN-7.9MMX18.5X63 SH8 3FL TA	7.9	18.5	63	8	3	FBV0503329
3/8"			16	TMRSS-16-UN-6.8MMX18.2X63 SH8 3FL TA	6.8	18.2	63	8	3	FBV0503330
	3/4"		16	TMRSS-16-UN-11.9MMX26.2X84 SH12 4FL TA	11.9	26.2	84	12	4	FBV0503331
7/16"			14	TMRSS-14-UN-7.8MMX20.8X63 SH8 3FL TA	7.8	20.8	63	8	3	FBV0503332
	7/8"		14	TMRSS-14-UN-11.9MMX24.5X84 SH12 4FL TA	11.9	24.5	84	12	4	FBV0503333
1/2"			13	TMRSS-13-UN-9.3MMX24.4X73 SH10 3FL TA	9.3	24.4	73	10	3	FBV0503334
9/16"			12	TMRSS-12-UN-10.6MMX26.4X84 SH12 4FL TA	10.6	26.4	84	12	4	FBV0503335
	1"		12	TMRSS-12-UN-15.9MMX39.1X105 SH16 5FL TA	15.9	39.1	105	16	5	FBV0503336
5/8"			11	TMRSS-11-UN-11.5MMX31.1X84 SH12 4FL TA	11.5	31.1	84	12	4	FBV0503337
3/4"			10	TMRSS-10-UN-14.3MMX36.8X105 SH16 4FL TA	14.3	36.8	105	16	4	FBV0503338
7/8"			9	TMRSS-9-UN-15.9MMX40.9X105 SH16 4FL TA	15.9	40.9	105	16	4	FBV0503339
1"			8	TMRSS-8-UN-19.7MMX39.7X105 SH20 4FL TA	19.7	39.7	105	20	4	FBV0503340

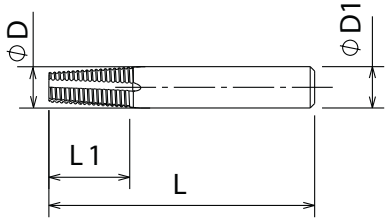
Defined by: USAS B2.1:1968 I Tolerance class: Standard NPT

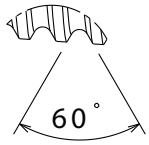
Multi Flute

NPT
Internal/external threading



TM RSTS NPT IT ET NPT TiAlN





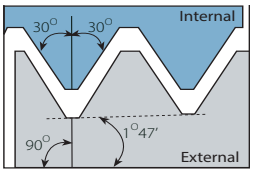
Detail view A

Thread Size	Pitch TPI	Description	D mm	L1 mm	L mm	D1 mm	No. of Flutes	EDP No
1/16"-1/8"	27	TMRSTS-27-NPT-5.9MMX9.8X57 SH6 3FL TA	5.9	9.8	57	6	3	FBV0503341
1/4"-3/8"	18	TMRSTS-18-NPT-9.9MMX16.2X73 SH10 4FL TA	9.9	16.2	73	10	4	FBV0503342
1/2"	14	TMRSTS-14-NPT-11.9MMX20.8X83 SH12 4FL TA	11.9	20.8	83	12	4	FBV0503343
1"-2"	11.5	TMRSTS-11.5-NPT-19.9MMX29.7X105 SH20 4FL TA	19.9	29.7	105	20	4	FBV0503344
2 1/2"-6"	8	TMRSTS-8-NPT-19.9MMX38.1X105 SH20 4FL TA	19.9	38.1	105	20	4	FBV0503345

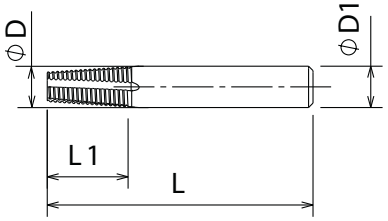
Defined by: USAS B2.1:1968 I Tolerance class: Standard NPT

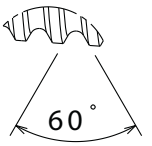
Multi Flute

NPTF
Internal/external threading



TM RSTS NPTF IT ET NPTF TiAlN





Detail view A

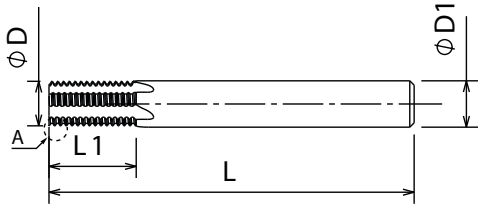
Thread Size	Pitch TPI	Description	D mm	L1 mm	L mm	D1 mm	No. of Flutes	EDP No
1/16"-1/8"	27	TMRSTS-27-NPTF-5.9MMX9.9X57 SH6 3FL TA	5.9	9.9	57	6	3	FBV0503346
1/4"-3/8"	18	TMRSTS-18-NPTF-9.9MMX16.2X73 SH10 4FL TA	9.9	16.2	73	10	4	FBV0503347
1/2"	14	TMRSTS-14-NPTF-11.9MMX20.8X83 SH12 4FL TA	11.9	20.8	83	12	4	FBV0503348
1"-2"	11.5	TMRSTS-11.5-NPTF-19.9MMX29.7X105SH20 4FTA	19.9	29.7	105	20	4	FBV0503349
2 1/2"-6"	8	TMRSTS-8-NPTF-19.9MMX38.1X105 SH20 4FL TA	19.9	38.1	105	20	4	FBV0503350

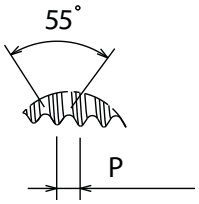
THREAD MILL

Multi Flute

BSP (G)
Internal/external threading

TM RSS BSP ET IT BS TiAlN





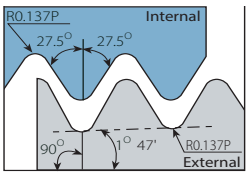
Detail View A

Thread Size	Pitch TPI	Description	D	L1	L	D1	No. of Flutes	EDP No
			mm	mm	mm	mm		
1/16"-1/8"	28	TMRSS-28-BSP-5.9MMX11.3X57 SH6 3FL TA	5.9	11.3	57	6	3	FBV0503351
1/4"-3/8"	19	TMRSS-19-BSP-9.9MMX16.6X73 SH10 4FL TA	9.9	16.6	73	10	4	FBV0503352
1/2"-7/8"	14	TMRSS-14-BSP-11.9MMX22.7X83 SH12 4FL TA	11.9	22.7	83	12	4	FBV0503353
1"-2"	11	TMRSS-11-BSP-15.9MMX32.1X105 SH16 4FL TA	15.9	32.1	105	16	4	FBV0503354

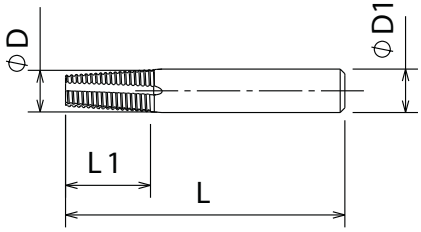
Defined by: B.S.21:1985 I Tolerance class: Tolerance class: Standard BSPT

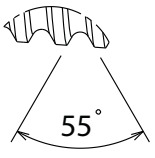
Multi Flute

BSPT (Rc)
Internal/external threading



TM RSTS BSP ET IT BS TiAlN



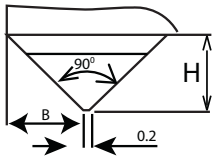


Detail view A

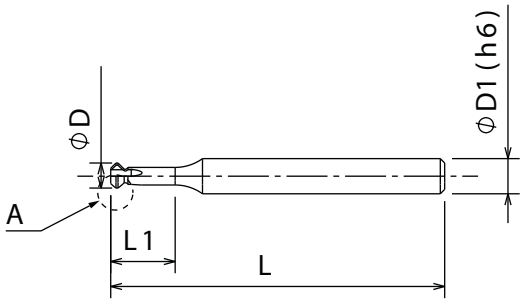
Thread Size	Pitch TPI	Description	D	L1	L	D1	No. of Flutes	EDP No
			mm	mm	mm	mm		
1/16"-1/8"	28	TMRSTS-28-BSPT-5.9MMX11.3X57 SH6 3FL TA	5.9	11.3	57	6	3	FBV0503355
1/4"-3/8"	19	TMRSTS-19-BSPT-9.9MMX16.6X73 SH10 4FL TA	9.9	16.6	73	10	4	FBV0503356
1/2"-7/8"	14	TMRSTS-14-BSPT-11.9MMX22.7X83 SH12 4FL TA	11.9	22.7	83	12	4	FBV0503357
1"-2"	11	TMRSTS-11-BSPT-15.9MMX32.1X105 SH16 4FL TA	15.9	32.1	105	16	4	FBV0503358

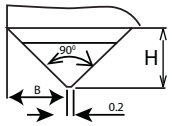
3 Flute

Chamfer tools
Internal chamfering- short



CT | A90S | SHORT | IC | IT | TiAlN



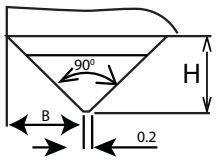


Detail View A

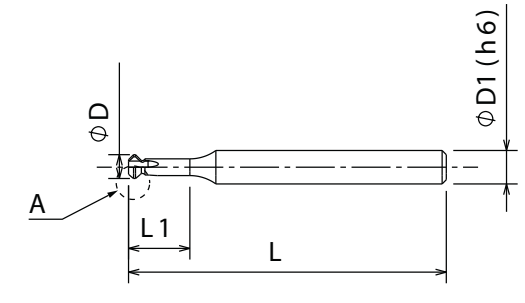
Description	D	L1	L	D1	H	B	Angle	No. Of Flutes	EDP No
	mm	mm	mm	mm	mm	mm	a		
CT-A90S-1.5MMX4X39 SH3 3FL TA	1.50	4	39	3	0.3	0.4	90	3	FBV0503359
CT-A90S-2MMX5X39 SH3 3FL TA	2.00	5	39	3	0.4	0.5	90	3	FBV0503360
CT-A90S-2.5MMX6X39 SH3 3FL TA	2.50	6	39	3	0.5	0.6	90	3	FBV0503361
CT-A90S-3.1MMX8X51 SH4 3FL TA	3.10	8	51	4	0.6	0.6	90	3	FBV0503362
CT-A90S-3.9MMX10X51 SH4 3FL TA	3.90	10	51	4	0.8	0.9	90	3	FBV0503363
CT-A90S-4.5MMX11X58 SH6 3FL TA	4.50	11	58	6	1.1	1.2	90	3	FBV0503364
CT-A90S-4.9MMX12X58 SH6 3FL TA	4.90	12	58	6	1.1	1.2	90	3	FBV0503365
CT-A90S-5.9MMX14X58 SH6 3FL TA	5.90	14	58	6	1.5	1.6	90	3	FBV0503366
CT-A90S-7.9MMX20X64 SH6 3FL TA	7.90	20	64	8	1.6	1.7	90	3	FBV0503367

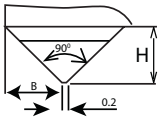
3 Flute

Chamfer tools
Internal chamfering- long



CT | A90L | LONG | IC | IT | TiAlN





Detail View A

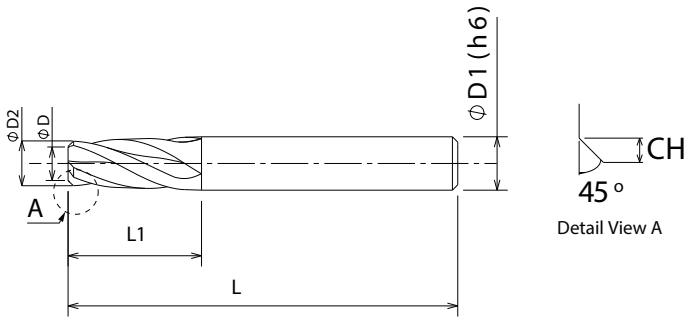
Description	D	L1	L	D1	H	B	Angle	No. Of Flutes	EDP No
	mm	mm	mm	mm	mm	mm	a		
CT-A90L-3.1MMX12X51 SH4 3FL TA	3.1	12	51	4	0.6	0.6	90	3	FBV0503368
CT-A90L-3.9MMX16X51 SH4 3FL TA	3.9	16	51	4	0.8	0.9	90	3	FBV0503369
CT-A90L-4.9MMX20X58 SH6 3FL TA	4.9	20	58	6	1.1	1.2	90	3	FBV0503370
CT-A90L-5.9MMX24X58 SH4 3FL TA	5.9	24	58	6	1.5	1.6	90	3	FBV0503371
CT-A90L-7.9MMX30X64 SH8 3FL TA	7.9	30	64	8	1.6	1.7	90	3	FBV0503372

4 Flute

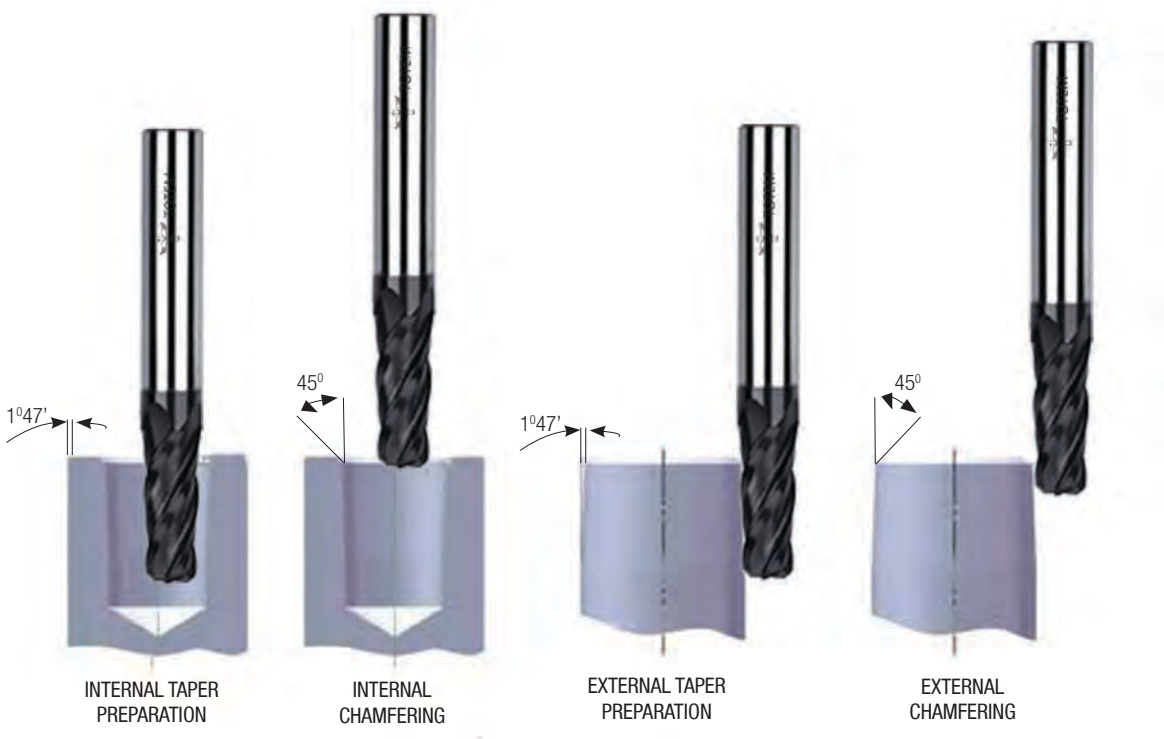
Taper end mills for conic preperation for taper threads (NPT, NPTF, BSPT) 45 degree chamfer preperation tool

Internal chamfering- short

TP | IC | EC | ICP | ECP | TiAlN



Description	D	L1	L	D1	D2	TPR Angle	CH	No. of Flutes	EDP No
	mm	mm	mm	mm	mm	a	mm		
EM 3.00MMX15X58 SH6 CH1 TPR1.47 4FL TA	3	15	58	6	5	1.47	1	4	FBV0503373
EM 5.60MMX25X73 SH10 CH1.4 TPR1.47 4F TA	5.6	25	73	10	8.4	1.47	1.4	4	FBV0503374
EM 6.30MMX33X84 SH12 CH1.8 TPR1.47 4FTA	6.3	33	84	12	9.9	1.47	1.8	4	FBV0503375



CARBIDE GRADE : K40UF

AN ADVANCED PVD TiALN COATED GRADE OVER A TOUGH WEAR-RESISTANT SUBMICRON SUBSTRATE FOR GENERAL PURPOSE MACHINING OF STEEL, STAINLESS STEEL, SUPERALLOYS.

Workpiece Material Group			Hardness HB	Cutting Speed m/min (Vc)	Feed (fz) mm/tooth Cutting Diameters						
					1.5-3	3-5	5-7	7-9	9-11	11-14	14-20
Steel	P	1	130	70-130	0.03	0.04	0.06	0.07	0.09	0.09	0.12
		2	200	60-120	0.02	0.04	0.05	0.06	0.08	0.08	0.1
		3	240	60-110	0.02	0.03	0.04	0.05	0.05	0.05	0.08
		4	270	60-100	0.02	0.03	0.04	0.05	0.05	0.05	0.06
		5	400	50-80	0.01	0.02	0.03	0.03	0.04	0.04	0.05
Stainless Steel	M	1	200	70-100	0.02	0.02	0.03	0.04	0.05	0.05	0.07
		2	240	70-90	0.02	0.02	0.03	0.04	0.04	0.04	0.06
		3	400	60-80	0.015	0.02	0.02	0.03	0.03	0.03	0.04
Cast Iron K	K	1	190	60-110	0.02	0.03	0.06	0.07	0.08	0.09	0.11
		2	180	60-90	0.02	0.03	0.05	0.06	0.08	0.09	0.12
		3	240	60-90	0.02	0.02	0.03	0.05	0.07	0.08	0.11
Non Ferrous	N	1	80	80-300	0.03	0.04	0.06	0.07	0.10	0.13	0.15
		2	90	100-300	0.03	0.04	0.06	0.07	0.11	0.13	0.16
		3	100	60-250	0.03	0.04	0.06	0.07	0.11	0.13	0.16
		4		100-400	0.05	0.06	0.08	0.09	0.13	0.15	0.18
Super Alloys	N	1	270	25-50	0.01	0.01	0.01	0.02	0.02	0.03	0.03
		2	350	20-40	0.01	0.01	0.01	0.02	0.02	0.03	0.03
		3	300	20-40	0.01	0.01	0.01	0.02	0.02	0.03	0.03
		4		40-80 30-60 20-50 20-50	0.02 0.02 0.02 0.02	0.02 0.02 0.02 0.02	0.02 0.02 0.02 0.02	0.03 0.03 0.03 0.02	0.04 0.03 0.03 0.03	0.04 0.04 0.03 0.03	0.05 0.05 0.04 0.04
Hardened Steel	H	2	50 HRc	25-40	0.01	0.01	0.02	0.02	0.02	0.03	0.03
		3	56 HRc	25-50	0.01	0.01	0.02	0.02	0.02	0.03	0.03

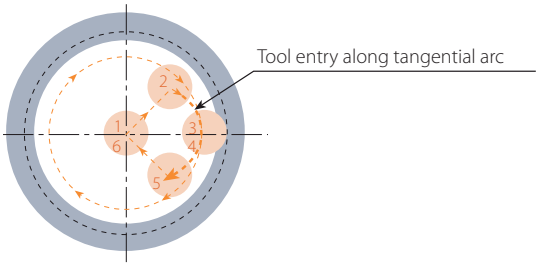
Troubleshooting

PROBLEM	CAUSE	SOLUTION
Chipping in cutting edges	Unstable conditions	Check tool and workpiece clamping and stability
	Feed rate too high	Decrease feed per tooth
	Depth of cut large	Increase the number of thread milling passes
Excessive wear	Incorrect cutting speed	Decrease cutting speed
	Incorrect feed per tooth	Increase feed per tooth
	Insufficient coolant	Check stability increase the coolant flow change to climb milling
Vibrations	Cutting speed too high	Change cutting speed
Vibrations	Incorrect tool and workpiece installtion	Check sability of workpiece
Vibrations	Large depth of cut stability: tool/machine, workpiece/ workpiece clamping	Change to number of passes
Vibrations	Concentricity	Make sure tool overhang in the holding device as short as possible
Bad surface finish on workpiece		Increase cutting speed decrease feed per tooth check stability and overhang of tools
Small difference between gauges (go/no go)	Ratio too close (tool cutting diameter / thread diameter)	Choose tool with smaller cutting diameter

Tips:

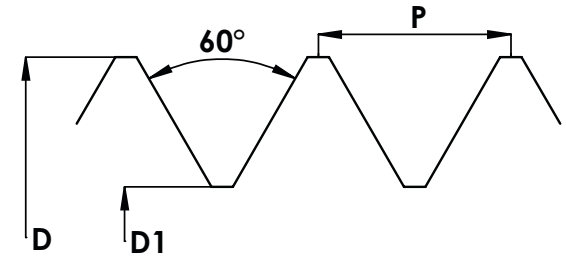
* **Recommendation:**
At tool entry, set the Feed f [mm/tooth] to 70% lower than the threading Feed.

Example:
Threading Feed: 0.3[mm/tooth]
Tool entry Feed: 0.09[mm/tooth]

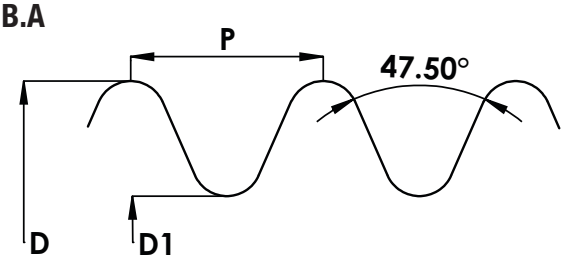


Thread forms

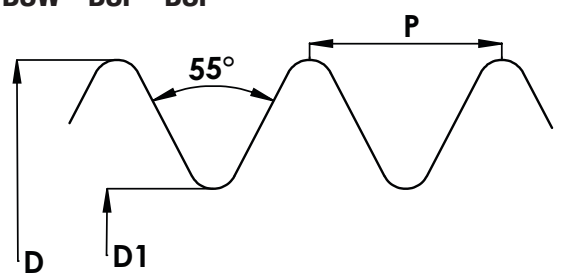
Metric ISO - UNC - UNF



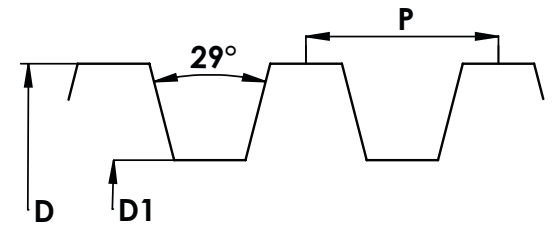
B.A



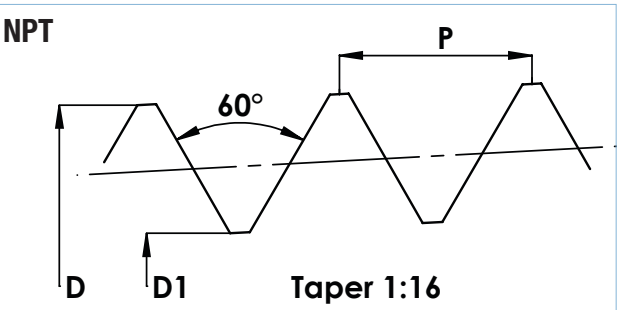
BSW - BSF - BSP



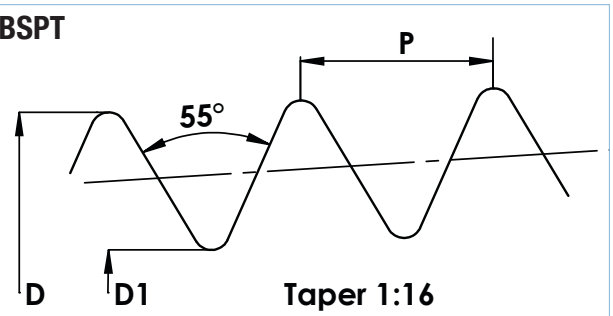
ACME



NPT



BSPT

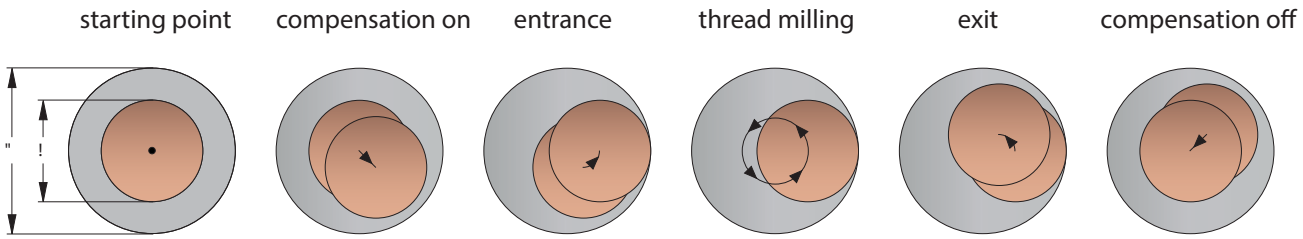


ACME	:	Acme Thread
BA	:	British Association Standard Thread
BSF	:	British Standard Fine Thread Series
BSP	:	British Standard Pipe
BSPT	:	British Standard Taper Pipe Thread
BSW	:	British Standard Whitworth Coarse Thread Series
M	:	Metric Screw Thread Series
NGT	:	National Gas Taper Thread (See “SGT”)
NPS	:	for Tap marking only (See NPSC, NPSM)
NPSF	:	Dryseal American National Standard Fuel Internal Straight Pipe Thread
NPSI	:	Dryseal American National Standard Intermediate Internal Straight Pipe Thread
NPT	:	American National Standard Taper Pipe Thread
NPTF	:	Dryseal American National Standard Taper Pipe Thread
PG	:	Panzer Gewinder
STI	:	Special Thread for Helial Coil Wire Screw Thread Inserts
UN	:	Unified Constant Pitch Thread Series
UNC	:	Unified Coarse Thread Series
UNEF	:	Unified Extra Fine Thread Series
UNF	:	Unified Fine Thread Series
UNS	:	Unified Thread-Special
WW	:	British Standard Whitworth Special Thread

Advantages of thread milling

- **Thread milling is a secure machining operation with less chances of part damage and breakage of the tool**
- **Threading in difficult to machine materials and hard materials is easy**
- **Higher thread quality**
  The cutting conditions are extremely good when you are thread milling. The result of the thread is a higher quality of surface finish, tolerance, angle, etc. Compared with other threading methods.
- **Flexible tool**
  Same cutter can be used for right hand and left hand thread. Threads with different diameters can be made with the same tool as long as the pitch is the same. The same thread mill can be used for blind holes and through holes.
- **Threading in blind holes**
  When thread milling you will get a complete thread profile to the bottom of the hole. When tapping it´s necessary to drill much deeper as it´s not until the third thread the tap will make a complete thread profile.
- **Less wear on the machine spindle**
  Thread milling will give you longer life to the machine spindle compared with tapping as the rotation on the spindle doesn´t need to be stopped and reversed for every thread.
- **Energy-saving production**
  Low energy consumption as the machine spindle doesn´t need to be stopped and started after each thread.
- **Thread Milling in a lathe with live tools**
  Reduced machining time compared with thread turning. Excellent chip control.

Threadmill movement during the interpolation cycle



Infeed method

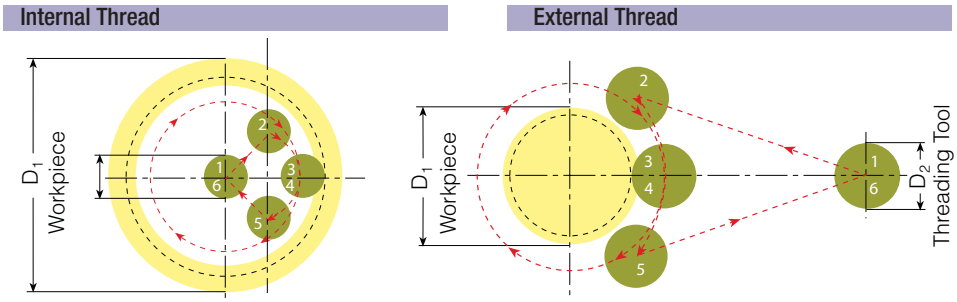
TANGENTIAL APPROACH

Thread milling cutter strategy of Machining and how to enter and exit the work piece. The Tangential arc approach is considered as the best method.

With this method, the tool enters and exits the work piece smoothly. No marks are left on the work piece and there is no vibration, even with harder materials.

Although it requires slightly more complex programming than the radial approach (see below), this is the method recommended for machining the highest quality threads.

1-2: Rapid approach
2-3: Tool entry along tangential arc, with simultaneous feed along z-axis (@ 30% of the programming Feed)
3-4: Helical movement during one full orbit (360 degrees in cut at full programmed Feed)
4-5: Tool exit along tangential arc, with continuing feed along z-axis
5-6: Rapid return



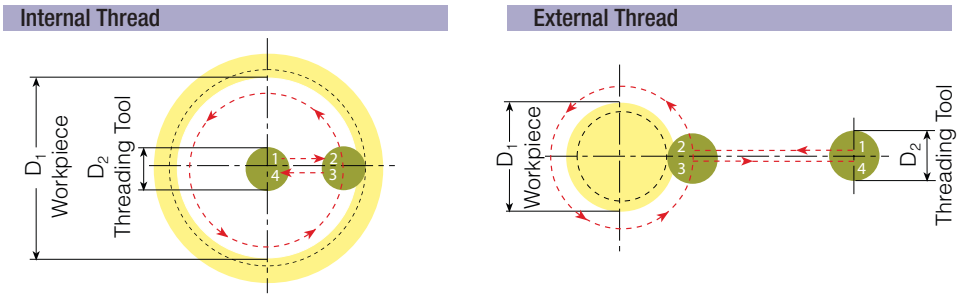
RADIAL APPROACH

This is the simplest method.

There are two characteristics worth noting about the radial approach:

- a small vertical mark may be left at the entry (and exit) point. This is of no significance to the thread itself.
- when using this method with very hard materials, the tool may have a tendency to vibrate as it approaches the full cutting depth.

Note: Radial feed during entry to the full profile depth should only be 1/3 of the subsequent circular feed.

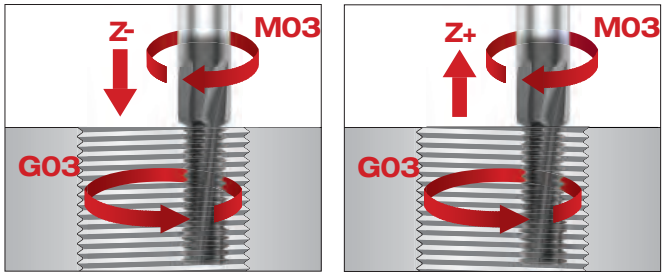


1-2: Radial entry
2-3: Helical movement during one full orbit (360 degrees in cut at full programmed Feed)
3-4: Radial exit

Thread milling methods

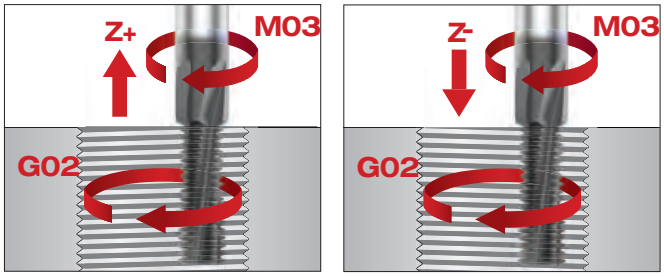
INTERNAL THREADING

Climb Milling



Internal left hand thread | Internal right hand thread

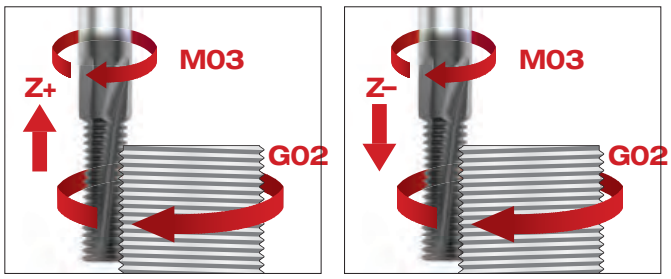
Conventional Milling



Internal left hand thread | Internal right hand thread

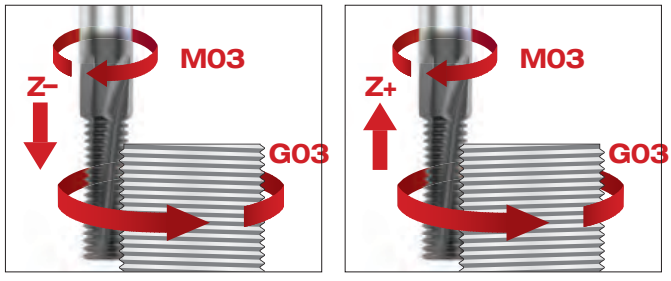
EXTERNAL THREADING

Climb Milling



External left hand thread | External right hand thread

Conventional Milling



External left hand thread | External right hand thread

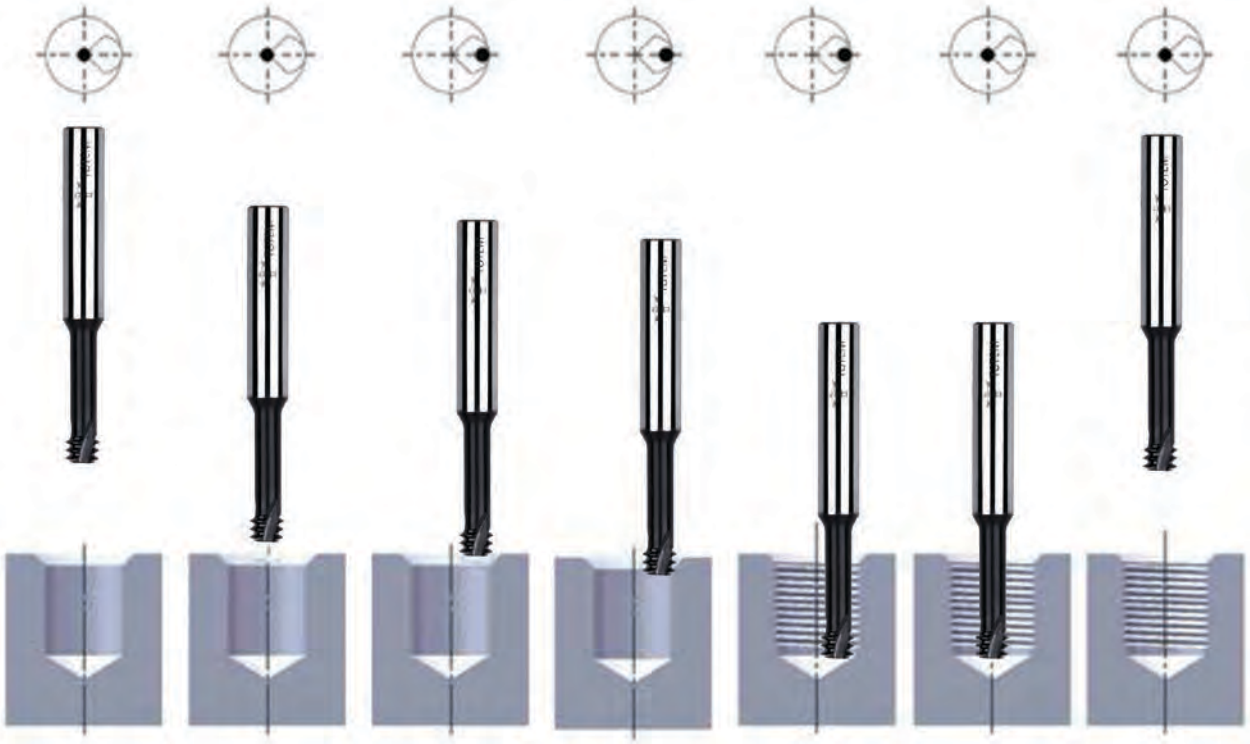
G CODES

G00	Send to position with rapid feed
G01	Send to position with linear movement and control by feed
G02	Clockwise circular interpolation
G03	Counter-clockwise circular interpolation
G40	Cutter compensation cancel
G41	Turn on left hand cutter compensation
G42	Turn on right hand cutter compensation
G54-59	Available workpiece coordinate settings
G90	Absolute positioning
G91	Incremental positioning

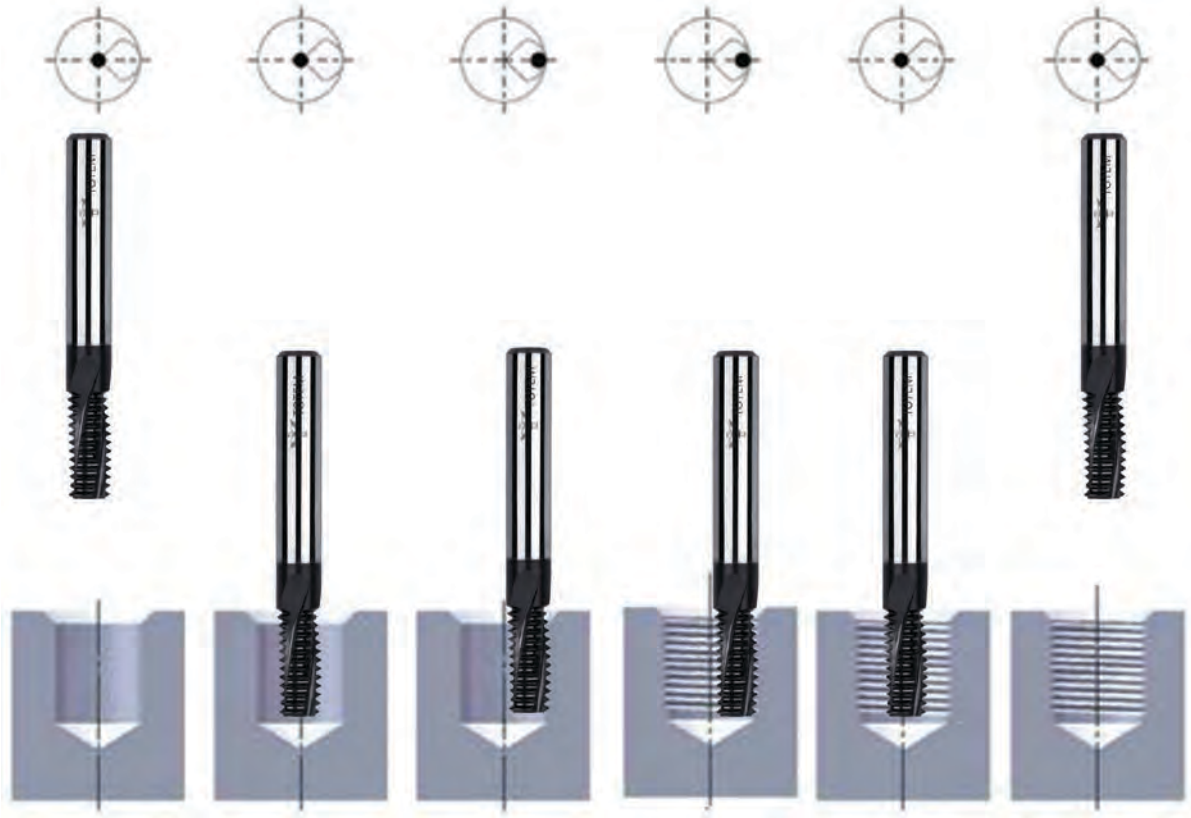
M CODES

M00	Program stop
M01	Program optional stop
M03	Turn on spindle clockwise direction
M04	Turn on spindle counter-clockwise direction
M05	Turn off spindle rotation
M06	Tool change
M08	Coolant on
M09	Coolant off
M30	Program end and reset to start of program

Threadmill cycle for MT2D/MT3D/MT4D



THREADMILL CYCLE FOR RHTS/RHTC/RHS/RHC/RSS/RSTS



Thread mill technical questionnaire

CUSTOMER INFORMATION

Company Name: ..... City: .....

Name: ..... Designation: .....

Mobile no: ..... Email ID: .....

WORK CONDITIONS

Machine Type: ..... Spindle Taper .....

Orientation: Horizontal ☐ Vertical ☐

Rotation: Clockwise ☐ Anti-clockwise ☐

Product Code: ..... Project: .....

Part Name: ..... Part Volume: .....

Holder Type: ..... Holder Name: .....

CUTTING CONDITIONS

Thread Size: ..... Pitch: ..... Thread Style: .....

Tolerance: ..... RPM .....

Feed: fz (mm/tooth): ..... F (mm/min) .....

Hole Depth: .....

Coolant Pressure (Bar) ..... Tool Life (No of Threads): .....

Coolant: Internal ☐ External ☐ Y Type ☐

Tool Design: Helical ☐ Straight ☐

WORKPEICE INFORMATION

Workpeice Material: ..... Grade: .....

Hardness: ..... UTS (N/mm^2): .....

Sketch

TOTEM®

High Performance Cutting Tools

SOLID CARBIDE DRILLS

CONTENTS

TD DRILLS SOLID AND THROUGH COOLANT - 3X, 5X, 7X — 4.004

WORK PIECE MATERIALS

PRIMARY

Steel, Stainless Steel, Cast Iron, Super Alloys

FEATURES

- Reinforced core geometry for higher feed rates
- Special flute form for effective chip evacuation
- Special nano grain carbide raw material with an optimum balance of hardness and toughness
- High performance coating for superior wear resistance at higher cutting speeds

FUNCTION

- High performance coating for superior wear resistance at higher cutting speeds
- Universal geometry

BENEFITS

- Higher productivity
- High feed rate geometry
- Lower breakages and rejection rates due to stable core

DHD SERIES - DEEP HOLE DRILLING - 12X, 15X, 20X — 4.022

WORK PIECE MATERIALS

PRIMARY

Forged Steel, Stainless Steel, Cast Iron, Aluminium

FEATURES

- Reinforced core design
- Superior surface treatment
- 4 Margins to guide
- High performance coating
- Optimized flute design

FUNCTION

- High performance coating for superior wear resistance at higher cutting speeds
- Stable cutting edge

BENEFITS

- Better hole straightness
- High feed rate geometry
- Lower breakages and rejection rates due to stable core

SOLID CARBIDE JOBBER DRILL - F224/F224A AND F226/F226A — 4.036

WORK PIECE MATERIALS

PRIMARY

Steel, Stainless Steel, Cast Iron, Aluminium

FEATURES

- Reinforced core design
- Superior surface treatment
- Available in regular and stub
- 30 Degree helix & 118 degree point angle
- Optimized flute design

FUNCTION

- High performance coating for superior wear resistance at higher cutting speeds
- Stable cutting edge

BENEFITS

- Better hole straightness
- High feed rate geometry
- Lower breakages and rejection rates due to stable core

CARBIDE SPOTTING DRILL (60°/90°/120°) — 4.043

WORK PIECE MATERIALS

PRIMARY

Steel, Cast Iron, Stainless Steel, Super Alloys, Hard Steel, Aluminium

FEATURES

- Right-hand helix
- h6 tolerance range
- Point angle tolerance +0°/-1°
- Standard length

FUNCTION

- 60°/90°/120° point angle
- Can be used as a chamfering tool if the spot drill diameter is larger than the final hole size.
- Tight tolerance with a very short flute length
- Highly recommend in deep-hole drilling

BENEFITS

- Ensure accurate hole location by avoiding drill deflectionof materials.
- Useful in abrasive workpiece materials where the machining conditions are rigid.
- Designed to be extremely rigid to precisely spot a hole for a twist drill

CONTENTS

CARBIDE CENTRE DRILLS 4.044

WORK PIECE MATERIALS

PRIMARY
Steel, Stainless Steel, Cast Iron, Super Alloys

PRIMARY
Cast Irons & Non Ferrous

FEATURES
- DIN333 standard
- Available in both LH and RH cut
- Available in form A and form B

FUNCTION
- 118° point angle
- General centering process for wide range of materials
- Coating available on request
- Can operate on higher cutting speeds

BENEFITS
- Double ended drills produce smoother finishes and many more holes than HSS centre drills
- Works equally well on soft and heat treated materials
- Carbide reduces possiblity of breakage
- Increase tool life dramatically

CARBIDE CHAMFER TOOLS (60°/90°) 4.047

WORK PIECE MATERIALS

PRIMARY
Steel, Cast Iron, Stainless Steel, Super Alloys, Hard Steel, Aluminium

FEATURES
- 4 flutes
- Available in TiN coating
- Available in 60°and 90° point angle

FUNCTION
- Versatile chamfering tool

BENEFITS
- Superior surface quality

MULTI FLUTE CARBIDE REAMING TOOLS 4.050

WORK PIECE MATERIALS

PRIMARY
Steel, Stainless Steel, Cast Iron and Non ferrous

FEATURES
- ISO H7 tolerance class hole
- Internal coolant supply
- Available in right hand cut
- Intermediate diameters from 1.5mm - 20mm

FUNCTION
- Special coatings and lead chamfer configurations enable high-speed machining
- Highest metal removal rate at higher speeds and feeds

BENEFITS
- Longer tool life with increased hole and surface quality
- Address most common reaming applications.

TOTEM®

High Performance Cutting Tools

TD DRILLS

Features Benefits

- Reinforced core geometry for higher feed rates
- Special flute form for effective chip evacuation
- Special nano grain carbide raw material with an optimum balance of hardness and toughness
- High performance coating for superior wear resistance at higher cutting speeds

Functions & Benefits

- Universal geometry which can be used for Cast Iron and Steel
- Higher Productivity
- High Feed Rate Geometry
- Lower breakages and rejection rates due to stable core

3X Solid carbide 3X high performance drill

Carbide | STUB | 3X | 142° | 30° | TiAlN

IMAGE 1

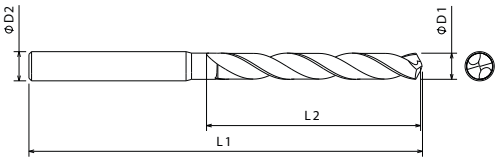
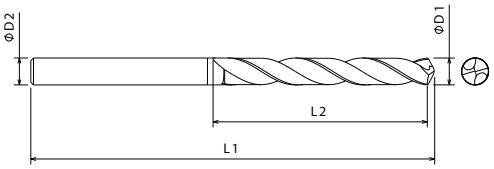


IMAGE 2



P0-P6
K1-K3
S1-S4
M1-M3

DRILLS

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
1.0	7	58	4	1	FBJ0503714
1.2	7	58	4	1	FBJ0503715
1.3	7	58	4	1	FBJ0503716
1.4	7	58	4	1	FBJ0503717
1.5	9	58	4	1	FBJ0503718
1.6	9	58	4	1	FBJ0503719
1.7	9	58	4	1	FBJ0503720
1.8	9	58	4	1	FBJ0503721
1.9	13	58	4	1	FBJ0503722
2.0	13	58	4	1	FBJ0503723
2.1	13	58	4	1	FBJ0503724
2.2	13	58	4	1	FBJ0503725
2.3	13	58	4	1	FBJ0503726
2.4	13	58	4	1	FBJ0503727
2.5	13	58	4	1	FBJ0503728
2.6	13	58	4	1	FBJ0503729
2.7	13	58	4	1	FBJ0503730
2.8	13	58	4	1	FBJ0503731
2.9	13	58	4	1	FBJ0503732
3.0	16	57	3	1	FBJ0501006
3.0	16	57	6	1	FBJ0503835
3.1	22	63	4	1	FBJ0501007
3.1	22	63	6	1	FBJ0503836
3.2	22	63	4	1	FBJ0501008
3.2	22	63	6	1	FBJ0503837
3.3	22	63	4	1	FBJ0501009
3.3	22	63	6	1	FBJ0503838

ØD1	L2	L1	ØD2	Image	EDP No
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3.4	22	63	6	1	FBJ0503839
3.5	22	63	4	1	FBJ0501011
3.5	22	63	6	1	FBJ0503840
3.6	22	63	4	1	FBJ0501012
3.6	22	63	6	1	FBJ0503841
3.7	22	63	4	1	FBJ0501013
3.7	22	63	6	1	FBJ0503842
3.8	22	63	4	1	FBJ0501014
3.8	22	63	6	1	FBJ0503843
3.9	22	63	4	1	FBJ0501015
3.9	22	63	6	1	FBJ0503844
4.0	22	63	4	2	FBJ0501016
4.0	22	63	6	1	FBJ0503845
4.1	26	63	5	1	FBJ0501017
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4.2	26	63	5	1	FBJ0501018
4.2	26	63	6	1	FBJ0503847
4.3	26	63	5	1	FBJ0501019
4.3	26	63	6	1	FBJ0503848
4.4	26	63	5	1	FBJ0501020
4.4	26	63	6	1	FBJ0503849
4.5	26	63	5	1	FBJ0501021
4.5	26	63	6	1	FBJ0503850
4.6	26	63	5	1	FBJ0501022
4.6	26	63	6	1	FBJ0503851
4.65	26	63	6	1	FBJ0505029

Application data on page no 4.011

3X Solid carbide 3X high performance drill

Carbide | STUB | 3X | 142° | 30° | TiAlN

IMAGE 1

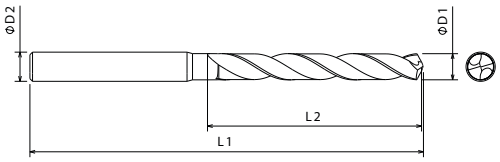
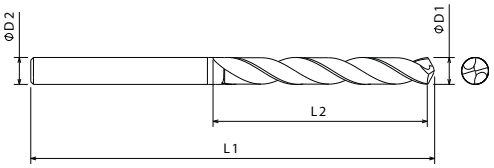


IMAGE 2



P0-P6
K1-K3
S1-S4
M1-M3

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
4.65	26	63	5	1	FBJ0505030
4.7	26	63	5	1	FBJ0501023
4.7	26	63	6	1	FBJ0503852
4.8	26	63	5	1	FBJ0501024
4.8	26	63	6	1	FBJ0503853
4.9	26	63	5	1	FBJ0501025
4.9	26	63	6	1	FBJ0503854
5.0	26	63	5	2	FBJ0501026
5.0	26	63	6	1	FBJ0503855
5.1	30	76	6	1	FBJ0501027
5.2	30	76	6	1	FBJ0501028
5.3	30	76	6	1	FBJ0501029
5.4	30	76	6	1	FBJ0501030
5.5	30	76	6	1	FBJ0501031
5.7	30	76	6	1	FBJ0501032
5.8	30	76	6	1	FBJ0501033
5.9	30	76	6	1	FBJ0501034
6.0	30	76	6	2	FBJ0501035
6.1	35	82	8	1	FBJ0501037
6.2	35	82	8	1	FBJ0501038
6.3	35	82	8	1	FBJ0501039
6.4	35	82	8	1	FBJ0501040
6.5	35	82	8	1	FBJ0501041
6.6	35	82	8	1	FBJ0501042
6.7	35	82	8	1	FBJ0501043
6.8	35	82	8	1	FBJ0501044
6.9	35	82	8	1	FBJ0501045

ØD1	L2	L1	ØD2	Image	EDP No
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7.1	38	82	8	1	FBJ0501047
7.2	38	82	8	1	FBJ0501048
7.3	38	82	8	1	FBJ0501049
7.4	38	82	8	1	FBJ0501050
7.5	38	82	8	1	FBJ0501051
7.6	38	82	8	1	FBJ0501052
7.8	38	82	8	1	FBJ0501053
7.9	38	82	8	1	FBJ0501054
8.0	38	82	8	2	FBJ0501055
8.1	43	89	10	1	FBJ0501056
8.2	43	89	10	1	FBJ0501057
8.3	43	89	10	1	FBJ0501058
8.4	43	89	10	1	FBJ0501059
8.5	43	89	10	1	FBJ0501060
8.6	43	89	10	1	FBJ0501061
8.7	43	89	10	1	FBJ0501062
8.8	43	89	10	1	FBJ0501063
8.9	43	89	10	1	FBJ0501064
9.0	43	89	10	1	FBJ0501065
9.1	43	89	10	1	FBJ0501066
9.2	43	89	10	1	FBJ0501067
9.25	43	89	10	1	FBJ0501068
9.3	43	89	10	1	FBJ0501069
9.4	43	89	10	1	FBJ0501072
9.5	43	89	10	1	FBJ0501070
9.6	43	89	10	1	FBJ0501071

Application data on page no 4.011

3X Solid carbide 3X high performance drill

Carbide | STUB | 3X | 142° | 30° | TiAlN

IMAGE 1

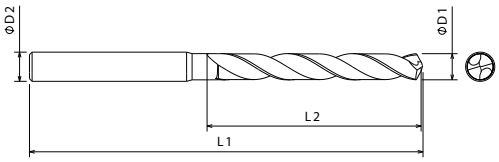
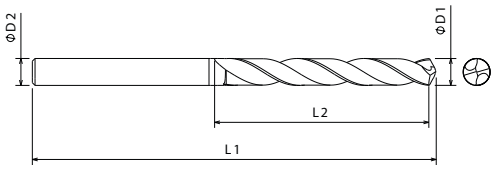


IMAGE 2



P0-P6
K1-K3
S1-S4
M1-M3

DRILLS

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
9.7	43	89	10	1	FBJ0501073
9.8	43	89	10	1	FBJ0501074
9.9	43	89	10	1	FBJ0501075
10.0	43	89	10	2	FBJ0501076
10.1	51	101	12	1	FBJ0501077
10.2	51	101	12	1	FBJ0501078
10.3	51	101	12	1	FBJ0501079
10.4	51	101	12	1	FBJ0501080
10.5	51	101	12	1	FBJ0501081
10.6	51	101	12	1	FBJ0501082
10.7	51	101	12	1	FBJ0501083
10.8	51	101	12	1	FBJ0501084
10.9	51	101	12	1	FBJ0501085
11.0	51	101	12	1	FBJ0501086
11.1	51	101	12	1	FBJ0501087
11.2	51	101	12	1	FBJ0501088
11.3	51	101	12	1	FBJ0501089
11.4	51	101	12	1	FBJ0501090
11.5	51	101	12	1	FBJ0501091
11.6	51	101	12	1	FBJ0501092
11.7	51	101	12	1	FBJ0501093
11.8	51	101	12	1	FBJ0501094
11.9	51	101	12	1	FBJ0501095
12.0	51	101	12	2	FBJ0501096
12.1	54	107	14	1	FBJ0501097
12.5	54	107	14	1	FBJ0501098

ØD1	L2	L1	ØD2	Image	EDP No
12.8	54	107	14	1	FBJ0501099
12.83	54	107	14	1	FBJ0501100
12.9	54	107	14	1	FBJ0501101
13.0	54	107	14	1	FBJ0501102
13.5	54	107	14	1	FBJ0501103
13.7	54	107	14	1	FBJ0501104
14.0	54	107	14	2	FBJ0501105
14.5	60	117	16	1	FBJ0501106
14.7	60	117	16	1	FBJ0501107
15.0	60	117	16	1	FBJ0501108
15.3	60	117	16	1	FBJ0501109
15.5	60	117	16	1	FBJ0501110
15.7	60	117	16	1	FBJ0501111
16.0	60	117	16	2	FBJ0501112
16.08	63	122	18	1	FBJ0501113
16.3	63	122	18	1	FBJ0501114
16.5	63	122	18	1	FBJ0501115
17.0	63	122	18	1	FBJ0501116
17.5	63	122	18	1	FBJ0501117
18.0	63	122	18	2	FBJ0501118
18.5	70	133	20	1	FBJ0501119
19.16	70	133	20	1	FBJ0501120
19.25	70	133	20	1	FBJ0501121
19.3	70	133	20	1	FBJ0501122
19.5	70	133	20	1	FBJ0501123
20.0	70	133	20	2	FBJ0501124

Application data on page no 4.011

5X Solid carbide 5X high performance drill

Carbide | 5X | 142° | 30° | TiAlN

P0-P6
K1-K3
S1-S4
M1-M3

IMAGE 1

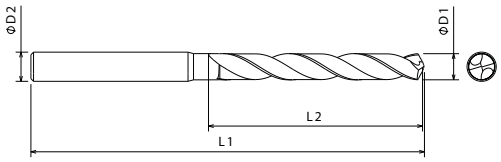
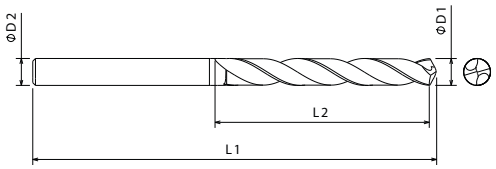


IMAGE 2



Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
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1.4	9	58	4	1	FBJ0504392
1.5	12	58	4	1	FBJ0504393
1.6	12	58	4	1	FBJ0504394
1.7	12	58	4	1	FBJ0504395
1.8	12	58	4	1	FBJ0504396
1.9	15	58	4	1	FBJ0504397
2.0	18	58	4	1	FBJ0504398
2.1	18	58	4	1	FBJ0504399
2.2	18	58	4	1	FBJ0504400
2.3	18	58	4	1	FBJ0504401
2.4	22	58	4	1	FBJ0504402
2.5	22	58	4	1	FBJ0504403
2.6	22	58	4	1	FBJ0504404
2.7	22	58	4	1	FBJ0504405
2.8	22	58	4	1	FBJ0504406
2.9	22	58	4	1	FBJ0504407
3.0	28	66	6	1	FBJ0504408
3.0	24	63	3	1	FBJ0501125
3.0	24	63	6	1	FBJ0503886
3.1	32	69	4	1	FBJ0501126
3.1	32	69	6	1	FBJ0503887
3.2	32	69	4	1	FBJ0501127

ØD1	L2	L1	ØD2	Image	EDP No
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3.3	32	69	4	1	FBJ0501128
3.3	32	69	6	1	FBJ0503889
3.4	32	69	4	1	FBJ0501129
3.4	32	69	6	1	FBJ0503890
3.5	32	69	4	1	FBJ0501130
3.5	32	69	6	1	FBJ0503891
3.6	32	69	4	1	FBJ0501131
3.6	32	69	6	1	FBJ0503892
3.7	32	69	4	1	FBJ0501132
3.7	32	69	6	1	FBJ0503893
3.8	32	69	4	1	FBJ0501133
3.8	32	69	6	1	FBJ0503894
3.9	32	69	4	1	FBJ0501134
3.9	32	69	6	1	FBJ0503895
4.0	32	69	4	2	FBJ0501135
4.0	32	69	6	1	FBJ0503896
4.1	38	80	5	1	FBJ0501136
4.1	38	80	6	1	FBJ0503897
4.2	38	80	5	1	FBJ0501137
4.2	38	80	6	1	FBJ0503898
4.3	38	80	5	1	FBJ0501138
4.3	38	80	6	1	FBJ0503899
4.4	38	80	5	1	FBJ0501139
4.4	38	80	6	1	FBJ0503900

Application data on page no 4.011

5X Solid carbide 5X high performance drill

Carbide | 5X | 142° | 30° | TiAlN

IMAGE 1

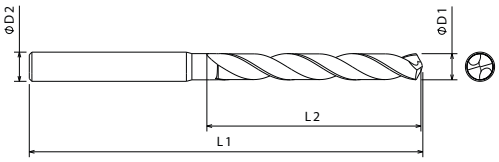
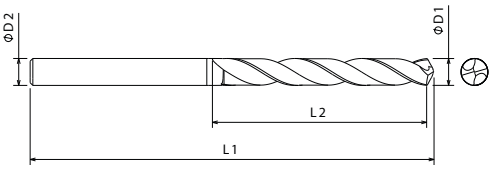


IMAGE 2



P0-P6
K1-K3
S1-S4
M1-M3

DRILLS

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
4.5	38	80	5	1	FBJ0501140
4.5	38	80	6	1	FBJ0503901
4.6	38	80	5	1	FBJ0501141
4.6	38	80	6	1	FBJ0503902
4.65	38	80	6	1	FBJ0505031
4.65	38	80	5	1	FBJ0505032
4.7	38	80	5	1	FBJ0501142
4.7	38	80	6	1	FBJ0503903
4.8	38	80	5	1	FBJ0501143
4.8	38	80	6	1	FBJ0503904
4.9	38	80	5	1	FBJ0501144
4.9	38	80	6	1	FBJ0503905
5.0	38	80	5	2	FBJ0501145
5.0	38	80	6	1	FBJ0503906
5.1	40	82	6	1	FBJ0501146
5.2	40	82	6	1	FBJ0501147
5.3	40	82	6	1	FBJ0501148
5.4	40	82	6	1	FBJ0501149
5.5	40	82	6	1	FBJ0501150
5.7	40	82	6	1	FBJ0501151
5.8	40	82	6	1	FBJ0501152
5.9	40	82	6	1	FBJ0501153
6.0	40	82	6	2	FBJ0501154
6.1	48	91	8	1	FBJ0501155
6.2	48	91	8	1	FBJ0501156

ØD1	L2	L1	ØD2	Image	EDP No
6.3	48	91	8	1	FBJ0501157
6.4	48	91	8	1	FBJ0501158
6.5	48	91	8	1	FBJ0501159
6.6	48	91	8	1	FBJ0501160
6.7	48	91	8	1	FBJ0501161
6.8	48	91	8	1	FBJ0501162
6.9	48	91	8	1	FBJ0501163
7.0	48	91	8	1	FBJ0501164
7.1	48	91	8	1	FBJ0501165
7.2	48	91	8	1	FBJ0501166
7.3	48	91	8	1	FBJ0501167
7.4	48	91	8	1	FBJ0501168
7.5	48	91	8	1	FBJ0501169
7.6	48	91	8	1	FBJ0501170
7.7	48	91	8	1	FBJ0501171
7.8	48	91	8	1	FBJ0501172
7.9	48	91	8	1	FBJ0501173
8.0	48	91	8	2	FBJ0501174
8.1	55	103	10	1	FBJ0501175
8.2	55	103	10	1	FBJ0501176
8.3	55	103	10	1	FBJ0501177
8.4	55	103	10	1	FBJ0501178
8.5	55	103	10	1	FBJ0501179
8.6	55	103	10	1	FBJ0501180
8.7	55	103	10	1	FBJ0501181

Application data on page no 4.011

5X Solid carbide 5X high performance drill

Carbide | 5X | 142° | 30° | TiAlN

IMAGE 1

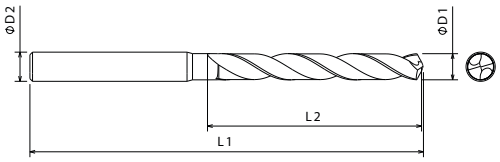
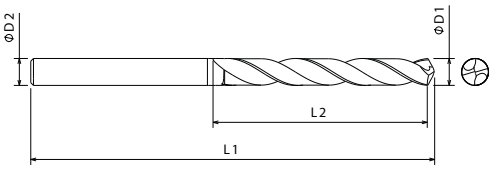


IMAGE 2



P0-P6
K1-K3
S1-S4
M1-M3

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
8.8	55	103	10	1	FBJ0501182
8.9	55	103	10	1	FBJ0501183
9.0	55	103	10	1	FBJ0501184
9.1	55	103	10	1	FBJ0501185
9.2	55	103	10	1	FBJ0501186
9.25	55	103	10	1	FBJ0501187
9.3	55	103	10	1	FBJ0501188
9.4	55	103	10	1	FBJ0501189
9.5	55	103	10	1	FBJ0501190
9.6	55	103	10	1	FBJ0501191
9.7	55	103	10	1	FBJ0501192
9.8	55	103	10	1	FBJ0501193
9.9	55	103	10	1	FBJ0501194
10.0	55	103	10	2	FBJ0501195
10.1	60	120	12	1	FBJ0501196
10.2	60	120	12	1	FBJ0501197
10.3	60	120	12	1	FBJ0501198
10.4	60	120	12	1	FBJ0501199
10.5	60	120	12	1	FBJ0501200
10.6	60	120	12	1	FBJ0501201
10.7	60	120	12	1	FBJ0501202
10.8	60	120	12	1	FBJ0501203
10.9	60	120	12	1	FBJ0501204
11.0	60	120	12	1	FBJ0501205
11.1	66	120	12	1	FBJ0501206

ØD1	L2	L1	ØD2	Image	EDP No
11.2	66	120	12	1	FBJ0501207
11.3	66	120	12	1	FBJ0501208
11.4	66	120	12	1	FBJ0501209
11.5	66	120	12	1	FBJ0501210
11.6	66	120	12	1	FBJ0501211
11.7	66	120	12	1	FBJ0501212
11.8	66	120	12	1	FBJ0501213
11.9	66	120	12	1	FBJ0501214
12.0	66	120	12	2	FBJ0501215
12.1	72	126	14	1	FBJ0501216
12.5	72	126	14	1	FBJ0501217
12.8	72	126	14	1	FBJ0501218
12.83	72	126	14	1	FBJ0501219
12.9	72	126	14	1	FBJ0501220
13.0	72	126	14	1	FBJ0501221
13.5	77	134	14	1	FBJ0501222
13.7	77	134	14	1	FBJ0501223
14.0	77	134	14	2	FBJ0501224
14.5	80	140	16	1	FBJ0501225
14.7	80	140	16	1	FBJ0501226
15.0	80	140	16	1	FBJ0501227
15.3	82	146	16	1	FBJ0501228
15.5	82	146	16	1	FBJ0501229
15.7	82	146	16	1	FBJ0501230
16.0	82	146	16	2	FBJ0501231

Application data on page no 4.011

Cutting parameters

Series 2TDSS/2TDSR METRIC

Workpiece Material Group			Cutting Speed Vc(m/min)			Recommended Feed in mm/rev											
						Tool Diameter (mm)											
					mm	3.00		6.00		10.00		12.00		16.0		20.0	
			min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	0	105	125	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		1	105	125	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	105	125	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		3	85	105	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		4	50	65	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		5	85	105	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		6	50	65	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
Stainless Steels	M	1	40	60	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	30	50	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		3	30	50	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
Cast Iron	K	1	125	150	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	95	115	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		3	95	115	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
Special Alloys	S	1	15	25	f rev	0.015	0.026	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		2	10	15	f rev	0.015	0.026	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		3	15	25	f rev	0.015	0.026	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		4	25	45	f rev	0.015	0.026	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191

#RPM(N) = Vc(m/min) X 318.18/Tool Dia. #Vf(mm/min) = RPM(N) X frev (mm/rev)

Series 2TDSS/2TDSR INCH

Workpiece Material Group			Cutting Speed Vc ft/min			Recommended Feed in inch/rev											
						Tool Diameter (Inch)											
					Inch	1/8		1/4		3/8		1/2		5/8		3/4	
			min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	0	344	410	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		1	344	410	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	344	410	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		3	279	344.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		4	164	213.2	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
		5	279	344.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		6	164	213.2	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
Stainless Steels	M	1	131	196.8	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	98	164	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
		3	98	164	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
Cast Iron	K	1	410	492	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	312	377.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		3	312	377.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
Special Alloys	S	1	49	82	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		2	33	49.2	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		3	49	82	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		4	82	147.6	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075

#RPM (N) = Vc (SFM) X 3.82/Tool Dia. #Vf (Inch/min) = RPM (N) x frev (inch/rev)

The technical data are based upon theoretical values and are only intended for planning purposes and may vary based on the application. Actual results will vary. No responsibility from Forbes and Company Limited or their distributors is assumed.

Drill tolerance

Details	Cutting Dia. "D1" Range	Cutting Dia. "D1" Tolerance h7 ANSI B4.2	Shank Dia. "D2"	Shank Tolerance h6 ANSI B4.2
2TDSS	1.00-3.00	0.00/-0.010	3.00-6.00	-0.008
	3.00-6.00	0.00/-0.012	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.015	6.00-10.00	-0.009
	10.00-18.00	0.00/-0.018	10.00-18.00	-0.011
	20.00	0.00/-0.021	20.00	-0.013
2TDSR	1.00-3.00	0.00/-0.010	3.00-6.00	-0.008
	3.00-6.00	0.00/-0.012	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.015	6.00-10.00	-0.009
	10.00-16.00	0.00/-0.018	10.00-16.00	-0.011

3X Solid carbide 3X high performance drill with coolant feed

Carbide | STUB | 3X | 142° | 30° | TiAlN

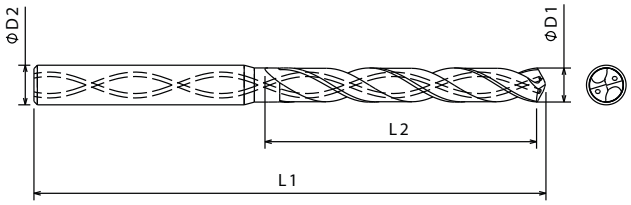


IMAGE 1

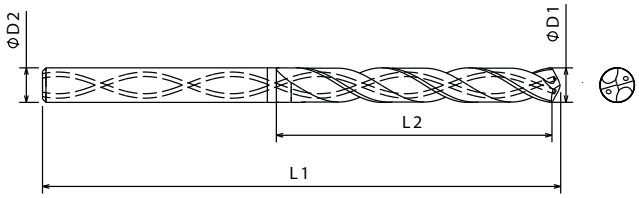


IMAGE 2

P0-P6
K1-K3
M1-M3
S1-S4

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
3.0	16	57	3	2	FBJ0502493
3.1	22	63	4	1	FBJ0502494
3.2	22	63	4	1	FBJ0502495
3.3	22	63	4	1	FBJ0502496
3.4	22	63	4	1	FBJ0502497
3.5	22	63	4	1	FBJ0502498
3.6	22	63	4	1	FBJ0502499
3.7	22	63	4	1	FBJ0502500
3.8	22	63	4	1	FBJ0502501
3.9	22	63	4	1	FBJ0502502
4.0	22	63	4	2	FBJ0502503
4.1	26	65	5	1	FBJ0502504
4.2	26	65	5	1	FBJ0502505
4.3	26	65	5	1	FBJ0502506
4.4	26	65	5	1	FBJ0502507
4.5	26	65	5	1	FBJ0502508
4.6	26	65	5	1	FBJ0502509
4.65	26	65	5	1	FBJ0505033
4.7	26	65	5	1	FBJ0502510
4.8	26	65	5	1	FBJ0502511

ØD1	L2	L1	ØD2	Image	EDP No
4.9	26	65	5	1	FBJ0502512
5.0	26	65	5	2	FBJ0502513
5.1	26	65	6	1	FBJ0502514
5.2	26	65	6	1	FBJ0502515
5.3	26	65	6	1	FBJ0502516
5.4	26	65	6	1	FBJ0502517
5.5	26	65	6	1	FBJ0502518
5.6	26	65	6	1	FBJ0502519
5.7	26	65	6	1	FBJ0502520
5.8	26	65	6	1	FBJ0502521
5.9	26	65	6	1	FBJ0502522
6.0	26	65	6	2	FBJ0502523
6.1	35	80	8	1	FBJ0502524
6.2	35	80	8	1	FBJ0502525
6.3	35	80	8	1	FBJ0502526
6.4	35	80	8	1	FBJ0502527
6.5	35	80	8	1	FBJ0502528
6.6	35	80	8	1	FBJ0502529
6.7	35	80	8	1	FBJ0502530
6.8	35	80	8	1	FBJ0502531

Application data on page no 4.018

3X Solid carbide 3X high performance drill with coolant feed

Carbide | STUB | 30° | 142° | TiAlN

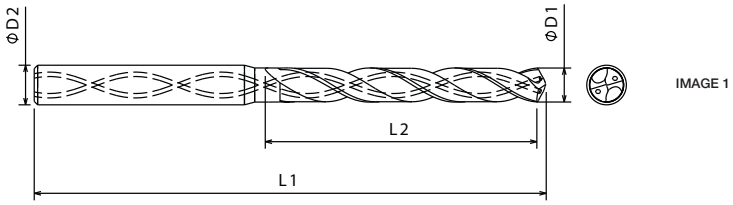


IMAGE 1

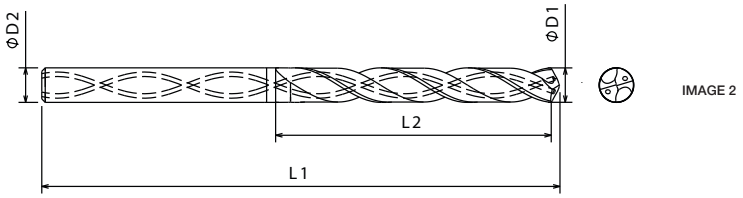


IMAGE 2

P0-P6
K1-K3
M1-M3
S1-S4

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
6.9	35	80	8	1	FBJ0502532
7.0	35	80	8	1	FBJ0502533
7.1	38	80	8	1	FBJ0502534
7.2	38	80	8	1	FBJ0502535
7.3	38	80	8	1	FBJ0502536
7.4	38	80	8	1	FBJ0502537
7.5	38	80	8	1	FBJ0502538
7.6	38	80	8	1	FBJ0502539
7.8	38	80	8	1	FBJ0502540
7.9	38	80	8	1	FBJ0502541
8.0	38	80	8	2	FBJ0502542
8.1	41	82	10	1	FBJ0502543
8.2	41	82	10	1	FBJ0502544
8.3	41	82	10	1	FBJ0502545
8.4	41	82	10	1	FBJ0502546
8.5	41	82	10	1	FBJ0502547
8.6	41	82	10	1	FBJ0502548
8.7	41	82	10	1	FBJ0502549
8.8	41	82	10	1	FBJ0502550
8.9	41	82	10	1	FBJ0502551

ØD1	L2	L1	ØD2	Image	EDP No
9.0	41	82	10	1	FBJ0502552
9.1	41	82	10	1	FBJ0502553
9.2	41	82	10	1	FBJ0502554
9.3	41	82	10	1	FBJ0502555
9.4	41	82	10	1	FBJ0502556
9.5	41	82	10	1	FBJ0502557
9.6	41	82	10	1	FBJ0502558
9.7	41	82	10	1	FBJ0502559
9.8	41	82	10	1	FBJ0502560
9.9	41	82	10	1	FBJ0502561
10.0	41	82	10	2	FBJ0502562
10.1	55	102	12	1	FBJ0502563
10.2	55	102	12	1	FBJ0502564
10.3	55	102	12	1	FBJ0502565
10.4	55	102	12	1	FBJ0502566
10.5	55	102	12	1	FBJ0502567
10.6	55	102	12	1	FBJ0502568
10.7	55	102	12	1	FBJ0502569
10.8	55	102	12	1	FBJ0502570
10.9	55	102	12	1	FBJ0502571

Application data on page no 4.018

3X Solid carbide 3X high performance drill with coolant feed

Carbide | STUB | 3X | 142° | 30° | TiAlN

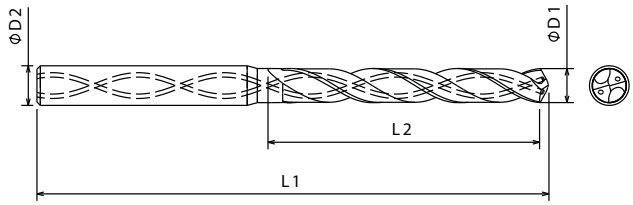


IMAGE 1

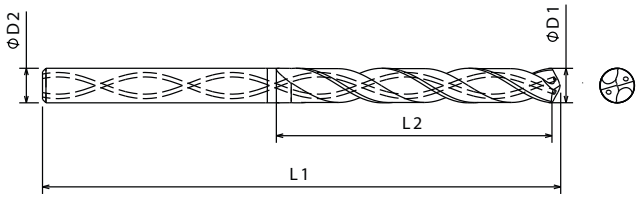


IMAGE 2

P0-P6
K1-K3
M1-M3
S1-S4

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
11.0	55	102	12	1	FBJ0502572
11.1	55	102	12	1	FBJ0502573
11.2	55	102	12	1	FBJ0502574
11.3	55	102	12	1	FBJ0502575
11.4	55	102	12	1	FBJ0502576
11.5	55	102	12	1	FBJ0502577
11.6	55	102	12	1	FBJ0502578
11.7	55	102	12	1	FBJ0502579
11.8	55	102	12	1	FBJ0502580
11.9	55	102	12	1	FBJ0502581
12.0	55	102	12	2	FBJ0502582
12.1	60	107	14	1	FBJ0502583
12.5	60	107	14	1	FBJ0502584
12.8	60	107	14	1	FBJ0502585
12.9	60	107	14	1	FBJ0502587
13.0	60	107	14	1	FBJ0502588
13.5	60	107	14	1	FBJ0502589
13.7	60	107	14	1	FBJ0502590

ØD1	L2	L1	ØD2	Image	EDP No
14.0	60	107	14	2	FBJ0502591
14.5	60	110	16	1	FBJ0502592
14.7	60	110	16	1	FBJ0502593
15.0	60	110	16	1	FBJ0502594
15.3	60	110	16	1	FBJ0502595
15.5	60	110	16	1	FBJ0502596
15.7	60	110	16	1	FBJ0502597
16.0	60	110	16	2	FBJ0502598
16.3	73	122	18	1	FBJ0502599
16.5	73	122	18	1	FBJ0502600
17.0	73	122	18	1	FBJ0502601
17.5	73	122	18	1	FBJ0502602
18.0	73	122	18	2	FBJ0502603
18.5	80	133	20	1	FBJ0502604
19.1	80	133	20	1	FBJ0502605
19.3	80	133	20	1	FBJ0502607
19.5	80	133	20	1	FBJ0502608
20.0	80	133	20	2	FBJ0502609

Application data on page no 4.018

5X Solid carbide 5X high performance drill with coolant feed

Carbide | REG | 5X | 142° | 30° | TiAlN

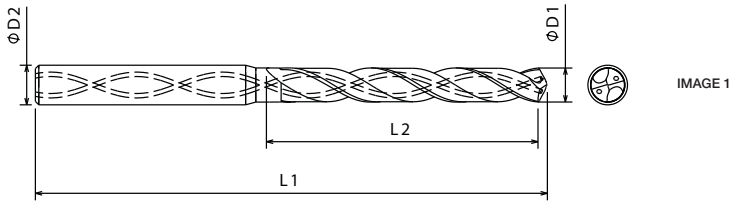


IMAGE 1

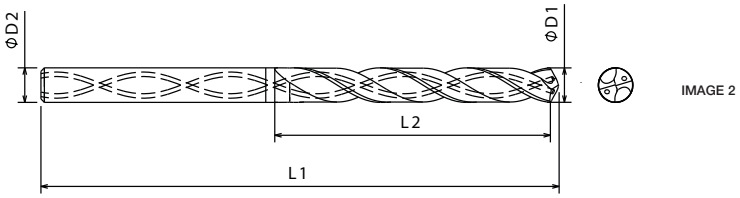


IMAGE 2

P0-P6
K1-K3
S1-S4
M1-M3

DRILLS

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
3.0	24	75	3	2	FBJ0501232
3.1	32	80	4	1	FBJ0501233
3.2	32	80	4	1	FBJ0501234
3.3	32	80	4	1	FBJ0501235
3.4	32	80	4	1	FBJ0501236
3.5	32	80	4	1	FBJ0501237
3.6	32	80	4	1	FBJ0501238
3.7	32	80	4	1	FBJ0501239
3.8	32	80	4	1	FBJ0501240
3.9	32	80	4	1	FBJ0501241
4.0	32	80	4	2	FBJ0501242
4.1	38	82	5	1	FBJ0501243
4.2	38	82	5	1	FBJ0501244
4.3	38	82	5	1	FBJ0501245
4.4	38	82	5	1	FBJ0501246
4.5	38	82	5	1	FBJ0501247
4.6	38	82	5	1	FBJ0501248
4.65	38	82	5	1	FBJ0505034
4.7	38	82	5	1	FBJ0501249
4.8	38	82	5	1	FBJ0501250

ØD1	L2	L1	ØD2	Image	EDP No
4.9	38	82	5	1	FBJ0501251
5.0	38	82	5	2	FBJ0501252
5.1	40	82	6	1	FBJ0501253
5.2	40	82	6	1	FBJ0501254
5.3	40	82	6	1	FBJ0501255
5.4	40	82	6	1	FBJ0501256
5.5	40	82	6	1	FBJ0501257
5.7	40	82	6	1	FBJ0501258
5.8	40	82	6	1	FBJ0501259
5.9	40	82	6	1	FBJ0501260
6.0	40	82	6	2	FBJ0501261
6.1	48	91	8	1	FBJ0501262
6.2	48	91	8	1	FBJ0501263
6.3	48	91	8	1	FBJ0501264
6.4	48	91	8	1	FBJ0501265
6.5	48	91	8	1	FBJ0501266
6.6	48	91	8	1	FBJ0501267
6.7	48	91	8	1	FBJ0501268
6.8	48	91	8	1	FBJ0501269
6.9	48	91	8	1	FBJ0501270

Application data on page no 4.018

5X Solid carbide 5X high performance drill with coolant feed

Carbide | REG | 5X | 142° | 30° | TiAlN

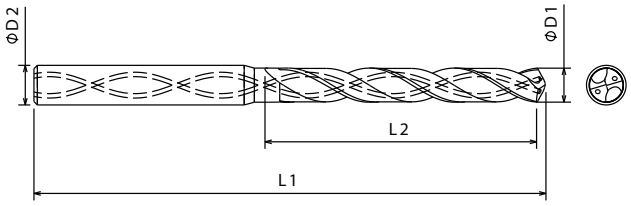


IMAGE 1

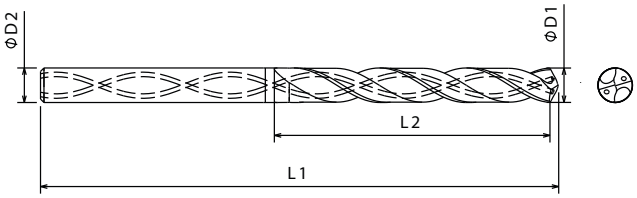


IMAGE 2

P0-P6
K1-K3
S1-S4
M1-M3

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
7.0	48	91	8	1	FBJ0501271
7.1	48	91	8	1	FBJ0501272
7.14	48	91	8	1	FBJ0501273
7.2	48	91	8	1	FBJ0501274
7.3	48	91	8	1	FBJ0501275
7.4	48	91	8	1	FBJ0501276
7.5	48	91	8	1	FBJ0501277
7.6	48	91	8	1	FBJ0501278
7.7	48	91	8	1	FBJ0501279
7.8	48	91	8	1	FBJ0501280
7.9	48	91	8	1	FBJ0501281
8.0	48	91	8	2	FBJ0501282
8.1	55	103	10	1	FBJ0501283
8.2	55	103	10	1	FBJ0501284
8.3	55	103	10	1	FBJ0501285
8.4	55	103	10	1	FBJ0501286
8.5	55	103	10	1	FBJ0501287
8.6	55	103	10	1	FBJ0501288
8.7	55	103	10	1	FBJ0501289
8.8	55	103	10	1	FBJ0501290

ØD1	L2	L1	ØD2	Image	EDP No
8.9	55	103	10	1	FBJ0501291
9.0	55	103	10	1	FBJ0501292
9.1	55	103	10	1	FBJ0501293
9.2	55	103	10	1	FBJ0501294
9.25	55	103	10	1	FBJ0501295
9.3	55	103	10	1	FBJ0501296
9.4	55	103	10	1	FBJ0501297
9.5	55	103	10	1	FBJ0501298
9.6	55	103	10	1	FBJ0501299
9.7	55	103	10	1	FBJ0501300
9.8	55	103	10	1	FBJ0501301
9.9	55	103	10	1	FBJ0501302
10.0	55	103	10	2	FBJ0501303
10.1	60	120	12	1	FBJ0501304
10.2	60	120	12	1	FBJ0501305
10.3	60	120	12	1	FBJ0501306
10.4	60	120	12	1	FBJ0501307
10.5	60	120	12	1	FBJ0501308
10.6	60	120	12	1	FBJ0501309
10.7	60	120	12	1	FBJ0501310

Application data on page no 4.018

5X Solid carbide 5X high performance drill with coolant feed

Carbide | REG | 5X | 142° | 30° | TiAlN

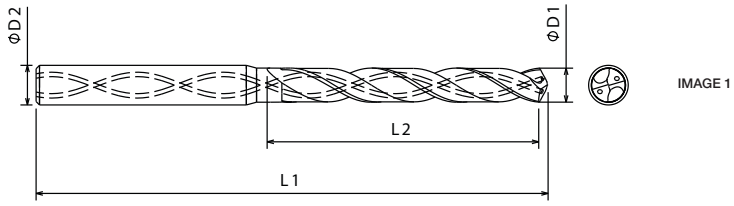


IMAGE 1

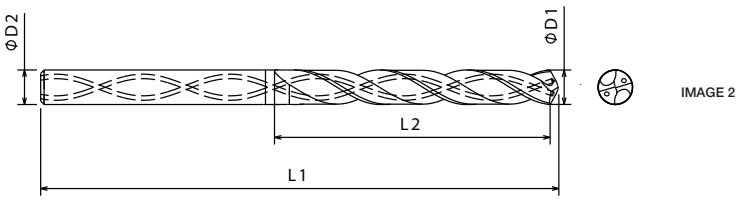


IMAGE 2

P0-P6
K1-K3
S1-S4
M1-M3

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
10.8	60	120	12	1	FBJ0501311
10.9	60	120	12	1	FBJ0501312
11.0	60	120	12	1	FBJ0501313
11.1	66	120	12	1	FBJ0501314
11.2	66	120	12	1	FBJ0501315
11.3	66	120	12	1	FBJ0501316
11.4	66	120	12	1	FBJ0501317
11.5	66	120	12	1	FBJ0501318
11.6	66	120	12	1	FBJ0501319
11.7	66	120	12	1	FBJ0501320
11.8	66	120	12	1	FBJ0501321
11.9	66	120	12	1	FBJ0501322
12.0	66	120	12	2	FBJ0501323
12.1	72	126	14	1	FBJ0501324
12.5	72	126	14	1	FBJ0501325
12.8	72	126	14	1	FBJ0501326
12.83	72	126	14	1	FBJ0501327
12.9	72	126	14	1	FBJ0501328
13.0	72	126	14	1	FBJ0501329
13.5	77	134	14	1	FBJ0501330
13.7	77	134	14	1	FBJ0501331

ØD1	L2	L1	ØD2	Image	EDP No
14.0	77	134	14	2	FBJ0501332
14.5	80	146	16	1	FBJ0501333
14.7	80	146	16	1	FBJ0501334
15.0	80	146	16	1	FBJ0501335
15.3	82	146	16	1	FBJ0501336
15.5	82	146	16	1	FBJ0501337
15.7	82	146	16	1	FBJ0501338
16.0	82	146	16	2	FBJ0501339
16.08	90	158	18	1	FBJ0501340
16.3	90	158	18	1	FBJ0501341
16.5	90	158	18	1	FBJ0501342
17.0	90	158	18	1	FBJ0501343
17.5	95	158	18	1	FBJ0501344
18.0	95	158	18	2	FBJ0501345
18.5	100	160	20	1	FBJ0501346
19.16	100	160	20	1	FBJ0501347
19.25	100	160	20	1	FBJ0501348
19.3	100	160	20	1	FBJ0501349
19.5	100	160	20	1	FBJ0501350
20.0	100	160	20	2	FBJ0501351

Application data on page no 4.018

Cutting parameters

Series 2TDCS/2TDCR METRIC

Workpiece Material Group			Cutting Speed Vc(m/min)			Recommended Feed in mm/rev											
						Tool Diameter (mm)											
					mm	3.00		6.00		10.00		12.00		16.0		20.0	
			min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	0	150	190	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		1	150	190	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	150	190	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		3	95	130	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		4	60	75	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		5	95	130	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		6	60	75	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
Stainless Steels	M	1	65	95	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	45	65	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		3	45	65	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
Cast Iron	K	1	150	190	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	106	129	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		3	106	129	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
Special Alloys	S	1	20	30	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		2	10	15	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		3	20	30	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		4	35	55	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191

#RPM = Vc x 318.18/Tool Dia. #mm/min = RPM x mm/rev

Series 2TDCS/2TDCR INCH

Workpiece Material Group			Cutting Speed Vc ft/min			Recommended Feed in inch/rev											
						Tool Diameter (Inch)											
					Inch	1/8		1/4		3/8		1/2		5/8		3/4	
			min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	0	492	623.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		1	492	623.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	492	623.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		3	312	426.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		4	197	246	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
		5	312	426.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		6	197	246	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
Stainless Steels	M	1	213	311.6	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	148	213.2	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
		3	148	213.2	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
Cast Iron	K	1	492	623.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	348	423.12	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		3	348	423.12	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
Special Alloys	S	1	66	98.4	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		2	33	49.2	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		3	66	98.4	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		4	115	180.4	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075

#RPM (N) = Vc (SFM) X 3.82/Tool Dia. #Vf (Inch/min) = RPM (N) x frev (inch/rev)

The technical data are based upon theoretical values and are only intended for planning purposes and may vary based on the application. Actual results will vary. No responsibility from Forbes and Company Limited or their distributors is assumed.

Drill tolerance

Details	Cutting Dia. "D1" Range	Cutting Dia. "D1" Tolerance h7 ANSI B4.2	Shank Dia. "D2"	Shank Tolerance h6 ANSI B4.2
2TDCS	3.00-6.00	0.00/-0.012	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.015	6.00-10.00	-0.009
	10.00-18.00	0.00/-0.018	10.00-18.00	-0.011
	20.00	0.00/-0.021	20.00	-0.013
2TDCR	3.00-6.00	0.00/-0.012	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.015	6.00-10.00	-0.009
	10.00-18.00	0.00/-0.018	10.00-18.00	-0.011
	20.00	0.00/-0.021	20.00	-0.013

7X Solid carbide 7X high performance drill with coolant feed

Carbide | LONG | 7X | 142° | 30° | TiAlN

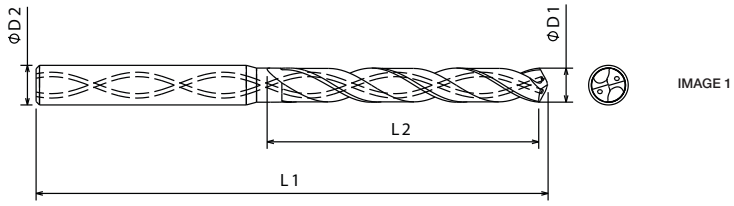


IMAGE 1

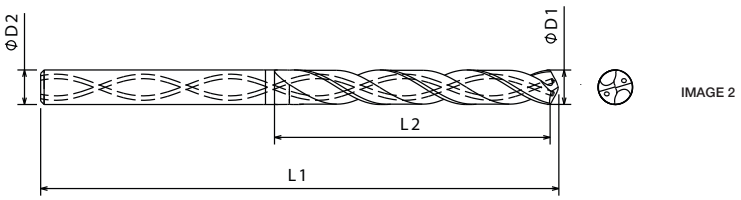


IMAGE 2

P0-P6
K1-K3
S1-S4
M1-M3

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
3.0	33	81	3	2	FBJ0501352
3.1	40	92	4	1	FBJ0501353
3.2	40	92	4	1	FBJ0501354
3.3	40	92	4	1	FBJ0501355
3.4	40	92	4	1	FBJ0501356
3.5	40	92	4	1	FBJ0501357
3.6	40	92	4	1	FBJ0501358
3.7	40	92	4	1	FBJ0501359
3.8	40	92	4	1	FBJ0501360
3.9	40	92	4	1	FBJ0501361
4.0	40	92	4	2	FBJ0501362
4.1	45	100	5	1	FBJ0501363
4.2	45	100	5	1	FBJ0501364
4.3	45	100	5	1	FBJ0501365
4.4	45	100	5	1	FBJ0501366
4.5	45	100	5	1	FBJ0501367
4.6	45	100	5	1	FBJ0501368
4.65	45	100	5	1	FBJ0505035
4.7	45	100	5	1	FBJ0501369
4.8	45	100	5	1	FBJ0501370
4.9	45	100	5	1	FBJ0501371
5.0	45	100	5	2	FBJ0501372
5.1	51	100	6	1	FBJ0501373
5.2	51	100	6	1	FBJ0501374

ØD1	L2	L1	ØD2	Image	EDP No
5.3	51	100	6	1	FBJ0501375
5.4	51	100	6	1	FBJ0501376
5.5	51	100	6	1	FBJ0501377
5.6	51	100	6	1	FBJ0505036
5.7	51	100	6	1	FBJ0501378
5.8	51	100	6	1	FBJ0501379
5.9	51	100	6	1	FBJ0501380
6.0	51	100	6	2	FBJ0501381
6.1	60	109	8	1	FBJ0501382
6.2	60	109	8	1	FBJ0501383
6.3	60	109	8	1	FBJ0501384
6.4	60	109	8	1	FBJ0501385
6.5	60	109	8	1	FBJ0501386
6.6	60	109	8	1	FBJ0501387
6.7	60	109	8	1	FBJ0501388
6.8	60	109	8	1	FBJ0501389
6.9	60	109	8	1	FBJ0501390
7.0	60	109	8	1	FBJ0501391
7.1	70	118	8	1	FBJ0501392
7.2	70	118	8	1	FBJ0501393
7.3	70	118	8	1	FBJ0501394
7.4	70	118	8	1	FBJ0501395
7.5	70	118	8	1	FBJ0501396
7.6	70	118	8	1	FBJ0501397

Application data on page no 4.021

7X Solid carbide 7X high performance drill with coolant feed

Carbide | LONG | 7X | 142° | 30° | TiAlN

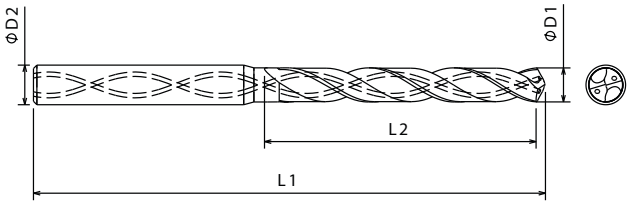


IMAGE 1

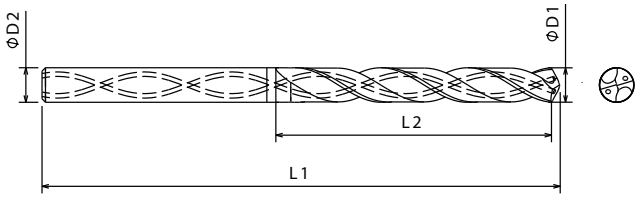


IMAGE 2

P0-P6
K1-K3
S1-S4
M1-M3

Unit : mm

ØD1	L2	L1	ØD2	Image	EDP No
7.7	70	118	8	1	FBJ0501398
7.8	70	118	8	1	FBJ0501399
7.9	70	118	8	1	FBJ0501400
8.0	70	118	8	2	FBJ0501401
8.1	80	127	10	1	FBJ0501402
8.2	80	127	10	1	FBJ0501403
8.3	80	127	10	1	FBJ0501404
8.4	80	127	10	1	FBJ0501405
8.5	80	127	10	1	FBJ0501406
8.6	80	127	10	1	FBJ0501407
8.7	80	127	10	1	FBJ0501408
8.8	80	127	10	1	FBJ0501409
8.9	80	127	10	1	FBJ0501410
9.0	80	127	10	1	FBJ0501411
9.1	85	136	10	1	FBJ0501412
9.2	85	136	10	1	FBJ0501413
9.25	85	136	10	1	FBJ0501414
9.3	85	136	10	1	FBJ0501415
9.4	85	136	10	1	FBJ0501416
9.5	85	136	10	1	FBJ0501417
9.6	85	136	10	1	FBJ0501418
9.7	85	136	10	1	FBJ0501419
9.8	85	136	10	1	FBJ0501420

ØD1	L2	L1	ØD2	Image	EDP No
9.9	85	136	10	1	FBJ0501421
10.0	85	136	10	2	FBJ0501422
10.1	93	149	12	1	FBJ0501423
10.2	93	149	12	1	FBJ0501424
10.3	93	149	12	1	FBJ0501425
10.4	93	149	12	1	FBJ0501426
10.5	93	149	12	1	FBJ0501427
10.6	93	149	12	1	FBJ0501428
10.7	93	149	12	1	FBJ0501429
10.8	93	149	12	1	FBJ0501430
10.9	93	149	12	1	FBJ0501431
11.0	93	149	12	1	FBJ0501432
11.1	102	155	12	1	FBJ0501433
11.2	102	155	12	1	FBJ0501434
11.3	102	155	12	1	FBJ0501435
11.4	102	155	12	1	FBJ0501436
11.5	102	155	12	1	FBJ0501437
11.6	102	155	12	1	FBJ0501438
11.7	102	155	12	1	FBJ0501439
11.8	102	155	12	1	FBJ0501440
11.9	102	155	12	1	FBJ0501441
12.0	102	155	12	2	FBJ0501442

Application data on page no 4.021

Cutting parameters

Series 2TDCL METRIC

Workpiece Material Group			Cutting Speed Vc(m/min)			Recommended Feed in mm/rev											
						Tool Diameter (mm)											
					mm	3.00		6.00		10.00		12.00		16.0		20.0	
			min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	0	160	180	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		1	160	180	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	160	180	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		3	85	115	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		4	50	70	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		5	85	115	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		6	50	70	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
Stainless Steels	M	1	55	85	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	40	60	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
		3	40	60	f rev	0.051	0.076	0.102	0.152	0.127	0.229	0.152	0.254	0.229	0.305	0.254	0.356
Cast Iron	K	1	160	180	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		2	106	129	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
		3	106	129	f rev	0.102	0.152	0.152	0.229	0.229	0.279	0.254	0.330	0.279	0.381	0.305	0.432
Special Alloys	S	1	20	30	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		2	10	15	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		3	20	30	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191
		4	35	55	f rev	0.015	0.025	0.032	0.064	0.070	0.102	0.090	0.127	0.120	0.152	0.160	0.191

#RPM(N) = Vc(m/min) X 318.18/Tool Dia. #Vf(mm/min) = RPM(N) X frev (mm/rev)

Series 2TDCL INCH

Workpiece Material Group			Cutting Speed Vc ft/min			Recommended Feed in inch/rev											
						Tool Diameter (Inch)											
					Inch	1/8		1/4		3/8		1/2		5/8		3/4	
			min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	0	525	590.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		1	525	590.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	525	590.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		3	279	377.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		4	164	229.6	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
		5	279	377.2	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		6	164	229.6	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
Stainless Steels	M	1	180	278.8	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	131	196.8	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
		3	131	196.8	f rev	0.0020	0.0030	0.0040	0.0060	0.0050	0.0090	0.0060	0.0100	0.0090	0.0120	0.0100	0.0140
Cast Iron	K	1	525	590.4	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		2	348	423.12	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
		3	348	423.12	f rev	0.0040	0.0060	0.0060	0.0090	0.0090	0.0110	0.0100	0.0130	0.0110	0.0150	0.0120	0.0170
Special Alloys	S	1	66	98.4	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		2	33	49.2	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		3	66	98.4	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075
		4	115	180.4	f rev	0.0006	0.0010	0.0013	0.0025	0.0028	0.0040	0.0035	0.0050	0.0047	0.0060	0.0063	0.0075

#RPM (N) = Vc (SFM) X 3.82/Tool Dia. #Vf (Inch/min) = RPM (N) x frev (inch/rev)

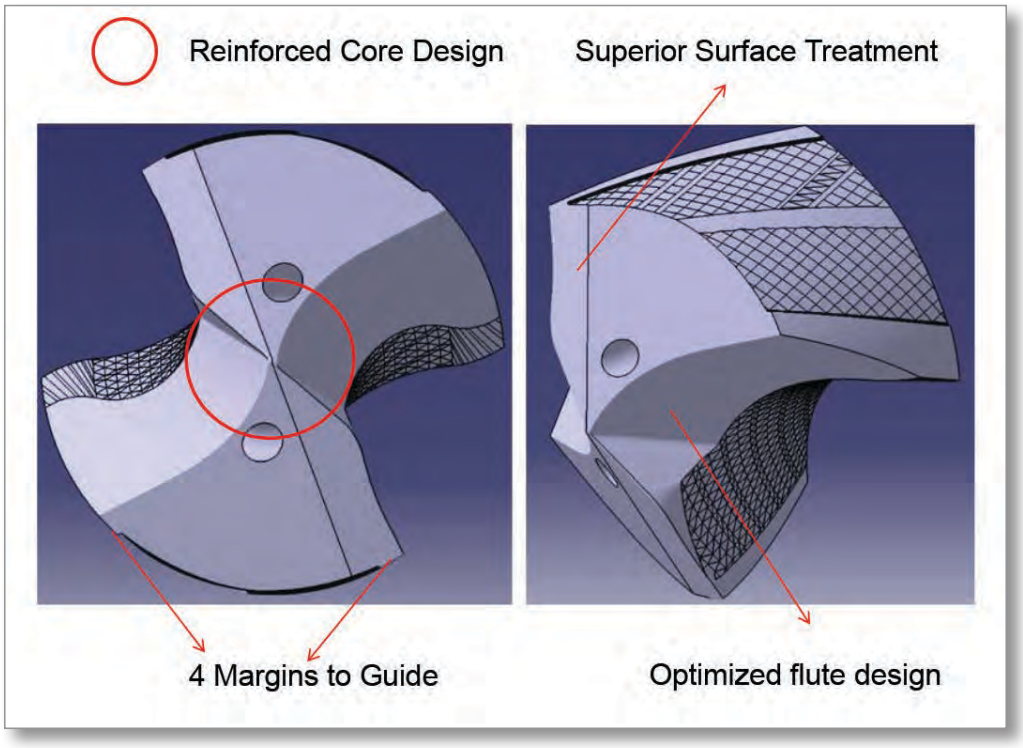
Drill tolerance

Details	Cutting Dia. "D1" Range	Cutting Dia. "D1" Tolerance h7 ANSI B4.2	Shank Dia. "D2"	Shank Tolerance h6 ANSI B4.2
2TDCL	3.00-6.00	0.00/-0.012	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.015	6.00-10.00	-0.009
	10.00-12.00	0.00/-0.018	10.00-12.00	-0.011

Deep hole drilling

Features
- Reinforced Core Design
- Superior Surface Treatment
- 4 Margins to Guide
- High Performance Coating
- Optimized Flute Design

Benefits
- Stable cutting edge
- Better Chip Evacuation
- Better Hole Straightness
- Superior Tool Life
- Eliminated Breakages



Case studies

Challenge	Reduction in CPC
Component	Crank Shaft
Material	Forged Steel- 30 HRc
Competition	Mitsubishi
Solution	DRILL 8.00MMX240X290 SH8 T/C DHD PT
Machine	HMC
Vc	80m/min
RPM	3200
Feed in mm/min	230 @ entry/ 350 /220 @ exit
Depth	160 X 1 Hole
Existing Tool Life	64 meters
Tool Life Achieved	66 meters
Result	Better tool Life
Benefit	15% reduction in CPC

Challenge	Reduction in breakage of oil hole drill
Component	Crankshaft 4 Cyliner
Material	Forged Steel
Competition	Guhring
Solution	DRILL 5.50MMX84X125 SH6 T/C DHD PT
Machine	SPM
Vc	65m/min
RPM	3760
Feed in mm/min	200 @ entry/ 500 /1000 @ exit
Depth	78 X 4 Holes
Existing Tool Life	187 meters
Tool Life Achieved	190 meters
Result	No Breakage
Benefit	10% reduction in CPC

Challenge	Reduce burr folding at exit
Component	Cylinder Head
Material	Aluminium ADC-7% Si
Competition	OSG Korea
Solution	DRILL 6.00MMX118X175 SH6 T/C DHD
Machine	HMC HSK63A
Vc	188m/min
RPM	10000
Feed in mm/min	500 @ entry/ 1200 /500 @ exit
Depth	80 X 4 Holes
Existing Tool Life	800 meters
Tool Life Achieved	800 meters
Result	Negligible wear and burr folding
Benefit	10% reduction in CPC

Challenge	Reduction in breakage of oil hole drill
Component	Crankshaft 2 Cyliner
Material	Forged Steel SAE 1541B
Competition	Sumitomo
Solution	DRILL 4.97X115X165MM SH5 T/C DHD PT
Machine	HMC
Vc	73m/min
RPM	4700
Feed in mm/min	200 @ entry/ 700 /500 @ exit
Depth	95 X 2 Holes
Existing Tool Life	34.2 meters
Tool Life Achieved	38 meters
Result	No Breakage
Benefit	10% reduction in CPC

Challenge	Reduction in CPC
Component	Crankshaft 4 Cyliner
Material	Forged Steel 38 MnSiV6 30-32 HRc
Competition	OSG
Solution	DRILL 6.00MMX115X 165 SH6 T/C DHD PT
Machine	Angular SPM
Vc	55m/min
RPM	2400
Feed in mm/min	150 @ entry/ 450 /150 @ exit
Depth	85 X 4 Holes
Existing Tool Life	150 meters
Tool Life Achieved	162 meters
Result	No Breakage
Benefit	10% reduction in CPC

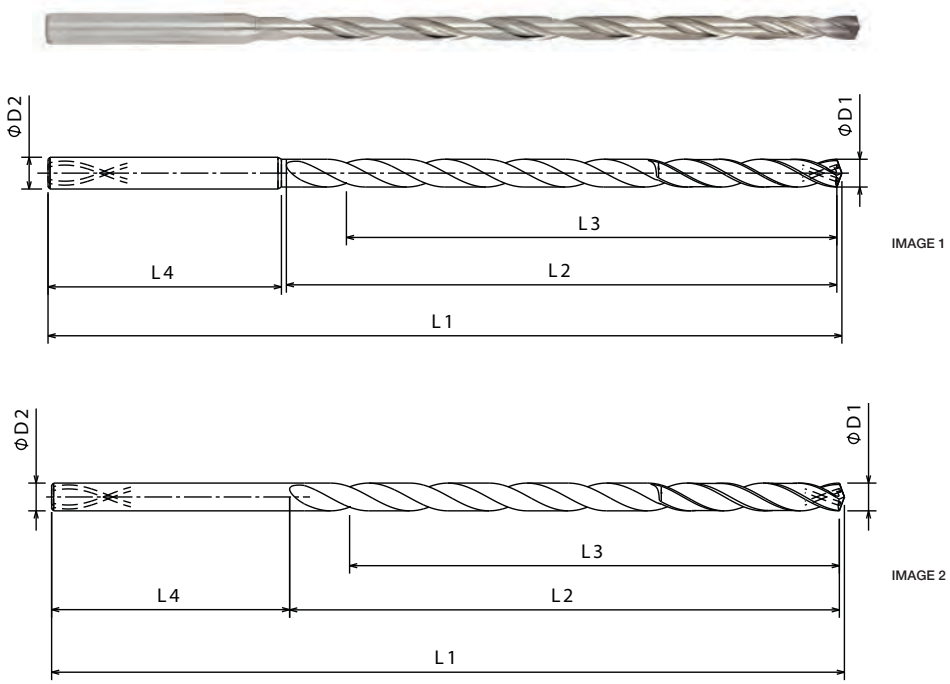
Challenge	Reduction in CPC
Component	Crankshaft 6 Cyliner
Material	Forged Steel 38 MnSiV6 30-32 HRc
Competition	OSG
Solution	DRILL 7.00MMX110X160 SH8 T/C DHD PT
Machine	Angular SPM
Vc	55m/min
RPM	2800
Feed in mm/min	150 @ entry/ 500 /150 @ exit
Depth	80 X 4 Holes
Existing Tool Life	150 meters
Tool Life Achieved	172 meters
Result	No Breakage
Benefit	15% reduction in CPC

Challenge	Reduction in CPC
Component	Crankshaft 4 Cyliner
Material	Forged Steel EN19B 280-320 BHN
Competition	OSG
Solution	DRILL 5.95MMX120X 192 SH6 T/C DHD PT
Machine	HMC
Vc	55m/min
RPM	2934
Feed in mm/min	150 @ entry/ 480 /150 @ exit
Depth	105 X 4 Holes
Existing Tool Life	110 meters
Tool Life Achieved	124 meters
Result	No Breakage
Benefit	10% reduction in CPC

Challenge	Reduction in CPC
Component	Cam Shaft
Material	Forged Steel 16MnCr5 20-25 HRc
Competition	Walter
Solution	DRILL 7.00MMX110X 160 SH8 T/C DHD PT
Machine	SPM
Vc	55m/min
RPM	2500
Feed in mm/min	400 @ entry/ 550 /400 @ exit
Depth	68 X 1 Holes
Existing Tool Life	68 meters
Tool Life Achieved	123 meters
Result	No Breakage
Benefit	50% reduction in CPC

12X Solid carbide 12X high performance deep hole drill with coolant feed

Carbide | DHD | 12X | 142° | 30°



P0-P4
M1-M3
K1-K3
N1-N2

Unit : mm

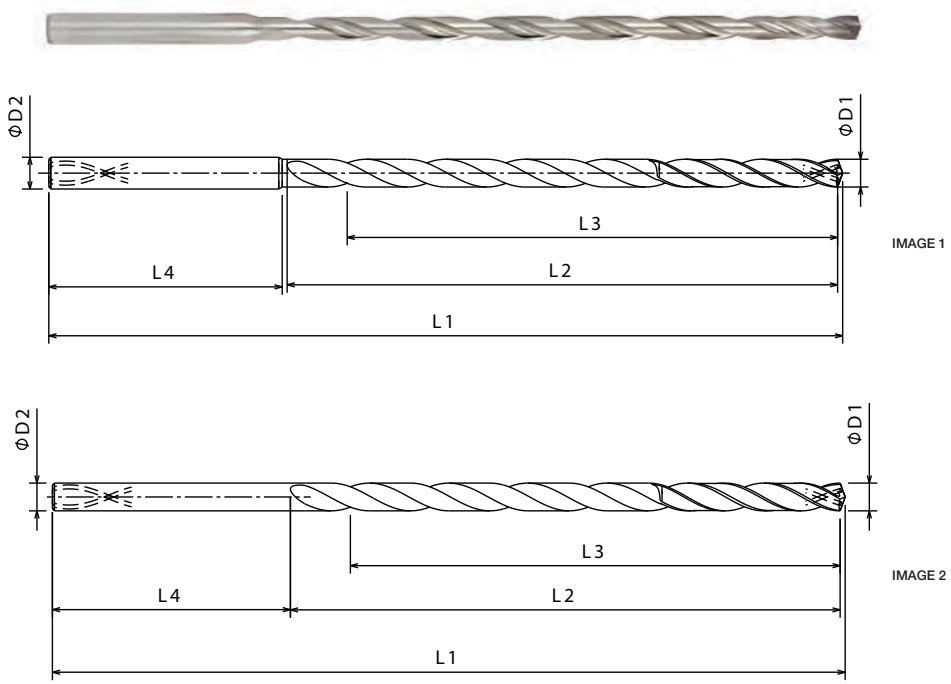
Diameter	Flute Length	Cutting Length	Overall Length	Shank Lenght	Shank Diameter	Image	Bright - Polished	TiAlN
ØD1	L2	L3	L1	L4	D2		EDP No	EDP No
3.00	52	44	93	36	4	1	FBJ0504114	FBJ0504035
3.175	52	44	93	36	4	1	FBJ0504115	FBJ0504036
3.264	53	44	93	36	4	1	FBJ0504116	FBJ0504037
3.50	53	44	93	36	4	1	FBJ0504117	FBJ0504038
3.970	66	56	107	36	4	1	FBJ0504118	FBJ0504039
4.00	66	56	107	36	6	1	FBJ0504119	FBJ0504040
4.50	67	56	107	36	6	1	FBJ0504120	FBJ0504041
4.60	68	57	107	36	6	1	FBJ0504121	FBJ0504042
4.763	82	69	125	36	6	1	FBJ0504122	FBJ0504043
4.80	82	69	125	36	6	1	FBJ0504123	FBJ0504044
4.90	83	70	125	36	6	1	FBJ0504124	FBJ0504045
5.00	83	70	125	36	6	1	FBJ0504125	FBJ0504046
5.10	83	70	125	36	6	1	FBJ0504126	FBJ0504047
5.20	83	70	125	36	6	1	FBJ0504127	FBJ0504048
5.30	84	71	125	36	6	1	FBJ0504128	FBJ0504049
5.41	84	71	125	36	6	1	FBJ0504129	FBJ0504050
5.50	84	71	125	36	6	1	FBJ0504130	FBJ0504051
5.558	84	71	125	36	6	1	FBJ0504131	FBJ0504052
5.60	85	72	125	36	6	1	FBJ0504132	FBJ0504053
5.70	85	72	125	36	6	1	FBJ0504133	FBJ0504054

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills

12X Solid carbide 12X high performance deep hole drill with coolant feed

Carbide | DHD | 12X | 142° | 30°



P0-P4
M1-M3
K1-K3
N1-N2

Unit : mm

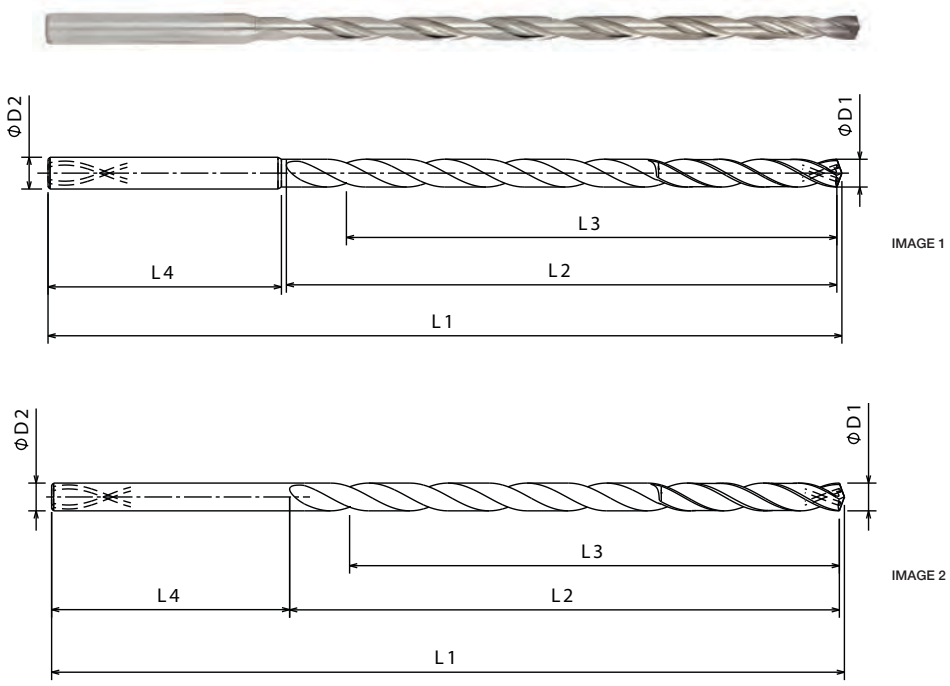
Diameter	Flute Length	Cutting Length	Overall Length	Shank Lenght	Shank Diameter	Image	Bright - Polished	TiAlN
ØD1	L2	L3	L1	L4	D2		EDP No	EDP No
5.80	85	71	125	36	6	1	FBJ0504134	FBJ0504055
5.90	85	71	125	36	6	1	FBJ0504135	FBJ0504056
6.00	86	72	125	36	6	2	FBJ0504136	FBJ0504057
6.20	97	82	139	36	8	1	FBJ0504137	FBJ0504058
6.35	98	83	139	36	8	1	FBJ0504138	FBJ0504059
6.50	98	83	139	36	8	1	FBJ0504139	FBJ0504060
6.528	98	83	139	36	8	1	FBJ0504140	FBJ0504061
6.60	99	84	139	36	8	1	FBJ0504141	FBJ0504062
6.746	99	83	139	36	8	1	FBJ0504142	FBJ0504063
6.80	99	83	139	36	8	1	FBJ0504143	FBJ0504064
6.909	100	84	139	36	8	1	FBJ0504144	FBJ0504065
7.00	100	84	139	36	8	1	FBJ0504145	FBJ0504066
7.145	111	94	153	36	8	1	FBJ0504146	FBJ0504067
7.50	112	95	153	36	8	1	FBJ0504147	FBJ0504068
7.541	112	95	153	36	8	1	FBJ0504148	FBJ0504069
7.70	113	96	153	36	8	1	FBJ0504149	FBJ0504070
7.80	113	95	153	36	8	1	FBJ0504150	FBJ0504071
7.938	114	96	153	36	8	1	FBJ0504151	FBJ0504072
8.00	114	96	153	36	8	2	FBJ0504152	FBJ0504073
8.10	136	116	185	40	10	1	FBJ0504153	FBJ0504074

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills

12X Solid carbide 12X high performance deep hole drill with coolant feed

Carbide | DHD | 12X | 142° | 30°



P0-P4
M1-M3
K1-K3
N1-N2

Unit : mm

Diameter	Flute Length	Cutting Length	Overall Length	Shank Lenght	Shank Diameter	Image	Bright - Polished	TiAlN
ØD1	L2	L3	L1	L4	D2		EDP No	EDP No
8.334	137	117	185	40	10	1	FBJ0504154	FBJ0504075
8.433	137	117	185	40	10	1	FBJ0504155	FBJ0504076
8.50	137	117	185	40	10	1	FBJ0504156	FBJ0504077
8.70	138	118	185	40	10	1	FBJ0504157	FBJ0504078
8.733	138	117	185	40	10	1	FBJ0504158	FBJ0504079
9.00	139	118	185	40	10	1	FBJ0504159	FBJ0504080
9.10	139	118	185	40	10	1	FBJ0504160	FBJ0504081
9.129	139	118	185	40	10	1	FBJ0504161	FBJ0504082
9.50	140	119	185	40	10	1	FBJ0504162	FBJ0504083
9.525	140	119	185	40	10	1	FBJ0504163	FBJ0504084
9.921	142	120	185	40	10	1	FBJ0504164	FBJ0504085
10.00	142	120	185	40	10	2	FBJ0504165	FBJ0504086
10.20	164	140	218	45	12	1	FBJ0504166	FBJ0504087
10.30	165	141	218	45	12	1	FBJ0504167	FBJ0504088
10.32	165	141	218	45	12	1	FBJ0504168	FBJ0504089
10.50	165	141	218	45	12	1	FBJ0504169	FBJ0504090
10.716	166	142	218	45	12	1	FBJ0504170	FBJ0504091
10.80	166	141	218	45	12	1	FBJ0504171	FBJ0504092
11.00	167	142	218	45	12	1	FBJ0504172	FBJ0504093

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills

12X Solid carbide 12X high performance deep hole drill with coolant feed

Carbide | DHD | 12X | 142° | 30°

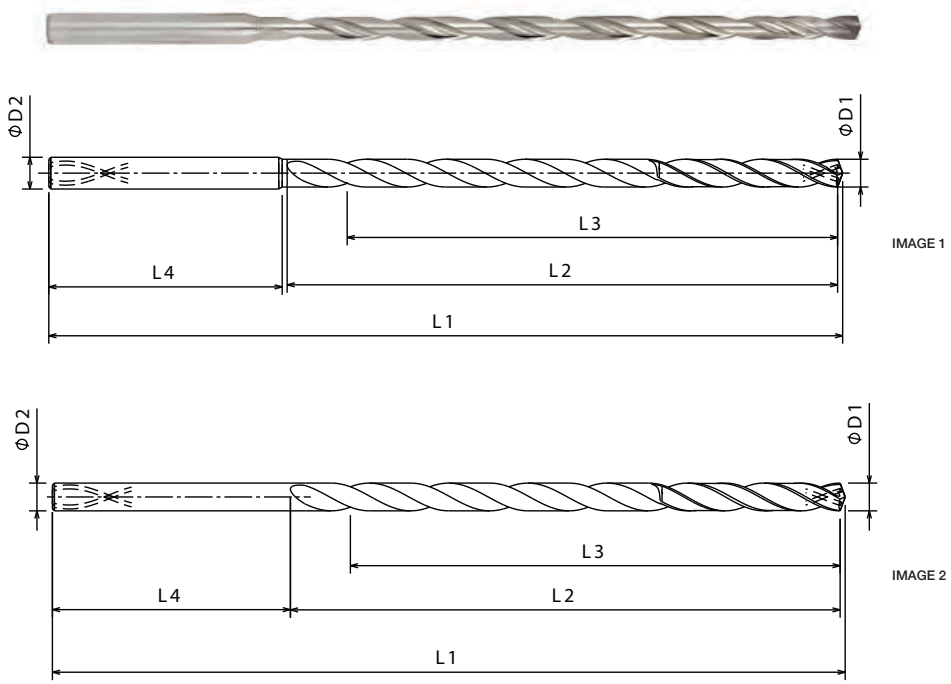


IMAGE 1

IMAGE 2

P0-P4
M1-M3
K1-K3
N1-N2

Unit : mm

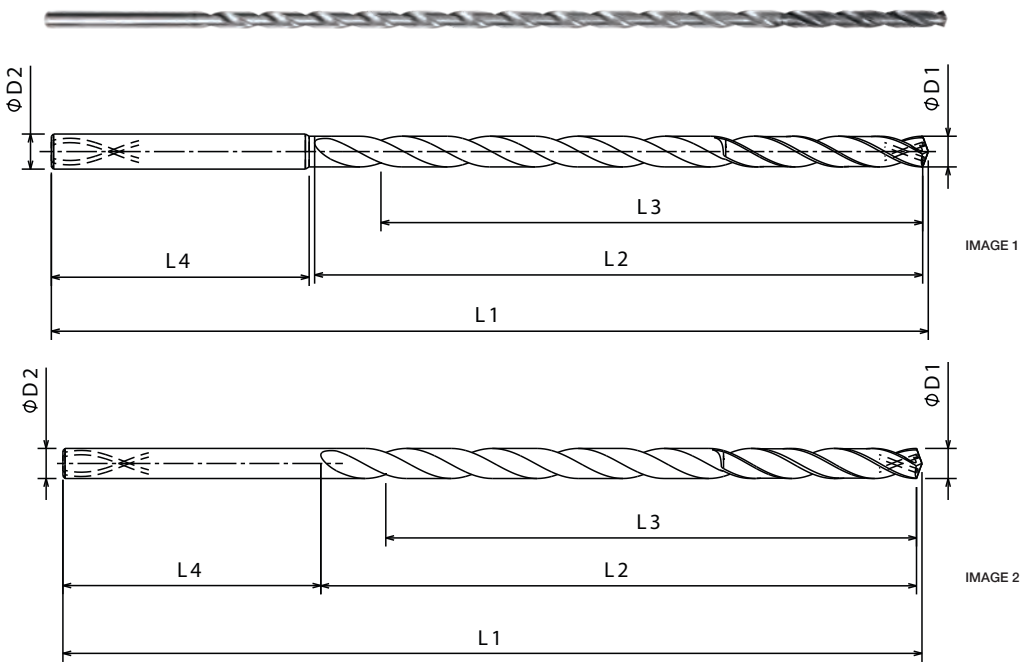
Diameter	Flute Length	Cutting Length	Overall Length	Shank Lenght	Shank Diameter	Image	Bright - Polished	TiAlN
ØD1	L2	L3	L1	L4	D2		EDP No	EDP No
11.113	167	142	218	45	12	1	FBJ0504173	FBJ0504094
11.50	168	143	218	45	12	1	FBJ0504174	FBJ0504095
11.80	169	143	218	45	12	1	FBJ0504175	FBJ0504096
12.00	170	144	218	45	12	2	FBJ0504176	FBJ0504097
12.10	192	164	246	45	14	1	FBJ0504177	FBJ0504098
12.304	193	165	246	45	14	1	FBJ0504178	FBJ0504099
12.50	193	165	246	45	14	1	FBJ0504179	FBJ0504100
12.70	194	166	246	45	14	1	FBJ0504180	FBJ0504101
13.00	195	166	246	45	14	1	FBJ0504181	FBJ0504102
13.10	195	166	246	45	14	1	FBJ0504182	FBJ0504103
13.50	196	167	246	45	14	1	FBJ0504183	FBJ0504104
14.00	198	168	246	45	14	2	FBJ0504184	FBJ0504105
14.10	220	188	277	48	16	1	FBJ0504185	FBJ0504106
14.288	220	188	277	48	16	1	FBJ0504186	FBJ0504107
14.50	221	189	277	48	16	1	FBJ0504187	FBJ0504108
14.684	222	190	277	48	16	1	FBJ0504188	FBJ0504109
15.00	223	190	277	48	16	1	FBJ0504189	FBJ0504110
15.50	224	191	277	48	16	1	FBJ0504190	FBJ0504111
15.875	225	192	277	48	16	1	FBJ0504191	FBJ0504112
16.00	226	192	277	48	16	2	FBJ0504192	FBJ0504113

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills

15X Solid carbide 15X high performance deep hole drill with coolant feed

Carbide | DHD | 15X | 142° | 30°



P0-P4
M1-M3
K1-K3
N1-N2

Unit : mm

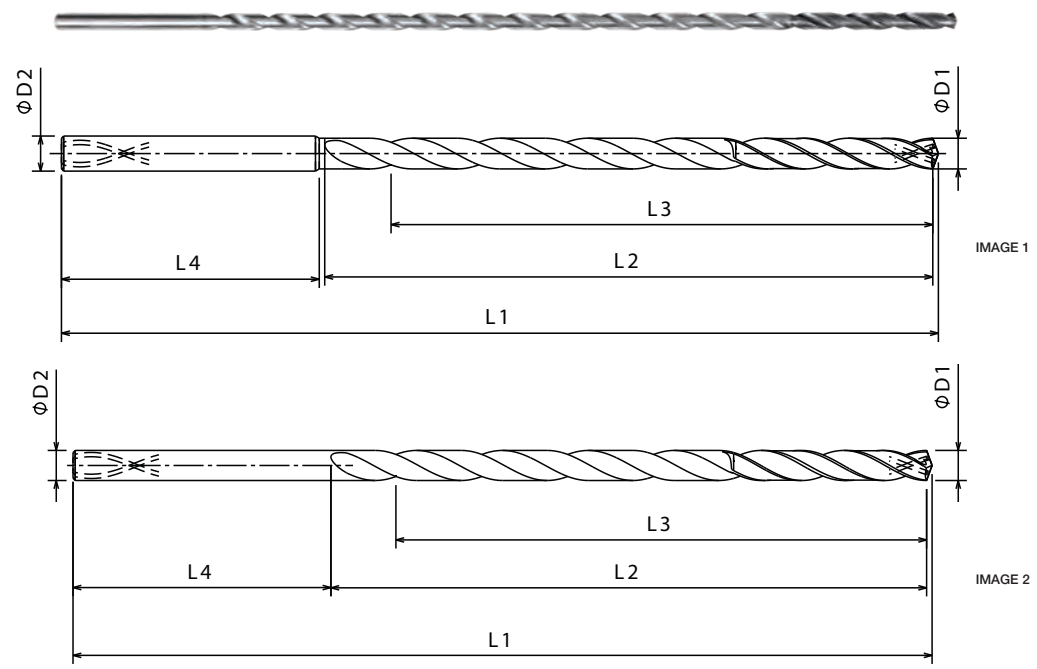
Diameter	Flute Length	Cutting Length	Overall Length	Shank Lenght	Shank Diameter	Image	Bright - Polished	TiAlN
ØD1	L2	L3	L1	L4	D2		EDP No	EDP No
3.00	67	58	105	32	4	1	FBJ0504245	FBJ0504193
3.175	67	58	105	32	4	1	FBJ0504246	FBJ0504194
3.20	67	58	105	32	4	1	FBJ0504247	FBJ0504195
3.50	68	59	105	32	4	1	FBJ0504248	FBJ0504196
3.970	70	60	105	32	4	1	FBJ0504249	FBJ0504197
4.00	70	60	105	32	6	1	FBJ0504250	FBJ0504198
4.50	85	74	124	34	6	1	FBJ0504251	FBJ0504199
4.623	86	75	124	34	6	1	FBJ0504252	FBJ0504200
4.763	86	75	124	34	6	1	FBJ0504253	FBJ0504201
4.90	87	75	124	34	6	1	FBJ0504254	FBJ0504202
5.00	87	75	124	34	6	1	FBJ0504255	FBJ0504203
5.260	102	89	143	36	6	1	FBJ0504256	FBJ0504204
5.41	102	89	143	36	6	1	FBJ0504257	FBJ0504205
5.50	102	89	143	36	6	1	FBJ0504258	FBJ0504206
5.558	102	89	143	36	6	1	FBJ0504259	FBJ0504207
5.80	103	89	143	36	6	1	FBJ0504260	FBJ0504208
5.90	104	90	143	36	6	1	FBJ0504261	FBJ0504209
6.00	104	90	143	36	6	2	FBJ0504262	FBJ0504210

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills

15X Solid carbide 15X high performance deep hole drill with coolant feed

Carbide | DHD | 15X | 142° | 30°



P0-P4
M1-M3
K1-K3
N1-N2

DRILLS

Unit : mm

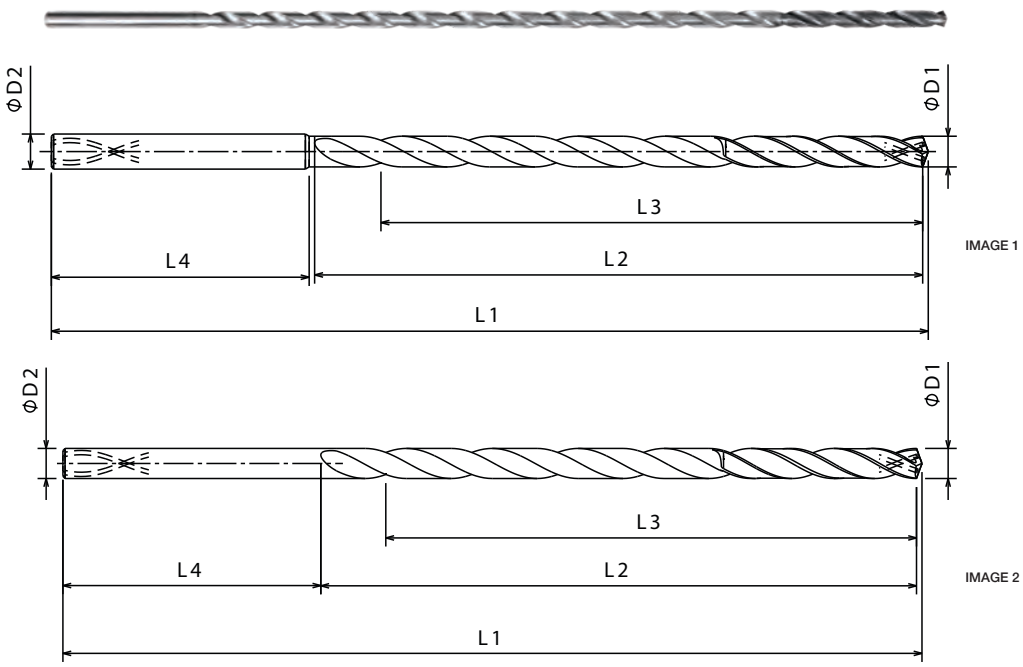
Diameter	Flute Length	Cutting Length	Overall Length	Shank Lenght	Shank Diameter	Image	Bright - Polished	TiAlN
Ø D1	L2	L3	L1	L4	D2		EDP No	EDP No
6.20	118	103	162	38	8	1	FBJ0504263	FBJ0504211
6.35	119	104	162	38	8	1	FBJ0504264	FBJ0504212
6.50	119	104	162	38	8	1	FBJ0504265	FBJ0504213
6.528	119	104	162	38	8	1	FBJ0504266	FBJ0504214
6.746	120	104	162	38	8	1	FBJ0504267	FBJ0504215
6.909	121	105	162	38	8	1	FBJ0504268	FBJ0504216
7.00	121	105	162	38	8	1	FBJ0504269	FBJ0504217
7.145	135	118	181	40	8	1	FBJ0504270	FBJ0504218
7.50	136	119	181	40	8	1	FBJ0504271	FBJ0504219
7.541	136	119	181	40	8	1	FBJ0504272	FBJ0504220
7.938	138	120	181	40	8	1	FBJ0504273	FBJ0504221
8.00	138	120	181	40	8	2	FBJ0504274	FBJ0504222
8.334	153	134	200	42	10	1	FBJ0504275	FBJ0504223
8.433	153	134	200	42	10	1	FBJ0504276	FBJ0504224
8.50	153	134	200	42	10	1	FBJ0504277	FBJ0504225
8.733	154	134	200	42	10	1	FBJ0504278	FBJ0504226
9.00	155	135	200	42	10	1	FBJ0504279	FBJ0504227

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills

15X Solid carbide 15X high performance deep hole drill with coolant feed

Carbide | DHD | 15X | 142° | 30°



P0-P4
M1-M3
K1-K3
N1-N2

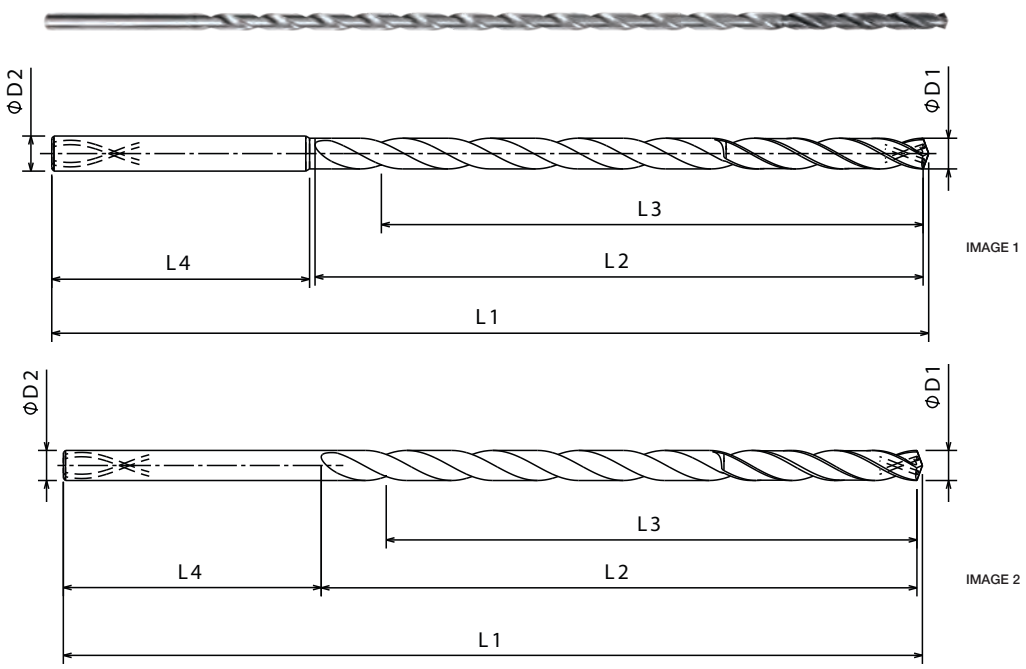
Unit : mm

Diameter	Flute Length	Cutting Length	Overall Length	Shank Lenght	Shank Diameter	Image	Bright - Polished	TiAlN
ØD1	L2	L3	L1	L4	D2		EDP No	EDP No
9.10	169	148	219	44	10	1	FBJ0504280	FBJ0504228
9.50	170	149	219	44	10	1	FBJ0504281	FBJ0504229
9.525	170	149	219	44	10	1	FBJ0504282	FBJ0504230
9.75	171	149	219	44	10	1	FBJ0504283	FBJ0504231
10.00	172	150	219	44	10	2	FBJ0504284	FBJ0504232
10.20	186	163	238	46	12	1	FBJ0504285	FBJ0504233
10.50	187	164	238	46	12	1	FBJ0504286	FBJ0504234
10.72	188	165	238	46	12	1	FBJ0504287	FBJ0504235
11.00	189	165	238	46	12	1	FBJ0504288	FBJ0504236
11.50	204	179	257	48	12	1	FBJ0504289	FBJ0504237
12.00	206	180	257	48	12	2	FBJ0504290	FBJ0504238
12.50	221	194	276	50	14	1	FBJ0504291	FBJ0504239
12.70	222	195	276	50	14	1	FBJ0504292	FBJ0504240
13.00	223	195	276	50	14	1	FBJ0504293	FBJ0504241
13.10	237	208	295	52	14	1	FBJ0504294	FBJ0504242
13.50	238	209	295	52	14	1	FBJ0504295	FBJ0504243
14.00	240	210	295	52	14	2	FBJ0504296	FBJ0504244

Application data on page no 4.034
Note: Use DHD drills with Forbes PA150 pilot drills

20X Solid carbide 20X high performance deep hole drill with coolant feed

Carbide | DHD | 20X | 142° | 30°



P0-P4
M1-M3
K1-K3
N1-N2

DRILLS

Unit : mm

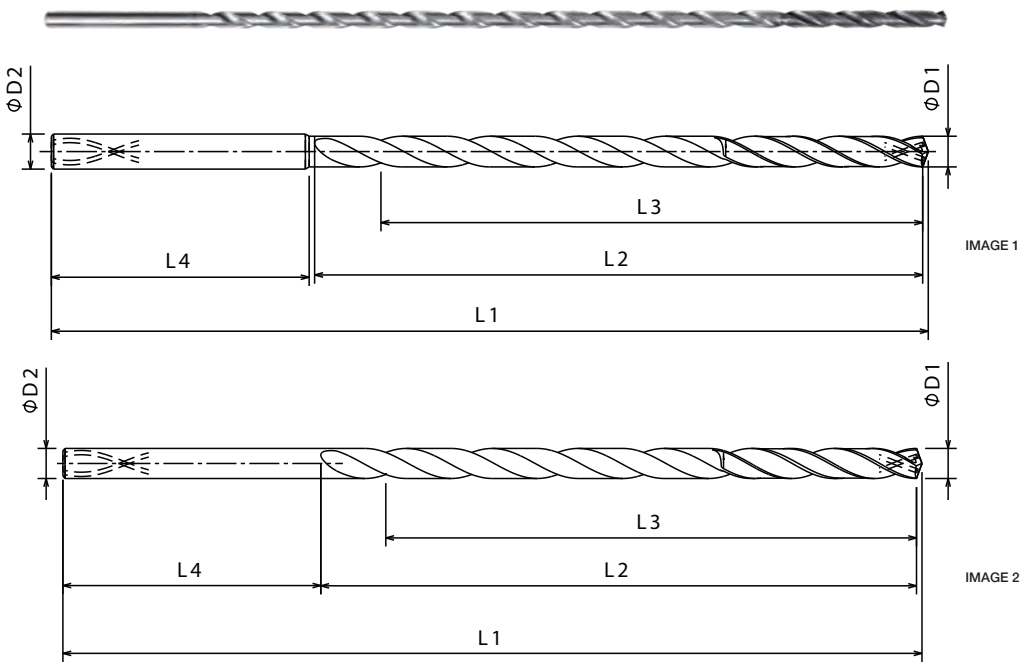
Diameter	Flute Length	Cutting Length	Overall Length	Shank Lenght	Shank Diameter	Image	Bright - Polished	TiAlN
ØD1	L2	L3	L1	L4	D2		EDP No	EDP No
3.00	83	74	125	32	4	1	FBJ0504341	FBJ0504297
3.175	83	74	125	32	4	1	FBJ0504342	FBJ0504298
3.30	84	75	125	32	4	1	FBJ0504343	FBJ0504299
3.50	86	77	125	32	4	1	FBJ0504344	FBJ0504300
3.97	89	79	125	32	4	1	FBJ0504345	FBJ0504301
4.00	90	80	125	32	6	1	FBJ0504346	FBJ0504302
4.50	108	97	149	34	6	1	FBJ0504347	FBJ0504303
4.623	109	98	149	34	6	1	FBJ0504348	FBJ0504304
4.763	110	99	149	34	6	1	FBJ0504349	FBJ0504305
4.90	112	100	149	34	6	1	FBJ0504350	FBJ0504306
5.00	112	100	149	34	6	1	FBJ0504351	FBJ0504307
5.26	128	115	173	36	6	1	FBJ0504352	FBJ0504308
5.41	129	116	173	36	6	1	FBJ0504353	FBJ0504309
5.50	130	117	173	36	6	1	FBJ0504354	FBJ0504310
5.558	130	117	173	36	6	1	FBJ0504355	FBJ0504311

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills

20X Solid carbide 20X high performance deep hole drill with coolant feed

Carbide | DHD | 20X | 142° | 30°



P0-P4
M1-M3
K1-K3
N1-N2

Unit : mm

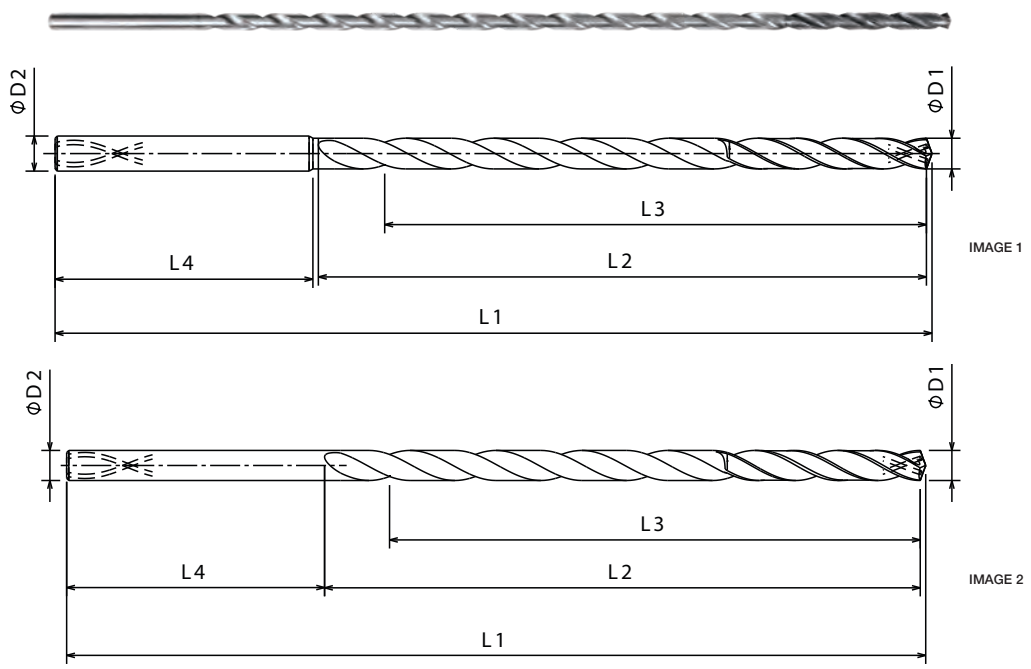
Diameter	Flute Length	Cutting Length	Overall Length	Shank Lenght	Shank Diameter	Image	Bright - Polished	TiAlN
Ø D1	L2	L3	L1	L4	D2		EDP No	EDP No
5.80	132	118	173	36	6	1	FBJ0504356	FBJ0504312
5.90	134	120	173	36	6	1	FBJ0504357	FBJ0504313
6.00	134	120	173	36	6	2	FBJ0504358	FBJ0504314
6.20	149	134	197	38	8	1	FBJ0504359	FBJ0504315
6.35	151	136	197	38	8	1	FBJ0504360	FBJ0504316
6.50	152	137	197	38	8	1	FBJ0504361	FBJ0504317
6.528	152	137	197	38	8	1	FBJ0504362	FBJ0504318
6.746	154	138	197	38	8	1	FBJ0504363	FBJ0504319
6.909	155	139	197	38	8	1	FBJ0504364	FBJ0504320
7.00	156	140	197	38	8	1	FBJ0504365	FBJ0504321
7.145	171	154	221	40	8	1	FBJ0504366	FBJ0504322
7.50	174	157	221	40	8	1	FBJ0504367	FBJ0504323
7.541	174	157	221	40	8	1	FBJ0504368	FBJ0504324
7.938	177	159	221	40	8	1	FBJ0504369	FBJ0504325
8.00	178	160	221	40	8	2	FBJ0504370	FBJ0504326

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills

20X Solid carbide 20X high performance deep hole drill with coolant feed

Carbide | DHD | 20X | 142° | 30°



P0-P4
M1-M3
K1-K3
N1-N2

Unit : mm

Diameter	Flute Length	Cutting Length	Overall Length	Shank Lenght	Shank Diameter	Image	Bright - Polished	TiAlN
ØD1	L2	L3	L1	L4	D2		EDP No	EDP No
8.334	194	175	245	42	10	1	FBJ0504371	FBJ0504327
8.433	195	176	245	42	10	1	FBJ0504372	FBJ0504328
8.50	196	177	245	42	10	1	FBJ0504373	FBJ0504329
8.733	198	178	245	42	10	1	FBJ0504374	FBJ0504330
9.00	200	180	245	42	10	1	FBJ0504375	FBJ0504331
9.10	215	194	269	44	10	1	FBJ0504376	FBJ0504332
9.50	218	197	269	44	10	1	FBJ0504377	FBJ0504333
9.525	218	197	269	44	10	1	FBJ0504378	FBJ0504334
9.75	220	198	269	44	10	1	FBJ0504379	FBJ0504335
10.00	222	200	269	44	10	2	FBJ0504380	FBJ0504336
10.20	237	214	293	46	12	1	FBJ0504381	FBJ0504337
10.50	240	217	293	46	12	1	FBJ0504382	FBJ0504338
10.72	242	219	293	46	12	1	FBJ0504383	FBJ0504339
11.00	244	220	293	46	12	1	FBJ0504384	FBJ0504340

Application data on page no 4.034

Note: Use DHD drills with Forbes PA150 pilot drills

Cutting parameters

Series DHD-12X/DHD-15X/DHD-20X METRIC TiAlN

Workpiece Material Group			Cutting Speed Vc(m/min)			Recommended feed in mm/rev													
						Diameter in mm													
					mm	3.00		4.00		6.00		8.00		10.0		12.0		16.0	
			min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	0	50	80	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
		1	50	80	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
		2	50	80	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
		3	40	60	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
		4	40	60	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
Stainless Steels	M	1	40	60	f rev	0.05	0.09	0.07	0.12	0.09	0.14	0.10	0.15	0.11	0.16	0.12	0.17	0.14	0.19
		2	30	50	f rev	0.04	0.08	0.06	0.11	0.08	0.13	0.09	0.14	0.10	0.15	0.11	0.16	0.13	0.18
		3	30	50	f rev	0.04	0.08	0.06	0.11	0.08	0.13	0.09	0.14	0.10	0.15	0.11	0.16	0.13	0.18
Cast Iron	K	1	60	100	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
		2	60	80	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24
		3	60	80	f rev	0.10	0.12	0.12	0.13	0.14	0.16	0.16	0.18	0.18	0.20	0.20	0.22	0.22	0.24

Series DHD-12X/DHD-15X/DHD-20X Bright METRIC

Workpiece Material Group			Cutting Speed Vc(m/min)			Recommended feed in mm/rev													
						Diameter in mm													
					mm	3.00		4.00		6.00		8.00		10.0		12.0		16.0	
			min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Non Ferrous	N	1	120	300	f rev	0.12	0.17	0.13	0.18	0.15	0.24	0.19	0.29	0.26	0.35	0.31	0.4	0.41	0.51
		2	120	300	f rev	0.12	0.17	0.13	0.18	0.15	0.24	0.19	0.29	0.26	0.35	0.31	0.4	0.41	0.51

#RPM(N) = Vc(m/min) X 318.18/Tool Dia. #Vf(mm/min) = RPM(N) X frev (mm/rev)

The technical data are based upon theoretical values and are only intended for planning purposes and may vary based on the application. Actual results will vary. No responsibility from Forbes and Company Limited or their distributors is assumed.

Case studies

Challenge	Reduction in CPC
Component	Crank Shaft
Material	Forged Steel SAE1541
Competition	OSG
Solution	DRILL 5.00MMX135X185 SH6 T/C DHD PT
Machine	SPM
Vc	59m/min
RPM	3800
Feed in mm/min	150 @ entry/ 480/150 @ exit
Depth	105 X 2 Holes
Existing Tool Life	26 meters
Tool Life Achieved	32 meters
Result	No Breakage
Benefit	10% reduction in CPC

Challenge	Reduction in CPC
Component	Crank Shaft
Material	Forged Steel 35 HRc
Competition	Mitsubishi/Sumitomo/Walter
Solution	DRILL 5.97MMX160X210 SH6 T/C DHD PT
Machine	HMC
Vc	66m/min
RPM	3500
Feed in mm/min	420mm/min
Depth	138 X 6 Holes
Existing Tool Life	33 meters
Tool Life Achieved	33 meters
Result	No Breakage
Benefit	10% reduction in CPC

Drill tolerance

Details	Cutting Dia. "D1" Range	Cutting Dia. "D1" Tolerance h7 ANSI B4.2	Shank Dia. "D2"	Shank Tolerance h6 ANSI B4.2
DHD 12X	3.00-6.00	-0.020/-0.030	4.00-6.00	-0.008
	6.00-10.00	-0.020/-0.030	6.00-10.00	-0.009
	10.00-16.00	-0.020/-0.030	10.00-16.00	-0.011
DHD 15X	3.00-6.00	-0.020/-0.030	4.00-6.00	-0.008
	6.00-10.00	-0.020/-0.030	6.00-10.00	-0.009
	10.00-14.00	-0.020/-0.030	10.00-14.00	-0.011
DHD 20X	3.00-6.00	-0.020/-0.030	4.00-6.00	-0.008
	6.00-10.00	-0.020/-0.030	6.00-10.00	-0.009
	10.00-12.00	-0.020/-0.030	10.00-12.00	-0.011

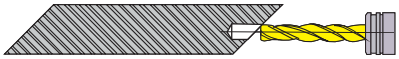
Technical details

Clamping-Always use a Hydraulic chuck and ensure that the tool is set and the max run out is within 2-3 microns

SPOT FACING/ SURFACE PREPARATION

- Create a small flat which will ensure that the next tool has a flat surface to drill- Machine a flat surface on the surface using a flat end mill or a slot drill capable of Spot facing,
- Ensure the spot face is atleast equal to the diameter of the tool

DRILLING A PILOT HOLE – USE A DRILL WITH A WIDER POINT ANGLE THAN THE DEEP HOLE DRILL

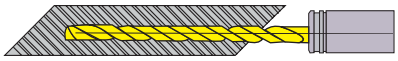


- We always recommend you to ask your supplier to supply the long drill along with the pilot, This would ensure better understanding of the process as a whole by the supplier, For example we recommend that the Pilot should have an angle of 150-155 degrees and the long drill 135-142, this is recommended to ensure no rubbing during entry and the best centring for the long drill
- We always ensure that the pilots we make are of a positive tolerance when compared to the oil hole drill. For Example the pilot we prepare is generally of m7 tolerance and the DHD is of h7 tolerance. This will ensure no interference during machining
- We recommend that you drill a minimum of 1XD for the pilot or can go as high as per the application of the long drill, Note that the higher the pilot drills, the long drill has a lesser contact time which will help improve output on the long run
- We also recommend that you can combine the Spot Face and the Pilot into a single tool and try the Forbes designed flat bottom pilot tool to reduce your cycle time

DRILLING WITH THE LONG DRILL – ENTRY AND INITIAL CUTTING

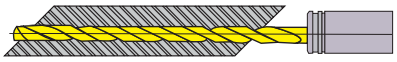
- Enter the drilled pilot hole at a lower cutting speed (lower than 30m/min) and a moderate feed and stop about 1-3mm before the bottom face of the pilot drill

DRILLING WITH THE LONG DRILL – DRILLING THE DEEP HOLE



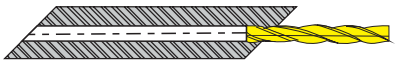
- Start cutting at the recommended parameters of the supplier without any pecking cycle. Note here first achieve the desired RPM and then start the feed, generally we notice a lot of breakage at this area as the Drill would not have reached its suggested RPM and contact the surface creating high load condition and break.

DRILLING WITH THE LONG DRILL – BREAKING THROUGH



- At the exit we typically will face a challenge where the drill will need to break out into a cross hole or a curved exit. We recommend you drop you feed at the exit to 15%-20% of the recommended cutting parameters. This will ensure lowest probability of an edge breakage due to uneven cutting.

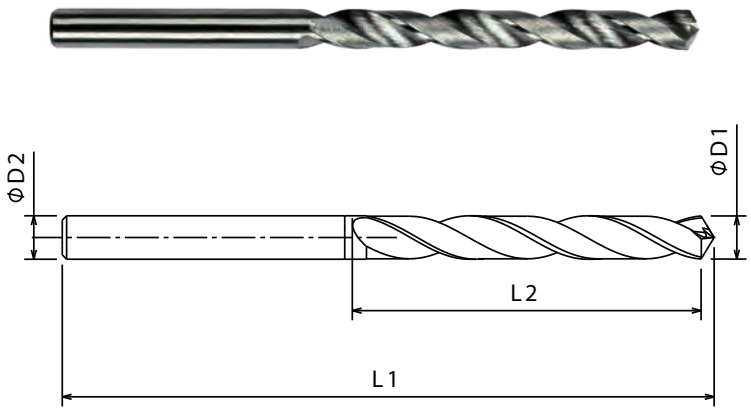
RETRACTION OF THE LONG DRILL



- Retract the drill with anything between 1m to 3mm feed rate upto the last 5mm of the pilot hole and then clear the hole at the same parameters used during entry.

5X Solid carbide jobber drill

Carbide | REG | 5X | 118° | 30°



P1-P6
M1-M2
K1-K2
N5-N6

Unit : mm

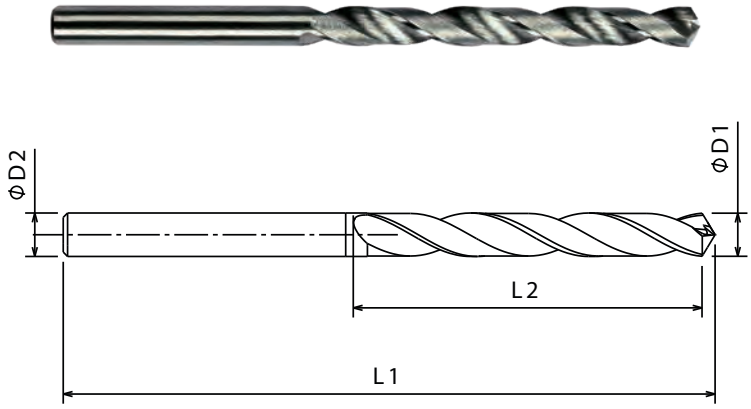
Ø D1	L2	L1	Ø D2	F224 (BRIGHT) EDP No	F224A (TiAlN) EDP No
1.00	12.00	34	1.00	FBJ0501506	FBJ0501507
1.05	12.00	34	1.05	FBJ0501516	FBJ0501517
1.10	14.00	36	1.10	FBJ0501520	FBJ0501521
1.15	14.00	36	1.15	FBJ0501528	FBJ0501529
1.20	16.00	38	1.20	FBJ0501532	FBJ0501533
1.25	16.00	38	1.25	FBJ0501542	FBJ0501543
1.30	16.00	38	1.30	FBJ0501546	FBJ0501547
1.35	18.00	40	1.35	FBJ0501550	FBJ0501551
1.40	18.00	40	1.40	FBJ0501554	FBJ0501555
1.45	18.00	40	1.45	FBJ0501560	FBJ0501561
1.50	18.00	40	1.50	FBJ0501570	FBJ0501571
1.60	20.00	43	1.60	FBJ0501584	FBJ0501585
1.70	20.00	43	1.70	FBJ0501592	FBJ0501593
1.80	22.00	46	1.80	FBJ0501598	FBJ0501599
1.90	22.00	46	1.90	FBJ0501604	FBJ0501605
2.00	24.00	49	2.00	FBJ0501612	FBJ0501613
2.10	24.00	49	2.10	FBJ0501618	FBJ0501619
2.20	27.00	53	2.20	FBJ0501622	FBJ0501623
2.30	27.00	53	2.30	FBJ0501628	FBJ0501629
2.40	30.00	57	2.40	FBJ0501638	FBJ0501639
2.50	30.00	57	2.50	FBJ0501646	FBJ0501647
2.60	30.00	57	2.60	FBJ0501654	FBJ0501655

Ø D1	L2	L1	Ø D2	F224 (BRIGHT) EDP No	F224A (TiAlN) EDP No
2.70	33.00	61	2.70	FBJ0501660	FBJ0501661
2.80	33.00	61	2.80	FBJ0501664	FBJ0501665
3.00	33.00	61	3.00	FBJ0500001	FBJ0500002
3.10	36.00	65	3.10	FBJ0500003	FBJ0500004
3.20	36.00	65	3.20	FBJ0500005	FBJ0500006
3.30	36.00	65	3.30	FBJ0500007	FBJ0500008
3.40	39.00	70	3.40	FBJ0500009	FBJ0500010
3.50	39.00	70	3.50	FBJ0500011	FBJ0500012
3.60	39.00	70	3.60	FBJ0500013	FBJ0500014
3.70	39.00	70	3.70	FBJ0500015	FBJ0500016
3.80	43.00	75	3.80	FBJ0500017	FBJ0500018
3.90	43.00	75	3.90	FBJ0500019	FBJ0500020
4.00	43.00	75	4.00	FBJ0500021	FBJ0500022
4.10	43.00	75	4.10	FBJ0500023	FBJ0500024
4.20	43.00	75	4.20	FBJ0500025	FBJ0500026
4.30	47.00	80	4.30	FBJ0500027	FBJ0500028
4.40	47.00	80	4.40	FBJ0500029	FBJ0500030
4.50	47.00	80	4.50	FBJ0500031	FBJ0500032
4.60	47.00	80	4.60	FBJ0500033	FBJ0500034
4.70	47.00	80	4.70	FBJ0500035	FBJ0500036
4.80	52.00	86	4.80	FBJ0500037	FBJ0500038
4.90	52.00	86	4.90	FBJ0500039	FBJ0500040

Application data on page no 4.042

5X Solid carbide jobber drill

Carbide | REG | 5X | 118° | 30°



P1-P6
M1-M2
K1-K2
N5-N6

DRILLS

Unit : mm

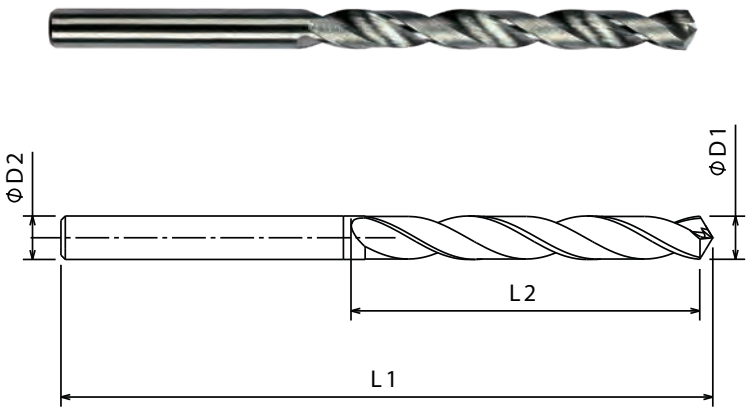
Ø D1	L2	L1	Ø D2	F224 (BRIGHT) EDP No	F224A (TiAlN) EDP No
5.00	52.00	86	5.00	FBJ0500041	FBJ0500042
5.10	52.00	86	5.10	FBJ0500043	FBJ0500044
5.20	52.00	86	5.20	FBJ0500045	FBJ0500046
5.30	52.00	86	5.30	FBJ0500047	FBJ0500048
5.40	57.00	93	5.40	FBJ0500049	FBJ0500050
5.50	57.00	93	5.50	FBJ0500051	FBJ0500052
5.60	57.00	93	5.60	FBJ0500053	FBJ0500054
5.70	57.00	93	5.70	FBJ0500055	FBJ0500056
5.80	57.00	93	5.80	FBJ0500057	FBJ0500058
5.90	57.00	93	5.90	FBJ0500059	FBJ0500060
6.00	57.00	93	6.00	FBJ0500061	FBJ0500062
6.10	63.00	101	6.10	FBJ0500063	FBJ0500064
6.20	63.00	101	6.20	FBJ0500065	FBJ0500066
6.30	63.00	101	6.30	FBJ0500067	FBJ0500068
6.40	63.00	101	6.40	FBJ0500069	FBJ0500070
6.50	63.00	101	6.50	FBJ0500071	FBJ0500072
6.60	63.00	101	6.60	FBJ0500073	FBJ0500074
6.70	63.00	101	6.70	FBJ0500075	FBJ0500076
6.80	69.00	109	6.80	FBJ0500077	FBJ0500078
6.90	69.00	109	6.90	FBJ0500079	FBJ0500080
7.00	69.00	109	7.00	FBJ0500081	FBJ0500082
7.10	69.00	109	7.10	FBJ0500083	FBJ0500084

Ø D1	L2	L1	Ø D2	F224 (BRIGHT) EDP No	F224A (TiAlN) EDP No
7.20	69.00	109	7.20	FBJ0500085	FBJ0500086
7.30	69.00	109	7.30	FBJ0500087	FBJ0500088
7.40	69.00	109	7.40	FBJ0500089	FBJ0500090
7.50	69.00	109	7.50	FBJ0500091	FBJ0500092
7.60	75.00	117	7.60	FBJ0500093	FBJ0500094
7.70	75.00	117	7.70	FBJ0500095	FBJ0500096
7.80	75.00	117	7.80	FBJ0500097	FBJ0500098
7.90	75.00	117	7.90	FBJ0500099	FBJ0500100
8.00	75.00	117	8.00	FBJ0500101	FBJ0500102
8.10	75.00	117	8.10	FBJ0500103	FBJ0500104
8.20	75.00	117	8.20	FBJ0500105	FBJ0500106
8.30	75.00	117	8.30	FBJ0500107	FBJ0500108
8.40	75.00	117	8.40	FBJ0500109	FBJ0500110
8.50	75.00	117	8.50	FBJ0500111	FBJ0500112
8.60	81.00	125	8.60	FBJ0500113	FBJ0500114
8.70	81.00	125	8.70	FBJ0500115	FBJ0500116
8.80	81.00	125	8.80	FBJ0500117	FBJ0500118
8.90	81.00	125	8.90	FBJ0500119	FBJ0500120
9.00	81.00	125	9.00	FBJ0500121	FBJ0500122
9.10	81.00	125	9.10	FBJ0500123	FBJ0500124
9.20	81.00	125	9.20	FBJ0500125	FBJ0500126
9.30	81.00	125	9.30	FBJ0500127	FBJ0500128

Application data on page no 4.042

5X Solid carbide jobber drill

Carbide | REG | 5X | 118° | 30°



P1-P6
M1-M2
K1-K2
N5-N6

Unit : mm

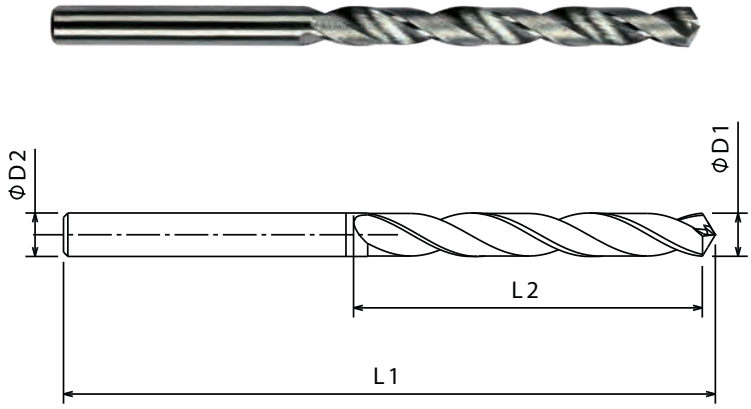
Ø D1	L2	L1	Ø D2	F224 (BRIGHT) EDP No	F224A (TiAlN) EDP No
9.40	81.00	125	9.40	FBJ0500129	FBJ0500130
9.50	81.00	125	9.50	FBJ0500131	FBJ0500132
9.60	87.00	133	9.60	FBJ0500133	FBJ0500134
9.70	87.00	133	9.70	FBJ0500135	FBJ0500136
9.80	87.00	133	9.80	FBJ0500137	FBJ0500138
9.90	87.00	133	9.90	FBJ0500139	FBJ0500140
10.00	87.00	133	10.00	FBJ0500141	FBJ0500142
10.10	87.00	133	10.10	FBJ0500143	FBJ0500144
10.20	87.00	133	10.20	FBJ0500145	FBJ0500146
10.30	87.00	133	10.30	FBJ0500147	FBJ0500148
10.40	87.00	133	10.40	FBJ0500149	FBJ0500150
10.50	87.00	133	10.50	FBJ0500151	FBJ0500152
10.60	87.00	133	10.60	FBJ0500153	FBJ0500154
10.70	94.00	142	10.70	FBJ0500155	FBJ0500156
10.80	94.00	142	10.80	FBJ0500157	FBJ0500158
10.90	94.00	142	10.90	FBJ0500159	FBJ0500160
11.00	94.00	142	11.00	FBJ0500161	FBJ0500162
11.10	94.00	142	11.10	FBJ0500163	FBJ0500164
11.20	94.00	142	11.20	FBJ0500165	FBJ0500166
11.30	94.00	142	11.30	FBJ0500167	FBJ0500168
11.40	94.00	142	11.40	FBJ0500169	FBJ0500170

Ø D1	L2	L1	Ø D2	F224 (BRIGHT) EDP No	F224A (TiAlN) EDP No
11.50	94.00	142	11.50	FBJ0500171	FBJ0500172
11.60	94.00	142	11.60	FBJ0500173	FBJ0500174
11.70	94.00	142	11.70	FBJ0500175	FBJ0500176
11.80	94.00	142	11.80	FBJ0500177	FBJ0500178
11.90	101.00	151	11.90	FBJ0500179	FBJ0500180
12.00	101.00	151	12.00	FBJ0500181	FBJ0500182
12.50	101.00	151	12.50	FBJ0500183	FBJ0500184
13.00	101.00	151	13.00	FBJ0500185	FBJ0500186
13.50	108.00	160	13.50	FBJ0500187	FBJ0500188
14.00	108.00	160	14.00	FBJ0500189	FBJ0500190
14.50	114.00	169	14.50	FBJ0500191	FBJ0500192
15.00	114.00	169	15.00	FBJ0500193	FBJ0500194
15.50	120.00	178	15.50	FBJ0500195	FBJ0500196
16.00	120.00	178	16.00	FBJ0500197	FBJ0500198
16.50	125.00	184	16.50	FBJ0500199	FBJ0500200
17.00	125.00	184	17.00	FBJ0500201	FBJ0500202
17.50	130.00	191	17.50	FBJ0500203	FBJ0500204
18.00	130.00	191	18.00	FBJ0500205	FBJ0500206
18.50	135.00	198	18.50	FBJ0500207	FBJ0500208
19.00	135.00	198	19.00	FBJ0500209	FBJ0500210
20.00	140.00	205	20.00	FBJ0500211	FBJ0500212

Application data on page no 4.042

3X Solid carbide jobber drill

Carbide | STUB | 3X | 118° | 30°



P1-P6
M1-M2
K1-K2
N5-N6

DRILLS

Unit : mm

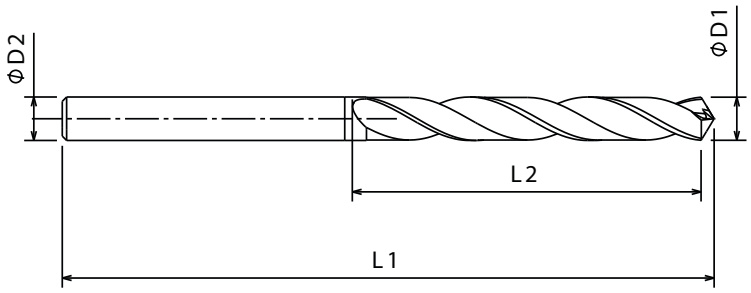
ØD1	L2	L1	ØD2	F226 (BRIGHT) EDP No	F226A (TiAlN) EDP No
1.00	6	26	1.00	FBJ0501504	FBJ0501505
1.05	7	28	1.05	FBJ0501518	FBJ0501519
1.10	7	28	1.10	FBJ0501522	FBJ0501523
1.15	8	30	1.15	FBJ0501530	FBJ0501531
1.20	8	30	1.20	FBJ0501534	FBJ0501535
1.25	8	30	1.25	FBJ0501544	FBJ0501545
1.30	8	30	1.30	FBJ0501548	FBJ0501549
1.35	9	32	1.35	FBJ0501552	FBJ0501553
1.40	9	32	1.40	FBJ0501556	FBJ0501557
1.45	9	32	1.45	FBJ0501562	FBJ0501563
1.50	9	32	1.50	FBJ0501572	FBJ0501573
1.60	10	34	1.60	FBJ0501580	FBJ0501581
1.70	10	34	1.70	FBJ0501590	FBJ0501591
1.80	11	36	1.80	FBJ0501594	FBJ0501595
1.90	11	36	1.90	FBJ0501600	FBJ0501601
2.00	12	38	2.00	FBJ0501608	FBJ0501609
2.10	12	38	2.10	FBJ0501616	FBJ0501617
2.20	13	40	2.20	FBJ0501620	FBJ0501621
2.30	13	40	2.30	FBJ0501624	FBJ0501625
2.40	14	43	2.40	FBJ0501634	FBJ0501635
2.50	14	43	2.50	FBJ0501642	FBJ0501643
2.60	14	43	2.60	FBJ0501652	FBJ0501653

ØD1	L2	L1	ØD2	F226 (BRIGHT) EDP No	F226A (TiAlN) EDP No
2.70	16	46	2.70	FBJ0501658	FBJ0501659
2.80	16	46	2.80	FBJ0501662	FBJ0501663
3.00	16	46	3.00	FBJ0500213	FBJ0500214
3.10	18	49	3.10	FBJ0500215	FBJ0500216
3.20	18	49	3.20	FBJ0500217	FBJ0500218
3.30	18	49	3.30	FBJ0500219	FBJ0500220
3.40	20	52	3.40	FBJ0500221	FBJ0500222
3.50	20	52	3.50	FBJ0500223	FBJ0500224
3.60	20	52	3.60	FBJ0500225	FBJ0500226
3.70	20	52	3.70	FBJ0500227	FBJ0500228
3.80	22	55	3.80	FBJ0500229	FBJ0500230
3.90	22	55	3.90	FBJ0500231	FBJ0500232
4.00	22	55	4.00	FBJ0500233	FBJ0500234
4.10	22	55	4.10	FBJ0500235	FBJ0500236
4.20	22	55	4.20	FBJ0500237	FBJ0500238
4.30	24	58	4.30	FBJ0500239	FBJ0500240
4.40	24	58	4.40	FBJ0500241	FBJ0500242
4.50	24	58	4.50	FBJ0500243	FBJ0500244
4.60	24	58	4.60	FBJ0500245	FBJ0500246
4.70	24	58	4.70	FBJ0500247	FBJ0500248
4.80	26	62	4.80	FBJ0500249	FBJ0500250
4.90	26	62	4.90	FBJ0500251	FBJ0500252

Application data on page no 4.042

3X Solid carbide jobber drill

Carbide | STUB | 3X | 118° | 30°



P1-P6
M1-M2
K1-K2
N5-N6

Unit : mm

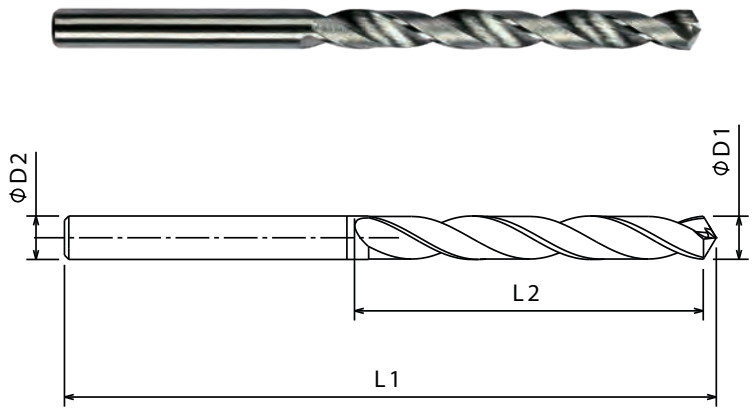
ØD1	L2	L1	ØD2	F226 (BRIGHT) EDP No	F226A (TiAlN) EDP No
5.00	26	62	5.00	FBJ0500253	FBJ0500254
5.10	26	62	5.10	FBJ0500255	FBJ0500256
5.20	26	62	5.20	FBJ0500257	FBJ0500258
5.30	26	62	5.30	FBJ0500259	FBJ0500260
5.40	28	66	5.40	FBJ0500261	FBJ0500262
5.50	28	66	5.50	FBJ0500263	FBJ0500264
5.60	28	66	5.60	FBJ0500265	FBJ0500266
5.70	28	66	5.70	FBJ0500267	FBJ0500268
5.80	28	66	5.80	FBJ0500269	FBJ0500270
5.90	28	66	5.90	FBJ0500271	FBJ0500272
6.00	28	66	6.00	FBJ0500273	FBJ0500274
6.10	31	70	6.10	FBJ0500275	FBJ0500276
6.20	31	70	6.20	FBJ0500277	FBJ0500278
6.30	31	70	6.30	FBJ0500279	FBJ0500280
6.40	31	70	6.40	FBJ0500281	FBJ0500282
6.50	31	70	6.50	FBJ0500283	FBJ0500284
6.60	31	70	6.60	FBJ0500285	FBJ0500286
6.70	31	70	6.70	FBJ0500287	FBJ0500288
6.80	34	74	6.80	FBJ0500289	FBJ0500290
6.90	34	74	6.90	FBJ0500291	FBJ0500292
7.00	34	74	7.00	FBJ0500293	FBJ0500294
7.10	34	74	7.10	FBJ0500295	FBJ0500296

ØD1	L2	L1	ØD2	F226 (BRIGHT) EDP No	F226A (TiAlN) EDP No
7.20	34	74	7.20	FBJ0500297	FBJ0500298
7.30	34	74	7.30	FBJ0500299	FBJ0500300
7.40	34	74	7.40	FBJ0500301	FBJ0500302
7.50	34	74	7.50	FBJ0500303	FBJ0500304
7.60	37	79	7.60	FBJ0500305	FBJ0500306
7.70	37	79	7.70	FBJ0500307	FBJ0500308
7.80	37	79	7.80	FBJ0500309	FBJ0500310
7.90	37	79	7.90	FBJ0500311	FBJ0500312
8.00	37	79	8.00	FBJ0500313	FBJ0500314
8.10	37	79	8.10	FBJ0500315	FBJ0500316
8.20	37	79	8.20	FBJ0500317	FBJ0500318
8.30	37	79	8.30	FBJ0500319	FBJ0500320
8.40	37	79	8.40	FBJ0500321	FBJ0500322
8.50	37	79	8.50	FBJ0500323	FBJ0500324
8.60	40	84	8.60	FBJ0500325	FBJ0500326
8.70	40	84	8.70	FBJ0500327	FBJ0500328
8.80	40	84	8.80	FBJ0500329	FBJ0500330
8.90	40	84	8.90	FBJ0500331	FBJ0500332
9.00	40	84	9.00	FBJ0500333	FBJ0500334
9.10	40	84	9.10	FBJ0500335	FBJ0500336
9.20	40	84	9.20	FBJ0500337	FBJ0500338
9.30	40	84	9.30	FBJ0500339	FBJ0500340

Application data on page no 4.042

3X Solid carbide jobber drill

Carbide | STUB | 118° | 30°



P1-P6
M1-M2
K1-K2
N5-N6

DRILLS

Unit : mm

ØD1	L2	L1	ØD2	F226 (BRIGHT) EDP No	F226A (TiAlN) EDP No
9.40	40	84	9.40	FBJ0500341	FBJ0500342
9.50	40	84	9.50	FBJ0500343	FBJ0500344
9.60	43	89	9.60	FBJ0500345	FBJ0500346
9.70	43	89	9.70	FBJ0500347	FBJ0500348
9.80	43	89	9.80	FBJ0500349	FBJ0500350
9.90	43	89	9.90	FBJ0500351	FBJ0500352
10.00	43	89	10.00	FBJ0500353	FBJ0500354
10.10	43	89	10.10	FBJ0500355	FBJ0500356
10.20	43	89	10.20	FBJ0500357	FBJ0500358
10.30	43	89	10.30	FBJ0500359	FBJ0500360
10.40	43	89	10.40	FBJ0500361	FBJ0500362
10.50	43	89	10.50	FBJ0500363	FBJ0500364
10.60	43	89	10.60	FBJ0500365	FBJ0500366
10.70	47	95	10.70	FBJ0500367	FBJ0500368
10.80	47	95	10.80	FBJ0500369	FBJ0500370
10.90	47	95	10.90	FBJ0500371	FBJ0500372
11.00	47	95	11.00	FBJ0500373	FBJ0500374
11.10	47	95	11.10	FBJ0500375	FBJ0500376
11.20	47	95	11.20	FBJ0500377	FBJ0500378
11.30	47	95	11.30	FBJ0500379	FBJ0500380
11.40	47	95	11.40	FBJ0500381	FBJ0500382

ØD1	L2	L1	ØD2	F226 (BRIGHT) EDP No	F226A (TiAlN) EDP No
11.50	47	95	11.50	FBJ0500383	FBJ0500384
11.60	47	95	11.60	FBJ0500385	FBJ0500386
11.70	47	95	11.70	FBJ0500387	FBJ0500388
11.80	47	95	11.80	FBJ0500389	FBJ0500390
11.90	51	102	11.90	FBJ0500391	FBJ0500392
12.00	51	102	12.00	FBJ0500393	FBJ0500394
12.50	51	102	12.50	FBJ0500395	FBJ0500396
13.00	51	102	13.00	FBJ0500397	FBJ0500398
13.50	54	107	13.50	FBJ0500399	FBJ0500400
14.00	54	107	14.00	FBJ0500401	FBJ0500402
14.50	56	111	14.50	FBJ0500403	FBJ0500404
15.00	56	111	15.00	FBJ0500405	FBJ0500406
15.50	58	115	15.50	FBJ0500407	FBJ0500408
16.00	58	115	16.00	FBJ0500409	FBJ0500410
16.50	60	119	16.50	FBJ0500411	FBJ0500412
17.00	60	119	17.00	FBJ0500413	FBJ0500414
17.50	62	123	17.50	FBJ0500415	FBJ0500416
18.00	62	123	18.00	FBJ0500417	FBJ0500418
18.50	64	127	18.50	FBJ0500419	FBJ0500420
19.00	64	127	19.00	FBJ0500421	FBJ0500422
20.00	66	131	20.00	FBJ0500423	FBJ0500424

Application data on page no 4.042

Cutting parameters

Series F224/F226 METRIC

Workpiece Material Group			Cutting Speed Vc (m/min)			Recommended feed in mm/rev																	
						Diameter in mm																	
					mm	1.0		1.5		3.0		4.0		6.0		8.0		10.0		12.0		16.0		20.0	
			min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	1	50	55	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		2	50	55	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		3	45	50	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		4	45	50	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		5	40	45	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		6	40	45	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
Stainless Steels	M	1	50	55	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		2	40	45	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
Cast Iron	K	1	75	85	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
		2	50	55	f rev	0.020	0.025	0.040	0.050	0.061	0.076	0.081	0.101	0.122	0.152	0.138	0.172	0.162	0.203	0.202	0.253	0.220	0.275	0.244	0.305
Non Ferrous	N	5	105	120	f rev	0.005	0.006	0.010	0.013	0.040	0.050	0.048	0.060	0.061	0.076	0.073	0.091	0.081	0.101	0.122	0.152	0.162	0.203	0.180	0.225
		6	105	120	f rev	0.005	0.006	0.010	0.013	0.040	0.050	0.048	0.060	0.061	0.076	0.073	0.091	0.081	0.101	0.122	0.152	0.162	0.203	0.180	0.225

#RPM(N) = Vc(m/min) X 318.18/Tool Dia. #Vf(mm/min) = RPM(N) X frev (mm/rev)

For coated F224/F226 increase cutting speed by 20%

Series F224/F226 Inch

Workpiece Material Group			Cutting Speed Vc ft/min			Recommended feed in mm/rev																	
						Diameter in mm																	
					Inch	1/32		1/16		1/8		1/6		1/4		1/3		3/8		1/2		5/8		3/4	
			min	max	Range	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
Steel	P	1	164	180	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		2	164	180	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		3	148	164	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		4	148	164	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		5	131	148	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		6	131	148	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
Stainless Steels	M	1	164	180	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		2	131	148	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
Cast Iron	K	1	246	279	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
		2	164	180	f rev	0.0008	0.0010	0.0016	0.0020	0.0024	0.0030	0.0032	0.0040	0.0048	0.0060	0.0054	0.0068	0.0064	0.0080	0.0080	0.0100	0.0087	0.0108	0.0096	0.0120
Non Ferrous	N	5	344	394	f rev	0.0002	0.0002	0.0004	0.0005	0.0016	0.0020	0.0019	0.0024	0.0024	0.0030	0.0029	0.0036	0.0032	0.0040	0.0048	0.0060	0.0064	0.0080	0.0071	0.0089
		6	344	394	f rev	0.0002	0.0002	0.0004	0.0005	0.0016	0.0020	0.0019	0.0024	0.0024	0.0030	0.0029	0.0036	0.0032	0.0040	0.0048	0.0060	0.0064	0.0080	0.0071	0.0089

#RPM (N) = Vc (SFM) X 3.82/Tool Dia. #Vf (Inch/min) = RPM (N) x frev (inch/rev)

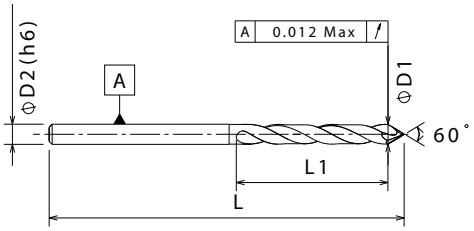
The technical data are based upon theoretical values and are only intended for planning purposes and may vary based on the application. Actual results will vary. No responsibility from Forbes and Company Limited or their distributors is assumed.

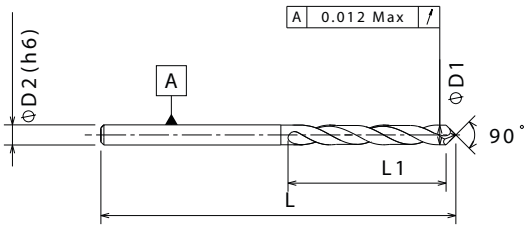
Drill tolerance

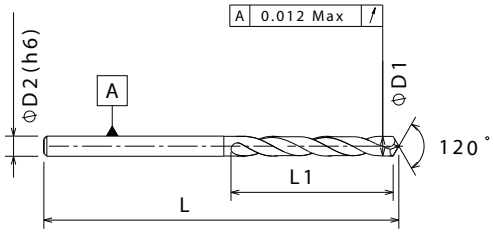
Details	Cutting Dia. "D1" Range	Cutting Dia. "D1" Tolerance h7 ANSI B4.2	Shank Dia. "D2"	Shank Tolerance h6 ANSI B4.2
F224/224A	1.00-3.00	0.00/-0.013	1.00-3.00	-0.006
	3.00-6.00	0.00/-0.013	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.013	6.00-10.00	-0.009
	10.00-18.00	0.00/-0.013	10.00-12.00	-0.011
	20.00	0.00/-0.013	20.00	-0.013
F226/226A	1.00-3.00	0.00/-0.013	1.00-3.00	-0.006
	3.00-6.00	0.00/-0.013	3.00-6.00	-0.008
	6.00-10.00	0.00/-0.013	6.00-10.00	-0.009
	10.00-18.00	0.00/-0.013	10.00-12.00	-0.011
	20.00	0.00/-0.013	20.00	-0.013

Spoting drill (60°/90°/120°)

Carbide | 30° | TiN







P1-P5
M1-M3
K1-K3
S1-S4
N1-N5

DRILLS

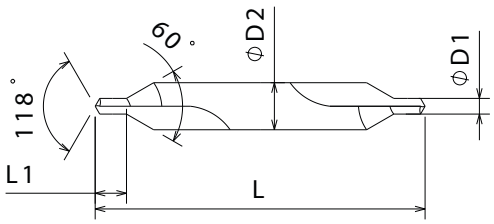
Unit : mm

Cutting Dia	Flute Length	Shank Dia	OAL	Number of teeth	Helix	EDP No	EDP No	EDP No
ØD1	L1	ØD2	L	Z		60°	90°	120°
2.00	6.00	2.00	50.00	2	30	FBJ0505371	FBJ0505380	FBJ0505389
3.00	8.00	3.00	50.00	2	30	FBJ0505372	FBJ0505381	FBJ0505390
4.00	11.00	4.00	50.00	2	30	FBJ0505373	FBJ0505382	FBJ0505391
5.00	13.00	5.00	50.00	2	30	FBJ0505374	FBJ0505383	FBJ0505392
6.00	15.00	6.00	50.00	2	30	FBJ0505375	FBJ0505384	FBJ0505393
8.00	20.00	8.00	60.00	2	30	FBJ0505376	FBJ0505385	FBJ0505394
10.00	25.00	10.00	75.00	2	30	FBJ0505377	FBJ0505386	FBJ0505395
12.00	30.00	12.00	75.00	2	30	FBJ0505378	FBJ0505387	FBJ0505396
16.00	45.00	16.00	100.00	2	30	FBJ0505379	FBJ0505388	FBJ0505397

Application data on page no 4.046

Carbide center drill

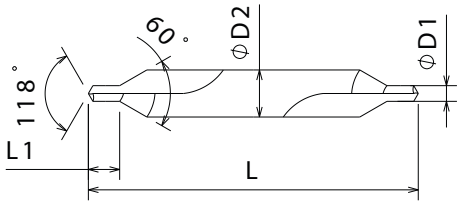
Carbide | DIN 333 | FORM A | 118° | BF



P1-P5
M1-M3
K1-K3
S1-S4
N1-N5

Cutting Dia	Shank Dia	OAL	Flute Length	Form	Hand	Bright
ØD1	ØD2	L	L1			EDP No
1	3.15	31	1.8	A	RH	FBJ0505428
1.25	3.15	31	2.2	A	RH	FBJ0505429
1	4	35	1.9	A	RH	FBJ0505430
1.6	4	35	2.8	A	RH	FBJ0505431
2	5	40	3.3	A	RH	FBJ0505432
2.5	6.3	45	4.1	A	RH	FBJ0505433
3	8	50	4.9	A	RH	FBJ0505434
3.15	8	50	4.9	A	RH	FBJ0505461

Form-A LH



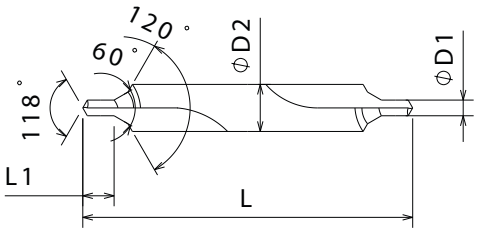
P1-P5
M1-M3
K1-K3
S1-S4
N1-N5

Cutting Dia	Shank Dia	OAL	Flute Length	Form	Hand	Bright
ØD1	ØD2	L	L1			EDP No
1	3.15	31	1.8	A	LH	FBJ0505442
1.25	3.15	31	2.2	A	LH	FBJ0505443
1	4	35	1.9	A	LH	FBJ0505444
1.6	4	35	2.8	A	LH	FBJ0505445
2	5	40	3.3	A	LH	FBJ0505446
2.5	6.3	45	4.1	A	LH	FBJ0505447
3	8	50	4.9	A	LH	FBJ0505448
3.15	8	50	4.9	A	LH	FBJ0505460

Application data on page no 4.046

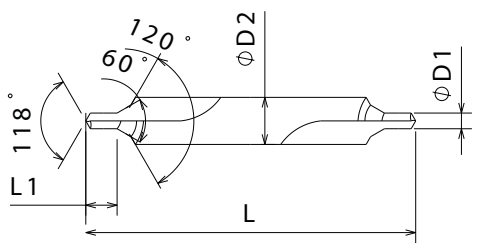
Carbide center Drill

Carbide | DIN 333 | FORM B | 118° | BF



P1-P5
M1-M3
K1-K3
S1-S4
N1-N5

Cutting Dia	Shank Dia	OAL	Flute Length	Form	Hand	Bright
ØD1	ØD2	L	L1			EDP No
1	3.15	31	1.8	B	RH	FBJ0505435
1.25	3.15	31	2.2	B	RH	FBJ0505436
1	4	35	1.9	B	RH	FBJ0505437
1.6	4	35	2.8	B	RH	FBJ0505438
2	5	40	3.3	B	RH	FBJ0505439
2.5	6.3	45	4.1	B	RH	FBJ0505440
3	8	50	4.9	B	RH	FBJ0505441
3.15	8	50	4.9	B	RH	FBJ0505459



P1-P5
M1-M3
K1-K3
S1-S4
N1-N5

Cutting Dia	Shank Dia	OAL	Flute Length	Form	Hand	Bright
ØD1	ØD2	L	L1			EDP No
1	3.15	31	1.8	B	LH	FBJ0505449
1.25	3.15	31	2.2	B	LH	FBJ0505450
1	4	35	1.9	B	LH	FBJ0505451
1.6	4	35	2.8	B	LH	FBJ0505452
2	5	40	3.3	B	LH	FBJ0505453
2.5	6.3	45	4.1	B	LH	FBJ0505454
3	8	50	4.9	B	LH	FBJ0505455
3.15	8	50	4.9	B	LH	FBJ0505458

Application data on page no 4.046

Cutting parameters

Spotting Drills

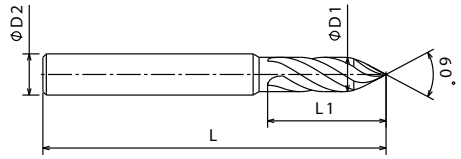
Workpiece Material Group			Cutting Speed (Vc) m/mim	Recommended feed in mm/rev								
				Diameter in mm								
				2	3	4	5	6	8	10	12	16
Steel	P	1	70-80	0.0635	0.0991	0.1245	0.1499	0.1753	0.2007	0.2261	0.2515	0.2769
		2	60-70	0.0635	0.0991	0.1194	0.1397	0.1600	0.1803	0.2007	0.2210	0.2413
		3	50-60	0.0508	0.0787	0.0940	0.1143	0.1346	0.1549	0.1753	0.1956	0.2159
		4	40-50	0.0406	0.0635	0.0754	0.0872	0.0991	0.1109	0.1228	0.1347	0.1465
		5	20-25	0.0508	0.0787	0.0940	0.1143	0.1346	0.1549	0.1753	0.1956	0.2159
Stainless Steel	M	1	20-25	0.0635	0.0991	0.1194	0.1397	0.1600	0.1803	0.2007	0.2210	0.2413
		2	15-20	0.0508	0.0787	0.0940	0.1143	0.1346	0.1549	0.1753	0.1956	0.2159
		3	12-15	0.0508	0.0787	0.0940	0.1143	0.1346	0.1549	0.1753	0.1956	0.2159
Cast Iron	K	1	80-90	0.0635	0.0991	0.1194	0.1397	0.1600	0.1803	0.2007	0.2210	0.2413
		2	70-80	0.0635	0.0991	0.1194	0.1397	0.1600	0.1803	0.2007	0.2210	0.2413
		3	60-70	0.0635	0.0991	0.1194	0.1397	0.1600	0.1803	0.2007	0.2210	0.2413
Super Alloys	S	1	15-20	0.0406	0.0635	0.0754	0.0872	0.0991	0.1109	0.1228	0.1347	0.1465
		4	10-15	0.0406	0.0635	0.0754	0.0872	0.0991	0.1109	0.1228	0.1347	0.1465
Cast Iron	K	1	150-200	0.1245	0.2007	0.2388	0.2769	0.3150	0.3531	0.3912	0.4293	0.4674
		2	120-150	0.0991	0.1600	0.1897	0.2193	0.2489	0.2786	0.3082	0.3379	0.3675
		3	100-120	0.0991	0.1600	0.1897	0.2193	0.2489	0.2786	0.3082	0.3379	0.3675
Non Ferrous	N	1	160-180	0.0787	0.1245	0.1499	0.1753	0.2007	0.2261	0.2515	0.2769	0.3023
		2	160-180	0.0787	0.1245	0.1499	0.1753	0.2007	0.2261	0.2515	0.2769	0.3023
		3	120-130	0.0787	0.1245	0.1499	0.1753	0.2007	0.2261	0.2515	0.2769	0.3023
		4	20-30	0.0635	0.0991	0.1194	0.1397	0.1600	0.1803	0.2007	0.2210	0.2413
		5	40-50	0.0508	0.0787	0.0940	0.1143	0.1346	0.1549	0.1753	0.1956	0.2159

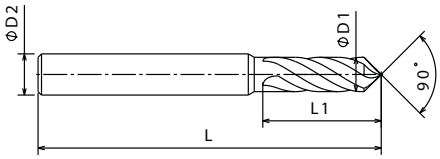
Center Drills

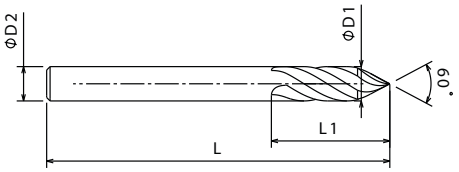
Workpiece Material Group			Cutting Speed (Vc) m/mim	Recommended feed in mm/rev										
				Diameter in mm										
				0.5	1	1.25	1.6	2	2.5	3	3.15	4	5	6.3	8
Steel	P	1	60-70	0.008	0.015	0.028	0.028	0.037	0.051	0.059	0.064	0.079	0.079	0.099	0.124
		2	45-50	0.008	0.015	0.028	0.028	0.037	0.051	0.059	0.064	0.079	0.079	0.099	0.124
		3	35-45	0.008	0.013	0.024	0.023	0.031	0.041	0.049	0.051	0.064	0.064	0.079	0.099
		4	20-35	0.008	0.015	0.028	0.028	0.037	0.051	0.059	0.064	0.079	0.079	0.099	0.124
		5	15-20	0.005	0.008	0.015	0.017	0.023	0.033	0.039	0.041	0.051	0.051	0.064	0.079
Stainless Steel	M	1	30-20	0.008	0.013	0.024	0.023	0.031	0.041	0.049	0.051	0.064	0.064	0.079	0.099
		2	20-15	0.008	0.013	0.024	0.023	0.031	0.041	0.049	0.051	0.064	0.064	0.079	0.099
		3	15-Oct	0.008	0.013	0.024	0.023	0.031	0.041	0.049	0.051	0.064	0.064	0.079	0.099
Cast Iron	K	1	50-60	0.013	0.018	0.036	0.041	0.056	0.079	0.094	0.099	0.124	0.124	0.16	0.201
		2	60-70	0.013	0.018	0.036	0.041	0.056	0.079	0.094	0.099	0.124	0.124	0.16	0.201
		3	50-60	0.01	0.015	0.03	0.033	0.045	0.064	0.076	0.079	0.099	0.099	0.124	0.16
Super Alloys	S	1	Oct-15	0.005	0.005	0.011	0.013	0.018	0.025	0.031	0.033	0.041	0.041	0.051	0.064
		4	Oct-15	0.005	0.008	0.015	0.017	0.023	0.033	0.039	0.041	0.051	0.051	0.064	0.079
Non Ferrous	N	1	150-160	0.015	0.02	0.043	0.05	0.07	0.099	0.119	0.124	0.16	0.16	0.201	0.249
		2	100-120	0.013	0.018	0.036	0.041	0.056	0.079	0.094	0.099	0.124	0.124	0.16	0.201
		3	140-150	0.013	0.018	0.036	0.041	0.056	0.079	0.094	0.099	0.124	0.124	0.16	0.201
		4	120-130	0.01	0.015	0.03	0.033	0.045	0.064	0.076	0.079	0.099	0.099	0.124	0.16
		5	90-100	0.01	0.015	0.03	0.033	0.045	0.064	0.076	0.079	0.099	0.099	0.124	0.16

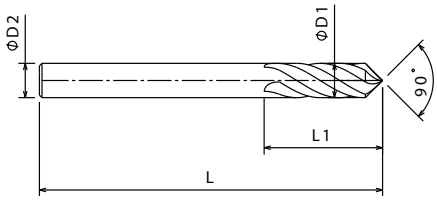
Chamfer tool (60°/90°)

Carbide | 30° | TiN









P1-P5
M1-M2
K1-K2
S1-S2
N1

Unit : mm

Cutting Dia	Flute Length	Shank Dia	OAL	Number of teeth	Helix	EDP No 60°	EDP No 90°
ØD1	L1	ØD2	L	Z		TiN Coated	TiAlN Coated
3.00	20.00	3.00	50.00	4	30	FBJ0505363	FBJ0505410
4.00	20.00	4.00	50.00	4	30	FBJ0505364	FBJ0505411
5.00	20.00	5.00	50.00	4	30	FBJ0505365	FBJ0505357
6.00	20.00	6.00	50.00	4	30	FBJ0505366	FBJ0505358
8.00	25.00	8.00	60.00	4	30	FBJ0505367	FBJ0505359
10.00	30.00	10.00	75.00	4	30	FBJ0505368	FBJ0505360
12.00	30.00	12.00	75.00	4	30	FBJ0505369	FBJ0505361
16.00	30.00	16.00	100.00	4	30	FBJ0505370	FBJ0505362

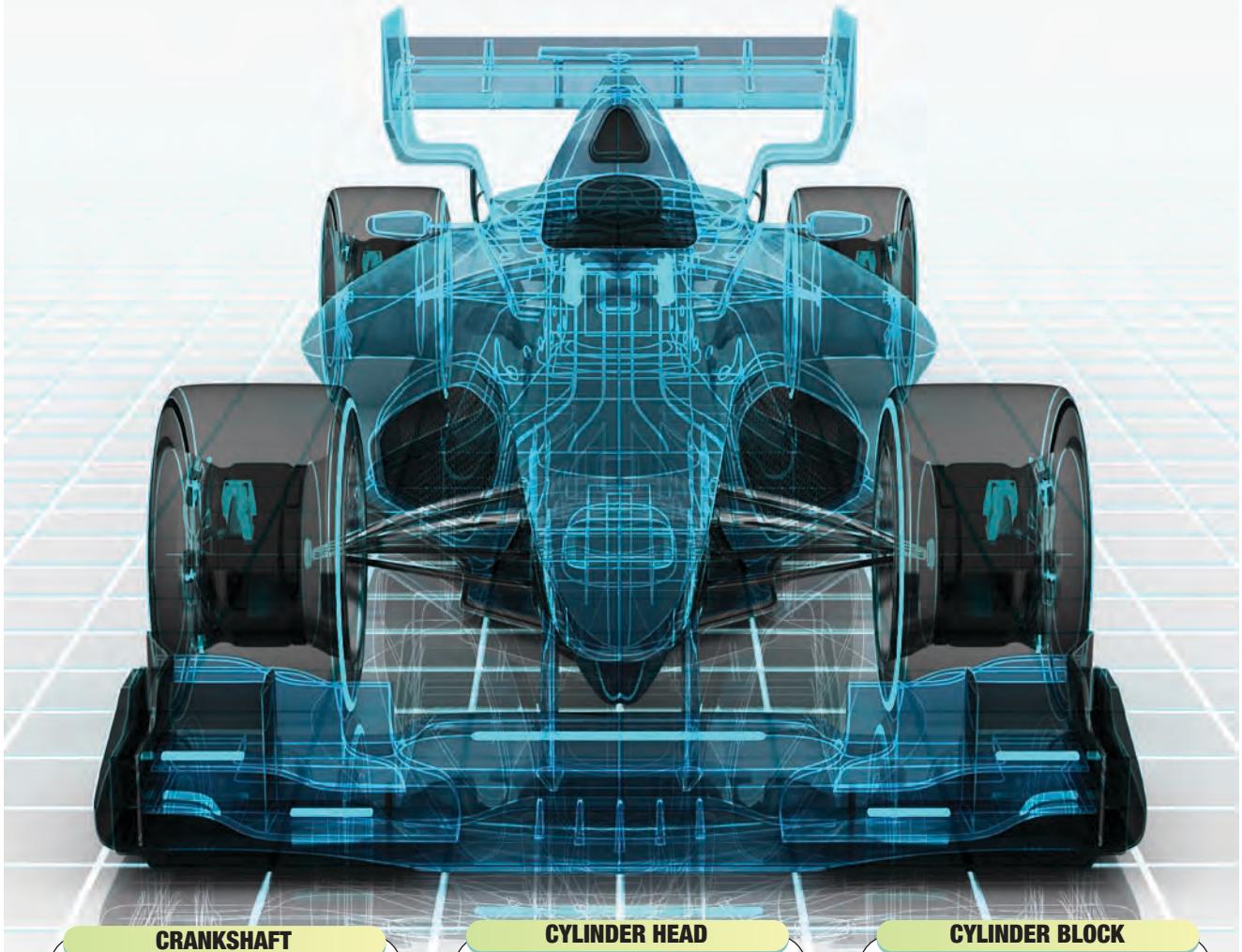
Application data on page no 4.048

Cutting parameters

Chamfer Tool

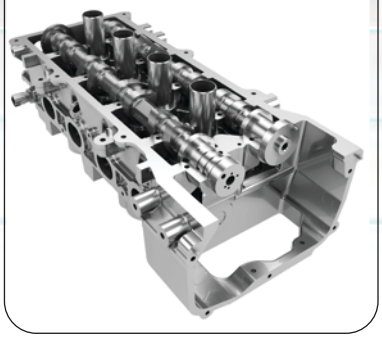
Workpiece Material Group			Cutting Speed (Vc) m/min	Recommended feed in mm/rev						
				Diameter in mm						
				3	6	8	10	12	16	20
Steel	P	1	150-160	0.010	0.013	0.015	0.025	0.033	0.043	0.048
		2	130-140	0.008	0.010	0.013	0.015	0.025	0.033	0.043
		3	100-110	0.008	0.010	0.013	0.015	0.025	0.033	0.043
		4	80-90	0.008	0.010	0.013	0.015	0.025	0.033	0.043
		5	60-70	0.008	0.010	0.013	0.015	0.025	0.033	0.043
Stain-less Steel	M	1	60-70	0.008	0.010	0.013	0.015	0.025	0.033	0.043
		2	40-50	0.008	0.010	0.013	0.015	0.025	0.033	0.043
Super Alloys	S	1	65-70	0.008	0.010	0.013	0.015	0.025	0.033	0.043
		2	40-45	0.008	0.010	0.013	0.015	0.025	0.033	0.043
Cast Iron	K	1	140-150	0.010	0.013	0.015	0.025	0.033	0.043	0.048
		2	120-130	0.008	0.010	0.013	0.015	0.025	0.033	0.043
Non Fer-rous	N	1	165-175	0.127	0.018	0.025	0.033	0.043	0.048	0.064

Automotive soloutions



CRANKSHAFT

CYLINDER HEAD



CYLINDER BLOCK

CONNECTING ROD

GEAR AND FLANGE MACHINING

INTAKE MANIFOLD

CARBIDE REAMERS

About TMRT - Totem Multiflute Reaming Tools

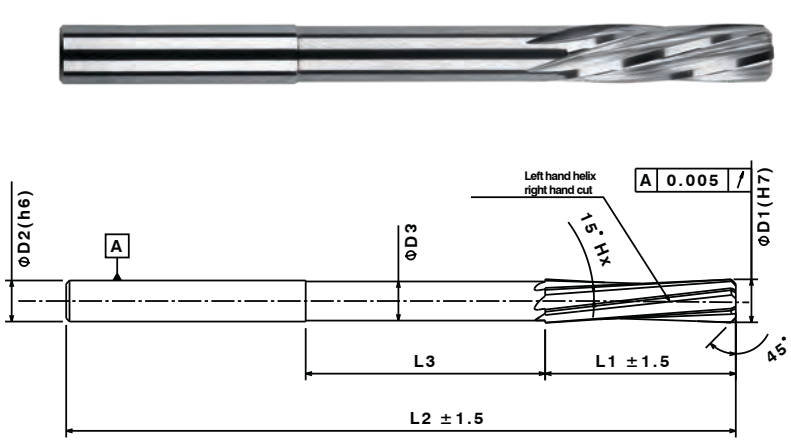
- These reamers are designed for the highest metal removal rates from diameter 1.5mm–12mm as a standard
- All standard reamers are ground to an ISO H7 tolerance class hole to address most common applications.
- Special coatings and lead chamfer configurations enable high-speed machining of steel, stainless steel, cast iron, and non–ferrous materials at high speeds.

Features & Benefits

- Higher productivity and profitability
- Longer tool life with increased hole and surface quality
- Highest metal removal rate at higher speeds and feeds due to reaming-specific low cobalt grades and substrates.
- Intermediate diameters from 1.5mm - 20mm can be offered as per various lead chamfer configuration as a custom solution.
- All TMRT reamers are also offered with internal coolant supply.

TMRT Totem multi flute reaming tools

Carbide | H7 | BF | 15° LH | RH



P0-P6
K1-K3
M1-M3
N1-N7

REAMERS

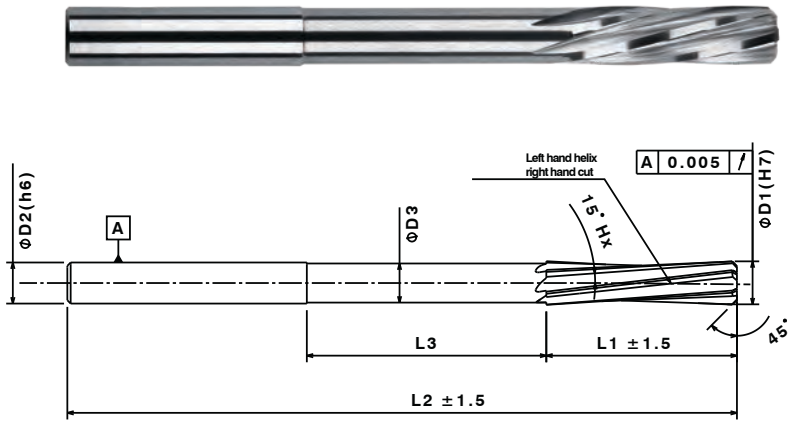
Unit : mm

ØD1	L1	L3	ØD3	L2	ØD2	z	SPIRAL FLUTE
mm	mm	mm	mm	mm	mm	mm	EDP No
1.5	16	16	1.4	57	3	4	FBK0508453
1.95	16	16	1.7	57	3	4	FBK0508442
1.96	16	16	1.7	57	3	4	FBK0508443
1.97	16	16	1.7	57	3	4	FBK0508444
1.98	16	16	1.7	57	3	4	FBK0508445
1.99	16	16	1.7	57	3	4	FBK0508446
2.0	16	16	1.8	57	3	4	FBK0508447
2.01	16	16	1.8	57	3	4	FBK0508448
2.02	16	16	1.8	57	3	4	FBK0508449
2.03	16	16	1.8	57	3	4	FBK0508450
2.04	16	16	1.8	57	3	4	FBK0508451
2.05	16	16	1.8	57	3	4	FBK0508452
2.95	16	16	2.7	65	3	4	FBK0508309
2.96	16	16	2.7	65	3	4	FBK0508310
2.97	16	16	2.7	65	3	4	FBK0508311
2.98	16	16	2.7	65	3	4	FBK0508312
2.99	16	16	2.7	65	3	4	FBK0508313
3.0	16	20	2.5	65	3	4	FBK0508314
3.01	16	20	2.51	65	3	4	FBK0508315
3.02	16	20	2.52	65	3	4	FBK0508316
3.03	16	20	2.53	65	3	4	FBK0508317
3.04	16	20	2.54	65	3	4	FBK0508318
3.05	16	20	2.55	65	3	4	FBK0508319
3.1	16	20	2.6	65	3	4	FBK0508320
3.2	16	20	2.7	65	3	4	FBK0508321
3.3	19	20	2.8	65	3	4	FBK0508322
3.35	19	20	2.85	65	3	4	FBK0508323
3.4	19	20	2.9	70	3	4	FBK0508324
3.45	19	20	2.95	70	3	4	FBK0508325
3.55	19	20	3.05	70	3	4	FBK0508326
3.6	19	20	3.1	70	3	4	FBK0508327
3.65	19	20	3.15	70	3	4	FBK0508328

Application data on page no 4.059

TMRT Totem multi flute reaming tools

Carbide | H7 | BF | 15° LH | RH



P0-P6
K1-K3
M1-M3
N1-N7

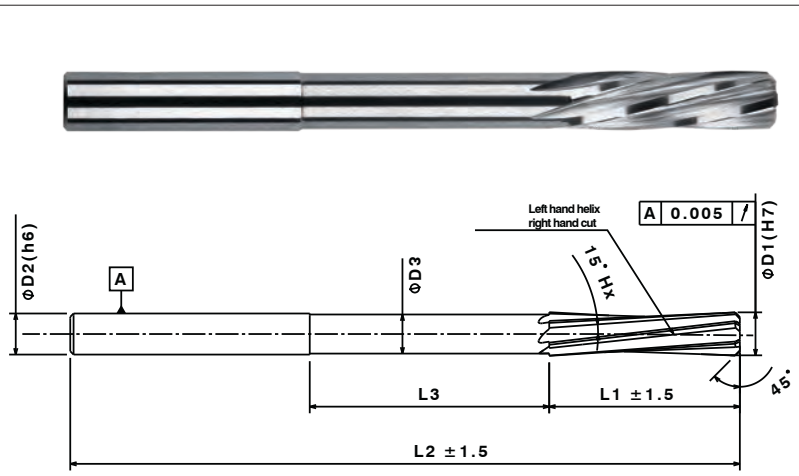
Unit : mm

ØD1	L1	L3	ØD3	L2	ØD2	z	SPIRAL FLUTE
mm	mm	mm	mm	mm	mm	mm	EDP No
3.7	19	25	3.2	70	4	4	FBK0508329
3.75	19	25	3.25	75	4	4	FBK0508330
3.8	19	25	3.3	75	4	4	FBK0508331
3.9	19	25	3.4	75	4	4	FBK0508332
3.95	19	25	3.45	75	4	4	FBK0508333
3.96	19	25	3.46	70	4	4	FBK0508334
3.97	19	25	3.47	70	4	4	FBK0508335
3.98	19	25	3.48	70	4	4	FBK0508336
3.99	19	25	3.49	70	4	4	FBK0508337
4.0	19	25	3.5	75	4	4	FBK0508338
4.01	19	25	3.51	70	4	4	FBK0508339
4.02	19	25	3.52	70	4	4	FBK0508340
4.03	19	25	3.53	70	4	4	FBK0508341
4.04	19	25	3.54	70	4	4	FBK0508342
4.05	19	25	3.55	75	4	4	FBK0508343
4.1	22	25	3.6	75	4	4	FBK0508344
4.15	22	25	3.65	75	4	4	FBK0508345
4.2	22	25	3.7	75	4	4	FBK0508346
4.25	22	25	3.75	80	4	4	FBK0508347
4.3	22	25	3.8	80	4	4	FBK0508348
4.35	22	25	3.85	80	4	4	FBK0508349
4.4	22	25	3.9	80	4	4	FBK0508350
4.45	22	25	3.95	80	4	4	FBK0508351
4.5	22	25	4	80	4	4	FBK0508352
4.55	22	25	4.05	80	4	4	FBK0508353
4.6	22	25	4.1	80	4	4	FBK0508354
4.65	22	25	4.15	80	5	6	FBK0508355
4.7	22	25	4.2	80	5	6	FBK0508356
4.74	7/8"	25	4.24	2-3/4"	5	6	FBK0508357
4.75	22	25	4.25	80	5	6	FBK0508358
4.8	22	29	4.3	86	5	6	FBK0508359
4.85	22	29	4.35	86	5	6	FBK0508360

Application data on page no 4.059

TMRT Totem multi flute reaming tools

Carbide | H7 | BF | 15° LH | RH



P0-P6
K1-K3
M1-M3
N1-N7

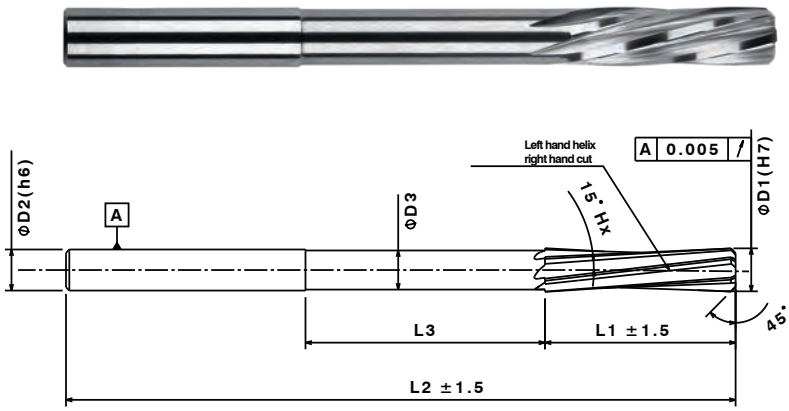
Unit : mm

ØD1	L1	L3	ØD3	L2	ØD2	z	SPIRAL FLUTE
mm	mm	mm	mm	mm	mm	mm	EDP No
4.9	25	29	4.4	85	5	6	FBK0508361
4.95	25	29	4.45	86	5	6	FBK0508362
4.96	25	29	4.46	86	5	6	FBK0508363
4.97	25	29	4.47	86	5	6	FBK0508364
4.99	25	29	4.49	86	5	6	FBK0508365
5.0	25	29	4.5	86	5	6	FBK0508366
5.01	25	29	4.51	86	5	6	FBK0508367
5.02	25	29	4.52	86	5	6	FBK0508368
5.03	25	29	4.53	86	5	6	FBK0508369
5.04	25	29	4.54	86	5	6	FBK0508370
5.05	25	29	4.55	86	5	6	FBK0508371
5.1	25	29	4.6	86	5	6	FBK0508372
5.15	25	29	4.65	86	5	6	FBK0508373
5.2	25	29	4.7	86	5	6	FBK0508374
5.25	25	29	4.75	86	5	6	FBK0508375
5.3	25	29	4.8	86	5	6	FBK0508376
5.35	25	29	4.85	86	5	6	FBK0508377
5.4	25	33	4.9	93	5	6	FBK0508378
5.45	25	33	4.95	93	5	6	FBK0508379
5.5	25	33	5	93	5	6	FBK0508380
5.55	25	33	5.05	93	5	6	FBK0508381
5.6	25	33	5.1	93	5	6	FBK0508382
5.65	25	33	5.15	93	6	6	FBK0508383
5.7	25	33	5.2	93	6	6	FBK0508384
5.75	25	33	5.25	93	6	6	FBK0508385
5.8	25	33	5.3	93	6	6	FBK0508386
5.85	25	33	5.35	93	6	6	FBK0508387
5.9	25	33	5.4	93	6	6	FBK0508388
5.95	25	33	5.45	93	6	6	FBK0508389
5.96	25	33	5.46	93	6	6	FBK0508390
5.97	25	33	5.47	93	6	6	FBK0508391
5.98	25	33	5.48	93	6	6	FBK0508392
5.99	25	33	5.49	93	6	6	FBK0508393

Application data on page no 4.059

TMRT Totem multi flute reaming tools

Carbide | H7 | BF | 15° LH | RH



P0-P6
K1-K3
M1-M3
N1-N7

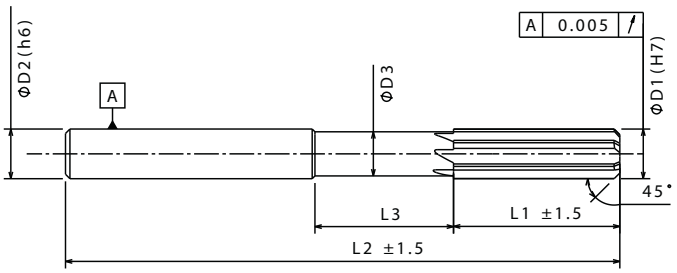
Unit : mm

ØD1	L1	L3	ØD3	L2	ØD2	z	SPIRAL FLUTE
mm	mm	mm	mm	mm	mm	mm	EDP No
6.0	25	33	5.5	93	6	6	FBK0508394
6.01	25	33	5.51	93	6	6	FBK0508395
6.02	25	33	5.52	93	6	6	FBK0508396
6.03	25	33	5.53	93	6	6	FBK0508397
6.04	25	33	5.54	93	6	6	FBK0508398
6.05	25	33	5.55	93	6	6	FBK0508399
6.06	25	33	5.56	93	6	6	FBK0508400
6.1	29	36	5.6	101	6	6	FBK0508401
6.13	29	36	5.63	101	6	6	FBK0508402
6.2	29	36	5.7	101	6	6	FBK0508403
6.25	29	36	5.75	101	6	6	FBK0508404
6.3	29	36	5.8	101	6	6	FBK0508405
6.4	29	36	5.9	101	6	6	FBK0508406
6.5	29	36	6	101	6	6	FBK0508407
6.95	29	36	6.45	101	6	6	FBK0508408
6.96	29	36	6.46	101	6	6	FBK0508409
6.97	29	36	6.47	101	6	6	FBK0508410
6.98	29	36	6.48	101	6	6	FBK0508411
6.99	29	36	6.49	101	6	6	FBK0508412
7.0	29	36	6.5	101	6	6	FBK0508413
7.98	32	40	7.48	117	8	6	FBK0508414
8.01	32	40	7.51	117	8	6	FBK0508415
8.03	32	40	7.53	117	8	6	FBK0508416
8.0	32	40	7.5	117	8	6	FBK0508417
8.5	32	40	8	117	8	6	FBK0508418
9.0	32	40	8.5	117	9	6	FBK0508419
9.5	32	40	9	117	9	6	FBK0508420
10.0	38	50	9.5	133	10	6	FBK0508421
10.5	38	50	10	133	10	6	FBK0508422
11.0	38	50	10.5	133	11	6	FBK0508423
11.5	38	50	11	133	11	6	FBK0508424
12.0	38	50	11.5	133	12	6	FBK0508425

Application data on page no 4.059

TMRT Totem multi flute reaming tools

Carbide | 0° | H7 | BF | RH



P0-P6
K1-K3
M1-M3
N1-N7

REAMERS

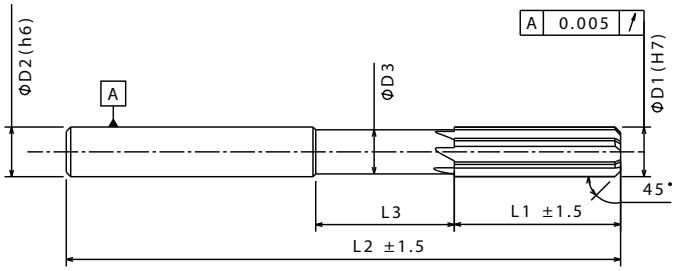
Unit : mm

ØD1	L1	L3	ØD3	L2	ØD2	z	STRAIGHT FLUTE
mm	mm	mm	mm	mm	mm	mm	EDP No
1.5	16	16	1.4	57	3	4	FBK0509075
1.95	16	16	1.7	57	3	4	FBK0509076
1.96	16	16	1.7	57	3	4	FBK0509077
1.97	16	16	1.7	57	3	4	FBK0509078
1.98	16	16	1.7	57	3	4	FBK0509079
1.99	16	16	1.7	57	3	4	FBK0509080
2.0	16	16	1.8	57	3	4	FBK0509081
2.01	16	16	1.8	57	3	4	FBK0509082
2.02	16	16	1.8	57	3	4	FBK0509083
2.03	16	16	1.8	57	3	4	FBK0509084
2.04	16	16	1.8	57	3	4	FBK0509085
2.05	16	16	1.8	57	3	4	FBK0509086
2.95	16	16	2.7	65	3	4	FBK0509087
2.96	16	16	2.7	65	3	4	FBK0509088
2.97	16	16	2.7	65	3	4	FBK0509089
2.98	16	16	2.7	65	3	4	FBK0509090
2.99	16	16	2.7	65	3	4	FBK0509091
3.0	16	20	2.5	65	3	4	FBK0509092
3.01	16	20	2.51	65	3	4	FBK0509093
3.02	16	20	2.52	65	3	4	FBK0509094
3.03	16	20	2.53	65	3	4	FBK0509095
3.04	16	20	2.54	65	3	4	FBK0509096
3.05	16	20	2.55	65	3	4	FBK0509097
3.1	16	20	2.6	65	3	4	FBK0509098
3.2	16	20	2.7	65	3	4	FBK0509099
3.3	19	20	2.8	65	3	4	FBK0509100
3.35	19	20	2.85	65	3	4	FBK0509101
3.4	19	20	2.9	70	3	4	FBK0509102
3.45	19	20	2.95	70	3	4	FBK0509103
3.55	19	20	3.05	70	3	4	FBK0509104
3.6	19	20	3.1	70	3	4	FBK0509105
3.65	19	20	3.15	70	3	4	FBK0509106

Application data on page no 4.059

TMRT Totem multi flute reaming tools

Carbide | 0° | H7 | BF | RH



P0-P6
K1-K3
M1-M3
N1-N7

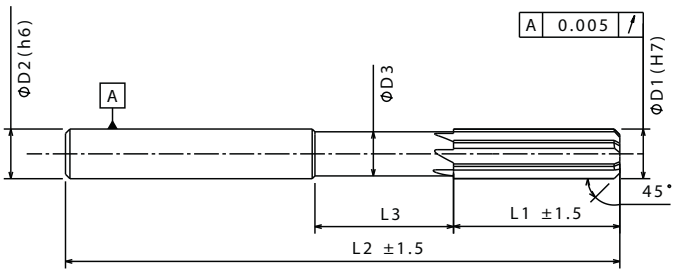
Unit : mm

ØD1	L1	L3	ØD3	L2	ØD2	z	STRAIGHT FLUTE
mm	mm	mm	mm	mm	mm	mm	EDP No
3.7	19	25	3.2	70	4	4	FBK0509107
3.75	19	25	3.25	75	4	4	FBK0509108
3.8	19	25	3.3	75	4	4	FBK0509109
3.9	19	25	3.4	75	4	4	FBK0509110
3.95	19	25	3.45	75	4	4	FBK0509111
3.96	19	25	3.46	70	4	4	FBK0509112
3.97	19	25	3.47	70	4	4	FBK0509113
3.98	19	25	3.48	70	4	4	FBK0509114
3.99	19	25	3.49	70	4	4	FBK0509115
4.0	19	25	3.5	75	4	4	FBK0509116
4.01	19	25	3.51	70	4	4	FBK0509117
4.02	19	25	3.52	70	4	4	FBK0509118
4.03	19	25	3.53	70	4	4	FBK0509119
4.04	19	25	3.54	70	4	4	FBK0509120
4.05	19	25	3.55	75	4	4	FBK0509121
4.1	22	25	3.6	75	4	4	FBK0509122
4.15	22	25	3.65	75	4	4	FBK0509123
4.2	22	25	3.7	75	4	4	FBK0509124
4.25	22	25	3.75	80	4	4	FBK0509125
4.3	22	25	3.8	80	4	4	FBK0509126
4.35	22	25	3.85	80	4	4	FBK0509127
4.4	22	25	3.9	80	4	4	FBK0509128
4.45	22	25	3.95	80	4	4	FBK0509129
4.5	22	25	4	80	4	4	FBK0509130
4.55	22	25	4.05	80	4	4	FBK0509131
4.6	22	25	4.1	80	4	4	FBK0509132
4.65	22	25	4.15	80	5	6	FBK0509133
4.7	22	25	4.2	80	5	6	FBK0509134
4.74	7/8"	25	4.24	2-3/4"	5	6	FBK0509135
4.75	22	25	4.25	80	5	6	FBK0509136
4.8	22	29	4.3	86	5	6	FBK0509137
4.85	22	29	4.35	86	5	6	FBK0509138

Application data on page no 4.059

TMRT Totem multi flute reaming tools

Carbide | 0° | H7 | BF | RH



P0-P6
K1-K3
M1-M3
N1-N7

REAMERS

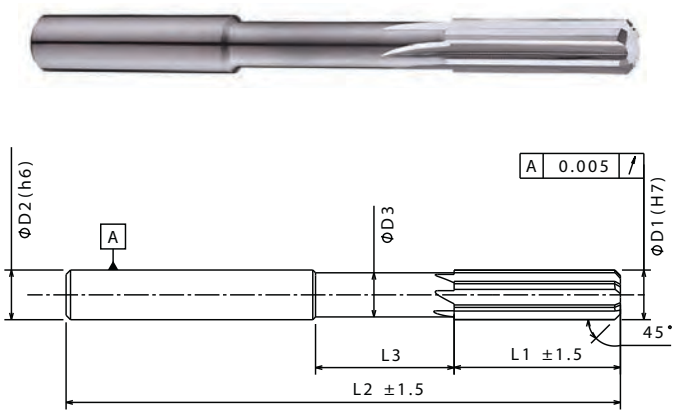
Unit : mm

ØD1	L1	L3	ØD3	L2	ØD2	z	STRAIGHT FLUTE
mm	mm	mm	mm	mm	mm	mm	EDP No
4.9	25	29	4.4	85	5	6	FBK0509139
4.95	25	29	4.45	86	5	6	FBK0509140
4.96	25	29	4.46	86	5	6	FBK0509141
4.97	25	29	4.47	86	5	6	FBK0509142
4.99	25	29	4.49	86	5	6	FBK0509143
5.0	25	29	4.5	86	5	6	FBK0509144
5.01	25	29	4.51	86	5	6	FBK0509145
5.02	25	29	4.52	86	5	6	FBK0509146
5.03	25	29	4.53	86	5	6	FBK0509147
5.04	25	29	4.54	86	5	6	FBK0509148
5.05	25	29	4.55	86	5	6	FBK0509149
5.1	25	29	4.6	86	5	6	FBK0509150
5.15	25	29	4.65	86	5	6	FBK0509151
5.2	25	29	4.7	86	5	6	FBK0509152
5.25	25	29	4.75	86	5	6	FBK0509153
5.3	25	29	4.8	86	5	6	FBK0509154
5.35	25	29	4.85	86	5	6	FBK0509155
5.4	25	33	4.9	93	5	6	FBK0509156
5.45	25	33	4.95	93	5	6	FBK0509157
5.5	25	33	5	93	5	6	FBK0509158
5.55	25	33	5.05	93	5	6	FBK0509159
5.6	25	33	5.1	93	5	6	FBK0509160
5.65	25	33	5.15	93	6	6	FBK0509161
5.7	25	33	5.2	93	6	6	FBK0509162
5.75	25	33	5.25	93	6	6	FBK0509163
5.8	25	33	5.3	93	6	6	FBK0509164
5.85	25	33	5.35	93	6	6	FBK0509165
5.9	25	33	5.4	93	6	6	FBK0509166
5.95	25	33	5.45	93	6	6	FBK0509167
5.96	25	33	5.46	93	6	6	FBK0509168
5.97	25	33	5.47	93	6	6	FBK0509169
5.98	25	33	5.48	93	6	6	FBK0509170
5.99	25	33	5.49	93	6	6	FBK0509171

Application data on page no 4.059

TMRT Totem multi flute reaming tools

Carbide | 0° | H7 | BF | RH



P0-P6
K1-K3
M1-M3
N1-N7

Unit : mm

ØD1	L1	L3	ØD3	L2	ØD2	z	STRAIGHT FLUTE
mm	mm	mm	mm	mm	mm	mm	EDP No
6.0	25	33	5.5	93	6	6	FBK0509172
6.01	25	33	5.51	93	6	6	FBK0509173
6.02	25	33	5.52	93	6	6	FBK0509174
6.03	25	33	5.53	93	6	6	FBK0509175
6.04	25	33	5.54	93	6	6	FBK0509176
6.05	25	33	5.55	93	6	6	FBK0509177
6.06	25	33	5.56	93	6	6	FBK0509178
6.1	29	36	5.6	101	6	6	FBK0509179
6.13	29	36	5.63	101	6	6	FBK0509180
6.2	29	36	5.7	101	6	6	FBK0509181
6.25	29	36	5.75	101	6	6	FBK0509182
6.3	29	36	5.8	101	6	6	FBK0509183
6.4	29	36	5.9	101	6	6	FBK0509184
6.5	29	36	6	101	6	6	FBK0509185
6.95	29	36	6.45	101	6	6	FBK0509186
6.96	29	36	6.46	101	6	6	FBK0509187
6.97	29	36	6.47	101	6	6	FBK0509188
6.98	29	36	6.48	101	6	6	FBK0509189
6.99	29	36	6.49	101	6	6	FBK0509190
7.0	29	36	6.5	101	6	6	FBK0509191
7.98	32	40	7.48	117	8	6	FBK0509192
8.01	32	40	7.51	117	8	6	FBK0509193
8.03	32	40	7.53	117	8	6	FBK0509194
8.0	32	40	7.5	117	8	6	FBK0509195
8.5	32	40	8	117	8	6	FBK0509196
9.0	32	40	8.5	117	9	6	FBK0509197
9.5	32	40	9	117	9	6	FBK0509198
10.0	38	50	9.5	133	10	6	FBK0509199
10.5	38	50	10	133	10	6	FBK0509200
11.0	38	50	10.5	133	11	6	FBK0509201
11.5	38	50	11	133	11	6	FBK0509202
12.0	38	50	11.5	133	12	6	FBK0509203

Application data on page no 4.059

Cutting parameters

Series TMRT- Reaming Metric

Workpiece Material Group			Cutting Speed Vc (m/min)			Recommended Feed/tooth (fz) Diameter in mm							
					mm	1.50-4.00		4.01-7.00		7.01-9.00		9.01-12.00	
			min	max	Range	min	max	min	max	min	max	min	max
Steel	P	1	40	70	fz	0.04	0.08	0.05	0.10	0.05	0.12	0.05	0.15
		2	40	70	fz	0.04	0.08	0.05	0.10	0.05	0.12	0.05	0.15
		3	35	60	fz	0.04	0.08	0.05	0.10	0.05	0.12	0.05	0.15
		4	25	45	fz	0.04	0.08	0.05	0.10	0.05	0.12	0.05	0.15
		5	15	25	fz	0.03	0.06	0.04	0.08	0.04	0.10	0.04	0.12
		6	15	25	fz	0.03	0.06	0.04	0.08	0.04	0.10	0.04	0.12
Stainless Steels	M	1	8	15	fz	0.03	0.06	0.04	0.08	0.04	0.09	0.04	0.10
		2	8	15	fz	0.03	0.06	0.04	0.08	0.04	0.09	0.04	0.10
		3	8	15	fz	0.03	0.06	0.04	0.08	0.04	0.09	0.04	0.10
Cast Iron	K	1	35	60	fz	0.04	0.14	0.05	0.16	0.05	0.18	0.05	0.20
		2	25	50	fz	0.04	0.12	0.05	0.14	0.05	0.16	0.05	0.18
		3	20	45	fz	0.04	0.10	0.05	0.12	0.05	0.14	0.05	0.16
Non-Ferrous	N	1	110	195	fz	0.05	0.14	0.06	0.16	0.06	0.18	0.06	0.20
		2	110	195	fz	0.05	0.14	0.06	0.16	0.06	0.18	0.06	0.20
		3	110	195	fz	0.05	0.14	0.06	0.16	0.06	0.18	0.06	0.20
		4	110	195	fz	0.05	0.14	0.06	0.16	0.06	0.18	0.06	0.20
		5	105	180	fz	0.05	0.14	0.06	0.16	0.06	0.18	0.06	0.20
Special Alloys	S	1	8	15	fz	0.03	0.06	0.04	0.08	0.04	0.10	0.04	0.12
		2	8	15	fz	0.03	0.06	0.04	0.08	0.04	0.10	0.04	0.12
		3	15	30	fz	0.04	0.08	0.05	0.10	0.05	0.12	0.05	0.15
		4	15	30	fz	0.04	0.08	0.05	0.10	0.05	0.12	0.05	0.15

#RPM(N) = Vc(m/min) X 318.18/Tool Dia. #Vf(mm/min) = RPM(N) X frev (mm/rev)

Series TMRT- Reaming Inch

Workpiece Material Group			Cutting Speed Vc (ft/min)			Recommended inch/tooth (IPT) Diameter in inch							
					Inch	1.50-4.00		4.01-7.00		7.01-9.00		9.01-12.00	
			min	max	Range	min	max	min	max	min	max	min	max
Steel	P	1	131	230	fz	0.0016	0.0031	0.0020	0.0039	0.0020	0.0047	0.0020	0.0059
		2	131	230	fz	0.0016	0.0031	0.0020	0.0039	0.0020	0.0047	0.0020	0.0059
		3	115	197	fz	0.0016	0.0031	0.0020	0.0039	0.0020	0.0047	0.0020	0.0059
		4	82	148	fz	0.0016	0.0031	0.0020	0.0039	0.0020	0.0047	0.0020	0.0059
		5	49	82	fz	0.0012	0.0024	0.0016	0.0031	0.0016	0.0039	0.0016	0.0047
		6	49	82	fz	0.0012	0.0024	0.0016	0.0031	0.0016	0.0039	0.0016	0.0047
Stainless Steels	M	1	26	49	fz	0.0012	0.0024	0.0016	0.0031	0.0016	0.0035	0.0016	0.0039
		2	26	49	fz	0.0012	0.0024	0.0016	0.0031	0.0016	0.0035	0.0016	0.0039
		3	26	49	fz	0.0012	0.0024	0.0016	0.0031	0.0016	0.0035	0.0016	0.0039
Cast Iron	K	1	115	197	fz	0.0016	0.0055	0.0020	0.0063	0.0020	0.0071	0.0020	0.0079
		2	82	164	fz	0.0016	0.0047	0.0020	0.0055	0.0020	0.0063	0.0020	0.0071
		3	66	148	fz	0.0016	0.0039	0.0020	0.0047	0.0020	0.0055	0.0020	0.0063
Non-Ferrous	N	1	361	640	fz	0.0020	0.0055	0.0024	0.0063	0.0024	0.0071	0.0024	0.0079
		2	361	640	fz	0.0020	0.0055	0.0024	0.0063	0.0024	0.0071	0.0024	0.0079
		3	361	640	fz	0.0020	0.0055	0.0024	0.0063	0.0024	0.0071	0.0024	0.0079
		4	361	640	fz	0.0020	0.0055	0.0024	0.0063	0.0024	0.0071	0.0024	0.0079
		5	344	590	fz	0.0020	0.0055	0.0024	0.0063	0.0024	0.0071	0.0024	0.0079
Special Alloys	S	1	26	49	fz	0.0012	0.0024	0.0016	0.0031	0.0016	0.0039	0.0016	0.0047
		2	26	49	fz	0.0012	0.0024	0.0016	0.0031	0.0016	0.0039	0.0016	0.0047
		3	49	98	fz	0.0016	0.0031	0.0020	0.0039	0.0020	0.0047	0.0020	0.0059
		4	49	98	fz	0.0016	0.0031	0.0020	0.0039	0.0020	0.0047	0.0020	0.0059

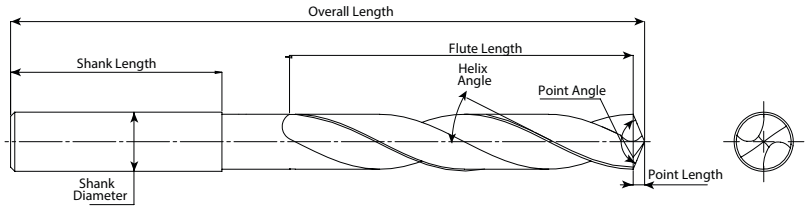
#RPM (N) = Vc (SFM) X 3.82/Tool Dia. #Vf (Inch/min) = RPM (N) x frev (inch/rev)

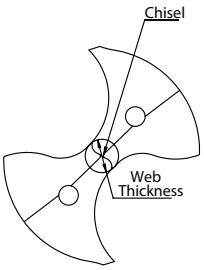
The technical data are based upon theoretical values and are only intended for planning purposes and may vary based on the application. Actual results will vary. No responsibility from Forbes and Company Limited or their distributors is assumed.

Drill tolerance

Details	Cutting Dia. "D1" Range	Dia. 'D1' Tolerance H7 ANSI B4.2	Shank Dia. D2	Shank 'D2" Tolerance h6 ANSI B4.2
15° LH	1.50-3.00	+0.004/+0.008	3.00	-0.006
	3.00-6.00	+0.005/+0.010	3.00-6.00	-0.008
	6.00-10.00	+0.006/+0.012	6.00-10.00	-0.009
	10.00-12.00	+0.008/+0.015	10.00-12.00	-0.011
0°	1.50-3.00	+0.004/+0.008	3.00	-0.006
	3.00-6.00	+0.005/+0.010	3.00-6.00	-0.008
	6.00-10.00	+0.006/+0.012	6.00-10.00	-0.009
	10.00-12.00	+0.008/+0.015	10.00-12.00	-0.011

Solid carbide drill nomenclature

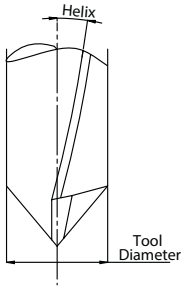


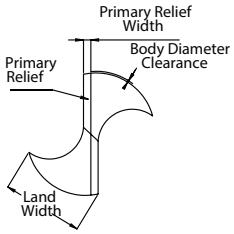


Chisel Edge – The non-cutting tip of the drill. Pushes, rather than cuts material. Having a smaller chisel means that a tool will cut more aggressively. A larger chisel means that a tool will be stronger.

Web – The core of the drill that is left from the fluting operation. A thicker web means added rigidity, while a smaller web means more chip evacuation. On two flute drills, typically varies from 16% - 30% of the tool diameter.

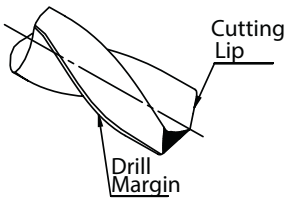
Helix Angle - Varies from 0° to 35° helix on standard tools. Lower helix angle means more rigidity and strength and a higher helix angle means more aggressive drilling and better chip evacuation.

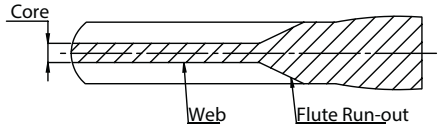




Margin Width – Provides a surface to support the drill inside the hole during the drilling operation. Totem® offers both single margin and double margin geometries. Margin widths are a balancing act between friction build-up vs. tool support in the drilling operation.

Cutting Lip - The cutting edges of a two flute drill extending from the chisel edge to the periphery.





Land Width – The amount of material left on the drill per side, from the fluting operation. Larger land widths mean more rigidity, while smaller land widths allow for better chip evacuation.

Having a problem with drill geometries? Circle the area where the problem exists.
Include a detailed explanation of the issue and mail to sales@forbes.co.in

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Drill troubleshooting

		Tool Deterioration													Chip Formation		
	Problem	Flank wear	Margin wear	Breakage	Flaking	Creater wear	Chisel edge wear	Corner chipping	Flute chipping	Cutting edge chipping	Cutting edge wear	Point center chipping	Rake face	Scoring on tool body	Long stringy	Varied chip form	Blue/brown chips
Speed & Feed	Reduce feed or reduce at exit	X		X			X	X	X	X		X	X	X			
	Reduce feed at entrance			X													
	Consistent feed rate			X											X	X	
	Increase feed	X					X								X		
	Reduce speed	X	X			X		X			X						
	Increase speed										X						
Coolant	Coolant mix		X	X	X					X				X			
	Coolant increase flow	X		X			X	X		X							X
	Coolant filter	X		X	X					X							
Setup	Workpiece clamp rigid		X	X			X	X		X				X			
	Collet accuracy			X						X							
	Tool holder fit .0008			X						X							
	Alignment			X						X							
	Peck drill			X													
	Concentricity		X	X	X			X	X					X			
	Do not extract tool during peck							X									

		Tool Life	Workpiece								Process						
	Problem	Tool Life	Undersized hole	Oversized hole	Poor alignment	Poor surface finish	Heavy burr breakout	Retract marks	Hole location	Hole straightness	Deflection	Point Deflection	Galling	Vibration	Abnormal noise	Chip packing	No drill penetration
Speed & Feed	Reduce feed or reduce at exit	X	X	X		X	X			X						X	
	Reduce feed at entrance		X			X			X		X			X		X	
	Consistent feed rate															X	
	Increase feed		X	X									X		X		
	Reduce speed	X	X													X	
	Increase speed					X											
Coolant	Coolant mix	X	X			X	X									X	
	Coolant increase flow	X	X			X	X									X	
	Coolant filter	X	X			X	X									X	
Setup	Workpiece clamp rigid	X		X	X	X	X	X	X	X							X
	Collet accuracy			X					X	X				X			
	Tool holder fit .0008			X					X	X				X			
	Alignment			X													X
	Peck drill																
	Concentricity				X	X		X	X	X		X		X			
	Do not extract tool during peck																

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Drill troubleshooting

PROBLEM	CAUSE	SOLUTION
Hole expansion	Run out of drill when attached to the machine	Check holder and/or select another one
	Loose hold	Check run out after fixing to the chuck
	Non-symmetric point angle	Regrind correctly
	Different lip height	Check preciseness after reground
	Run out of chisel edge	
Irregular hole size	Non-symmetric point angle	Regrind correctly
	Large lip height	Check precision after regrind
	Run out of chisel edge	
	Margin wear is large	
	Large run out after attached to the machine	Check holder and select another one
	Loose hold	Check run out after fixing to the chuck
	Low work holding rigidity	
	Feed rate to high	Decrease feed rate
	Not enough lubrication	Use drill with an oil hole
Low position accuracy	Large run out when attached to the machine	Check holder and/or select another one
		Check run out after fixing to the collet
	Large spindle run out	Select more rigid tool and machine
	Run out when cutting material	Select more rigid tool and machine
		Increase work clamping rigidity
		Select a low cutting resistance thinning
		Use centering
		Work piece should be horizontal
		Use a drill bush
Hole perpendicularity	Excessive tool wear	Regrind
	Low position accuracy	Increase position accuracy
	Non-symmetric point angle	Regrind correctly
	Large lip height	Check precision after regrinding
	Run out of chisel edge	
	Not enough drill rigidity	Increase drill rigidity
	Drilling surface is not horizontal	Work piece must be horizontal
	Poor alignment	Make a center hole. Check alignment
Bad cylindrical accuracy	Non-symmetric point angle	Regrind correctly
		Check precision after regrinding
	Large lip height	
	Run out of chisel edge	
	Large run out after attached to machine	Check holder and/or select another one
	Loose hold	Check run out after fixing to the chuck
	Low work holding rigidity	
	Relief angle is too large	Regrind correctly
	Low drill rigidity	Use larger web drills

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Drill troubleshooting

PROBLEM	CAUSE	SOLUTION
Poor surface finish	Poor regrinding	Take off all the wear
	Not suitable coolant for the material	Change supply method; increase volume
	Not enough coolant	Select higher coolant quality
	Large run out after attached to machine	Check holder and/or select another one
	Loose hold	Check run out after fixing to the chuck
	Feed rate is too high	Reduce feed rate
	Excessive tool wear	Regrind correctly
	Build up on margin is too large	Select a coated tool
	Chip packing	Select suitable drill (wide flute, high helix oil hole drill). Change cutting conditions (feed rate or adopt step drilling)
Bad cylindrical shape	Non-symmetric point angle	Regrind correctly
	Large lip height	Check precision after regrinding
	Run out of chisel edge	
	Large margin wear	
	Feed rate is too low	Increase the feed rate
Chipping of corner edge	In appropriate tool material	Choose suitable tool material
	Uneven hardness distribution on the work material	Iso static treatment
		Change tool, material & cutting conditions, machining method
	Cutting or feed speed is too high	Reduce cutting speed or feed
	Not enough coolant	Change lubrication method
Chipping of cutting edge	Large run out after attached to machine	Check holder and/or select another one
		Check run out after fixing to the collet
	Relief angle is too small	Regrind correctly
	Tool material is not suitable	Choose suitable tool material
	Cutting speed or feed is too high	Reduce cutting speed or feed
Abnormal wear on corner part	Too late regrinding	Regrind after a shorter time of use
	Bad alignment	Check/adjust the alignment
	Cutting speed too high	Decrease the cutting speed
	Point dimensions are not suitable	Select correct point dimensions
	Tool materials not suitable	Choose suitable tool material
	Coolant is not suitable	Change coolant
Large wear and chipping, crushing of the chisel edge	Feed rate is too large	Decrease feed rate
	Point dimensions are not suitable	Select correct point dimensions
	Tool materials is not suitable	Choose suitable tool material
	Relief angle is too small	Increase relief angle
Chipping of margin	Bush diameter is too small	Select correct bush diameter or select drill with chip breakers
	Chip packing between drill & bush	
Margin built-up	High heat generation due to large wear on the cutting edge	Regrind
	Lubrication is insufficient	Change lubrication method
	Coolant is not suitable	Change coolant
	Bad chip ejection	Change drill or the cutting conditions
	Ductile material	

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Product development enquiry data sheet solid carbide tools

Company Name:..... Date:.....
Address:.....
Contact person: .....Tel. Nos.: .....
Email Add.: .....Website Add.:.....

Component Details:

Component Name:.....
Work Material: ..... Detail Grade: ..... Hardness: ..... UTS: .....

Type of Operation: Drilling / Reaming / Milling

Drilling / Reaming:
Hole Depth: .....
Hole Type: Blind / Through / Interruption
Finish/Tolerance Reqd.: .....
Component shape: At tool entry: .....

Milling: Type: Slotting / profile /Contouring / other
Axial Depth: .....
Radial Depth: .....
Finish/ Tolerance Requirement.: .....
At Exit: .....

Machining Details:

Machine Type: Horizontal .....
Tool holding System: .....
Max. Spindle Speed: .....
Work Holding system: .....
Coolant Type : .....

Vertical:..... Other: .....
Tool run out after holding.....
Spindle HP: .....
Approach Length : .....
Coolant Pressure : ..... Coolant Filtration .....

Current Tool Specification:

Size:.....

(Attach Drawing if available)
Competitor Name: ..... Existing Tool Life: .....Tool Coating:.....

Application Details:

Cutting Speed: ..... RPM: ..... Feed: ..... DOC: ..... Pecking details:.....
Pecking details: .....
No. of Holes/Component: .....
Requirement per Month:.....
Current Cost per Component: .....

Commercial:

Total Potential for the size: .....
Business Potential Expected for us:.....
Trial Tool Requested:
Size:.....

Comments: .....

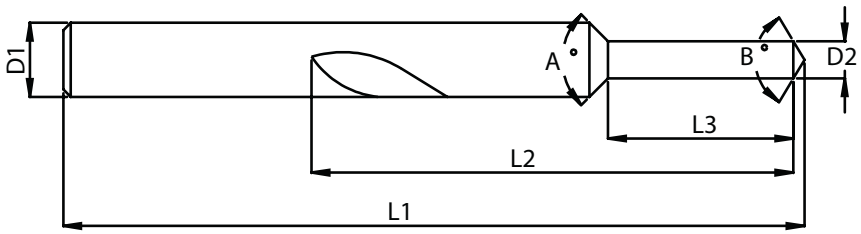
Sales Engineer: ..... Mob No..... Product Manager: .....

Note: Trial tool/custom tool request form can be downloaded from our website www.forbesprecision.co.in
Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Custom tool request form

Fill in information requested on drawing.
(*Required Fields)

☐ Request Approval Drawing



A = _____
B = _____
D1 = _____
D2 = _____
L1 = _____
L2 = _____
L3 = _____

***Material**
☐ Solid Carbide
☐ Carbide Coolant Thru

***Number of Flutes**
☐ Solid Carbide
☐ Carbide Coolant Thru

***Margin Style**
☐ Single
☐ Double

***Margin Style**
☐ Cutting
☐ Non-Cutting

***Flute Form**
☐ Straight
☐ Helical _____ °Helix on Major Dia.

***Coating**
☐ TiN
☐ TiCN
☐ TiAlN
☐ None
Other _____

Note:
This information enables us to engineer and manufacture a tool for your specific requirments.

Customer Name: _____

Phone: _____

* Work Material Machined: _____

Hardness: _____

Distributor: _____

Quantities: _____

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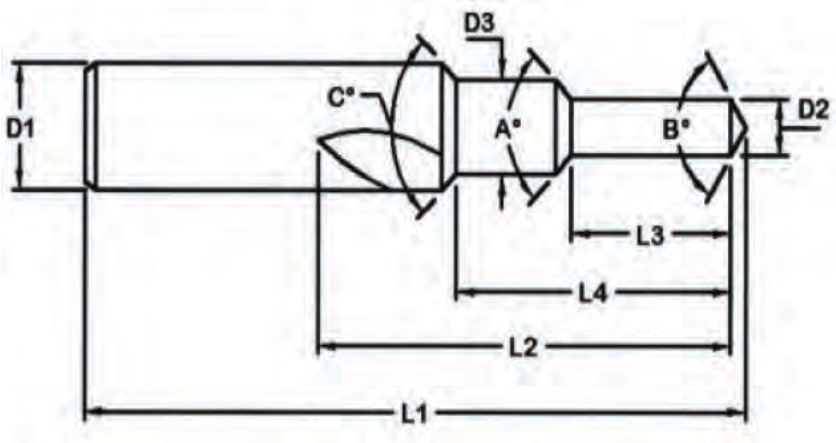
Custom tool request form

Step Drill Dimensions



A° (Inclusive) = _____

B° (Inclusive) = _____

C° (Inclusive) = _____

D1 = _____

D2 = _____

D3 = _____

L1 = _____

L2 = _____

L3 = _____

L4 = _____

M/C Type: _____
☐ Horizontal
☐ Vertical

Number of Flutes:
☐ Two
☐ Three

Existing Data:
Speed = _____ Toollife = _____
Feed = _____ No. of Regrinds = _____

Tool Consumption/Year = _____
Cost/Component = _____
Cycle Time of Operations = _____

Flute Form:
☐ Straight
☐ Helical _____ ☐ Helix on Major Dia.
☐ Square Drill

Material:
☐ Solid Carbide
☐ Carbide Coolant Thru

Coating:
☐ TiN ☐ TiCN ☐ TiAlN ☐ Other __

Customer Name: _____
Phone Number: _____
Work Material Machined: _____
Hardness: _____

Sales Engineer: _____

Tolerances unless otherwise specified:
Angles ± 1^0
Corners and Edges .25 Rad. Max

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Trial tool results form

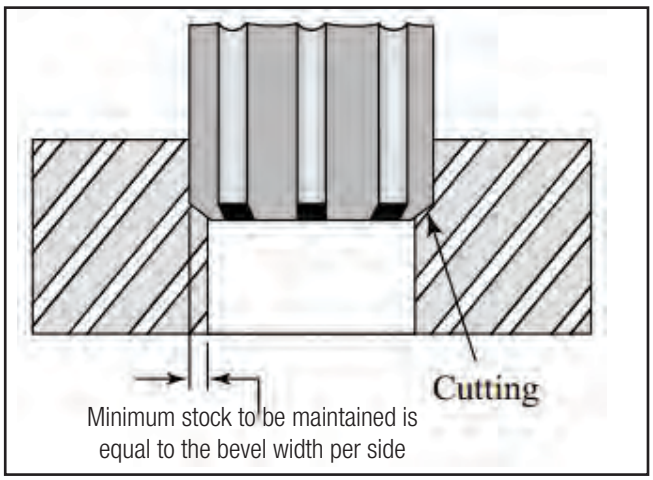
Customer Name		Ref No.	
Address		Date	
		Sales Engineer Name:	
		Contact No.:	
Contact Person :		Trial PO OA No:	
Tool Diameter :			
Component Details:		**Operation Details:**	
Name		Drilling Depth	
Material		No. of Holes/ Component	
Material Hardness		Drill Dia	
Machine Make /Model/No.		No. of Pecking	
Tool No.		Tol/Finish required :	
Machining Details :			
Parameters	**Existing**	**Trial 1**	
Holding			
M/c.Type			
Cycle Time			
Coolant			
Coolant Press.			
Tool Data:			
Parameters	**Existing**	**Trial 1**	**Regrinding Trial**
Make			
Ext/Thru cool			
Cutting Speed (Vc) m/min			
RPM			
Feed			
Depth of cut			
Life Obtained (TIME)			
Kind of Failure			
Cost Data:			
Tool Cost (Rs.)			
Cost/Component (Rs.)			
Remarks:-			
Customer Benefit:-1.			
Customer Benefit:-2.			

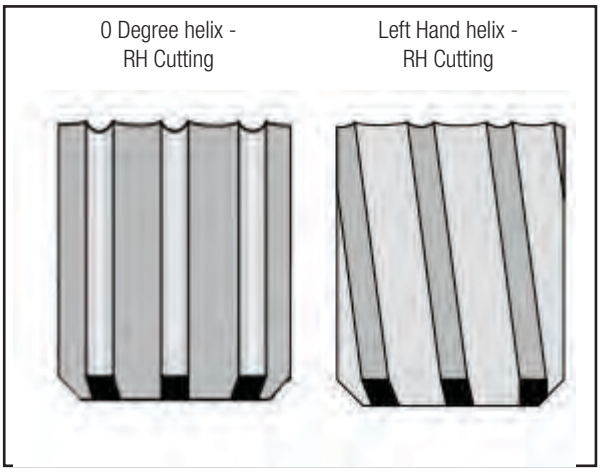
Sales Engineer
FORBES & COMPANY LIMITED

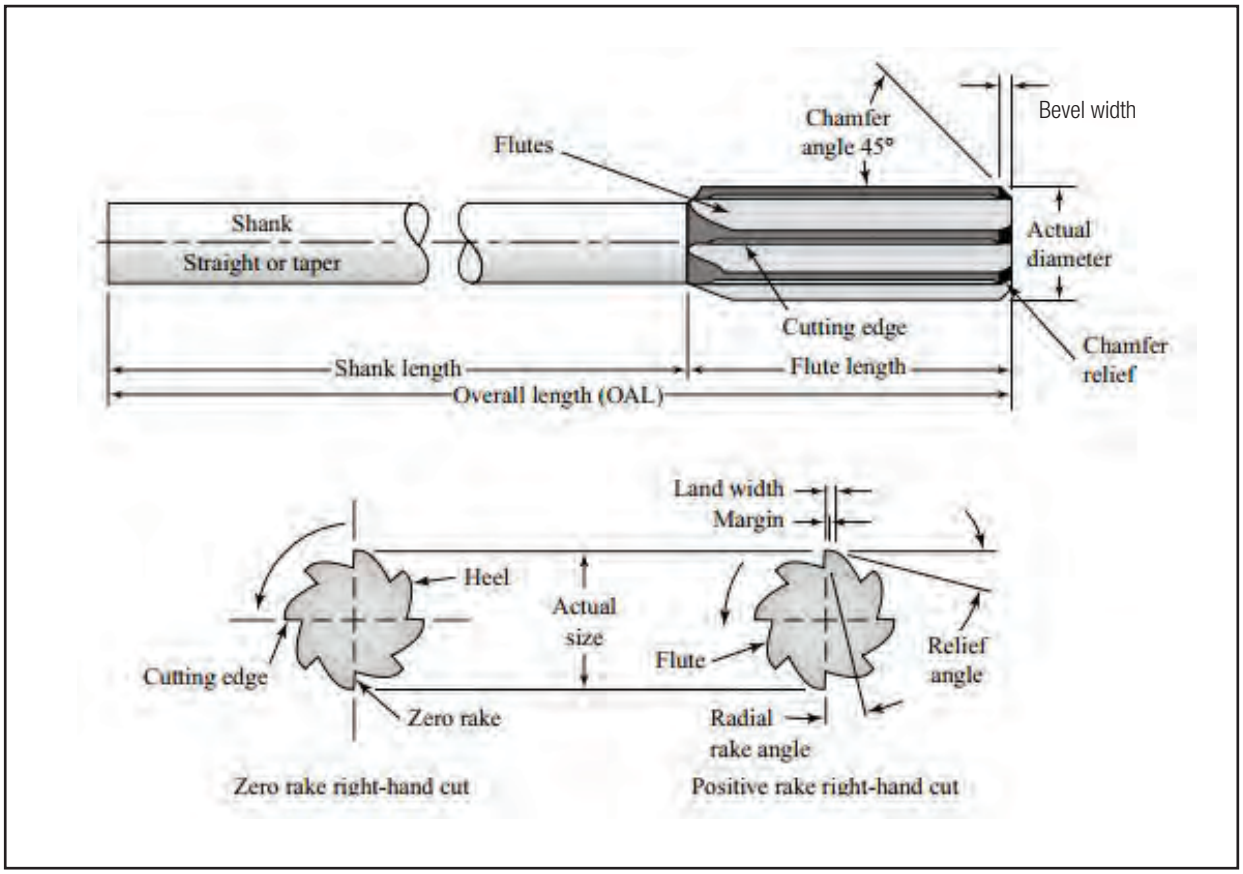
Authorised Signatory
CUSTOMER

Note: Trial tool/custom tool request form can be downloaded from our website www.forbesprecision.co.in
Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Reamer nomenclature

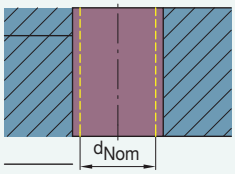
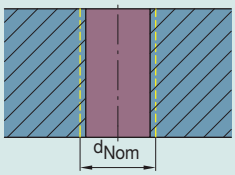
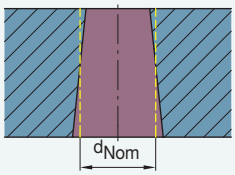
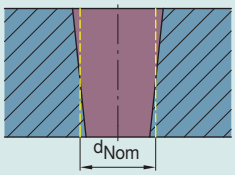
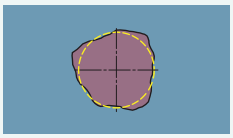
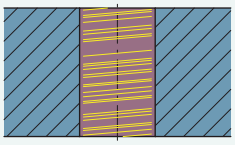






Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Reamers troubleshooting

Problem	Cause	Possible Remedy
Hole diameter too large. 	• Reaming tool running out-of-centre. • Concentricity of pilot hole and ream machining unsatisfactory. • Built-up edge. • Unsuitable cooling lubricant. • Reaming tool diameter too large.	• Use equalising adaptor. • Change cooling lubricant. • Change cutting speed. • Measure reamers and send for repairs.
Hole diameter too small. 	• Reamer worn. • Unsuitable cooling lubricant. • Reaming allowance too small.	• Replace and refit tool. • Change cooling lubricant. • Increase reaming allowance.
Conical hole profile wider towards drill runout. 	• Concentricity of pilot hole and reaming unsatisfactory. • Positioning accuracy of pilot hole to reaming.	• Re-align, use equalising adaptor. • Correct positioning accuracy.
Conical hole profile wider at drill entry point. 	• Concentricity of pilot hole and reaming unsatisfactory.	• Securely clamp reaming tool axially.
Hole out-of-centre and/or showing chatter marks. 	• Reaming tool running out-of-centre. • Slanted cutting surface/asymmetrical cutting. • Workpiece twisted.	• Use equalising adaptor. • Spot face as drilling preparation. • Take the direction of impact into account when clamping the workpiece.
Surface quality does not meet specification.	• Tool cutters worn. • Reaming tool running out-of-centre. • Incorrect technology data (cutting parameters). • Inadequate chip evacuation.	• Use equalising adaptor. • Change cooling lubricant. • Change cutting speed. • Measure reamers and send for repairs.
Feed grooves. 	• Built-up edge.	• Change cooling lubricant. • Change cutting speed.

Technical data provided should be considered advisory only as variations may be necessary depending on the particular application.

Deep Hole Drilling (DHD)- High Performance drills

Introducing the latest range of high performance solid carbide drills for deep hole drilling (DHD). DHD with through-coolant capabilities are tailor made to your specification. With an industry proven track record with its geometry, superior substrate and surface treatment, Totem drills command high wear resistance and micrograin structure to enable superior tool life and less breakage.

Application:- Oil Hole Drilling in Crankshaft

Material:- Forged Steel

Dia = 3.0–10,0mm

Length = 12D, 15D, 20D, 30D

Cutting conditions within a range of vc = 60–100 m/min, fz= 0,10–0,25mm/rev

Connecting rod bolt hole high performance drills

Our expertise in Connecting rod application for drilling has no comparison. Custom-made high performance drills with proven geometry, latest surface treatment, sub-micron substrate result in giving you the lowest Cost-per-part.

Application :- Connecting rod bolt hole drilling

Material:- Drop forged steel (heat treated)

Dia - 3-32mm

Length- 5D, 8D,10D

Cutting conditions within a range of vc = 60–100 m/min, fz= 0,15–0,35mm/rev

sales@forbesprecision.co.in

High performance special drills

Ultimate flexibility in supply of special drills as per customer's application with quick turnaround time. Our trained sales and application experts are ready to visit you to understand your needs in-depth. We commit to deliver superior solutions with lowest Cost-per-part.

Industry:-

Aerospace, Autmotive, Defense, Railways, General Engineering & Energy Equipments.

Dia 1.00- 32.00mm

Options:- Solid, Through Coolant 30 degree Helix, 40 Degree Helix, Axial Coolant Duct, Parallel Coolant Ducts.

High performance micro drills

Automotive:-
Fuel Injection Parts, Common Rail Parts, Turbo Charger Parts, Steering Components, Automatic Transmission Power Train Components.

Precision Machining:-
Jewellery Industry, Spinnerets & Spin Plates, Electronic Connector Parts, Screw & Machine Components.

Industry:-
Aerospace, Valve Bodies, Thermocouples, Integrated Sensors, Interior Cabin, Fixtures, Fuel System, Components Hydraulic & Pneumatic Parts, Writing Instruments Ball Pen Tips.

Medical:-
Traumatology
Medical Devices
Bone Screws & Plate
Surgical Suture Needles
Orthopedics Components
Dental, Implants & Bridges
Watch Industry, Watch Case, Watch Plates, Small Precision Parts, Watch Link Components.

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TOTEM®

High Performance Cutting Tools

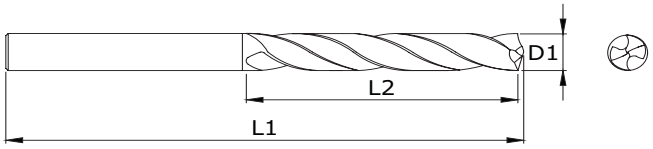
HIGH SPEED STEEL DRILLS

CONTENTS

SERIES	MATERIAL	SURFACE FINISH	PAGES
Jobber	HSS	Bright	5.003
Stub	HSS	Bright	5.006
Long	HSS	Bright	5.009
Extra Long Series	HSS	Bright	5.012
Jobber M35	HSS-E	Black & Gold	5.014
Jobber Steam Tempered	HSS	Black	5.017
Case Set	HSS	Bright	5.020
Reduced Shank	HSS	Blackened	5.021
Taper Shank	HSS	Bright	5.022
HSS M35 Centre Drill	HSS-E	Bright	5.024
HSS Annular Cutter	HSS	Bright	5.026
TCT Annular Cutter	TCT	Bright	5.030

HSS parallel shank twist drill - jobber series

HSS | BS 328 | IS 5101 | ISO 235 | DIN 338 | REG | N | h8 | 118° | 30° | BF

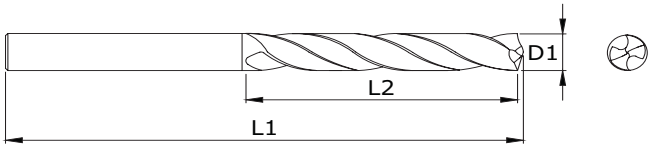


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
1.00		12	34	FBR0200001
1.10		14	36	FBR0200002
1.19	3/64"	16	38	FBR0200157
1.20		16	38	FBR0200003
1.30		16	38	FBR0200004
1.40		18	40	FBR0200005
1.50		18	40	FBR0200006
1.59	1/16"	20	43	FBR0200158
1.60		20	43	FBR0200007
1.70		20	43	FBR0200008
1.80		22	46	FBR0200009
1.90		22	46	FBR0200010
1.98	5/64"	24	49	FBR0200159
2.00		24	49	FBR0200011
2.10		24	49	FBR0200012
2.20		27	53	FBR0200013
2.30		27	53	FBR0200014
2.38	3/32"	30	57	FBR0200160
2.40		30	57	FBR0200015
2.50		30	57	FBR0200016
2.60		30	57	FBR0200017
2.70		33	61	FBR0200018
2.78	7/64"	33	61	FBR0200103
2.80		33	61	FBR0200019
2.90		33	61	FBR0200020
3.00		33	61	FBR0200021
3.10		36	65	FBR0200022
3.17	1/8"	36	65	FBR0200102
3.20		36	65	FBR0200023

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
3.30		36	65	FBR0200024
3.40		39	70	FBR0200025
3.50		39	70	FBR0200026
3.57	9/64"	39	70	FBR0200104
3.60		39	70	FBR0200027
3.70		39	70	FBR0200028
3.80		43	75	FBR0200029
3.90		43	75	FBR0200030
3.97	5/32'	43	75	FBR0200105
4.00		43	75	FBR0200031
4.10		43	75	FBR0200032
4.20		43	75	FBR0200033
4.30		47	80	FBR0200034
4.37	11/64"	47	80	FBR0200106
4.40		47	80	FBR0200035
4.50		47	80	FBR0200036
4.60		47	80	FBR0200037
4.70		47	80	FBR0200038
4.76	3/16"	52	86	FBR0200107
4.80		52	86	FBR0200039
4.90		52	86	FBR0200040
5.00		52	86	FBR0200041
5.10		52	86	FBR0200042
5.16	13/64"	52	86	FBR0200109
5.20		52	86	FBR0200043
5.30		52	86	FBR0200044
5.40		57	93	FBR0200045
5.50		57	93	FBR0200046
5.56	7/32"	57	93	FBR0200161

HSS parallel shank twist drill - jobber series

HSS | BS 328 | IS 5101 | ISO 235 | DIN 338 | REG | N | h8 | 118° | 30° | BF

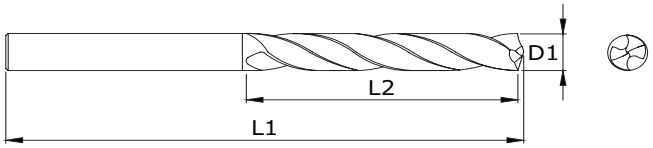


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
5.60		57	93	FBR0200047
5.70		57	93	FBR0200048
5.80		57	93	FBR0200049
5.90		57	93	FBR0200050
5.95	15/64"	57	93	FBR0200282
6.00		57	93	FBR0200051
6.10		63	101	FBR0200052
6.20		63	101	FBR0200053
6.30		63	101	FBR0200054
6.35	1/4"	63	101	FBR0200108
6.40		63	101	FBR0200055
6.50		63	101	FBR0200056
6.60		63	101	FBR0200057
6.70		63	101	FBR0200058
6.75	17/64"	69	109	FBR0200110
6.80		69	109	FBR0200059
6.90		69	109	FBR0200060
7.00		69	109	FBR0200061
7.10		69	109	FBR0200062
7.14	9/32"	69	109	FBR0200162
7.20		69	109	FBR0200063
7.30		69	109	FBR0200064
7.40		69	109	FBR0200065
7.50		69	109	FBR0200066
7.54	19/64"	75	117	FBR0200163
7.60		75	117	FBR0200067
7.70		75	117	FBR0200068
7.80		75	117	FBR0200069
7.90		75	117	FBR0200070
7.94	5/16"	75	117	FBR0200111
8.00		75	117	FBR0200071

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
8.10		75	117	FBR0200072
8.20		75	117	FBR0200073
8.30		75	117	FBR0200074
8.33	21/64"	75	117	FBR0200112
8.40		75	117	FBR0200075
8.50		75	117	FBR0200076
8.60		81	125	FBR0200077
8.70		81	125	FBR0200078
8.73	11/32"	81	125	FBR0200164
8.80		81	125	FBR0200079
8.90		81	125	FBR0200080
9.00		81	125	FBR0200081
9.10		81	125	FBR0200082
9.13	23/64"	81	125	FBR0200165
9.20		81	125	FBR0200083
9.30		81	125	FBR0200084
9.40		81	125	FBR0200085
9.50		81	125	FBR0200086
9.52	3/8"	87	133	FBR0200113
9.60		87	133	FBR0200087
9.70		87	133	FBR0200088
9.80		87	133	FBR0200089
9.90		87	133	FBR0200090
9.92	25/64"	87	133	FBR0200283
10.00		87	133	FBR0200091
10.10		87	133	FBR0200264
10.20		87	133	FBR0200092
10.30		87	133	FBR0200265
10.32	13/32"	87	133	FBR0200284
10.40		87	133	FBR0200266
10.50		87	133	FBR0200093

HSS parallel shank twist drill - jobber series

HSS | BS 328 | IS 5101 | ISO 235 | DIN 338 | REG | N | h8 | 118° | 30° | BF

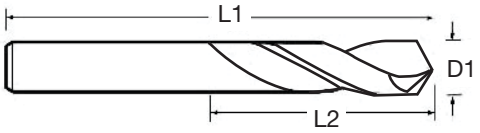


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
10.60		87	133	FBR0200141
10.70		94	142	FBR0200094
10.72	27/64"	94	142	FBR0200285
10.80		94	142	FBR0200095
10.90		94	142	FBR0200267
11.00		94	142	FBR0200096
11.10		94	142	FBR0200268
11.11	7/16"	94	142	FBR0200114
11.20		94	142	FBR0200269
11.30		94	142	FBR0200270
11.40		94	142	FBR0200271
11.50		94	142	FBR0200097
11.51	29/64"	94	142	FBR0200286
11.60		94	142	FBR0200272
11.70		94	142	FBR0200273
11.80		94	142	FBR0200098
11.90		101	151	FBR0200274
11.91	15/32"	101	151	FBR0200287
12.00		101	151	FBR0200099
12.10		101	151	FBR0200275
12.20		101	151	FBR0200276
12.30		101	151	FBR0200277
12.30	31/64"	101	151	FBR0200288
12.40		101	151	FBR0200278
12.50		101	151	FBR0200100
12.60		101	151	FBR0200142
12.70	1/2"	101	151	FBR0200115
12.70		101	151	FBR0200279
12.80		101	151	FBR0200280
12.90		101	151	FBR0200281

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
13.00		101	151	FBR0200101
13.10	33/64"	101	151	FBR0200289
13.49	17/32"	108	160	FBR0200290
13.50		108	160	FBR0200143
13.89	35/64"	108	160	FBR0200291
14.00		108	160	FBR0200144
14.29	9/16"	114	169	FBR0200292
14.50		114	169	FBR0200145
14.68	37/64"	114	169	FBR0200293
15.00		114	169	FBR0200146
15.08	19/32"	120	178	FBR0200294
15.48	39/64"	120	178	FBR0200295
15.50		120	178	FBR0200147
15.87	5/8"	120	178	FBR0200296
16.00		120	178	FBR0200148
16.50		125	184	FBR0200149
16.67	21/32"	125	184	FBR0200297
17.00		125	184	FBR0200150
17.46	11/16"	125	184	FBR0200298
17.50		130	191	FBR0200151
18.00		130	191	FBR0200152
18.26	23/32"	135	198	FBR0200299
18.50		135	198	FBR0200153
19.00		135	198	FBR0200154
19.05	3/4"	140	205	FBR0200300
19.50		140	205	FBR0200155
18.84	25/32"	140	205	FBR0200301
20.00		140	205	FBR0200156
20.64	13/16"	140	205	FBR0200302

HSS parallel shank twist drill - stub series

HSS | DIN 1897 | IS 5100 | ISO 235 | BS 328 | STUB | N | h8 | 118° | 30° | BF

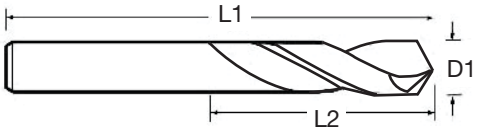


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
1.00		6	26	FBR0200313
1.10		7	28	FBR0200314
1.19	3/64"	8	30	FBR0200940
1.20		8	30	FBR0200315
1.30		8	30	FBR0200316
1.40		9	32	FBR0200317
1.50		9	32	FBR0200318
1.59	1/16"	10	34	FBR0200941
1.60		10	34	FBR0200319
1.70		10	34	FBR0200320
1.80		11	36	FBR0200321
1.90		11	36	FBR0200322
1.98	5/64"	12	38	FBR0200942
2.00		12	38	FBR0200323
2.10		12	38	FBR0200324
2.20		13	40	FBR0200325
2.30		13	40	FBR0200326
2.38	3/32"	14	43	FBR0200943
2.40		14	43	FBR0200327
2.50		14	43	FBR0200328
2.60		14	43	FBR0200329
2.70		16	46	FBR0200330
2.78	7/64"	16	46	FBR0200944
2.80		16	46	FBR0200331
2.90		16	46	FBR0200332
3.00		16	46	FBR0200333
3.10		18	49	FBR0200334
3.18	1/8"	18	49	FBR0200450
3.20		18	49	FBR0200335
3.30		18	49	FBR0200336

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
3.40		20	52	FBR0200337
3.50		20	52	FBR0200338
3.57	9/64"	20	52	FBR0200451
3.60		20	52	FBR0200339
3.70		20	52	FBR0200340
3.80		22	55	FBR0200341
3.90		22	55	FBR0200342
3.97	5/32"	22	55	FBR0200452
4.00		22	55	FBR0200343
4.10		22	55	FBR0200344
4.20		22	55	FBR0200345
4.30		24	58	FBR0200346
4.37	11/64"	24	58	FBR0200453
4.40		24	58	FBR0200347
4.50		24	58	FBR0200348
4.60		24	58	FBR0200349
4.70		24	58	FBR0200350
4.76	3/16	26	62	FBR0200454
4.80		26	62	FBR0200351
4.90		26	62	FBR0200352
5.00		26	62	FBR0200353
5.10		26	62	FBR0200354
5.16	13/64	26	62	FBR0200456
5.20		26	62	FBR0200355
5.30		26	62	FBR0200356
5.40		28	66	FBR0200357
5.50		28	66	FBR0200358
5.56	7/32"	28	66	FBR0200945
5.60		28	66	FBR0200359
5.70		28	66	FBR0200360

HSS parallel shank twist drill - stub series

HSS | DIN 1897 | IS 5100 | ISO 235 | BS 328 | STUB | N | h8 | 118° | 30° | BF

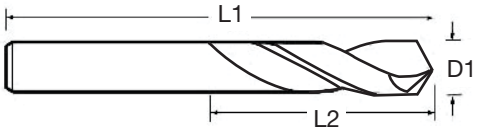


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
5.80		28	66	FBR0200361
5.90		28	66	FBR0200362
5.95	15/64	28	66	FBR0200946
6.00		28	66	FBR0200363
6.10		31	70	FBR0200364
6.20		31	70	FBR0200365
6.30		31	70	FBR0200366
6.40		31	70	FBR0200367
6.35	1/4"	31	70	FBR0200455
6.50		31	70	FBR0200368
6.60		31	70	FBR0200369
6.70		31	70	FBR0200370
6.75	17/64	34	74	FBR0200947
6.80		34	74	FBR0200371
6.90		34	74	FBR0200372
7.00		34	74	FBR0200373
7.10		34	74	FBR0200374
7.14	9/32"	34	74	FBR0200948
7.20		34	74	FBR0200375
7.30		34	74	FBR0200376
7.40		34	74	FBR0200377
7.50		34	74	FBR0200378
7.54	19/64	37	79	FBR0200949
7.60		37	79	FBR0200379
7.70		37	79	FBR0200380
7.80		37	79	FBR0200381
7.90		37	79	FBR0200382
7.94	5/16"	37	79	FBR0200457
8.00		37	79	FBR0200383
8.10		37	79	FBR0200384

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
8.20		37	79	FBR0200385
8.30		37	79	FBR0200386
8.33	21/64	37	79	FBR0200950
8.40		37	79	FBR0200387
8.50		37	79	FBR0200388
8.60		40	84	FBR0200389
8.70		40	84	FBR0200390
8.73	11/32"	40	84	FBR0200951
8.80		40	84	FBR0200391
8.90		40	84	FBR0200392
9.00		40	84	FBR0200393
9.10		40	84	FBR0200394
9.13	23/64	40	84	FBR0200952
9.20		40	84	FBR0200395
9.30		40	84	FBR0200396
9.40		40	84	FBR0200397
9.50		40	84	FBR0200398
9.60		43	89	FBR0200399
9.70		43	89	FBR0200400
9.52	3/8"	43	89	FBR0200458
9.80		43	89	FBR0200401
9.90		43	89	FBR0200402
9.92	25/64	43	89	FBR0200953
10.00		43	89	FBR0200403
10.10		43	89	FBR0200404
10.20		43	89	FBR0200405
10.30		43	89	FBR0200406
10.32	13/32	43	89	FBR0200954
10.40		43	89	FBR0200407
10.50		43	89	FBR0200408

HSS parallel shank twist drill - stub series

HSS | DIN 1897 | IS 5100 | ISO 235 | BS 328 | STUB | N | h8 | 118° | 30° | BF



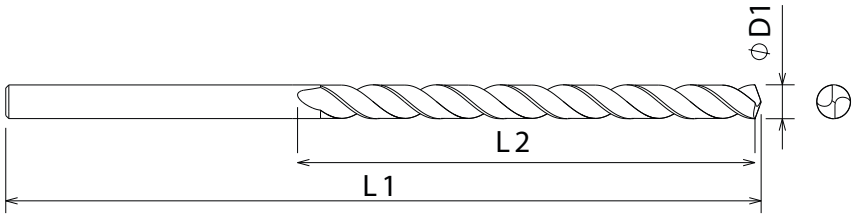
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
10.60		43	89	FBR0200409
10.70		47	95	FBR0200410
10.72	27/64	47	95	FBR0200955
10.80		47	95	FBR0200411
10.90		47	95	FBR0200412
11.00		47	95	FBR0200413
11.10		47	95	FBR0200414
11.11	7/16"	47	95	FBR0200459
11.20		47	95	FBR0200415
11.30		47	95	FBR0200416
11.40		47	95	FBR0200417
11.50		47	95	FBR0200418
11.51	29/64	47	95	FBR0200956
11.60		47	95	FBR0200419
11.70		47	95	FBR0200420
11.80		47	95	FBR0200421
11.90		51	102	FBR0200422
11.91	15/32	51	102	FBR0200957
12.00		51	102	FBR0200423
12.10		51	102	FBR0200424
12.20		51	102	FBR0200425
12.30		51	102	FBR0200426
12.40		51	102	FBR0200427
12.50		51	102	FBR0200428
12.60		51	102	FBR0200429
12.70	1/2"	51	102	FBR0200460
12.80		51	102	FBR0200431
12.90		51	102	FBR0200432

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
13.00		51	102	FBR0200433
13.50		54	107	FBR0200435
14.00		54	107	FBR0200437
14.28	9/16"	56	111	FBR0201799
14.50		56	111	FBR0200438
15.00		56	111	FBR0200439
15.50		58	115	FBR0200440
16.00		58	115	FBR0200441
16.50		60	119	FBR0200442
17.00		60	119	FBR0200443
17.50		62	123	FBR0200444
18.00		62	123	FBR0200445
18.50		64	127	FBR0200446
19.00		64	127	FBR0200447
19.50		66	131	FBR0200448
20.00		66	131	FBR0200449

1. An excellent general purpose drill with conventional 118° point angle
2. Shorter flute & overall length increases the rigidity, resulting in less deflection, better hole accuracy & longer tool life
3. Stable cutting edge
4. Better chip evacuation
5. Better hole straightness
6. Eliminated breakages
7. Operating at higher feeds
8. Ideal to use in manual hand held drilling application
9. Superior tool life

HSS parallel shank twist drill - long series

HSS | DIN 340 | IS 5102 | ISO 494 | BS 328 | LONG | N | h8 | 118° | 30° | BF

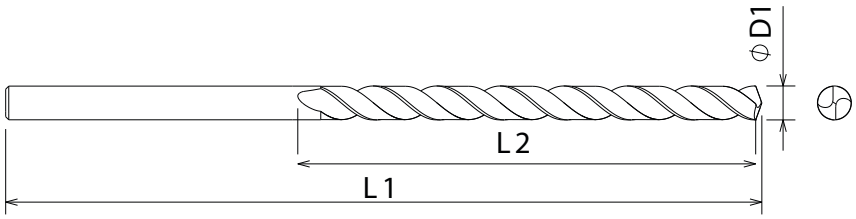


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
1.00		33	56	FBR0200958
1.10		37	60	FBR0200959
1.19	3/64"	41	65	FBR0200960
1.20		41	65	FBR0200961
1.30		41	65	FBR0200962
1.40		45	70	FBR0200963
1.50		45	70	FBR0200964
1.59	1/16"	50	76	FBR0200965
1.60		50	76	FBR0200966
1.80		53	80	FBR0200967
1.90		53	80	FBR0200968
1.98	5/64"	56	85	FBR0200969
2.00		56	85	FBR0200561
2.10		56	85	FBR0200970
2.20		59	90	FBR0200971
2.30		59	90	FBR0200972
2.38	3/32"	62	95	FBR0200973
2.40		62	95	FBR0200974
2.50		62	95	FBR0200562
2.60		62	95	FBR0200975
2.70		66	100	FBR0200976
2.78	7/64"	66	100	FBR0200977
2.80		66	100	FBR0200978
2.90		66	100	FBR0200979
3.00		66	100	FBR0200563
3.10		69	106	FBR0200980
3.17	1/8"	69	106	FBR0200981

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
3.20		69	106	FBR0200982
3.30		69	106	FBR0200983
3.40		73	112	FBR0200984
3.50		73	112	FBR0200564
3.60		73	112	FBR0200985
3.70		73	112	FBR0200986
3.80		78	119	FBR0200987
3.90		78	119	FBR0200988
3.97	5/32"	78	119	FBR0200989
4.00		78	119	FBR0200565
4.10		78	119	FBR0200990
4.20		78	119	FBR0200991
4.30		82	126	FBR0200992
4.37	11/64"	82	126	FBR0200993
4.40		82	126	FBR0200994
4.50		82	126	FBR0200566
4.60		82	126	FBR0200995
4.70		82	126	FBR0200996
4.76	3/16"	87	132	FBR0200997
4.80		87	132	FBR0200998
4.90		87	132	FBR0200999
5.00		87	132	FBR0200567
5.10		87	132	FBR0201000
5.16	13/64	87	132	FBR0201001
5.20		87	132	FBR0201002
5.30		87	132	FBR0201003
5.40		91	139	FBR0201004

HSS parallel shank twist drill - long series

HSS | DIN 340 | IS 5102 | ISO 494 | BS 328 | LONG | N | h8 | 118° | 30° | BF

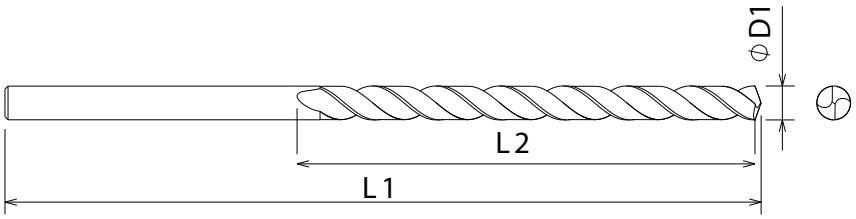


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
5.50		91	139	FBR0201005
5.56	7/32"	91	139	FBR0201006
5.60		91	139	FBR0201007
5.70		91	139	FBR0201008
5.80		91	139	FBR0201009
5.90		91	139	FBR0201010
5.95	15/64"	91	139	FBR0201011
6.00		91	139	FBR0200568
6.10		97	148	FBR0201012
6.20		97	148	FBR0201013
6.30		97	148	FBR0201014
6.35	1/4"	97	148	FBR0201015
6.40		97	148	FBR0201016
6.50		97	148	FBR0201017
6.60		97	148	FBR0201018
6.70		97	148	FBR0201019
6.75	17/64"	102	156	FBR0201020
6.80		102	156	FBR0201021
6.90		102	156	FBR0201022
7.00		102	156	FBR0201023
7.10		102	156	FBR0201024
7.14	9/32"	102	156	FBR0201025
7.20		102	156	FBR0201026
7.30		102	156	FBR0201027
7.40		102	156	FBR0201028
7.50		102	156	FBR0201029

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
7.54	19/64"	109	165	FBR0201030
7.60		109	165	FBR0201031
7.70		109	165	FBR0201032
7.80		109	165	FBR0201033
7.90		109	165	FBR0201034
7.94	5/16"	109	165	FBR0201035
8.00		109	165	FBR0201036
8.10		109	165	FBR0201037
8.20		109	165	FBR0201038
8.30		109	165	FBR0201039
8.33	21/64"	109	165	FBR0201040
8.40		109	165	FBR0201041
8.50		109	165	FBR0201042
8.60		115	175	FBR0201043
8.70		115	175	FBR0201044
8.73	11/32"	115	175	FBR0201045
8.80		115	175	FBR0201046
8.90		115	175	FBR0201047
9.00		115	175	FBR0201048
9.10		115	175	FBR0201049
9.13	23/64"	115	175	FBR0201050
9.20		115	175	FBR0201051
9.30		115	175	FBR0201052
9.40		115	175	FBR0201053
9.50		115	175	FBR0201054
9.52	3/8"	121	184	FBR0201055

HSS parallel shank twist drill - long series

HSS | DIN 340 | IS 5102 | ISO 494 | BS 328 | LONG | N | h8 | 118° | 30° | BF



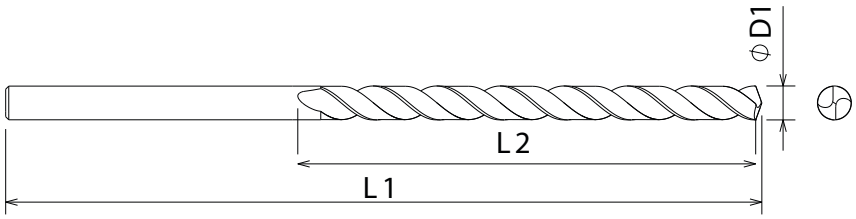
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
9.60		121	184	FBR0201056
9.70		121	184	FBR0201057
9.80		121	184	FBR0201058
9.90		121	184	FBR0201059
9.92	25/64"	121	184	FBR0201060
10.00		121	184	FBR0201061
10.10		121	184	FBR0201062
10.20		121	184	FBR0201063
10.30		121	184	FBR0201064
10.32	13/32"	121	184	FBR0201065
10.40		121	184	FBR0201066
10.50		121	184	FBR0201067
10.60		121	184	FBR0201068
10.70		128	195	FBR0201069
10.72	27/64	128	195	FBR0201070
10.80		128	195	FBR0201071
10.90		128	195	FBR0201072
11.00		128	195	FBR0201073
11.11	7/16"	128	195	FBR0201074
11.20		128	195	FBR0201075
11.30		128	195	FBR0201076
11.40		128	195	FBR0201077
11.50		128	195	FBR0201078
11.51	29/64"	128	195	FBR0201079
11.60		128	195	FBR0201080
11.70		128	195	FBR0201081

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
11.80		128	195	FBR0201082
11.90		134	205	FBR0201083
11.91	15/32"	134	205	FBR0201084
12.00		134	205	FBR0201085
12.10		134	205	FBR0201086
12.20		134	205	FBR0201087
12.3	31/64"	134	205	FBR0201088
12.40		134	205	FBR0201089
12.50		134	205	FBR0201090
12.60		134	205	FBR0201091
12.7	1/2"	134	205	FBR0201092
12.80		134	205	FBR0201093
12.90		134	205	FBR0201094
13.00		134	205	FBR0201095

1. For general purpose drilling in deep hole applications
2. Stable cutting edge
3. Better chip evacuation
4. Better hole straightness
5. Eliminated breakages
6. Well suited for deep holes
7. Superior tool life

HSS parallel shank twist drill – extra-long series

HSS | DIN 340 | IS 7823 | ISO 2005 | EXTRA LONG | N | h8 | 118° | 30° | BF

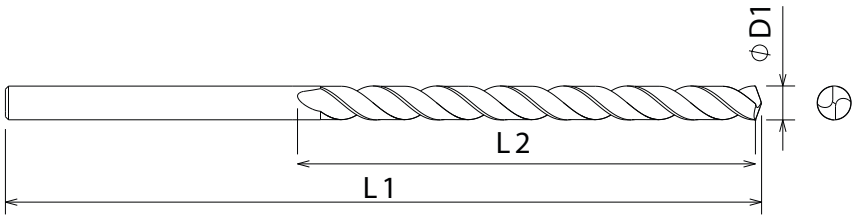


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
3.00		100	150	FBR0202963
3.50		100	150	FBR0202964
4.00		100	150	FBR0202965
4.50		100	150	FBR0202966
5.00		100	150	FBR0202967
5.50		100	150	FBR0202968
6.00		100	150	FBR0202969
3.00		120	175	FBR0202970
3.50		120	175	FBR0202971
4.00		120	175	FBR0202972
4.50		120	175	FBR0202973
5.00		120	175	FBR0202974
5.50		120	175	FBR0202975
6.00		120	175	FBR0202976
3.00		150	200	FBR0202977
3.50		150	200	FBR0202978
4.00		150	200	FBR0202979
4.50		150	200	FBR0202980
5.00		150	200	FBR0202981
5.50		150	200	FBR0202982
6.00		150	200	FBR0202983
6.50		150	200	FBR0202984
7.00		150	200	FBR0202985
7.50		150	200	FBR0202986
8.00		150	200	FBR0202987
8.50		150	200	FBR0202988

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
9.00		150	200	FBR0202989
9.50		150	200	FBR0202990
10.00		150	200	FBR0202991
10.50		150	200	FBR0202992
3.00		175	225	FBR0202993
3.50		175	225	FBR0202994
4.00		175	225	FBR0202995
4.50		175	225	FBR0202996
5.00		175	225	FBR0202997
5.50		175	225	FBR0202998
6.00		175	225	FBR0202999
3.00		200	250	FBR0203000
3.50		200	250	FBR0203001
4.00		200	250	FBR0203002
4.50		200	250	FBR0203003
5.00		200	250	FBR0203004
5.50		200	250	FBR0203005
6.00		200	250	FBR0203006
6.50		200	250	FBR0203007
7.00		200	250	FBR0203008
7.50		200	250	FBR0203009
8.00		200	250	FBR0203010
8.50		200	250	FBR0203011
9.00		200	250	FBR0203012
9.50		200	250	FBR0203013
10.00		200	250	FBR0203014

HSS parallel shank twist drill – extra-long series

HSS | DIN 340 | IS 7823 | ISO 2005 | EXTRA LONG | N | h8 | 118° | 30° | BF

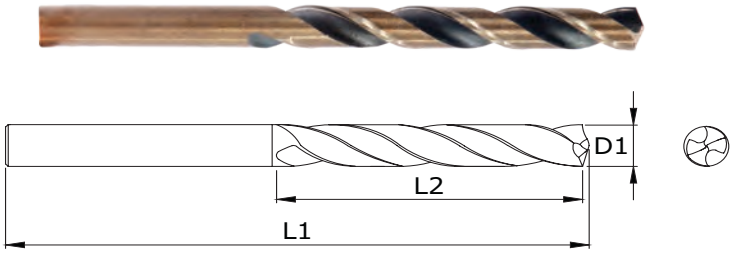


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
10.50		200	250	FBR0203015
11.00		200	250	FBR0203016
11.50		200	250	FBR0203017
12.00		200	250	FBR0203018
12.50		200	250	FBR0203019
3.00		250	300	FBR0203020
3.50		250	300	FBR0203021
4.00		250	300	FBR0203022
4.50		250	300	FBR0203023
5.00		250	300	FBR0203024
5.50		250	300	FBR0203025
6.00		250	300	FBR0203026
6.50		250	300	FBR0203027
7.00		250	300	FBR0203028
7.50		250	300	FBR0203029
8.00		250	300	FBR0203030
8.50		250	300	FBR0203031
9.00		250	300	FBR0203032
9.50		250	300	FBR0203033
10.00		250	300	FBR0203034
10.50		250	300	FBR0203035
11.00		250	300	FBR0203036
11.50		250	300	FBR0203037
12.00		250	300	FBR0203038
12.50		250	300	FBR0203039
4.00		300	350	FBR0203040
4.50		300	350	FBR0203041

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
5.00		300	350	FBR0203042
5.50		300	350	FBR0203043
6.00		300	350	FBR0203044
6.50		300	350	FBR0203045
7.00		300	350	FBR0203046
7.50		300	350	FBR0203047
8.00		300	350	FBR0203048
8.50		300	350	FBR0203049
9.00		300	350	FBR0203050
9.50		300	350	FBR0203051
10.00		300	350	FBR0203052
10.50		300	350	FBR0203053
11.00		300	350	FBR0203054
11.50		300	350	FBR0203055
12.00		300	350	FBR0203056
12.50		300	350	FBR0203057

HSS-E parallel shank twist drill - M35 series black & gold

HSS-E | BS 328 | IS 5101 | ISO 235 | DIN 338 | S | REG | h8 | 135° | 30° | B&G

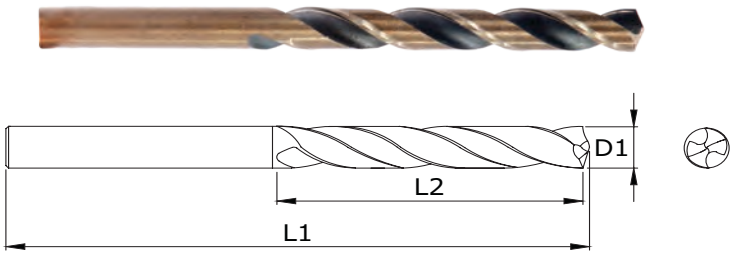


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
1.00		12	34	FBR0201801
1.10		14	36	FBR0201802
1.19	3/64	16	38	FBR0201923
1.20		16	38	FBR0201803
1.30		16	38	FBR0201804
1.40		18	40	FBR0201805
1.50		18	40	FBR0201806
1.59	1/16	20	43	FBR0201924
1.60		20	43	FBR0201807
1.70		20	43	FBR0201808
1.80		22	46	FBR0201809
1.90		22	46	FBR0201810
1.98	5/64	24	49	FBR0201925
2.00		24	49	FBR0201811
2.10		24	49	FBR0201812
2.20		27	53	FBR0201813
2.30		27	53	FBR0201814
2.38	3/32	30	57	FBR0201926
2.40		30	57	FBR0201815
2.50		30	57	FBR0201816
2.60		30	57	FBR0201817
2.70		33	61	FBR0201818
2.78	7/64	33	61	FBR0201927
2.80		33	61	FBR0201819
2.90		33	61	FBR0201820
3.00		33	61	FBR0201821
3.10		36	65	FBR0201822
3.17	1/8	36	65	FBR0201928

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
3.20		36	65	FBR0201823
3.30		36	65	FBR0201824
3.40		39	70	FBR0201825
3.50		39	70	FBR0201826
3.57	9/64	39	70	FBR0201929
3.60		39	70	FBR0201827
3.70		39	70	FBR0201828
3.80		43	75	FBR0201829
3.90		43	75	FBR0201830
3.97	5/32	43	75	FBR0201930
4.00		43	75	FBR0201831
4.10		43	75	FBR0201832
4.20		43	75	FBR0201833
4.30		47	80	FBR0201834
4.37	11/64	47	80	FBR0201931
4.40		47	80	FBR0201835
4.50		47	80	FBR0201836
4.60		47	80	FBR0201837
4.70		47	80	FBR0201838
4.76	3/16	52	86	FBR0201932
4.80		52	86	FBR0201839
4.90		52	86	FBR0201840
5.00		52	86	FBR0201841
5.10		52	86	FBR0201842
5.16	13/64	52	86	FBR0201933
5.20		52	86	FBR0201843
5.30		52	86	FBR0201844
5.40		57	93	FBR0201845

HSS-E parallel shank twist drill - M35 series black & gold

HSS-E | BS 328 | IS 5101 | ISO 235 | DIN 338 | S | h8 | 135° | 30° | B&G

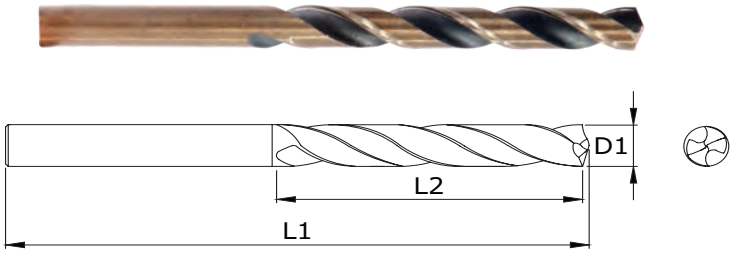


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
5.50		57	93	FBR0201846
5.56	7/32	57	93	FBR0201934
5.60		57	93	FBR0201847
5.70		57	93	FBR0201848
5.80		57	93	FBR0201849
5.90		57	93	FBR0201850
5.95	15/64	57	93	FBR0201935
6.00		57	93	FBR0201851
6.10		63	101	FBR0201852
6.20		63	101	FBR0201853
6.30		63	101	FBR0201854
6.35	1/4	63	101	FBR0201936
6.40		63	101	FBR0201855
6.50		63	101	FBR0201856
6.60		63	101	FBR0201857
6.70		63	101	FBR0201858
6.75	17/64	69	109	FBR0201937
6.80		69	109	FBR0201859
6.90		69	109	FBR0201860
7.00		69	109	FBR0201861
7.10		69	109	FBR0201862
7.14	9/32	69	109	FBR0201938
7.20		69	109	FBR0201863
7.30		69	109	FBR0201864
7.40		69	109	FBR0201865
7.50		69	109	FBR0201866
7.54	19/64	75	117	FBR0201939
7.60		75	117	FBR0201867

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
7.70		75	117	FBR0201868
7.80		75	117	FBR0201869
7.90		75	117	FBR0201870
7.94	5/16	75	117	FBR0201940
8.00		75	117	FBR0201871
8.10		75	117	FBR0201872
8.20		75	117	FBR0201873
8.30		75	117	FBR0201874
8.33	21/64	75	117	FBR0201941
8.40		75	117	FBR0201875
8.50		75	117	FBR0201876
8.60		81	125	FBR0201877
8.70		81	125	FBR0201878
8.73	11/32	81	125	FBR0201942
8.80		81	125	FBR0201879
8.90		81	125	FBR0201880
9.00		81	125	FBR0201881
9.10		81	125	FBR0201882
9.13	23/64	81	125	FBR0201943
9.20		81	125	FBR0201883
9.30		81	125	FBR0201884
9.40		81	125	FBR0201885
9.50		81	125	FBR0201886
9.52	3/8	87	133	FBR0201944
9.60		87	133	FBR0201887
9.70		87	133	FBR0201888
9.80		87	133	FBR0201889
9.90		87	133	FBR0201890

HSS-E parallel shank twist drill - M35 series black & gold

HSS-E | BS 328 | IS 5101 | ISO 235 | DIN 338 | S | h8 | 135° | 30° | B&G



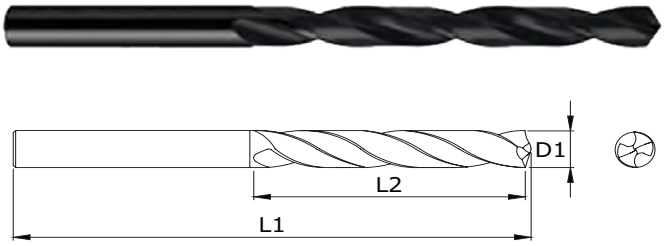
Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
9.92	25/64	87	133	FBR0201945
10.00		87	133	FBR0201891
10.10		87	133	FBR0201892
10.20		87	133	FBR0201893
10.30		87	133	FBR0201894
10.32	13/32	87	133	FBR0201946
10.40		87	133	FBR0201895
10.50		87	133	FBR0201896
10.60		87	133	FBR0201897
10.70		94	142	FBR0201898
10.72	27/64	94	142	FBR0201947
10.80		94	142	FBR0201899
10.90		94	142	FBR0201900
11.00		94	142	FBR0201901
11.10		94	142	FBR0201902
11.11	7/16	94	142	FBR0201948
11.20		94	142	FBR0201903
11.30		94	142	FBR0201904
11.40		94	142	FBR0201905
11.50		94	142	FBR0201906
11.51	29/64	94	142	FBR0201949
11.60		94	142	FBR0201907
11.70		94	142	FBR0201908
11.80		94	142	FBR0201909
11.90		101	151	FBR0201910
11.91	15/32	101	151	FBR0201950
12.00		101	151	FBR0201911
12.10		101	151	FBR0201912

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
12.20		101	151	FBR0201913
12.30		101	151	FBR0201914
12.30	31/64	101	151	FBR0201951
12.40		101	151	FBR0201915
12.50		101	151	FBR0201916
12.60		101	151	FBR0201917
12.70		101	151	FBR0201918
12.70	1/2	101	151	FBR0201952
12.80		101	151	FBR0201919
12.90		101	151	FBR0201920
13.00		101	151	FBR0201921

1. Made from premium grade High Speed Steel
2. High performance drills suitable for Production applications & also for tough Maintenance applications
3. Well suited for drilling on Stainless Steel & challenging Alloy Steel materials
4. Precision ground 135 Degree Split Point angle is Self Centreing & reduces Thrust during application
5. Special Black & Gold surface treatment to increase lubricity & reduce friction
6. Stable cutting edge
7. The strong web construction provides greater strength & rigidity to the drill
8. Better chip evacuation
9. Better hole straightness
10. Eliminated breakages
11. Operating at higher feeds
12. Superior tool life

HSS parallel shank twist drill - M2 steam tempered

HSS | BS 328 | IS 5101 | ISO 235 | DIN 338 | REG | N | h8 | 118° | 30° | BLACK

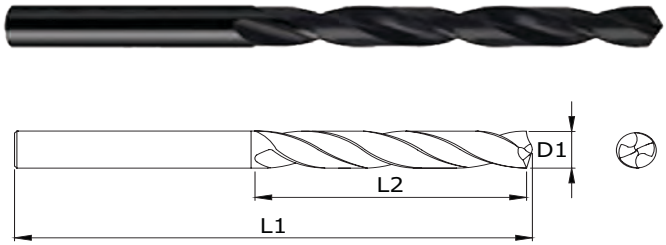


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
1.00		12	34	FBR0202591
1.10		14	36	FBR0202837
1.19	3/64"	16	38	FBR0202948
1.20		16	38	FBR0202592
1.30		16	38	FBR0202838
1.40		18	40	FBR0202839
1.50		18	40	FBR0202593
1.59	1/16"	20	43	FBR0202949
1.60		20	43	FBR0202840
1.70		20	43	FBR0202841
1.80		22	46	FBR0202540
1.90		22	46	FBR0202843
1.98	5/64"	24	49	FBR0202950
2.00		24	49	FBR0202594
2.10		24	49	FBR0202844
2.20		27	53	FBR0202845
2.30		27	53	FBR0202846
2.38	3/32"	30	57	FBR0202951
2.40		30	57	FBR0202541
2.50		30	57	FBR0202542
2.60		30	57	FBR0202686
2.70		33	61	FBR0202849
2.78	7/64"	33	61	FBR0202935
2.80		33	61	FBR0202850
2.90		33	61	FBR0202851
3.00		33	61	FBR0202543
3.10		36	65	FBR0202757
3.17	1/8"	36	65	FBR0202934
3.20		36	65	FBR0202852
3.30		36	65	FBR0202853

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
3.40		39	70	FBR0202854
3.50		39	70	FBR0202595
3.57	9/64"	39	70	FBR0202936
3.60		39	70	FBR0202855
3.70		39	70	FBR0202856
3.80		43	75	FBR0202857
3.90		43	75	FBR0202858
3.97	5/32'	43	75	FBR0202937
4.00		43	75	FBR0202544
4.10		43	75	FBR0202758
4.20		43	75	FBR0202690
4.30		47	80	FBR0202860
4.37	11/64"	47	80	FBR0202938
4.40		47	80	FBR0202861
4.50		47	80	FBR0202596
4.60		47	80	FBR0202862
4.70		47	80	FBR0202863
4.76	3/16"	52	86	FBR0202939
4.80		52	86	FBR0202864
4.90		52	86	FBR0202865
5.00		52	86	FBR0202474
5.10		52	86	FBR0202759
5.16	13/64"	52	86	FBR0202941
5.20		52	86	FBR0202958
5.30		52	86	FBR0202867
5.40		57	93	FBR0202868
5.50		57	93	FBR0202597
5.56	7/32"	57	93	FBR0202952
5.60		57	93	FBR0202869
5.70		57	93	FBR0202870

HSS parallel shank twist drill - M2 steam tempered

HSS | BS 328 | IS 5101 | ISO 235 | DIN 338 | REG | N | h8 | 118° | 30° | BLACK

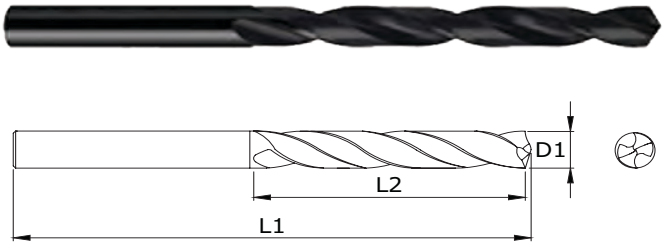


Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
5.80		57	93	FBR0202871
5.90		57	93	FBR0202691
6.00		57	93	FBR0202475
6.10		63	101	FBR0202873
6.20		63	101	FBR0202874
6.30		63	101	FBR0202875
6.35	1/4"	63	101	FBR0202940
6.40		63	101	FBR0202876
6.50		63	101	FBR0202598
6.60		63	101	FBR0202877
6.70		63	101	FBR0202692
6.75	17/64"	69	109	FBR0202942
6.80		69	109	FBR0202693
6.90		69	109	FBR0202879
7.00		69	109	FBR0202880
7.10		69	109	FBR0202881
7.14	9/32"	69	109	FBR0202953
7.20		69	109	FBR0202882
7.30		69	109	FBR0202883
7.40		69	109	FBR0202884
7.50		69	109	FBR0202885
7.54	19/64"	75	117	FBR0202954
7.60		75	117	FBR0202886
7.70		75	117	FBR0202887
7.80		75	117	FBR0202888
7.90		75	117	FBR0202889
7.94	5/16"	75	117	FBR0202943
8.00		75	117	FBR0202545
8.10		75	117	FBR0202890
8.20		75	117	FBR0202891

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
8.30		75	117	FBR0202892
8.33	21/64"	75	117	FBR0202944
8.40		75	117	FBR0202893
8.50		75	117	FBR0202296
8.60		81	125	FBR0202894
8.70		81	125	FBR0202694
8.73	11/32"	81	125	FBR0202955
8.80		81	125	FBR0202896
8.90		81	125	FBR0202897
9.00		81	125	FBR0202898
9.10		81	125	FBR0202899
9.13	23/64"	81	125	FBR0202956
9.20		81	125	FBR0202293
9.30		81	125	FBR0202901
9.40		81	125	FBR0202902
9.50		81	125	FBR0202903
9.52	3/8"	87	133	FBR0202945
9.60		87	133	FBR0202904
9.70		87	133	FBR0202905
9.80		87	133	FBR0202906
9.90		87	133	FBR0202907
10.00		87	133	FBR0202546
10.10		87	133	FBR0202908
10.20		87	133	FBR0202909
10.30		87	133	FBR0202910
10.40		87	133	FBR0202911
10.50		87	133	FBR0202599
10.60		87	133	FBR0202912
10.70		94	142	FBR0202913
10.80		94	142	FBR0202914

HSS parallel shank twist drill - M2 steam tempered

HSS | BS 328 | IS 5101 | ISO 235 | DIN 338 | REG | N | h8 | 118° | 30° | BLACK



Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
10.90		94	142	FBR0202915
11.00		94	142	FBR0202294
11.10		94	142	FBR0202916
11.11	7/16"	94	142	FBR0202946
11.20		94	142	FBR0202917
11.30		94	142	FBR0202918
11.40		94	142	FBR0202919
11.50		94	142	FBR0202920
11.60		94	142	FBR0202921
11.70		94	142	FBR0202922
11.80		94	142	FBR0202923
11.90		101	151	FBR0202924
12.00		101	151	FBR0202433
12.10		101	151	FBR0202926
12.20		101	151	FBR0202927
12.30		101	151	FBR0202928
12.40		101	151	FBR0202929
12.50		101	151	FBR0202600
12.60		101	151	FBR0202930
12.70	1/2"	101	151	FBR0202947
12.80		101	151	FBR0202932
12.90		101	151	FBR0202933
13.00		101	151	FBR0202295
13.50		108	160	FBR0203118
14.00		108	160	FBR0203119
14.50		114	169	FBR0203120
15.00		114	169	FBR0203121
15.50		120	178	FBR0203122
15.87	5/8"	120	178	FBR0203128

Size (D1)		Flute Length (L2)	Overall Length (L1)	EDP No
mm	inch	mm	mm	
16.00		120	178	FBR0203123
16.50		125	184	FBR0203124
17.00		125	184	FBR0203125
17.50		130	191	FBR0203126
18.00		130	191	FBR0203127
18.50		135	198	FBR0203170
19.00		135	198	FBR0203171
19.05	3/4"	140	205	FBR0203129
19.50		140	205	FBR0203172
20.00		140	205	FBR0203173
5.95	15/64"	57	93	FBR0203174
9.92	25/64"	87	133	FBR0203175
10.32	13/32"	87	133	FBR0203176
10.72	27/64"	94	142	FBR0203177
11.51	29/64"	94	142	FBR0203178
11.91	15/32"	101	151	FBR0203179
13.10	33/64"	101	151	FBR0203180
13.49	17/32"	108	160	FBR0203181
13.89	35/64"	108	160	FBR0203182
14.29	9/16"	114	169	FBR0203183
14.68	37/64"	114	169	FBR0203184
15.08	19/32"	120	178	FBR0203185
15.48	39/64"	120	178	FBR0203186
16.67	21/32"	125	184	FBR0203187
17.46	11/16"	125	184	FBR0203188
18.26	23/32"	135	198	FBR0203189
18.84	25/32"	140	205	FBR0203190
20.64	13/16"	140	205	FBR0203191

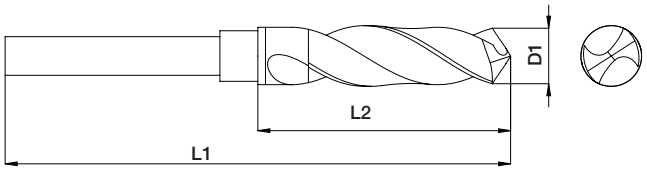
Drill case sets

HSS | HSS-E | DIN 338 | IS 5101 | ISO 235 | BS 328 | REG | N | h8 | 118° | 135° | 30° | BF | TiN | B&G

EDP No	Size
FBR0200531	HSS Drills Case Set 1.0 mm to 13.0 mm (25 pcs)
FBR0200532	HSS Drills Case Set 2.0 mm to 8.0 mm (13 pcs)
FBR0200543	HSS Drills Case Set 1/16" to 1/4" (13 pcs)
FBR0200545	HSS Drills Case Set 1/16" to 1/2" (29 pcs)
FBR0202169	HSS Drills Case Set M2 1.0 TO 10.0 mm (19 pcs)
FBR0202170	HSS Drills Case Set M2 1.0 TO 5.9 mm (50 pcs)
FBR0202171	HSS Drills Case Set M2 6.0 TO 10.0 mm (41 pcs)
FBR0202172	HSS Drills Case Set M35 B&G 1.0 TO 10.0 mm (19 pcs)
FBR0202173	HSS Drills Case Set M35 B&G 1.0 TO 13.0 mm (25 pcs)
FBR0202174	HSS Drills Case Set M35 B&G 1.0 TO 5.9 mm (50 pcs)
FBR0202175	HSS Drills Case Set M35 B&G 6.0 TO 10.0 mm (41 pcs)
FBR0202258	HSS Drills Case Set M35 B&G 1/16"TO 1/2"(29 pcs)
FBR0202259	HSS Drills Case Set M2 1/16'' TO 3/8'' (21 pcs)
FBR0202266	HSS Drills Case Set M2 1.50 TO 6.50 mm (13 pcs)
FBR0202267	HSS Drills Case Set M2 TiN 1.50 TO 6.50 mm (13 pcs)
FBR0202268	HSS Drills Case Set M2 TiN 1.0 TO 10.0 mm (19 pcs)

Reduced shank drill series

HSS | N | 118° | 30° | ST

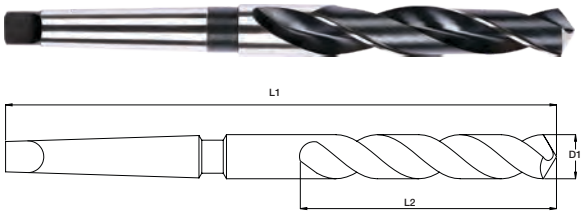


Size (D1) mm	Shank Dia (L2) inch	EDP No
13.5	1/2"	FBR0200479
14.0	1/2"	FBR0200461
14.50	1/2"	FBR0200480
15.0	1/2"	FBR0200462
15.50	1/2"	FBR0200481
16.0	1/2"	FBR0200463
16.50	1/2"	FBR0200482
17.0	1/2"	FBR0200464
17.50	1/2"	FBR0200483
18.0	1/2"	FBR0200465
18.50	1/2"	FBR0200484
19.0	1/2"	FBR0200466
19.50	1/2"	FBR0200485
20.0	1/2"	FBR0200467
20.50	1/2"	FBR0200486
21.0	1/2"	FBR0200469
21.50	1/2"	FBR0200487

Size (D1) mm	Shank Dia (L2) inch	EDP No
22.0	1/2"	FBR0200470
22.50	1/2"	FBR0200488
23.0	1/2"	FBR0200471
23.50	1/2"	FBR0200489
24.0	1/2"	FBR0200490
24.5	1/2"	FBR0200491
25.0	1/2"	FBR0200492
25.5	1/2"	FBR0200493
26.0	1/2"	FBR0200472
26.50	1/2"	FBR0200494
27.0	1/2"	FBR0200495
27.50	1/2"	FBR0200496
28.0	1/2"	FBR0200473
28.50	1/2"	FBR0200497
29.0	1/2"	FBR0200498
29.50	1/2"	FBR0200499
30.0	1/2"	FBR0200500

HSS taper shank twist drill series

HSS | BS 328 | IS 5103 | ISO 235/1 | DIN 345 | REG | N | h8 | 118° | 30° | BF | ST

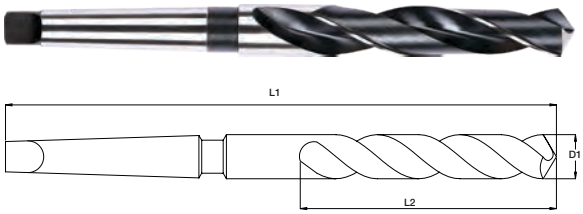


Size (D1)		Flute Length (L2)	Overall Length (L1)	MT Shank No	EDP No
mm	inch	mm	mm		
8.00		75	156	1	FBR0200198
8.50		75	156	1	FBR0200199
9.00		81	162	1	FBR0200200
9.50		81	162	1	FBR0200201
9.52	3/8"	87	168	1	FBR0200202
9.92	25/64"	87	168	1	FBR0200203
10.00		87	168	1	FBR0200204
10.32	13/32"	87	168	1	FBR0200205
10.50		87	168	1	FBR0200206
10.72	27/64"	94	175	1	FBR0200207
11.00		94	175	1	FBR0200208
11.11	7/16"	94	175	1	FBR0200209
11.50		94	175	1	FBR0200210
11.91	15/32"	101	182	1	FBR0200211
12.00		101	182	1	FBR0200116
12.50		101	182	1	FBR0200212
12.70	1/2"	101	182	1	FBR0200118
13.00		101	182	1	FBR0200117
13.49	17/32"	108	189	1	FBR0200213
13.50		108	189	1	FBR0200214
13.89	35/64"	108	189	1	FBR0200215
14.00		108	189	1	FBR0200119
14.29	9/16"	114	212	2	FBR0200120
14.50		114	212	2	FBR0200216
15.00		114	212	2	FBR0200121
15.50		120	218	2	FBR0200217
15.87	5/8"	120	218	2	FBR0200122
16.00		120	218	2	FBR0200123
16.50		125	223	2	FBR0200218
17.00		125	223	2	FBR0200219
17.46	11/16"	130	228	2	FBR0200124
17.50		130	228	2	FBR0200220

Size (D1)		Flute Length (L2)	Overall Length (L1)	MT Shank No	EDP No
mm	inch	mm	mm		
18.00		130	228	2	FBR0200125
18.50		135	233	2	FBR0200221
19.00		135	233	2	FBR0200126
19.05	3/4"	140	238	2	FBR0200127
19.50		140	238	2	FBR0200222
20.00		140	238	2	FBR0200128
20.50		145	243	2	FBR0200223
20.64	13/16"	145	243	2	FBR0200129
21.00		145	243	2	FBR0200130
21.50		150	248	2	FBR0200224
22.00		150	248	2	FBR0200308
22.22	7/8"	150	248	2	FBR0200131
22.50		155	253	2	FBR0200309
23.00		155	253	2	FBR0200225
23.50		155	276	3	FBR0200226
24.00		160	281	3	FBR0200132
24.50		160	281	3	FBR0200227
25.00		160	281	3	FBR0200133
25.40	1"	165	286	3	FBR0200134
25.50		165	286	3	FBR0200228
26.00		165	286	3	FBR0200135
26.50		165	286	3	FBR0200229
27.00		170	291	3	FBR0200230
27.50		170	291	3	FBR0200231
28.00		170	291	3	FBR0200136
28.50		175	296	3	FBR0200232
28.57	1.1/8"	175	296	3	FBR0200138
29.00		175	296	3	FBR0200137
29.50		175	296	3	FBR0200310
30.00		175	296	3	FBR0200139
30.50		180	301	3	FBR0200233
31.00		180	301	3	FBR0200234

HSS taper shank twist drill series

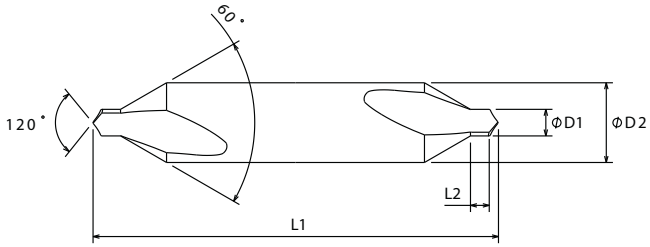
HSS | BS 328 | IS 5103 | ISO 235/1 | DIN 345 | REG | N | h8 | 118° | 30° | BF | ST



Size (D1)		Flute Length (L2)	Overall Length (L1)	MT Shank No	EDP No
mm	inch	mm	mm		
31.75	1-1/4"	185	306	3	FBR0200312
31.50		180	301	3	FBR0200235
32.00		185	334	4	FBR0200140
32.50		185	334	4	FBR0200236
33.00		185	334	4	FBR0200237
33.50		185	334	4	FBR0200238
34.00		190	339	4	FBR0200239
34.50		190	339	4	FBR0200240
34.93	1-3/8"	190	339	4	FBR0200475
35.00		190	339	4	FBR0200241
35.50		190	339	4	FBR0200242
36.00		195	344	4	FBR0200243
36.50		195	344	4	FBR0200244
36.51	1-7/16"	195	344	4	FBR0200476
37.00		195	344	4	FBR0200245
37.50		195	344	4	FBR0200246
38.00		200	349	4	FBR0200247
38.10	1-1/2"	200	349	4	FBR0200477
38.50		200	349	4	FBR0200248
39.00		200	349	4	FBR0200249
39.50		200	349	4	FBR0200250
40.00		200	349	4	FBR0200251
40.50		205	354	4	FBR0200252
41.00		205	354	4	FBR0200253
41.28	1-5/8"	205	354	4	FBR0200938
41.50		205	354	4	FBR0200254
42.00		205	354	4	FBR0200255
43.00		210	359	4	FBR0200256
44.00		210	359	4	FBR0200257
44.45	1-3/4"	210	359	4	FBR0200939
45.00		210	359	4	FBR0200258

Size (D1)		Flute Length (L2)	Overall Length (L1)	MT Shank No	EDP No
mm	inch	mm	mm		
46.00		215	364	4	FBR0200259
47.00		215	364	4	FBR0200260
48.00		220	369	4	FBR0200261
49.00		220	369	4	FBR0200262
50.00		220	369	4	FBR0200263
51.00		225	412	5	FBR0200922
50.80	2"	225	374	4	FBR0200478
52.00		225	412	5	FBR0200921
53.00		225	412	5	FBR0200923
54.00		230	417	5	FBR0200533
55.00		230	417	5	FBR0200639
56.00		230	417	5	FBR0200924
57.00		235	422	5	FBR0200925
58.00		235	422	5	FBR0200926
59.00		235	422	5	FBR0200927
60.00		235	422	5	FBR0200525
61.00		240	427	5	FBR0200928
62.00		240	427	5	FBR0200929
63.00		240	427	5	FBR0200930
64.00		245	432	5	FBR0200931
65.00		245	432	5	FBR0200526
66.00		245	432	5	FBR0200468
67.00		245	432	5	FBR0200932
68.00		250	437	5	FBR0200933
69.00		250	437	5	FBR0200934
70.00		250	437	5	FBR0200527
71.00		250	437	5	FBR0200935
72.00		255	442	5	FBR0200936
73.00		255	442	5	FBR0200920
74.00		255	442	5	FBR0200937
75.00		255	442	5	FBR0200528

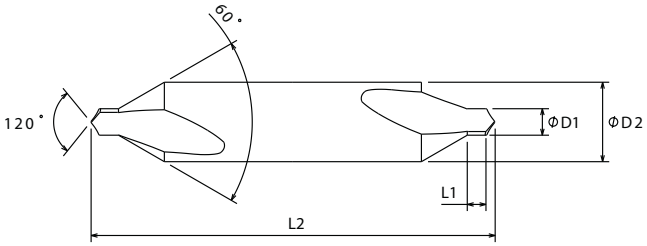
HSS M35 centre drills



HSS-E BS 328 120° BF

AS PER BS 328 - PART II - 1990

Size	Pilot Dia (D1)	Body Dia (D2)	Pilot Length (L2) (mm)		Overall Length (L1) (mm)		EDP No
B.S. No	Inch	Inch	MAX	MIN	MAX	MIN	
BS1	3/64	1/8	1.98	1.58	38.89	37.31	FBR0203093
BS2	1/16	3/16	2.38	1.98	45.22	43.68	FBR0203094
BS3	3/32	1/4	3.96	3.17	52.39	49.21	FBR0203095
BS4	1/8	5/16	4.76	3.96	58.74	55.56	FBR0203096
BS5	3/16	7/16	7.14	6.35	65.88	61.12	FBR0203097
BS6	1/4	5/8	9.52	7.93	78.58	73.82	FBR0203167
BS7	5/16	3/4	11.9	10.31	91.28	86.52	FBR0203168

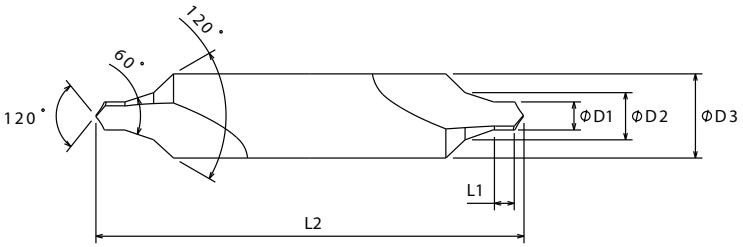


HSS-E IS 6708 120° BF

TYPE A -AS PER IS 6708 - 2002

Pilot Dia (D1)	Body Dia (D2)	Pilot Length (L2) (mm)		Overall Length (L1) (mm)		EDP No
mm	mm	MAX	MIN	MAX	MIN	
1.0	3.15	1.9	1.3	33.5	29.5	FBR0202161
1.25	3.15	2.2	1.6	33.5	29.5	FBR0202162
1.6	4.00	2.8	2	37.5	33.5	FBR0202163
2.00	5.00	3.3	2.5	42	38	FBR0202164
2.5	6.30	4.1	3.1	47	43	FBR0202165
3.15	8.00	4.9	3.9	52	48	FBR0202166
4.0	10.00	6.2	5	59	53	FBR0202167
5.0	12.50	7.5	6.3	66	60	FBR0202168
6.3	16.00	9.2	8	74	68	FBR0202444
8.0	20.00	11.5	10.1	83	77	FBR0203162
10.0	25.00	14.2	12.8	103	97	FBR0203163

HSS M35 centre drills



HSS-E | IS 6709 | ISO 2540 | 120° | BF

TYPE B - AS PER IS 6709 - 2002

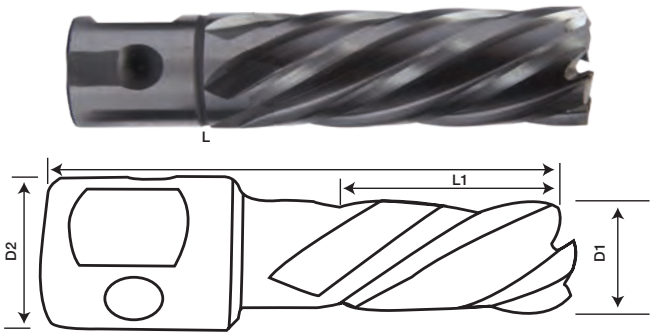
Pilot Dia (D1)	Body Dia (D2)	Pilot Length (L2) (mm)		Overall Length (L1) (mm)		EDP No
mm	mm	MAX	MIN	MAX	MIN	
1.60	6.30	2.8	2.0	47	43	FBR0203089
2.00	8.00	3.3	2.5	52	48	FBR0203090
2.50	10.00	4.1	3.1	59	53	FBR0203091
3.15	11.20	4.9	3.9	63	57	FBR0203092
4.00	14.00	6.2	5.0	70	64	FBR0202442
5.00	18.00	7.5	6.8	78	72	FBR0202443
6.30	20.00	9.2	8.0	83	77	FBR0203164
8.00	25.00	11.5	10.1	103	97	FBR0203165
10.00	31.50	14.2	12.8	128	122	FBR0203166

1. Made from premium grade High Speed Steel
2. Used for producing centre holes in metal work pieces
3. Also used for work-pieces requiring machining between centres
4. Stable cutting edge
5. Superior tool life

High speed steel annular cutter

HSS | 6535 HB | BF

WELDON SHANK



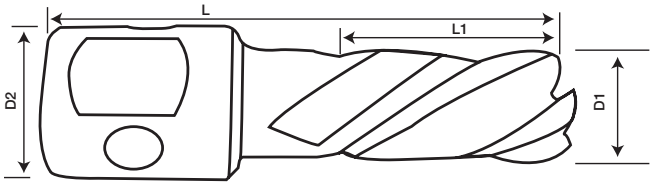
Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
14	19.05	30	63	FBR0202635
16	19.05	30	63	FBR0202636
18	19.05	30	63	FBR0202637
20	19.05	30	63	FBR0202638
22	19.05	30	63	FBR0202639
24	19.05	30	63	FBR0202640
25	19.05	30	63	FBR0202641
26	19.05	30	63	FBR0202642
28	19.05	30	63	FBR0202643
30	19.05	30	63	FBR0202644
32	19.05	30	63	FBR0202645

Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
34	19.05	30	63	FBR0202646
36	19.05	30	63	FBR0202647
38	19.05	30	63	FBR0202648
40	19.05	30	63	FBR0202649
42	19.05	30	63	FBR0202650
44	19.05	30	63	FBR0202651
46	19.05	30	63	FBR0202652
48	19.05	30	63	FBR0202653
50	19.05	30	63	FBR0202654
55	19.05	30	63	FBR0202655

High speed steel annular cutter

HSS | 6535 HB | BF

WELDON SHANK

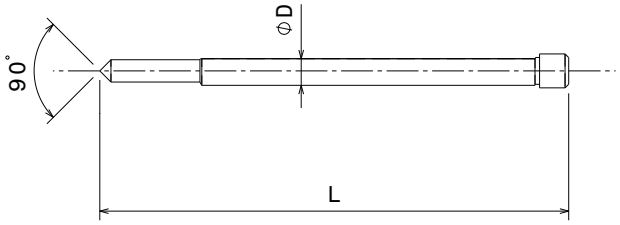


Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
12	19.05	55	88	FBR0202656
14	19.05	55	88	FBR0202657
16	19.05	55	88	FBR0202658
18	19.05	55	88	FBR0202659
20	19.05	55	88	FBR0202456
22	19.05	55	88	FBR0202660
24	19.05	55	88	FBR0202661
25	19.05	55	88	FBR0202662
26	19.05	55	88	FBR0202663
28	19.05	55	88	FBR0202664
30	19.05	55	88	FBR0202457
32	19.05	55	88	FBR0202458
34	19.05	55	88	FBR0202630

Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
35	19.05	55	88	FBR0202459
36	19.05	55	88	FBR0202460
38	19.05	55	88	FBR0202461
40	19.05	55	88	FBR0202462
42	19.05	55	88	FBR0202463
44	19.05	55	88	FBR0202464
46	19.05	55	88	FBR0202465
48	19.05	55	88	FBR0202665
50	19.05	55	88	FBR0202466
52	19.05	55	88	FBR0202666
55	19.05	55	88	FBR0202667
60	19.05	55	88	FBR0202668

MATCHING PILOT

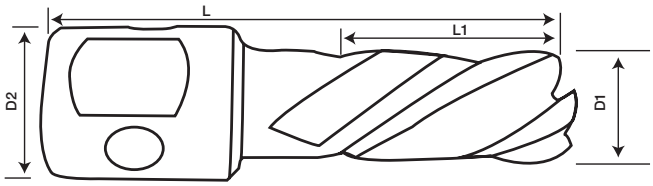
Size (D)	Cutting Depth (L)	EDP No
mm	mm	
6.34 X 77	30	FBR0201990
6.34 X 103	55	FBR0201991



1. Made from premium grade High Speed Steel
2. Applicable to hole cutting & process of annular groove on various magnetic drills
3. Multi – cut geometry for ply – cutting & lower friction to reach better performance of endurance & removal of chips
4. Meets requirements of hole cutting on various materials
5. Also available in One Touch Shank (Universal shank Dia ¾" or 19.05 mm)
6. Available from Diameter 12 MM to 50 MM & Depth of Cut 30mm max & 55mm max

High speed steel annular cutter

HSS-E | 6535 HB | BF

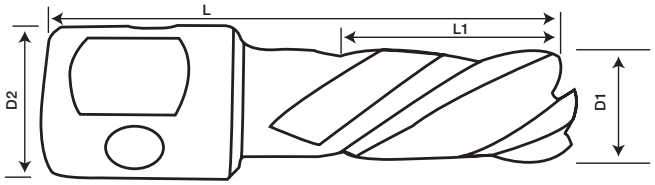


Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
12	19.05	30	63	FBR0201689
13	19.05	30	63	FBR0201690
14	19.05	30	63	FBR0201691
15	19.05	30	63	FBR0201692
16	19.05	30	63	FBR0201693
17	19.05	30	63	FBR0201694
18	19.05	30	63	FBR0201695
19	19.05	30	63	FBR0201696
20	19.05	30	63	FBR0201697
21	19.05	30	63	FBR0201698
22	19.05	30	63	FBR0201699
23	19.05	30	63	FBR0201700
24	19.05	30	63	FBR0201701
25	19.05	30	63	FBR0201702
26	19.05	30	63	FBR0201703
27	19.05	30	63	FBR0201704
28	19.05	30	63	FBR0201705
29	19.05	30	63	FBR0201706
30	19.05	30	63	FBR0201707
31	19.05	30	63	FBR0201708

Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
32	19.05	30	63	FBR0201709
33	19.05	30	63	FBR0201710
34	19.05	30	63	FBR0201711
35	19.05	30	63	FBR0201712
36	19.05	30	63	FBR0201713
37	19.05	30	63	FBR0201714
38	19.05	30	63	FBR0201715
39	19.05	30	63	FBR0201716
40	19.05	30	63	FBR0201717
41	19.05	30	63	FBR0201718
42	19.05	30	63	FBR0201719
43	19.05	30	63	FBR0201720
44	19.05	30	63	FBR0201721
45	19.05	30	63	FBR0201722
46	19.05	30	63	FBR0201723
47	19.05	30	63	FBR0201724
48	19.05	30	63	FBR0201725
49	19.05	30	63	FBR0201726
50	19.05	30	63	FBR0201727

High speed steel annular cutter

HSS-E | 6535 HB | BF

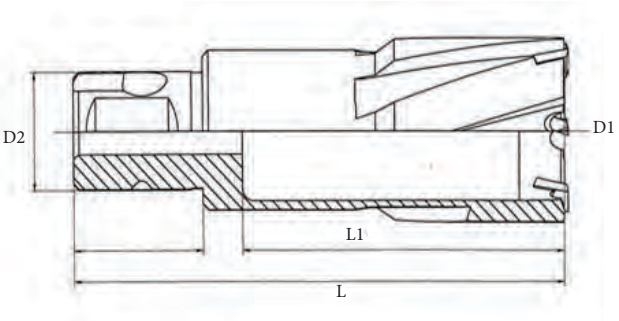


Size (D1) mm	Shank Dia (D2) mm	Cutting Depth (L1) mm	Overall Length (L) mm	EDP No
12	19.05	55	88	FBR0201728
13	19.05	55	88	FBR0201729
14	19.05	55	88	FBR0201730
15	19.05	55	88	FBR0201731
16	19.05	55	88	FBR0201732
17	19.05	55	88	FBR0201733
18	19.05	55	88	FBR0201734
19	19.05	55	88	FBR0201735
20	19.05	55	88	FBR0201736
21	19.05	55	88	FBR0201737
22	19.05	55	88	FBR0201738
23	19.05	55	88	FBR0201739
24	19.05	55	88	FBR0201740
25	19.05	55	88	FBR0201741
26	19.05	55	88	FBR0201742
27	19.05	55	88	FBR0201743
28	19.05	55	88	FBR0201744
29	19.05	55	88	FBR0201745
30	19.05	55	88	FBR0201746
31	19.05	55	88	FBR0201747

Size (D1) mm	Shank Dia (D2) mm	Cutting Depth (L1) mm	Overall Length (L) mm	EDP No
32	19.05	55	88	FBR0201748
33	19.05	55	88	FBR0201749
34	19.05	55	88	FBR0201750
35	19.05	55	88	FBR0201751
36	19.05	55	88	FBR0201752
37	19.05	55	88	FBR0201753
38	19.05	55	88	FBR0201754
39	19.05	55	88	FBR0201755
40	19.05	55	88	FBR0201756
41	19.05	55	88	FBR0201757
42	19.05	55	88	FBR0201758
43	19.05	55	88	FBR0201759
44	19.05	55	88	FBR0201760
45	19.05	55	88	FBR0201761
46	19.05	55	88	FBR0201762
47	19.05	55	88	FBR0201763
48	19.05	55	88	FBR0201764
49	19.05	55	88	FBR0201765
50	19.05	55	88	FBR0201766

TCT annular cutter

TCT | 6535 HB | BF



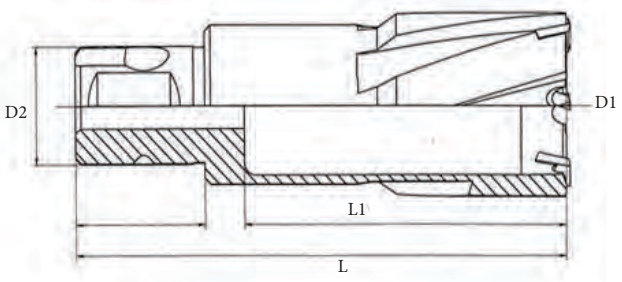
P1-P4
K1
M1-M2
N1

Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
11	19.05	40	74	FBR0202349
12	19.05	40	74	FBR0202350
13	19.05	40	74	FBR0202351
14	19.05	40	74	FBR0202352
15	19.05	40	74	FBR0202353
16	19.05	40	74	FBR0202354
17	19.05	40	74	FBR0202355
18	19.05	40	74	FBR0202356
19	19.05	40	74	FBR0202357
20	19.05	40	74	FBR0202358
21	19.05	40	74	FBR0202359
22	19.05	40	74	FBR0202360
23	19.05	40	74	FBR0202361
24	19.05	40	74	FBR0202362
25	19.05	40	74	FBR0202363

Size (D1)	Shank Dia (D2)	Cutting Depth (L1)	Overall Length (L)	EDP No
mm	mm	mm	mm	
26	19.05	40	74	FBR0202364
27	19.05	40	74	FBR0202365
28	19.05	40	74	FBR0202366
29	19.05	40	74	FBR0202367
30	19.05	40	74	FBR0202368
31	19.05	40	74	FBR0202369
32	19.05	40	74	FBR0202370
33	19.05	40	74	FBR0202371
34	19.05	40	74	FBR0202372
35	19.05	40	74	FBR0202373
36	19.05	40	74	FBR0202374
37	19.05	40	74	FBR0202375
38	19.05	40	74	FBR0202376
39	19.05	40	74	FBR0202377
40	19.05	40	74	FBR0202378

TCT annular cutter

TCT | 6535 HB | BF



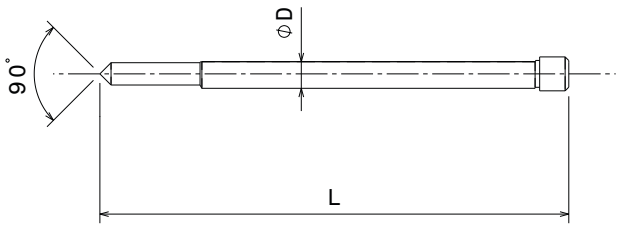
P1-P4
K1
M1-M2
N1

Size (D1) mm	Shank Dia (D2) mm	Cutting Depth (L1) mm	Overall Length (L) mm	EDP No
11	19.05	55	92	FBR0202319
12	19.05	55	92	FBR0202320
13	19.05	55	92	FBR0202321
14	19.05	55	92	FBR0202322
15	19.05	55	92	FBR0202323
16	19.05	55	92	FBR0202324
17	19.05	55	92	FBR0202325
18	19.05	55	92	FBR0202326
19	19.05	55	92	FBR0202327
20	19.05	55	92	FBR0202328
21	19.05	55	92	FBR0202329
22	19.05	55	92	FBR0202330
23	19.05	55	92	FBR0202331
24	19.05	55	92	FBR0202332
25	19.05	55	92	FBR0202333
26	19.05	55	92	FBR0202334
27	19.05	55	92	FBR0202335
28	19.05	55	92	FBR0202336

Size (D1) mm	Shank Dia (D2) mm	Cutting Depth (L1) mm	Overall Length (L) mm	EDP No
29	19.05	55	92	FBR0202337
30	19.05	55	92	FBR0202338
31	19.05	55	92	FBR0202339
32	19.05	55	92	FBR0202340
33	19.05	55	92	FBR0202341
34	19.05	55	92	FBR0202342
35	19.05	55	92	FBR0202343
36	19.05	55	92	FBR0202344
37	19.05	55	92	FBR0202345
38	19.05	55	92	FBR0202346
39	19.05	55	92	FBR0202347
40	19.05	55	92	FBR0202348
42	19.05	55	92	FBR0202669
44	19.05	55	92	FBR0202670
46	19.05	55	92	FBR0202671
48	19.05	55	92	FBR0202672
50	19.05	55	92	FBR0202673
55	19.05	55	92	FBR0202674

MATCHING PILOT

Size mm	Cutting length mm	EDP No
7.98 X 105	40	FBR0202131
7.98 X 160	55	FBR0202132



OPERATIONAL MANUAL

1. For Speed choice refer to cutting parameter table
2. Feed recommendation: 0.06-0.15 mm/cycle. Feed is the key point for hole cutting. Different feed forms different shaped chips, which determine the performance of chips removal
3. During the beginning and termination of hole cutting, decrease feed by 1/3, this can reduce damage of cutter
4. Sufficient coolant supply can increase the smoothness of holes as well as number of holes to be cut
5. Some materials like Cast Iron/Copper create lots of powder when cutting, so here compressed air is recommended for cooling instead of coolant
6. Remove the chips twining around the cutter from time to time, which is the better way for chip removal
7. When the wear width of the cutting edges reaches 0.4mm, cutter should be replaced

Speed and feed used in drilling various materials

Material	Tensile Strength (kg/mm)	m/mm.mm/rev. V_c or F	Drill Diameter D (mm)				
			2-5	6.11	12-18	19-25	26-50
Steel	50-<	V_c	20-25	20-25	30-35	30-35	25-30
		F	0.1	0.2	0.25	0.3	0.4
	50-70	V_c	20-25	20-25	25-25	25-30	25
		F	0.1	0.2	0.2	0.2	0.2
	70-90	V_c	15-18	15-18	15-18	18-22	15-20
		F	0.05	0.1	0.2	0.3	0.35
	90-100	V_c	10-14	10-14	12-18	16-20	14-16
		F	0.05	0.1	0.15	0.2	0.3
Cast Iron	12-18	V_c	25-20	30-40	25-30	20	20
		F	0.1	0.2	0.35	0.6	1
	18-30	V_c	12-18	14-18	16-20	16-20	16-18
		F	0.1	0.15	0.2	0.3	0.4
Brass Bronze	Soft	V_c	50 <	50 <	50 <	50 <	50 <
		F	0.05	0.15	0.3	0.45	-
	Hard	V_c	35 <	35 <	35 <	35 <	35 <
		F	0.05	0.1	0.2	0.35	-

HSS right hand cutting straight shank jobber drill

Type of HSS Jobber Drills	Application
Type N (Right Hand Cutting)	Standard drill for drilling Steel and Cast Steel, Alloyed and Non-Allowed Grey Cast Iron, Spheroidal Iron, Silver, Graphite, Maileable Cast Iron etc.
Type H (Right Hand Cutting)	For Drilling hard, crumbly materials such as Brass, Magesium Alloy, Bronze Phosphor Bronze, Mica, Pertinax, Zamak (thin section) , Electron (thin sections)
	Insulating Materials, Ebonite, Bakelite, Galalithe, Fiber, Celluloid, Synthetic Resins, Horn Compounds, Eternit, Hardboard, Perspex and Plastic Laminates.
	For these and similar materials a 140 Degree point angle is recommended when drilling in the plane of the laminations for drilling at right angles to the laminations a point angle of 80-100 Degree will give the best results.
	Note: Polishing of the cutting surfaces will improve drill performance in Eternit or Hardboard
Type S (Right Hand Cutting)	For drilling soft material forming long stringy swarf, such as aluminium, aluminum alloys. Zinc, refind Copper, Argalium, Soft Synthetic materials Wood etc.

Drill selection guide based on workpeice material

(A) FERROUS MATERIALS					
Material	Drill material	Point angle (Degree)	SFM	Feed range no. See table 1	Coolant
Free cutting mild Steel hardness up to 72.000psi (500 N/mm)	HSS	118 (130)	95-160	4	Soluble Oil
Non alloyed Carbon Steel 0.4% Carbon 113.000psi (800 N/mm)	HSS	118	65-95	4	Soluble Oil
Non Alloyed Carbon Steel with 0.4^% Carbon, hardness 113-142psi (800-1000 N/mm) and purified Alloy Steel with a hardness 98 psi (700N/mm)	HSS	118 (135)	50-65	3	Soluble Oil
Non Alloyed Tool Steel with a hardness of 113.000-142.000psi (800-1000 N/mm) and refined Alloy Steel with a hardness of 98.000-142.000 psi (700-1000 N/mm)	HSS	118 (135)	40-50	3	Soluble Oil
Alloyed Tool Steel Hardness of 113.000-142.000 psi (800-1000N/mm) and refined Alloy Steels with a hardness of 142.000-170.000psi (1000-1200 N/mm)	HSSE	118 (135)	30-50	2	Soluble Oil
Retined Alloyed Steel with a hardness of 170.000 psi (1200 N/mm)	HSSE	135	15-25	1	Soluble Oil, Cutting Oil
Chrome Molybdenum Stainless Steels	HSSE	135	25-40	1	Soluble Oil, Cutting Oil
Stainless Austenitic, Nickel Chrome, heat resisitng Steel.	HSSE	135	10-25	1	Cutting Oil
Manganese Steels containing up to 10% Molybdenum	HSSE	135	10-15	1	Dry
Spring Steels	HSSE	135	15-30	1	Soluble Oil
Nimonic Alloys	HSSE	135	10-25	1	Cutting Oil
Ferritic	HSSE	118	10-15	1	Dry Compressed Air
Titanium and Titanium Alloys	HSSE	113	10-15	1	Cutting Oil
Grey Cast Iron up to GG 26 and Malleable Iron	HSS / HSSE	118	50-80	5	Dry Soluble Oil
Hard Cast Iron up to 350 Brinell	HSSE	118	25-40	4	Dry Soluble Oil
(B) NON FERROUS MATERIALS					
Brass to MS 58	HSS	118	200-260	6	Cutting Oil
Brass from MS60	HSS	118	100-200	5	Soluble Oil
Red Copper	HSS	130	100-200	5	Soluble Oil
Electrolytic Copper	HSS	130	65-100	5	Soluble Oil
German Silver	HSS	118	65-100	3	Cutting Oil, Soluble Oil
Copper Nickel	HSS	130	65-100	3	Cutting Oil
Copper Tin Alloys					Soluble Oil
Copper-Aluminium Alloys	HSS	130	30-100	3	Soluble Oil
Alloys of Copper and Beryllium	HSS	130	30-50	2	Cutting Oil, Soluble Oil
Pure Aluminium	HSS	130	130-200	5	Soluble Oil

Drill selection guide based on workpeice material

Aluminium Manganese and Aluminium Chrome Alloys	HSS	135	130-200	5	Soluble Oil
Aluminium Alloyed with Lead, Antimony or Tin	HSS	135	200-325	5	Soluble Oil
Aluminium Copper Alloys containing Silicon, Magnesium, Lead, Tin, Titanium or Beryllium	HSS	135	130-200	5	Soluble Oil
Aluminium Silicon Alloys containing Copper, Magnesium, Manganese or Chorme Aluminium, Mangnesium Alloy with Silicon Mangance or Chrome	HSS	135	200-325	5	Soluble Oil
Magnesium Alloys (Electron)	HSS	135	260-325	5	Dry
	HSS	135	260-325	5	Dry
Zinc	HSS	118	100-130	4	Soluble Oil
(C) SYNTHETIC MATERICALS, PLASTICS, HARDBOARD ETC.					
Hard Duroplastics	HSS	80	30-65 (160-325)	3	Dry (Compressed Air)
Soft Thermoplastic	HSS	135	50-200	3	Water (Compressed Air)
Hardboard and the like	HSS	135	50-80	3	Dry (Compressed Air)

Note
Above recommendations hold good only, if the following condition are met:
a) Uniform consistency of the material to be drilled
b) Totem Drills to be used
c) Totem Drill of HSS and HSSE material are used
d) Maximum depth does not exceed 3 times the drill diameter
e) Good machine condition and rigid mounting of the workpiece
f) No drill bushing are used
g) Correct quality of coolant with sufficient flow
h) No excessive run-out of the machine spindle or drill

Feed chart (table-1)

Drill Diameter MM	mm pr					
	1	2	3	4	5	6
2	0.02	0.25	0.03	0.04	0.05	0.06
2.5	0.025	0.3	0.04	0.05	0.06	0.08
3	0.03	0.4	0.05	0.06	0.08	0.1
4	0.04	0.05	0.06	0.08	0.1	0.13
5	0.04	0.05	0.06	0.08	0.1	0.13
6.4	0.05	0.06	0.08	0.1	0.13	0.16
8	0.06	0.08	1	0.13	0.16	0.2
10	0.08	0.1	0.12	0.16	0.2	0.25
12.5	0.08	0.1	0.12	0.16	0.2	0.25
16	0.1	0.12	0.15	0.2	0.25	0.3
22	0.13	0.16	0.2	0.25	0.3	0.4
25	0.16	0.2	0.25	0.3	0.4	0.5
31.75	0.16	0.2	0.25	0.3	0.4	0.5
40	0.2	0.25	0.3	0.4	0.5	0.6
50	0.25	0.3	0.4	0.5	0.6	0.8
63	0.3	0.4	0.5	0.6	0.8	1
80	0.4	0.5	0.6	0.8	1	1.3

Trouble shooting and remedies for hss drills

	Problems	Reasons	Remedies
1	Oversize Hole	1) Lip Angles are not equal 2) Lip Lengths unequal	Regrind the Drill Point to correct lip angle with proper relif maintaining lip lenghts equal
2	Buckling of the Drill	Drill Deflects Axialy	Use Correct guide bush
3	Drill Chattering	1) Hard, Tough work piece 2) Torsional deflection of the drill	Increase Torsional stiffness by replacing thicker web drill. Reduce drill length and shorten flute length
4	Drill Breaking	1) Fixture not rigid 2) Web thickness more 3) Speed & feed not Proper	1) Use Rigid Fixture 2) Web thining to be Implemented 3) Use Proper speed & feed according to work material
5	Drill Breaking in deep hole drilling	1) Chips blocking in flutes 2) No uniform back taper 3) Drill runout on OD	1) Use wood check uniform 2) Before using check uniform back taper and concentricity
6	Drill Rubbing	1) No proper relief on point 2) No uniform back taper	1) Regrind with proper point relief 2) Check uniform back taper at no point negative back taper should occur on drill dia.
7	Heat Generation while drilling	1) Coolent imsufficient 2) Proper coolent not used 3) Work piece is hard	1) Use Proper coolent flow 2) Use proper coolent 3) select drill with correct geometry for the material

Conversion chart for drill gauge & letter sizes

Drill Gauge Size	Decimal equivalent inches	mm	Decimal equivalent inches
70	0.028	0.7	0.0276
69	0.0292	0.75	0.0295
68	0.031	1/32	0.0312
67	0.032	0.82	0.0323
66	0.033	0.85	0.0335
65	0.035	0.9	0.0354
64	0.036	0.92	0.0362
63	0.037	0.95	0.0374
62	0.038	0.98	0.0386
61	0.039	1	0.0394
60	0.04	1	0.0394
59	0.041	1.05	0.0413
58	0.042	1.05	0.0413
57	0.043	1.1	0.0433
56	0.0465	3/64	0.0469
55	0.052	1.3	0.0512
54	0.055	1.4	0.0551
53	0.0595	1.5	0.059
52	0.0635	1.6	0.063
51	0.067	1.7	0.0669
50	0.07	1.8	0.0709
49	0.073	1.85	0.0728
48	0.076	1.95	0.0786
47	0.0785	2	0.0787
46	0.081	2.05	0.0807
45	0.082	2.1	0.0827
44	0.086	2.2	0.0866
43	0.089	2.25	0.0866
42	0.0935	3/32	0.0938
41	0.096	2.45	0.0965
40	0.098	2.5	0.0984
39	0.1015	2.55	0.1004
38	0.104	2.6	0.1024
37	0.1065	2.65	0.1043
36	0.1065	2.7	0.1063
35	0.11	2.8	0.1102
34	0.111	2.8	0.1102
33	0.113	2.85	0.1122
32	0.116	2.95	0.1161
31	0.12	3	0.1181

Conversion chart for drill gauge & letter sizes

Drill Gauge Size	Decimal equivalent inches	mm	Decimal equivalent inches
30	0.1285	3.3	0.1299
29	0.136	3.5	0.1378
28	0.1405	9/64	0.1406
27	0.144	3.7	0.1457
26	0.147	3.7	0.1457
25	0.1495	3.8	0.1496
24	0.152	3.9	0.1535
23	0.154	3.9	0.1535
22	0.157	4	0.1575
21	0.159	4	0.1575
20	0.161	4.1	0.1614
19	0.166	4.2	0.1654
18	0.1695	4.3	0.1693
17	0.173	4.4	0.1732
16	0.177	4.5	0.1772
15	0.18	4.6	0.1811
14	0.182	4.6	0.1811
13	0.185	4.7	0.185
12	0.189	4.8	0.189
11	0.191	4.9	0.1929
10	0.1935	4.9	0.1929
9	0.196	5	0.1968
8	0.199	5.05	0.199
7	0.201	5.1	0.2008
6	0.204	5.2	0.2047
5	0.2055	5.2	0.2047
4	0.209	5.3	0.2087
3	0.213	5.4	0.2126
2	0.221	5.6	0.2205
1	0.228	5.8	0.2283
A	0.234	15/64	0.2344
B	0.238	6	0.2362
C	0.242	6.1	0.2402
D	0.246	6.2	0.2441
E	0.25	1/4	0.25
F	0.257	6.5	0.2559
G	0.261	6.6	0.2598
H	0.266	17/64	0.2656
I	0.272	6.9	0.2717
J	0.277	7	0.2756
K	0.281	9/32	0.2812

Conversion chart for drill gauge & letter sizes

Drill Gauge Size	Decimal equivalent inches	mm	Decimal equivalent inches
L	0.29	7.4	0.2913
M	0.295	7.5	0.2953
N	0.302	7	0.3031
O	0.316	8	0.315
P	0.323	8.2	0.3228
Q	0.332	8.4	0.3307
R	0.339	8.6	0.3386
S	0.348	8.8	0.3465
T	0.358	9.1	0.3583
U	0.368	9.3	0.3661
V	0.377	3/8	0.375
W	0.386	9.8	0.3858
X	0.397	10.1	0.3976
Y	0.404	10.3	0.4055
Z	0.413	10.5	0.4134

Conversion tables fraction and decimal to mm

Fraction	Inch	Decimal	mm
1/64		0.015625	0.3969
	1/32	0.03125	0.7938
3/64		0.046875	1.1906
	1/16	0.0625	1.5875
5/64		0.078125	1.9844
	3/32	0.09375	2.3812
7/64		0.109375	2.7781
	1/8	0.125	3.175
9/64		0.140625	3.5719
	5/32	0.15625	3.9688
11/64		0.171875	4.3656
	3/16	0.1875	4.7625
13/64		0.203125	5.1594
	7/32	0.21875	5.5562
15/64		0.234375	5.9531
	1/4	0.25	6.35
17/64		0.265625	6.7469
	9/32	0.28125	7.1438
19/64		0.296875	7.5406
	5/16	0.3125	7.9375
21/64		0.328125	8.3344
	11/32	0.34375	8.7312

Conversion tables fraction and decimal to mm

Fraction	Inch	Decimal	mm
23/64		0.359375	9.1281
	3/8	0.375	9.525
25/64		0.390625	9.9219
	13/32	0.40625	10.3188
27/64		0.421875	10.7156
	7/16	0.4375	11.1125
29/64		0.453125	11.5094
	15/32	0.46875	11.9062
31/64		0.46875	12.3031
	1/2	0.5	12.7
33/64		0.515625	13.0969
	17/32	0.53125	13.4938
35/64		0.546875	13.8906
	9/16	0.5625	14.2875
37/64		0.578125	14.6844
	19/32	0.59375	15.0812
39/64		0.609375	15.4781
	5/8	0.625	15.875
41/64		0.640625	16.2719
	21/32	0.65625	16.6688
43/64		0.671875	17.0656
	11/16	0.6875	17.4625
45/64		0.703125	17.8594
	23/32	0.71875	18.2562
47/64		0.734375	18.6531
	3/4	0.75	19.05
49/64		0.765625	19.4469
	25/32	0.78125	19.8438
51/64		0.796875	20.2406
	13/16	0.8125	20.6375
53/64		0.828125	21.0344
	27/32	0.84375	21.4312
55/64		0.859375	21.8281
	7/8	0.875	22.225
57/64		0.890625	22.6219
	29/32	0.90625	23.0188
59/64		0.921875	23.4156
	15/16	0.9375	23.8125
61/64		0.953125	24.2094
	31/32	0.96875	24.6062
63/64		0.984375	25.0031
	1	1	25.4

Conversion chart for different scale hardness

Tenstgth N/mm	VPN	HB	HRc	Tenstgth N/mm	VPN	HB	HRc	Tenstgth N/mm	VPN	HB	HRc
200	63	60	-	540	168	160	-	880	275	261	-
210	65	62	-	550	172	163	-	890	278	264	-
220	69	66	-	560	175	166	-	900	280	266	27
225	70	67	-	570	178	169	-	910	283	269	-
230	72	68	-	575	180	171	-	915	285	271	-
240	75	71	-	580	181	172	-	920	287	273	28
250	79	75	-	590	184	175	-	930	290	276	-
255	80	76	-	595	185	176	-	940	293	278	29
260	82	78	-	600	187	178	-	950	295	280	-
270	85	81	-	610	190	181	-	960	299	284	-
280	88	84	-	620	193	184	-	965	300	285	-
285	90	86	-	625	195	185	-	970	302	287	30
290	91	87	-	630	197	187	-	980	305	290	-
300	94	89	-	640	200	190	-	990	308	293	-
305	95	90	-	650	203	193	-	995	310	295	31
310	97	92	-	660	205	195	-	1000	311	296	-
320	100	95	-	670	208	198	-	1010	314	299	-
330	103	98	-	675	210	199	-	1020	317	301	32
335	105	100	-	680	212	201	-	1030	320	304	-
340	107	102	-	690	215	204	-	1040	323	307	-
350	110	105	-	700	219	208	-	1050	327	311	33
360	113	107	-	705	220	209	-	1060	330	314	-
370	115	109	-	710	222	211	-	1070	333	316	-
380	119	113	-	720	225	214	-	1080	336	319	34
385	120	114	-	730	228	216	-	1090	339	322	-
390	122	116	-	740	230	219	-	1095	340	323	-
400	125	119	-	750	233	221	-	1100	342	325	-
410	128	122	-	755	235	223	-	1110	345	328	35
415	130	124	-	760	237	225	-	1120	349	332	-
420	132	125	-	770	240	228	-	1125	350	333	-
430	135	128	-	870	243	231	21	1130	352	334	-
440	138	131	-	785	245	233	-	1140	355	337	36
450	140	133	-	790	247	235	-	1150	358	340	-
460	143	136	-	800	250	238	22	1155	360	342	-
465	145	138	-	810	253	240	-	1160	3361	343	-
470	147	140	-	820	255	242	23	1170	364	346	37
480	150	143	-	830	258	245	-	1180	367	349	-
490	153	145	-	835	260	247	24	1190	370	352	-
495	155	147	-	840	262	249	-	1200	373	354	38
500	157	149	-	850	265	252	-	1210	376	357	-
510	160	152	-	860	268	255	25	1220	380	361	-
520	163	155	-	865	270	257	-	1230	382	363	39
530	165	157	-	870	272	258	-	1240	385	366	-
1250	338	369	-	1570	484	460	48	1900	575	546	-
1255	390	371	-	1580	486	462	-	1910	578	549	54

Conversion chart for different scale hardness

Tenstgth N/mm	VPN	HB	HRc	Tenstgth N/mm	VPN	HB	HRc	Tenstgth N/mm	VPN	HB	HRc
1260	392	372	40	1590	489	465	-	1920	580	551	-
1270	394	374	-	1595	490	466	-	1930	583	554	-
1280	397	377	-	1600	491	467	-	1940	586	557	-
1290	400	380	-	1610	494	470	-	1950	589	560	-
1300	403	383	41	1620	497	472	49	1955	590	561	-
1310	407	387	-	1630	500	475	-	1960	591	562	-
1320	410	390	-	1640	503	478	-	1970	594	564	-
1330	413	393	42	1650	506	481	-	1980	596	567	55
1340	417	396	-	1660	509	483	-	1990	599	569	-
1350	420	399	-	1665	510	485	-	1995	600	570	-
1360	423	402	43	1670	511	486	-	2000	602	572	-
1370	426	405	-	1680	514	488	50	2010	605	575	-
1380	429	408	-	1690	517	491	-	2020	607	577	-
1385	430	409	-	1700	520	494	-	2030	610	580	-
1390	431	410	-	1710	522	496	-	2040	613	582	-
1400	434	413	44	1720	525	499	-	2050	615	584	56
1410	437	415	-	1730	527	501	51	2060	618	587	-
1420	440	418	-	1740	530	504	-	2070	620	589	-
1430	443	421	-	1750	533	506	-	2080	623	592	-
1440	446	424	45	1760	536	509	-	2090	626	595	-
1450	449	427	-	1770	539	512	-	2100	629	598	-
1455	450	428	-	1775	540	513	-	2105	630	599	-
1460	452	429	-	1780	541	514	-	2110	631	600	-
1470	455	432	-	1790	544	517	52	2120	634	602	-
1480	458	435	46	1800	547	520	-	2130	636	604	-
1485	460	437	-	1810	550	523	-	2140	639	607	57
1490	461	438	-	1820	553	525	-	2145	640	608	-
1500	464	441	-	1830	556	528	-	2150	641	609	-
1510	467	444	-	1840	559	531	-	2160	644	612	-
1520	470	447	-	1845	560	532	53	2170	647	615	-
1530	473	449	47	1850	561	533	-	2180	650	618	-
1540	476	452	-	1860	564	536	-	2190	653	620	-
1550	479	455	-	1870	567	539	-	2200	655	622	58
1555	480	456	-	1880	570	542	-	-	675	-	59
1560	481	457	-	1890	572	543	-	-	698	-	60
-	-	-	-	-	-	-	-	-	72	-	61
-	-	-	-	-	-	-	-	-	745	-	62
-	-	-	-	-	-	-	-	-	773	-	63
-	-	-	-	-	-	-	-	-	800	-	64
-	-	-	-	-	-	-	-	-	829	-	65
-	-	-	-	-	-	-	-	-	864	-	66
-	-	-	-	-	-	-	-	-	900	-	67
-	-	-	-	-	-	-	-	-	940	-	68

Table of cutting speeds - fractional size drills - HSS drill

Vc (ft/min)	50	60	70	80	100
Vc (m/min)	15	18	21	24	30
Drill dia (inch)	Revolutions Per Minute (RPM)				
1/64"	12224	14656	17088	19520	24448
1/32"	6112	7328	8544	9760	12224
3/64"	4064	4896	5696	6528	8160
1/16"	3056	3664	4272	4880	6112
5/64"	2448	2928	3424	3904	4896
3/32"	2032	2448	2848	3264	4080
1/8"	1528	1832	2136	2440	3056
5/32"	1224	1464	1712	1952	2448
3/16"	1016	1224	1424	1632	2040
7/32"	872	1048	1224	1400	1744
1/4"	764	916	1068	1220	1528
5/16"	612	732	856	976	1224
3/8"	508	612	712	816	1020
7/16"	436	524	612	700	872
1/2"	382	458	534	670	764
9/16"	340	408	476	544	680
5/8"	306	366	428	488	612
11/16"	278	334	388	444	556
3/4"	254	306	356	408	510
13/16"	234	282	330	376	470
7/8"	218	262	306	350	436
15/16"	204	244	286	326	408
1"	191	229	267	305	382
1-2/8"	170	204	238	272	340
1-1/4"	153	183	214	244	306
1-1/2"	127	153	178	204	255
1-3/4"	109	131	153	175	218
2"	95	114	133	152	191
2-1/4"	85	102	119	136	170
2-1/2"	76	92	107	122	153
2-3/4"	69	83	97	111	139
3"	64	76	89	102	127
4"	48	57	67	76	95

Table of cutting speeds - metric size drills - HSS drill

Vc (ft/min)	50	60	70	80	100
Vc (m/min)	15	18	21	24	30
Drill dia (mm)	Revolutions Per Minute				
0.5	9695	11634	13573	15512	19390
1	4847	5817	6786	7756	9695
1.5	3237	3884	4532	5179	6474
2	2427	2912	3397	3883	4854
2.5	1941	2329	2717	3105	3882
3	1617	1940	2264	2587	3234
4	1213	1455	1698	1940	2425
5	970	1164	1359	1553	1941
6	808	970	1132	1294	1617
7	693	832	970	1109	1386
8	606	728	849	970	1213
9	539	647	755	862	1078
10	485	582	679	776	970
11	441	529	617	706	882
12	404	485	566	647	808
13	373	448	522	597	746
14	346	416	485	554	693
15	323	388	453	554	693
16	303	364	424	485	606
17	285	342	399	456	571
18	269	323	377	431	539
19	255	306	357	408	511
20	242	291	340	388	485
21	231	277	323	370	462
22	220	265	309	353	441
23	211	253	295	337	422
24	202	242	283	323	404
25	194	233	272	310	388
26	186	224	261	298	373
27	180	216	252	287	359
30	162	194	226	259	323
33	147	176	206	235	294
36	135	162	189	216	270
39	124	149	174	199	249
42	116	139	162	185	231
45	108	129	151	172	216
48	101	121	141	162	202
51	95	114	133	152	190
56	87	104	121	139	173
61	80	95	111	127	159
65	75	90	104	119	149

Recommended cutting rotation speed of annular cutter

Diameter (mm)	Mild Steel 500N/mm	Medium Carbon Steel 750N/mm	High Carbon Steel 900N/mm	Alloy tool Steel 1200 N/mm	Carbon tool Steel 1400 N/mm	Stainless Steel	Aluminium	Cast Iron	Cast Copper
12	663	531	345	265	186	318	1327	478	1062
13	612	490	318	245	171	294	1225	441	980
14	569	455	296	227	159	273	1137	409	910
15	531	425	276	212	149	255	1062	382	849
16	498	398	259	199	139	239	995	358	796
17	468	375	244	187	131	225	937	337	749
18	442	354	230	177	124	212	885	318	708
19	419	335	218	168	117	201	838	302	670
20	398	318	207	159	111	191	796	287	637
21	379	303	197	152	106	182	758	273	607
22	362	290	188	145	101	174	724	261	579
23	346	277	180	138	97	166	692	249	554
24	332	265	173	133	93	159	663	239	531
25	318	255	166	127	89	153	637	229	510
26	306	245	159	122	86	147	612	220	490
27	295	236	153	118	83	142	590	212	472
28	284	227	148	114	80	136	569	205	455
29	275	220	143	110	77	132	549	198	439
30	265	212	138	106	74	127	531	191	425
31	257	205	134	103	72	123	514	185	411
32	249	199	129	100	70	119	498	179	398
33	241	193	125	97	68	116	483	174	386
34	234	187	122	94	66	112	468	169	375
35	227	182	118	91	64	109	455	164	364
36	221	177	115	88	62	106	442	159	354
37	215	172	112	86	60	103	430	155	344
38	210	168	109	84	59	101	419	151	335
39	204	163	106	82	57	98	408	147	327
40	199	159	104	80	56	96	398	143	31 8
41	194	155	101	78	54	93	388	140	311
42	190	152	99	76	53	91	379	136	303
43	185	148	96	74	52	89	370	133	296
44	181	145	94	72	51	87	362	130	290
45	177	142	92	71	50	85	354	127	283
46	173	138	90	69	48	83	346	125	277
47	169	136	88	68	47	81	339	122	271
48	166	133	86	66	46	80	332	119	265
49	162	130	84	65	45	78	325	117	260
50	159	127	83	64	45	76	318	115	255
51	156	125	81	62	44	75	312	112	250
52	153	122	80	61	43	73	306	110	245
53	150	120	78	60	42	72	300	108	240
54	147	118	77	59	41	71	295	106	236
55	145	116	75	58	41	69	290	104	232
56	142	114	74	57	40	68	284	102	227
57	140	112	73	56	39	67	279	101	223
58	137	110	71	55	38	66	275	99	220
59	135	108	70	54	38	65	270	97	216
60	133	106	69	53	37	64	265	96	212

Recommended cutting rotation speed for tCT cutter

Diameter (mm)	Mild Steel 500N/mm	Medium Carbon Steel 750N/mm	High Carbon Steel 900N/mm	Alloy tool Steel 1200 N/mm	Carbon tool Steel 1400 N/mm	Stainless Steel	Aluminium	Cast Iron	Cast Copper
12	1062	982	929	796	663	531	2389	1592	929
13	980	906	857	735	612	490	2205	1470	857
14	910	842	796	682	569	455	2047	1470	796
15	849	786	743	637	531	425	1911	1274	743
16	796	736	697	597	498	398	1791	1194	697
17	749	693	656	562	468	375	1686	1124	656
18	708	655	619	531	442	354	1592	1062	619
19	670	620	587	503	419	335	1509	1006	587
20	637	589	557	478	398	318	1433	955	557
21	607	561	531	455	379	303	1365	910	531
22	579	536	507	434	362	290	1303	869	507
23	554	512	485	415	346	277	1246	831	485
24	531	491	464	398	332	265	1194	796	464
25	510	47 1	446	382	318	255	1146	764	446
26	490	453	429	367	306	245	1102	735	429
27	472	436	413	354	295	236	1062	708	413
28	455	421	398	34 1	284	227	1024	682	398
29	439	406	384	329	275	220	988	659	384
30	425	393	372	318	265	212	955	637	372
31	411	380	360	308	257	205	925	616	360
32	398	368	348	299	249	199	896	597	348
33	386	357	338	290	24 1	193	869	579	338
34	375	347	328	281	234	187	843	562	328
35	364	337	318	273	227	182	819	546	318
36	354	327	310	265	221	177	796	531	310
37	344	318	301	258	215	172	775	516	301
38	335	310	293	251	210	168	754	503	293
39	327	302	286	245	204	163	735	490	286
40	318	295	279	239	199	159	717	478	279
41	311	287	272	233	194	155	699	466	272
42	303	281	265	227	190	152	682	455	265
43	296	274	259	222	185	148	667	444	259
44	290	268	253	217	181	145	651	434	253
45	283	262	248	212	177	142	637	425	248
46	277	256	242	208	173	138	623	415	242
47	271	251	237	203	169	136	610	407	237
48	265	245	232	199	166	133	597	398	232
49	260	240	227	195	162	130	585	390	227
50	255	236	223	191	159	127	573	382	223
51	250	231	219	187	156	125	562	375	219
52	245	227	214	184	153	122	551	367	214
53	240	222	210	180	150	120	541	361	210
54	236	218	206	177	147	118	531	354	206
55	232	214	203	174	145	116	521	347	203
56	227	210	199	171	142	114	512	341	199
57	223	207	196	168	140	112	503	335	196
58	220	203	192	165	137	110	494	329	192
59	216	200	189	162	135	108	486	324	189
60	212	196	186	159	133	106	478	318	186

Recommended Feed Rate for Totem HSS Annular Cutter & TCT Annular Cutter

Material	Feed rate (mm/r)
Mild steel	0.08-0.13
Medium carbon steel	0.08-0.13
High carbon steel	0.05-0.1
Alloy tool steel	0.05-0.1
Carbon tool steel	0.05-0.1

Material	Feed rate (mm/r)
Stainless Steel	0.05-0.1
Aluminium	0.1-0.15
Cast Iron	0.07-0.12
Cast Copper	0.08-0.13

Dos & don'ts for HSS / HSS-E drills

1. Adjust drilling condition according to the rigidity of machine or the work clamp state
2. Adjust drilling condition when unusual vibration, different sound occurs while cutting
3. Provide sufficient amount cutting fluid to the cutting point & in the flute
4. When the hole depth is more than 3 x D, reduce the rotation & feed by 20%
5. When the hole depth is more than 3 x D, add step seeding. The depth of step should be from 0.2 to 1.0 diameter
6. For Stainless Steel material drilling, use step feed. In step feed, return to the entrance hole
7. Adjust the drill run out to the lowest value possible
8. Ensure the correct Point Angle, Lip position & Lip Length post regrinding operation
9. Do not allow the choking of swarf

Dos & don'ts for annular cutter

1. Different feed forms different shaped chips, which determines the chip evacuation efficiency
2. During the beginning & before the end of hole cutting, decrease feed rate by 1/3 to reduce the damage on cutter
3. Sufficient coolant supply is necessary to increase the smoothness of hole as well as the quantities of holes to be cut
4. Some materials like Cast Iron, Copper etc result in chips in powder form while cutting. Hence compressed air is recommended for cooling instead of coolant
5. Remove the chips twining around the cutter from time to time
6. When the wear width of cutting edges reaches 0.4 mm, cutter should be replaced

Bradmag: magnetic drilling machine from bradma

WHAT IS A MAGNETIC DRILL MACHINE?

It is a Portable drilling machine with an electromagnetic base or a permanent magnet base. It is used to drill hole using Annular Cutters, TCT cutters, and Morse Taper shank drills in various materials thereby producing accurate, burr free holes. The machine can also be used for tapping for specific models*

WHY TO USE THE MAGNETIC DRILLING MACHINE?

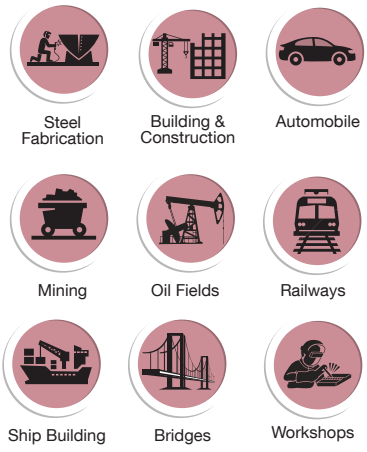
Fabrication is done at site for the structural components. Owing to its portability, it is ideal for use at site.

*Please consult our application engineer for technical details and optimum use

SPECIFICATION

	BRADMAG 35	BRADMAG 50	BRADMAG 120
Motor rated power (W)	1550	1700	2690
No Load Speed (RPM)	100-830	100-810	100-130/100-30/ 100-620
Rotating direction Clockwise	Clockwise	Clockwise	Clockwise & Counter clockwise
Arbor Bore (mm)	19.05	19.05	-
Cooling Method	Internal Cooling	Internal Cooling	Internal Cooling
Voltage	AC 220V~240V	AC 220V~240V	AC 220V~240V
Frequency Range (Hz)	50-60	50-60	50-60
Magnetic Deadlift (N)	14800	15600	18600
Motor Height Adjustment (mm)	300-470	300-490	530-730
Max Cutting Dia - Annular Cutter (mm)	35 (1-3/8 ")	50	130
Max Cutting Depth (mm)	30	35	75
Maximum Diameter Twist Drill (mm)	13	16	32
MT Shank	-	-	MT3
Tapping	-	-	M28
Stroke (mm)	120	130	340
Magnet Footprint (mm)	166x80x50	166x80x50	115x280x56.5
Weight (Kgs)	15	16	33
Dimensions (cm)	53x17x43	53x17x43	62x20x51
Max Attraction (N)	14800	15600	18600
Cutting Depth (mm)	30	35	75
Stroke (mm)	120	130	340
Wire (m)	3.5	3.5	3.5
Magnetic Base Size (mm)	166x80x50	166x80x50	200x100x68
Net / Gross Weight (Kgs)	12/15	13/16	28/33
Packing Size (cm)	53x17x43	53x17x43	62x20x51
Warranty (Months)	12	12	12

INDUSTRY APPLICATIONS



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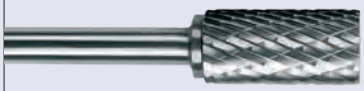
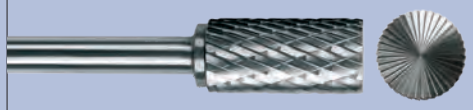
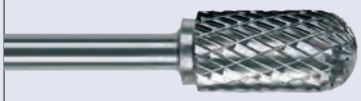
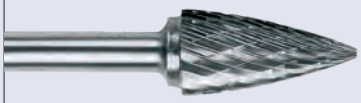
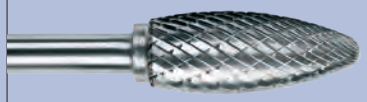
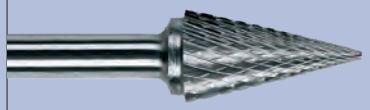
TOTEM®

High Performance Cutting Tools

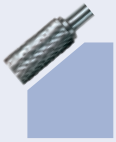
CARBIDE BURRS

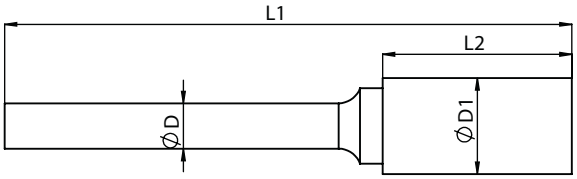
CONTENTS

CARBIDE BURR

SERIES	SHAPE DESCRIPTION	TYPE OF SHAPE	TOTEM REFERENCE	PAGE
SA/ZYA	Cylindrical without end cut		C	6.003
SB/ZYAS	Cylindrical with end cut		CE	6.005
SC/WRC	Cylindrical with radius end		B	6.007
SD/KUD	Ball shape		S	6.009
SE/TRE	Oval shape		O	6.011
SF/RBF	Tree shape with radius end		TB	6.012
SG/SPG	Tree shape with point end		T	6.013
SH	Flame shape		F	6.014
SL/KEL	Cone with radius end		K	6.015
SM/SKM	Cone shaped		A	6.017
SN	Inverted cone shape		N	6.019
RIM	RIM shape		R	6.020
-	Burr sets		-	6.021

SA Cylindrical without end cut





3 mm Shank

Head Diameter	Head length	Overall Length	Shank Dia	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
Ø D1	L2	L1	D		EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
2.8	16	38	3	MC1*	FAC0200563	FAC0200565	FAC0200566	–	–	SA-43M
2.8	16	50	3	MC1L*	FAC0200567	FAC0200568	FAC0200569	–	–	SA-43ML2
2.8	16	75	3	MC1L1*	FAC0200570	FAC0200571	FAC0200572	–	–	SA-43ML3
6.3	6.3	32	3	MC2	FAC0200573	FAC0200574	FAC0200575	–	–	–
6.3	6.3	56	3	MC2L	FAC0200576	FAC0200577	FAC0200578	–	–	–
6.3	6.3	75	3	MC2L1	FAC0200579	FAC0200580	FAC0200581	–	–	–
6.3	12.7	38	3	MC3	FAC0200582	FAC0200583	FAC0200584	–	–	SA-51M
1.5	6	38	3	MC4*	FAC0200585	FAC0200586	FAC0200587	–	–	SA-41M
1.5	6	50	3	MC4L*	FAC0200588	FAC0200589	FAC0200590	–	–	SA-41ML2
1.5	6	75	3	MC4L1*	FAC0200591	FAC0200592	FAC0200593	–	–	SA-41ML3
2.5	11	38	3	MC5*	FAC0200594	FAC0200595	FAC0200596	–	–	SA-42M
2.5	11	50	3	MC5L*	FAC0200597	FAC0200598	FAC0200599	–	–	SA-42ML2
2.5	11	75	3	MC5L1*	FAC0200600	FAC0200601	FAC0200602	–	–	SA-42ML3

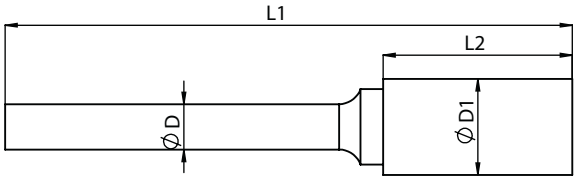
6 mm Shank

2.8	12.7	50	6	C0	FAC0200208	FAC0200209	FAC0200210	–	–	SA-11M
3.8	14	50	6	C1	FAC0200211	FAC0200212	FAC0200213	–	–	SA-13M
5.8	20	50	6	C2*	FAC0200220	FAC0200221	FAC0200222	–	–	–
6	20	70	6	C2	FAC0200226	FAC0201365	FAC0200227	–	–	–
8	19	69	6	C3	FAC0200236	FAC0200237	FAC0200238	FAC0200245	–	SA-2M
9.5	19	69	6	C4	FAC0200246	FAC0200247	FAC0200249	FAC0200258	–	SA-3M
12.7	19	69	6	C5	FAC0200259	FAC0200263	FAC0200265	FAC0201320	–	–
16	25	75	6	C6	FAC0200273	FAC0200275	FAC0200277	FAC0200279	–	SA-6M
12.7	14	64	6	C7	FAC0200281	FAC0200282	FAC0200283	FAC0200284	–	–
12.7	25	75	6	C8	FAC0200285	FAC0200286	FAC0200287	FAC0200292	–	SA-5M
19	25	75	6	C9	FAC0200294	FAC0200296	FAC0200298	FAC0201314	–	SA-7M
25	25	75	6	C10	FAC0200300	FAC0200302	FAC0200304	FAC0201315	–	SA-9M
5	16	66	6	C11	FAC0200306	FAC0200307	FAC0200308	–	–	SA-14M
6.3	16	66	6	C12	FAC0200309	FAC0200310	FAC0200311	–	–	SA-1M
10	25	75	6	C13	FAC0200312	FAC0200313	FAC0200314	–	–	–
11	25	75	6	C14	FAC0200315	FAC0200316	FAC0200317	–	–	SA-4M

* indicates full carbide burrs

Note:
- Ask your local representative about our long shank program –Available in 4",5",6",7",8",9"10",11"& 12"
- All sizes available as a special in left hand cut
- Coarse cut burrs available on request

SA Cylindrical without end cut



Head Diameter	Head length	Overall Length	Shank Dia	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
Ø D1	L2	L1	D		EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
8 mm Shank										
9.5	19	69	8	C4Z	FAC0201858	FAC0200248	FAC0201859	–	–	SA-3M8
12.7	19	69	8	C5Z	FAC0200261	FAC0200264	FAC0200266	–	–	–
16	25	75	8	C6Z	FAC0200274	FAC0200276	FAC0200278	–	–	SA-6M8
19	25	75	8	C9Z	FAC0200295	FAC0200297	FAC0200299	–	–	SA-7M8
25	25	75	8	C10Z	FAC0200301	FAC0200303	FAC0200305	–	–	SA-9M8
1/8 inch Shank										
1/16	1/4	1-1/2	1/8	MC4I*	FAC0201966	FAC0201968	FAC0201967	–	–	SA-41
3/32	7/16	1-1/2	1/8	MC5I*	FAC0201969	FAC0201971	FAC0201970	–	–	SA-42
1/8	9/16	1-1/2	1/8	MC1I*	FAC0201957	FAC0201959	FAC0201958	–	–	SA-43
1/4	1/2	2	1/8	MC3I	FAC0201963	FAC0201965	FAC0201964	–	–	SA-51
1/4	1/4	1-1/2	1/8	MC2I	FAC0201960	FAC0201962	FAC0201961	–	–	–
1/4 inch Shank										
1/8	5/8	2	1/4	C1I	FAC0201849	FAC0201851	FAC0201850	–	–	SA-12
3/16	5/8	2	1/4	C11I	FAC0201840	FAC0201842	FAC0201841	–	–	SA-14
1/4	5/8	2	1/4	C12I	FAC0201843	FAC0201845	FAC0201844	–	–	SA-1
5/16	3/4	2-1/2	1/4	C3I	FAC0201852	FAC0201854	FAC0201853	–	–	SA-2
3/8	3/4	2-1/2	1/4	C4I	FAC0201855	FAC0201857	FAC0201856	–	–	SA-3
7/16	1	2-3/4	1/4	C14I	FAC0201846	FAC0201848	FAC0201847	–	–	SA-4
1/2	1	3	1/4	C8I	FAC0201863	FAC0201865	FAC0201864	–	–	SA-5
5/8	1	2-3/4	1/4	C6I	FAC0201860	FAC0201862	FAC0201861	–	–	SA-6
3/4	1	2-3/4	1/4	C9I	FAC0201866	FAC0201868	FAC0201867	–	–	SA-7
1	1	2-3/4	1/4	C10I	FAC0201837	FAC0201839	FAC0201838	–	–	SA-9

* indicates full carbide burrs

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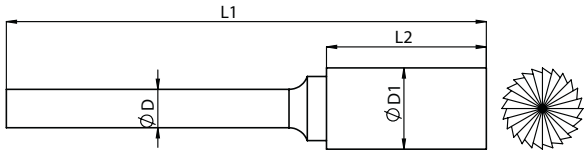
SB Cylindrical with end cut



3 mm Shank

Head Diameter	Head length	Overall Length	Shank Dia	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
Ø D1	L2	L1	D		EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
2.8	16	38	3	MCE1*	FAC0200603	FAC0200604	FAC0200605	–	–	SB-43M
2.8	16	50	3	MCE1L*	FAC0200606	FAC0200607	FAC0200608	–	–	SB-43ML2
2.8	16	75	3	MCE1L1*	FAC0200609	FAC0200610	FAC0200611	–	–	SB-43ML3
6.3	6.3	32	3	MCE2	FAC0200612	FAC0200613	FAC0200614	–	–	–
6.3	6.3	56	3	MCE2L	FAC0200615	FAC0200616	FAC0200617	–	–	–
6.3	6.3	75	3	MCE2L1	FAC0200618	FAC0200619	FAC0200620	–	–	–
6.3	12.7	38	3	MCE3	FAC0200621	FAC0200622	FAC0200623	–	–	SB-51M
6.3	16	66	3	CE12	FAC0200391	FAC0200392	FAC0200393	FAC0201339	–	SB-1M
2.5	11	38	3	MCE5*	FAC0200624	FAC0200625	FAC0200626	–	–	SB-42M
2.5	11	50	3	MCE5L*	FAC0200627	FAC0200628	FAC0200629	–	–	SB-42ML2
2.5	11	75	3	MCE5L1*	FAC0200630	FAC0200631	FAC0200632	–	–	SB-42ML3

6 mm Shank

2.8	12.7	50	6	CE0	FAC0200318	FAC0200319	FAC0200320	–	–	SB-11M
3.8	14	50	6	CE1	FAC0200321	FAC0200322	FAC0200323	FAC0201338	–	SB-13M
5.8	20	50	6	CE2*	FAC0200326	FAC0200327	FAC0200328	FAC0201270	–	SB-1M
6	20	70	6	CE2	FAC0200332	FAC0201885	FAC0201884	–	–	SB-1M
8	19	69	6	CE3	FAC0200339	FAC0200340	FAC0200341	FAC0201340	–	SB-2M
9.5	19	69	6	CE4	FAC0200344	FAC0200345	FAC0200346	–	–	SB-3M
12.7	19	69	6	CE5	FAC0200352	FAC0200353	FAC0200355	FAC0201232	–	–
16	25	75	6	CE6	FAC0200356	FAC0200358	FAC0200360	FAC0200362	–	SB-6M
12.7	14	64	6	CE7	FAC0200364	FAC0200365	FAC0200366	FAC0200367	–	–
12.7	25	75	6	CE8	FAC0200368	FAC0200369	FAC0200371	FAC0201342	–	SB-5M
19	25	75	6	CE9	FAC0200376	FAC0200378	FAC0200380	–	–	SB-7M
25	25	75	6	CE10	FAC0200382	FAC0200384	FAC0200386	–	–	–
5	16	66	6	CE11	FAC0200388	FAC0200389	FAC0200390	–	–	SB-14M
10	25	75	6	CE13	FAC0200394	FAC0200395	FAC0200396	FAC0201341	–	–
11	25	75	6	CE14	FAC0200397	FAC0200398	FAC0200399	–	–	SB-4M

* indicates full carbide burrs

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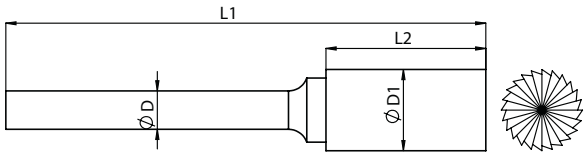
SB Cylindrical with end cut



Head Diameter	Head length	Overall Length	Shank Dia	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
Ø D1	L2	L1	D		EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
8 mm Shank										
9.5	19	69	8	CE4Z	FAC0201892	FAC0201278	FAC0201893	–	–	SB-3M8
12.7	19	69	8	CE5Z	FAC0201894	FAC0200354	–	–	–	–
12.7	25	75	8	CE8Z	FAC0201901	FAC0200370	FAC0201293	–	–	SB-5M8
19	25	75	8	CE9Z	FAC0200377	FAC0200379	FAC0200381	–	–	SB-7M8
16	25	75	8	CE6Z	FAC0200357	FAC0200359	FAC0200361	–	–	SB-6M8
25	25	75	8	CE10Z	FAC0200383	FAC0200385	FAC0200387	–	–	–
1/8 inch Shank										
3/32	7/16	1-1/2	1/8	MCE5I*	FAC0201978	FAC0201980	FAC0201979	–	–	SB-42
1/8	9/16	1-1/2	1/8	MCE1I*	FAC0201975	FAC0201977	FAC0201976	–	–	SB-43
1/4	5/8	2-5/8	1/8	MCE12I	FAC0201972	FAC0201974	FAC0201973	–	–	SB-51
1/4 inch Shank										
1/8	5/8	2	1/4	CE0I	FAC0201869	FAC0201871	FAC0201870	–	–	SB-12
3/16	5/8	2-5/8	1/4	CE11I	FAC0201875	FAC0201877	FAC0201876	–	–	SB-14
1/4	5/8	2-5/8	1/4	CE12I	FAC0201878	FAC0201880	FAC0201879	–	–	SB-1
5/16	3/4	2-3/4	1/4	CE3I	FAC0201886	FAC0201888	FAC0201887	–	–	SB-2
3/8	3/4	2-3/4	1/4	CE4I	FAC0201889	FAC0201891	FAC0201890	–	–	SB-3
7/16	1	3	1/4	CE14I	FAC0201881	FAC0201883	FAC0201882	–	–	SB-4
1/2	1	3	1/4	CE8I	FAC0201898	FAC0201900	FAC0201899	–	–	SB-5
5/8	1	3	1/4	CE6I	FAC0201895	FAC0201897	FAC0201896	–	–	SB-6
3/4	1	3	1/4	CE9I	FAC0201902	FAC0201904	FAC0201903	–	–	SB-7
1	1	3	1/4	CE10I	FAC0201872	FAC0201874	FAC0201873	–	–	SB-9

CARBIDE BURRS

* indicates full carbide burrs

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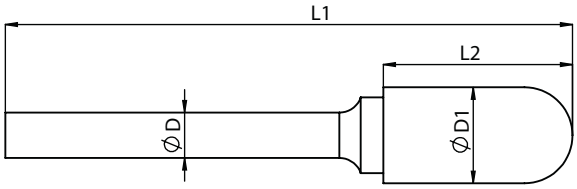
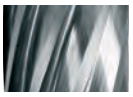
SC Cylindrical with radius end





3 mm Shank

Head Diameter	Head length	Overall Length	Shank Dia	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
Ø D1	L2	L1	D		EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
2.5	11	38	3	MB0*	FAC0200542	FAC0200543	FAC0200544	–	–	SC-41M
2.8	16	38	3	MB1*	FAC0200545	FAC0200547	FAC0200548	–	–	SC-42M
2.8	16	50	3	MB1L*	FAC0200549	FAC0200550	FAC0200551	–	–	SC-42ML2
2.8	16	75	3	MB1L1*	FAC0200552	FAC0200553	FAC0200554	–	–	SC-43ML3
6.3	12.7	38	3	MB2	FAC0200556	FAC02005557	FAC0200558	–	–	SC-51
6.3	12.7	63	3	MB2L	FAC0200559	FAC0200560	FAC0200561	–	–	SC-51L2

6 mm Shank

2.8	16	69	6	B0	FAC0200074	FAC0200075	FAC0200076	–	–	SC-12M
2.8	20	50	6	B1*	FAC0200077	FAC0200078	FAC0200079	–	–	–
6	20	70	6	B1	FAC0200083	FAC0201707	FAC0201219	–	–	–
8	19	69	6	B2	FAC0200097	FAC0200099	FAC0200101	FAC0200112	–	SC-2M
9.5	19	69	6	B3	FAC0200113	FAC0200115	FAC0200117	FAC0200131	–	SC-3M
12.7	19	69	6	B4	FAC0200132	FAC0200134	FAC0200136	FAC0200144	–	–
16	25	75	6	B5	FAC0200145	FAC0200147	FAC0200149	FAC0200155	–	SC-6M
12.7	25	75	6	B6	FAC0200157	FAC0200159	FAC0200161	FAC0200173	–	SC-5M
4	19	55	6	B7	FAC0200175	FAC0200176	FAC0200177	–	–	SC-13M
5	19	70	6	B8	FAC0200178	FAC0200179	FAC0200180	–	–	SC-14M
19	25	75	6	B9	FAC0200181	FAC0200183	FAC0200185	FAC0200187	–	SC-7M
25	25	75	6	B10	FAC0200189	FAC0200191	FAC0200193	FAC0200195	–	SC-9M
6.3	16	66	6	B11	FAC0200197	FAC0200198	FAC0200199	–	–	SC-1M
10	25	75	6	B12	FAC0200200	FAC0200201	FAC0200202	FAC0200203	–	SC-3MZ
11	25	75	6	B13	FAC0200204	FAC0200205	FAC0200206	FAC0200207	–	SC-4M

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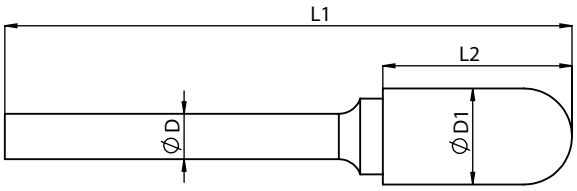
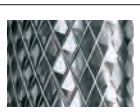
SC Cylindrical with radius end





Head Diameter	Head length	Overall Length	Shank Dia	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
ØD1	L2	L1	D		EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
8 mm Shank										
8	19	69	8	B2Z	FAC0200098	FAC0200100	FAC0201819	–	–	SC-2M8
9.5	19	69	8	B3Z	FAC0200114	FAC0200116	FAC0201823	–	–	SC-3M8
12.7	19	69	8	B4Z	FAC0200133	FAC0200135	FAC0200137	–	–	–
16	25	75	8	B5Z	FAC0200146	FAC0200148	FAC0200150	FAC0200156	–	SC-6M8
12.7	25	75	8	B6Z	FAC0200158	FAC0200160	FAC0201830	FAC0200174	–	SC-5M8
19	25	75	8	B9Z	FAC0200182	FAC0200184	FAC0200186	FAC0200188	–	SC-7M8
25	25	75	8	B10Z	FAC0200190	FAC0200192	FAC0200194	FAC0200196	–	SC-9M8
1/8 inch Shank										
3/32	7/16	1-1/2	1/8	MB0I*	FAC0201948	FAC0201950	FAC0201949	–	–	SC-41
1/8	9/16	1-1/2	1/8	MB1I*	FAC0201951	FAC0201953	FAC0201952	–	–	SC-42
1/4	1/2	1-1/2	1/8	MB2I	FAC0201954	FAC0201956	FAC0201955	–	–	SC-51
1/4 inch Shank										
1/8	5/8	2-5/8	1/4	B0I	FAC0201807	FAC0201809	FAC0201808	–	–	SC-12
3/16	3/4	2-3/4	1/4	B8I	FAC0201831	FAC0201833	FAC0201832	–	–	SC-14
1/4	5/8	2-5/8	1/4	B11I	FAC0201810	FAC0201812	FAC0201811	–	–	SC-1
5/16	3/4	2-3/4	1/4	B2I	FAC0201816	FAC0201818	FAC0201817	–	–	SC-2
3/8	3/4	2-3/4	1/4	B3I	FAC0201820	FAC0201822	FAC0201821	–	–	SC-3
7/16	1	3	1/4	B13I	FAC0201813	FAC0201815	FAC0201814	–	–	SC-4
1/2	1	3	1/4	B6I	FAC0201827	FAC0201829	FAC0201828	–	–	SC-5
5/8	1	3	1/4	B5I	FAC0201824	FAC0201826	FAC0201825	–	–	SC-6
3/4	1	3	1/4	B9I	FAC0201834	FAC0201836	FAC0201835	–	–	SC-7

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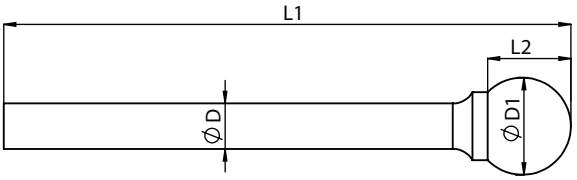
SD Ball shape



3 mm Shank

Head Diameter	Head length	Overall Length	Shank Dia	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
Ø D1	L2	L1	D		EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
2.5	2.3	38	3	MS2*	FAC0200691	FAC0200692	FAC0200693	–	–	SD-41M
2.8	2.5	38	3	MS0*	FAC0200678	FAC0200679	FAC0200680	–	–	SD-42M
2.8	2.5	50	3	MS0L*	FAC0200681	FAC0200682	FAC0200683	–	–	SD-42ML2
2.8	2.5	75	3	MS0L1*	FAC0200684	FAC0200685	FAC0200686	–	–	SD-42ML3
2.8	3	75	3	MS3*	FAC0201249	FAC0201250	FAC0201251	–	–	–
4	3.4	38	3	MS1*	FAC0200687	FAC0200689	FAC0200690	–	–	SD-52M

6 mm Shank

6.3	6.3	50	6	S1*	FAC0200805	FAC0200806	FAC0200807	FAC0201351	–	SD-1M
6.3	6.3	56	6	S1	FAC0201332	FAC0201333	FAC0201334	–	–	–
8	6.4	50	6	S2*	FAC0200814	FAC0200815	FAC0200817	–	–	SD-2M
8	6.4	56	6	S2	FAC0200818	–	–	–	–	–
9.5	8	58	6	S3	FAC0200824	FAC0200826	FAC0200828	FAC0200836	–	SD-3M
12.7	11	61	6	S4	FAC0200838	FAC0200840	FAC0200842	FAC0200852	–	SD-5M
16	14	64	6	S5	FAC0200854	FAC0200856	FAC0200858	FAC0200864	–	SD-6M
19	16	66	6	S6	FAC0200867	FAC0200869	FAC0200871	FAC0200873	–	SD-7M
25	21	71	6	S7	FAC0200875	FAC0200877	FAC0200879	FAC0200881	–	SD-9M
11	9.5	60	6	S9	FAC0200883	FAC0200884	FAC0200885	FAC0200886	–	SD-4M

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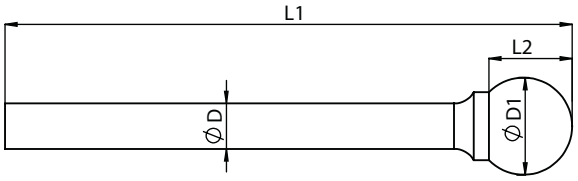
SD Ball shape



Head Diameter	Head length	Overall Length	Shank Dia	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
ØD1	L2	L1	D		EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
8 mm Shank										
8	6.4	56	8	S2Z	FAC0202038	FAC0200816	FAC0202038	–	–	SD-2M8
9.5	8	58	8	S3Z	FAC0200825	FAC0200827	FAC0202042	–	–	SD-3M8
12.7	11	61	8	S4Z	FAC0200839	FAC0200841	FAC0200843	–	–	SD-5M8
16	14	64	8	S5Z	FAC0200855	FAC0200857	FAC0200859	FAC0200865	–	SD-6M8
19	16	66	8	S6Z	FAC0200868	FAC0200870	FAC0200872	FAC0200874	–	SD-7M8
25	21	71	8	S7Z	FAC0200876	FAC0200878	FAC0200880	FAC0200882	–	SD-9M8
1/8 inch Shank										
3/32	3/32	1-1/2	1/8	MS2I*	FAC0201999	FAC0202001	FAC0202000	–	–	SD-41
1/8	1/8	1-1/2	1/8	MS0I*	FAC0201996	FAC0201998	FAC0201997	–	–	SD-42
1/4 inch Shank										
1/4	7/32	2	1/4	S1I	FAC0202032	FAC0202034	FAC0202033	–	–	SD-1
5/16	1/4	2	1/4	S2I	FAC0202035	FAC0202037	FAC0202036	–	–	SD-2
3/8	5/16	2-5/16	1/4	S3I	FAC0202039	FAC0202041	FAC0202040	–	–	SD-3
1/2	7/16	2-7/16	1/4	S4I	FAC0202043	FAC0202045	FAC0202044	–	–	SD-5
5/8	9/16	2-9/16	1/4	S5I	FAC0202046	FAC0202048	FAC0202047	–	–	SD-6
3/4	5/8	2-5/8	1/4	S6I	FAC0202049	FAC0202051	FAC0202050	–	–	SD-7
1	15/16	2-15/16	1/4	S7I	FAC0202052	FAC0202054	FAC0202053	–	–	SD-9
7/16	3/8	2-3/8	1/4	S9I	FAC0202056	FAC0202058	FAC0202057	–	–	SD-4

CARBIDE BURRS

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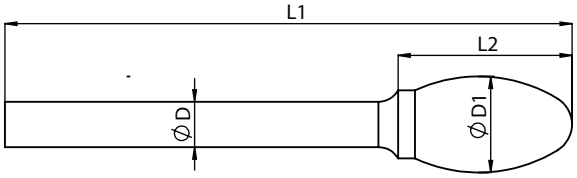
SE Oval shape



Head Diameter	Head length	Overall Length	Shank Dia	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
Ø D1	L2	L1	D		EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
3 mm Shank										
2.8	8	38	3	M01*	FAC0200659	FAC0200660	FAC0200661	–	–	SE-41M
2.8	8	50	3	M01L*	FAC0200662	FAC0200663	FAC0200664	–	–	SE-41ML2
2.8	8	75	3	M01L1*	FAC0200665	FAC0200666	FAC0200667	–	–	SE-41ML3
6.3	9.5	38	3	M02*	FAC0200668	FAC0200669	FAC0200670	–	–	SE-51M
6.3	9.5	50	3	M02L*	FAC0200671	FAC0200672	FAC0200673	–	–	SE-51ML2
6.3	9.5	75	3	M02L1*	FAC0200674	FAC0200675	FAC0200676	–	–	SE-51ML3
6 mm Shank										
8	12	51	6	01*	FAC0200726	FAC0200727	FAC0200728	FAC0200734	–	SE-2M
12.7	19	69	6	02	FAC0200735	FAC0200737	FAC0200739	FAC0200746	–	–
16	25	75	6	03	FAC0200747	FAC0200749	FAC0200751	FAC0200754	–	SE-6M
6.3	10	51	6	04*	FAC0200755	FAC0200756	FAC0200757	–	–	SE-1M
9.5	16	65	6	05	FAC0200762	FAC0200763	FAC0200764	FAC0200768	–	SE-3M
12.7	22	72	6	06	FAC0200770	FAC0200771	FAC0200772	FAC0200776	–	SE-5M
19	25	75	6	07	FAC0200778	FAC0200780	FAC0200782	FAC0200784	–	SE-7M
8 mm Shank										
12.7	19	69	8	02Z	FAC0200736	FAC0200738	FAC0200740	–	–	–
16	25	75	8	03Z	FAC0200748	FAC0200750	FAC0200752	–	–	SE-6M8
9.5	16	66	8	05Z	FAC0202024	FAC0201269	FAC0202025	–	–	SE-3M8
19	25	75	8	07Z	FAC0200779	FAC0200781	FAC0200783	–	–	SE-7M8
1/8 inch Shank										
1/8	5/16	1-1/2	1/8	M01I*	FAC0201990	FAC0201992	FAC0201991	–	–	SE-41
1/4	3/8	1-1/2	1/8	M02I*	FAC0201993	FAC0201995	FAC0201994	–	–	SE-51
1/4 inch Shank										
5/8	1	3	1/4	03I	FAC0202015	FAC0202017	FAC0202016	–	–	SE-6
1/4	3/8	2-3/8	1/4	04I	FAC0202018	FAC0202020	FAC0202019	–	–	SE-1
3/8	5/8	2-5/8	1/4	05I	FAC0202021	FAC0202023	FAC0202022	–	–	SE-3
1/2	3/4	2-3/4	1/4	06I	FAC0202026	FAC0202028	FAC0202027	–	–	SE-5
3/4	1	3	1/4	07I	FAC0202029	FAC0202031	FAC0202030	–	–	SE-7S

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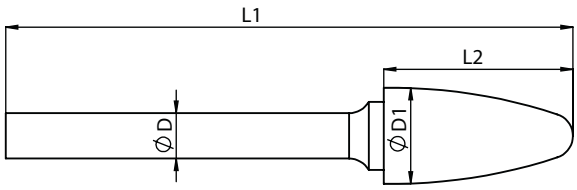
SF Tree shape with radius end



Head Diameter	Head length	Overall Length	Shank Dia	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
Ø D1	L2	L1	D		EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
3 mm Shank										
2.8	6	38	3	MTB1*	FAC0200714	FAC0200715	FAC0200716	–	–	SF-41M
2.8	12.7	38	3	MTB2*	FAC0200717	FAC0200718	FAC0200719	–	–	SF-42M
2.8	12.7	50	3	MTB2L*	FAC0200720	FAC0200721	FAC0200722	–	–	–
2.8	12.7	75	3	MTB2L1*	FAC0200723	FAC0200724	FAC0200725	–	–	–
6 mm Shank										
6	19	69	6	TB1	FAC0200962	FAC0200963	FAC0200964	–	–	SF-1M
9.5	19	69	6	TB2	FAC0200971	FAC0200973	FAC0200975	FAC0200986	–	SF-3M
12.7	25	75	6	TB3	FAC0200988	FAC0200990	FAC0200992	FAC0201002	–	SF-5M
16	32	82	6	TB4	FAC0201004	FAC0201006	FAC0201008	–	–	
8	19	69	6	TB5	FAC0201011	FAC0201012	FAC0201013	FAC0201345	–	SF-2M
6.3	16	66	6	TB6	FAC0201014	FAC0201015	FAC0201016	–	–	SF-1M
11	25	75	6	TB7	FAC0201017	FAC0201018	FAC0201020	FAC0201021	–	SF-4M
16	32	82	6	TB8	FAC0201022	FAC0201024	FAC0201026	FAC0201028	–	SF-6M
19	25	75	6	TB9	FAC0201030	FAC0201032	FAC0201034	FAC0201036	–	SF-7M
8 mm Shank										
9.5	19	69	8	TB2Z	FAC0200972	FAC0200974	FAC0200976	–	–	–
12.7	25	75	8	TB3Z	FAC0200989	FAC0200991	FAC0200993	FAC0201288	–	–
16	32	82	8	TB4Z	FAC0201005	FAC0201007	FAC0201009	FAC0201010	–	–
16	32	82	8	TB8Z	FAC0201023	FAC0201025	FAC0201027	FAC0201029	–	SF-6M8
19	25	75	8	TB9Z	FAC0201031	FAC0201033	FAC0201035	FAC0201037	–	SF-7M8
1/8 inch Shank										
1/8	1/4	1-1/2	1/8	MTB1I*	FAC0202002	FAC0202004	FAC0202003	–	–	SF-41
1/8	1/2	1-1/2	1/8	MTB2I*	FAC0202005	FAC0202007	FAC0202006	–	–	SF-42
1/4 inch Shank										
1/4	5/8	2-5/8	1/4	TB1I	FAC0202078	FAC0202080	FAC0202079	–	–	SF-1
3/8	3/4	2-3/4	1/4	TB2I	FAC0202081	FAC0202083	FAC0202082	–	–	SF-3
7/16	1	3	1/4	TB7I	FAC0202087	FAC0202089	FAC0202088	–	–	SF-4
1/2	1	3	1/4	TB3I	FAC0202084	FAC0202086	FAC0202085	–	–	SF-5
5/8	1	3	1/4	TB8I	FAC0202090	FAC0202092	FAC0202091	–	–	SF-6
3/4	1	3	1/4	TB9I	FAC0202093	FAC0202095	FAC0202094	–	–	SF-7

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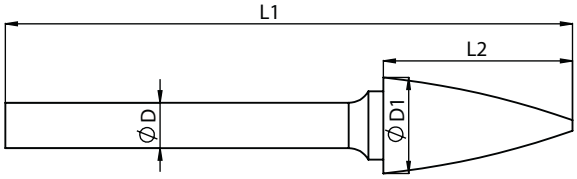
SG Tree shape with point end



Head Diameter ØD1	Head length L2	Overall Length L1	Shank Dia D	Tool No	Standard cut (Single cut) EDP No.	Supreme cut (Double cut) EDP No.	Deluxe cut (Diamond cut) EDP No.	Aluma Cut EDP No.	Coarse Cut EDP No.	CTI Number
3 mm Shank										
3	16	38	3	MT1*	FAC0200694	FAC0200697	FAC0200698	–	–	SG-41M
2.8	16	38	3	MT2*	FAC0200700	FAC0200701	FAC0200703	–	–	–
6.3	10	36	3	MT3	FAC0200704	FAC0200705	FAC0200706	–	–	SG-51M
2.8	12.7	38	3	MT4*	FAC0200708	FAC0200709	FAC0200710	–	–	–
3	6	38	3	MT5*	FAC0200711	FAC0200712	FAC0200713	–	–	SG-44M
3	8	75	3	MT6*	FAC0201252	FAC0201253	FAC0200254	–	–	SG-41M
6 mm Shank										
6	19	50	6	T1*	FAC0200887	FAC0200888	FAC0200889	–	–	SG-1M
6	19	70	6	T1	FAC0200891	FAC0202062	FAC0200892	–	–	SG-1M
9.5	19	69	6	T2	FAC0200902	FAC0200903	FAC0200905	FAC0201347	–	SG-3M
12.7	25	75	6	T3	FAC0200915	FAC0200920	FAC0200922	–	–	SG-5M
16	32	82	6	T4	FAC0200932	FAC0200934	FAC0200936	–	–	SG-6M
8	19	69	6	T5	FAC0200941	FAC0200942	FAC0200943	FAC0201346	–	SG-2M
16	25	75	6	T6	FAC0200947	FAC0200949	FAC0200951	–	–	–
6.3	16	66	6	T7	FAC0200953	FAC0200954	FAC0200955	–	–	SG-1M
19	25	75	6	T8	FAC0200956	FAC0200958	FAC0200960	–	–	SG-7M
8 mm Shank										
9.5	19	69	8	T2Z	FAC0202096	FAC0200904	FAC0202097	–	–	–
12.7	25	75	8	T3Z	FAC0200916	FAC0200921	FAC0201294	–	–	–
16	32	82	8	T4Z	FAC0200933	FAC0200935	FAC0200935	–	–	SG-6ML8
16	25	75	8	T6Z	FAC0200948	FAC0200950	FAC0200952	–	–	–
19	25	75	8	T8Z	FAC0200957	FAC0200959	FAC0200961	–	–	SG-7M8
1/8 inch Shank										
1/8	1/4	1-1/2	1/8	MT5I*	FAC0202098	FAC0202100	FAC0202099	–	–	SG-44
1/8	1/2	1-1/2	1/8	MT4I*	FAC0202101	FAC0202103	FAC0202102	–	–	SG-41
1/4 inch Shank										
1/4	3/4	2-3/4	1/4	T1I	FAC0202059	FAC0202061	FAC0202060	–	–	SG-1
5/16	3/4	2-3/4	1/4	T5I	FAC0202069	FAC0202071	FAC0202070	–	–	SG-2
3/8	3/4	2-3/4	1/4	T2I	FAC0202063	FAC0202065	FAC0202064	–	–	SG-3
1/2	1	3	1/4	T3I	FAC0202066	FAC0202068	FAC0202067	–	–	SG-5
5/8	1	3	1/4	T6I	FAC0202072	FAC0202074	FAC0202073	–	–	–
3/4	1	3	1/4	T8I	FAC0202075	FAC0202077	FAC0202076	–	–	SG-7

* indicates full carbide burrs

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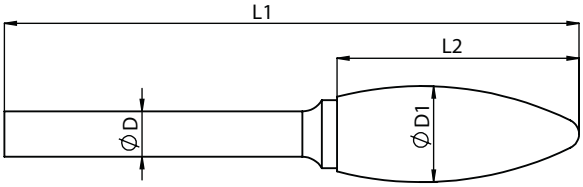
SH Flame shape



Head Diameter	Head length	Overall Length	Shank Dia	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
Ø D1	L2	L1	D		EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
3 mm Shank										
2.8	6.3	38	3	MF1*	FAC0200633	FAC0200634	FAC0200635	–	–	SH-41M
2.8	6.3	50	3	MF1L*	FAC0200636	FAC0200637	FAC0200638	–	–	SH-41ML2
6.3	16	42	3	MF2	FAC0201242	-	-	–	–	–
6 mm Shank										
6.3	16	66	6	F1	FAC0200400	FAC0200401	FAC0200402	–	–	SH-1M
8	19	69	6	F2	FAC0200403	FAC0200404	FAC0200405	FAC0200409	–	SH-2M
9.5	25	75	6	F3	FAC0200410	FAC0200411	FAC0200413	FAC0200415	FAC0201423	SH-3M
12.7	32	82	6	F4	FAC0200416	FAC0200418	FAC0200420	FAC0200425	–	SH-5M
16	34	84	6	F5	FAC0200428	FAC0200430	FAC0201279	–	–	SH-6M
19	41	91	6	F6	FAC0200432	FAC0200434	FAC0200436	–	–	SH-7M
8 mm Shank										
12.7	32	82	8	F4Z	FAC0200417	FAC0200419	–	–	–	–
16	34	84	8	F5Z	FAC0200429	FAC0200431	FAC0201917	–	–	SH-6M8
19	41	91	8	F6Z	FAC0200433	FAC0200435	FAC0200437	–	–	SH-7M8
1/8 inch Shank										
1/8	1/4	1-1/2	1/8	MF1I*	FAC0201981	FAC0201983	FAC0201982	–	–	SH-41
1/4 inch Shank										
1/4	5/8	2-5/8	1/4	F1I	FAC0201905	FAC0201907	FAC0201906	–	–	SH-1
5/16	3/4	2-3/4	1/4	F2I	FAC0201908	FAC0201910	FAC0201909	–	–	SH-2
1/2	1-1/4	3-1/4	1/4	F4I	FAC0201911	FAC0201913	FAC0201912	–	–	SH-5
5/8	1-5/8	3-5/8	1/4	F5I	FAC0201914	FAC0201916	FAC0201915	–	–	SH-6
3/4	1-5/8	3-5/8	1/4	F6I	FAC0201918	FAC0201920	FAC0201919	–	–	SH-7

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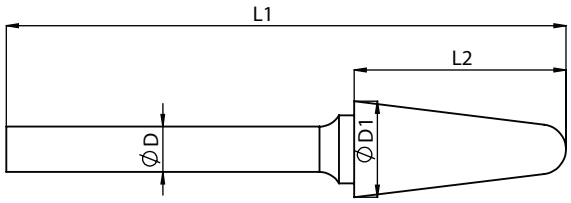
SL Cone with radius end



3 mm Shank

Head Diameter	Head length	Overall Length	Shank Dia	Angle Degree	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
Ø D1	L2	L1	D			EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
3	8	38	3	10°	MK1*	FAC0200639	FAC0200641	FAC0200642	–	–	–
3	9.5	50	3	8°	MK1L*	FAC0200643	FAC0200644	FAC0200645	–	–	SL-41M
3	12.7	38	3	8°	MK3*	FAC0200650	FAC0200651	FAC0200652	–	–	SL-42M
6.3	12.7	38	3	10°	MK2	FAC0200646	FAC0200648	FAC0200649	–	–	SL-51M

6 mm Shank

6.3	16	66	6	14°	K0	FAC0200438	FAC0200439	FAC0201311	FAC0201344	–	SL-1M
9.5	19	69	6	16°	K1	FAC0200442	FAC0200443	FAC0200445	FAC0200453	–	–
12.7	19	69	6	24°	K2	FAC0200454	FAC0200456	FAC0200458	FAC0200467	–	–
16	33	83	6	17°	K3	FAC0200468	FAC0200470	FAC0200472	FAC0201238	–	–
12.5	30	82	6	17°	K4	FAC0200480	FAC0200481	FAC0200482	FAC0200485	–	–
19	42	92	6	14°	K5	FAC0200486	FAC0200488	FAC0200490	–	–	SL-7M
9.5	26	76	6	14°	K6	FAC0200494	FAC0200495	FAC0200496	FAC0201226	–	SL-3M
12.7	28	78	6	14°	K7	FAC0200501	FAC0200502	FAC0200504	–	–	SL-4M
16	33	83	6	14°	K8	FAC0200507	FAC0200509	FAC0200511	–	–	SL-5M
4	19	70	6	26°	GD-1	FAC0201141	–	–	–	–	–
3	8.5	68	6	10°	GD-2	FAC0201258	–	–	–	–	–
3	13	58	6	26°	GD-3	FAC0201259	–	–	–	–	–
3.8	19	69	6	35°	GD-4	FAC0201142	–	–	–	–	–

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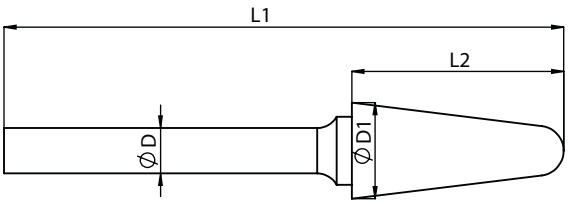
SL Cone with radius end



Head Diameter	Head length	Overall Length	Shank Dia	Angle Degree	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
8 mm Shank											
Ø D1	L2	L1	D			EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
12.7	19	69	8	24°	K2Z	FAC0200455	FAC0200457	FAC0200459	FAC0201166	–	–
16	33	83	8	17°	K3Z	FAC0200469	FAC0200471	FAC0200473	FAC0200479	–	–
16	33	83	8	14°	K8Z	FAC0200508	FAC0200510	FAC0200512	–	–	SL-5M8
19	42	92	8	14°	K5Z	FAC0200487	FAC0200489	FAC0200491	FAC0200493	–	SL-7M8
1/8 inch Shank											
1/8	3/8	1-1/2	1/8	8°	MK1LI*	FAC0201984	FAC0201986	FAC0201985	–	–	SL-41
1/8	1/2	1-1/2	1/8	8°	MK3I*	FAC0201987	FAC0201989	FAC0201988	–	–	SL-42
1/4 inch Shank											
1/4	5/8	2-5/8	1/4	14°	K0I	FAC0201921	FAC0201923	FAC0201922	–	–	SL-1
3/8	1-1/16	3-1/16	1/4	14°	K6I	FAC0201930	FAC0201932	FAC0201931	–	–	SL-3
1/2	1-1/8	3-1/8	1/4	14°	K7I	FAC0201933	FAC0201935	FAC0201934	–	–	SL-4
5/8	1-5/16	3-5/16	1/4	17°	K3I	FAC0201924	FAC0201926	FAC0201925	–	–	–
5/8	1-5/16	3-5/16	1/4	14°	K8I	FAC0201936	FAC0201938	FAC0201937	–	–	SL-5
3/4	1-1/2	3-1/2	1/4	14°	K5I	FAC0201927	FAC0201929	FAC0201928	–	–	SL-7

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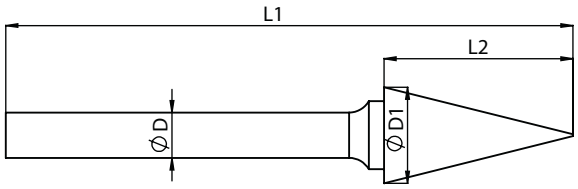
SM Cone shape



3 mm Shank

Head Diameter	Head length	Overall Length	Shank Dia	Angle Degree	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
Ø D1	L2	L1	D			EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
3	8	38	3	20^0	MA1*	FAC0200513	FAC0200514	FAC0200515	–	–	–
6.3	10.5	36.5	3	30^0	MA2	FAC0200518	FAC0200519	FAC0200520	–	–	SM-42M
3	11	38	3	14^0	MA5*	FAC0200521	FAC0200522	FAC0200523	–	–	SM-43M
3	16	38	3	7^0	MA6*	FAC0201255	FAC0201256	FAC0201257	–	–	SM-51M

6 mm Shank

6	19	50	6	17^0	A1*	FAC0200001	FAC0200002	FAC0200003	FAC0201348	–	SM-2M
6	19	70	6	17^0	A1	FAC0200004	FAC0201797	FAC0201790	–	–	SM-2M
9.5	20	70	6	24^0	A2	FAC0200012	FAC0200014	FAC0200016	–	–	–
12.7	25	75	6	28^0	A3	FAC0200022	FAC0200025	FAC0200027	FAC0201268	–	–
9.5	9.5	60	6	90^0	A4	FAC0200036	FAC0200037	FAC0200038	–	–	SK-3M
16	13	63	6	90^0	A5	FAC0200039	FAC0200040	FAC0200041	FAC0201353	–	SK-6M
16	16	66	6	60^0	A6	FAC0200044	FAC0200046	FAC0200047	–	–	SJ-6M
10	18	68	6	28^0	A7	FAC0200050	FAC0200051	FAC0200052	–	–	SM-4M
8	18	68	6	24^0	A8	FAC0200053	FAC0200054	FAC0200055	–	–	–
16	25	75	6	31^0	A9	FAC0200056	FAC0200058	FAC0200060	–	–	SM-6M
6.2	25	75	6	10^0	A10	FAC0200062	FAC0200063	FAC0200064	–	–	SM-3M
9.5	15	65	6	28^0	A11	FAC0200065	FAC0200066	FAC0200067	–	–	–
12.7	22	72	6	28^0	A12	FAC0200068	FAC0200069	FAC0200070	–	–	SM-5M
6.3	12.7	63	6	22^0	A13	FAC0200071	FAC0200072	FAC0200073	–	–	SM-1M

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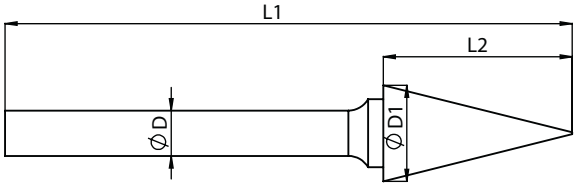
SM Cone shape



8 mm Shank											
Head Diameter	Head length	Overall Length	Shank Dia	Angle Degree	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	Coarse Cut	CTI Number
Ø D1	L2	L1	D			EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	
9.5	20	70	8	24°	A2Z	FAC0201798	FAC0200015	FAC0201799	–	–	–
12.7	25	75	8	28°	A3Z	FAC0201800	FAC0200026	FAC0201801	–	–	–
16	16	66	8	60°	A6Z	FAC0200045	FAC0201803	FAC0201802	–	–	–
16	25	75	8	31°	A9Z	FAC0200057	FAC0200059	FAC0200061	–	–	SM-6M8
1/8 inch Shank											
1/8	11/32	1-1/2	1/8	20°	MA1I*	FAC0201939	FAC0201941	FAC0201940	–	–	SM-41
1/8	7/16	1-1/2	1/8	14°	MA5I*	FAC0201942	FAC0201944	FAC0201943	–	–	SM-42
1/8	5/8	1-1/2	1/8	7°	MA6I*	FAC0201945	FAC0201947	FAC0201946	–	–	SM-43
1/4 inch Shank											
1/4	1/2	2-1/2	1/4	22°	A13I	-	FAC0201792	FAC0201791	–	–	SM-1
1/4	3/4	2-3/4	1/4	17°	A1I	FAC0201794	FAC0201796	FAC0201795	–	–	SM-2
1/4	1.00	3.00	1/4	10°	A10I	FAC0201781	FAC0201783	FAC0201782	–	–	SM-3
3/8	5/8	2-5/8	1/4	28°	A11I	FAC0201784	FAC0201786	FAC0201785	–	–	SM-4
1/2	7/8	2-7/8	1/4	28°	A12I	FAC0201787	FAC0201789	FAC0201788	–	–	SM-5
5/8	1.00	3.00	1/4	31°	A9I	FAC0201804	FAC0201806	FAC0201805	–	–	SM-6

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SN Inverted cone shape

Head Diameter	Head length	Overall Length	Shank Dia	Angle Degree	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	CTI Number
Ø D1	L2	L1	D			EDP No.	EDP No.	EDP No.	
3 mm Shank									
2.8	8.5	38	3	10°	MA3*	FAC0200530	FAC0200531	FAC0200532	SN-42M
6.3	8	38	3	15°	MA4*	FAC0200533	FAC0200535	FAC0200536	–
6 mm Shank									
6.3	8	58	–	10	N1	FAC0200538	FAC0200539	FAC0202008	SN-1M
10	10	58	–		N2	–	FAC0202240	FAC0202241	SN-2M
12.7	12.7	62	–	16	N4	FAC0200540	FAC0200541	FAC0202145	SN-4M
16	16	62	–		N3	–	FAC0202243	–	–
1/4 inch Shank									
1/4	5/16	2-5/16	1/4	10°	N1I	FAC0202009	FAC0202011	FAC0202010	SN-1
1/2	1/2	2-1/2	1/4	16°	N4I	FAC0202012	FAC0202014	FAC0202013	SN-4

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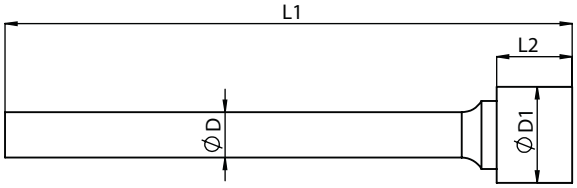
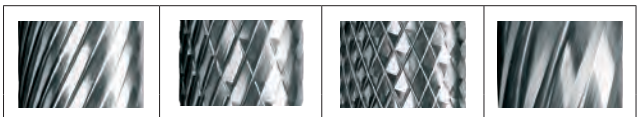
RIM Rim shape





6 mm Shank

Head Diameter	Head length	Overall Length	Shank Dia	Tool No	Standard cut (Single cut)	Supreme cut (Double cut)	Deluxe cut (Diamond cut)	Aluma Cut	CTI Number
Ø D1	L2	L1	D		EDP No.	EDP No.	EDP No.	EDP No.	
9.5	2	52	6	R1	FAC0200786	FAC0200787	FAC0200788	–	–
12.7	10	60	6	R3	FAC0200796	FAC0200797	FAC0200798	FAC0200800	–
15	5	54	6	R4	FAC0200801	FAC0200802	FAC0200803	–	–
19.1	6	56	6	R2	FAC0201282	FAC0200790	FAC0200791	FAC0200795	–

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Burr sets

BURR SET - 6 MM SHANK

BS1* - C8, B6, S4, TB3, T3, F4, K2, A3

(Dia 12.7 > Cylindrical, Cylindrical - Radius End, Ball, Tree Radius end, Tree, Flame, Cone-Radius End, Cone Shapes)

EDP No.	Description
FAC0201086	TCRB SET BS1 (STANDARD CUT)
FAC0201192	TCRB SET BS1 (DELUX CUT)
FAC0201087	TCRB SET BS1 (SUPREME)

BS2* - C4, B3, S3, TB2, T2, F3, K6, A11

(Dia 9.5 > Cylindrical, Cylindrical - Radius End, Ball, Tree Radius end, Tree, Flame, Cone-Radius End, Cone Shapes)

EDP No.	Description
FAC0201088	TCRB SET BS2 (STANDARD CUT)
FAC0201236	TCRB SET BS2 (DELUXE CUT)
FAC0201089	TCRB SET BS2 (SUPREME CUT)

BURR SET - 3 MM SHANK

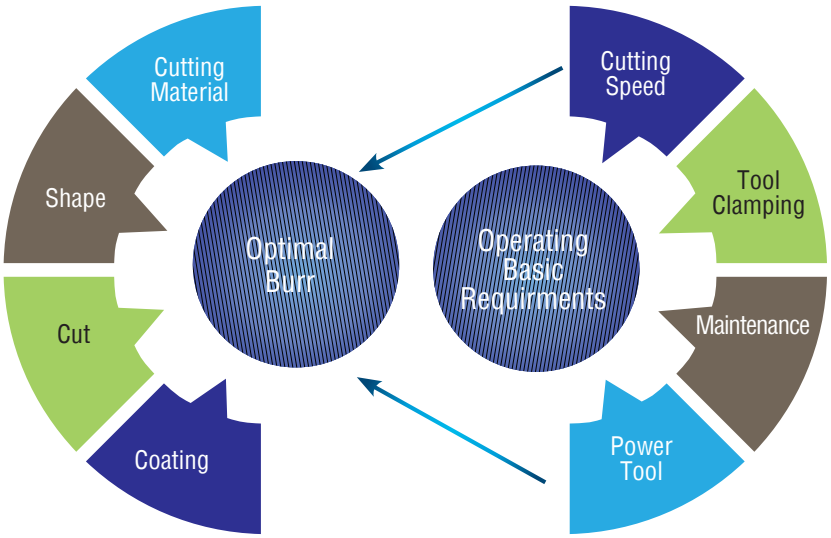
MINIBS1* - MC1, MC5, MB0, MB1, MS0, M01, MTB2, MT5, MF1, MK3, MA5, MA3

(Dia 3.0 > Cylindrical, Cylindrical - Radius End, Ball, Oval, Tree Radius end, Tree, Flame, Cone-Radius End, Cone, Inverted Cone Shapes)

EDP No.	Description
FAC0201090	TCRB SET MINIBS1 (STANDARD CUT)
FAC0201091	TCRB SET MINIBS1 (SUPREME CUT)

* While ordering please specify the fluting style - Standard Cut / Supreme Cut (Double Cut).

Optimal burr



Cutting material

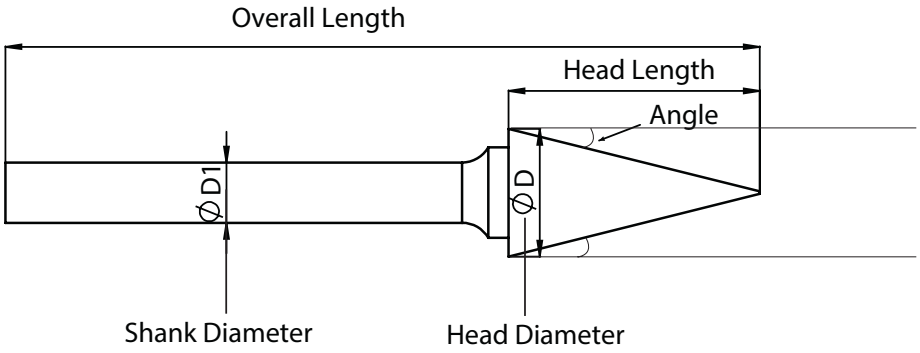
Totem burrs are manufactured using the best quality of raw material. The EN-24 shanks used are precision turned and ground to ensure the least possible run out.

Coating

Our TiN and TiCN high performance burrs are offered in extreme conditions to

a) Increase tool Life
b) Reduce cutting forces
c) Improve machinability
d) Better chip evacuation

Carbide burrs nomenclature



TYPE OF CUTS

Standard Cut (Single Cut):

This flute structure is designed for superior material removal and general purpose application. These can be used on Steel, Steel alloys, Cast Iron, Stainless Steel, Hard Bronze and Copper. Produces longer chips.

Supreme Cut (Double Cut / Cross Cut):

This burr allows for efficient stock removal in the harder materials. Its design reduces tool chatter and breaks the chips into granular shapes. These smaller chips also help to eliminate loading on the flutes. This design helps to have better control on the burr and grinder.

Deluxe Cut (Diamond Cut):

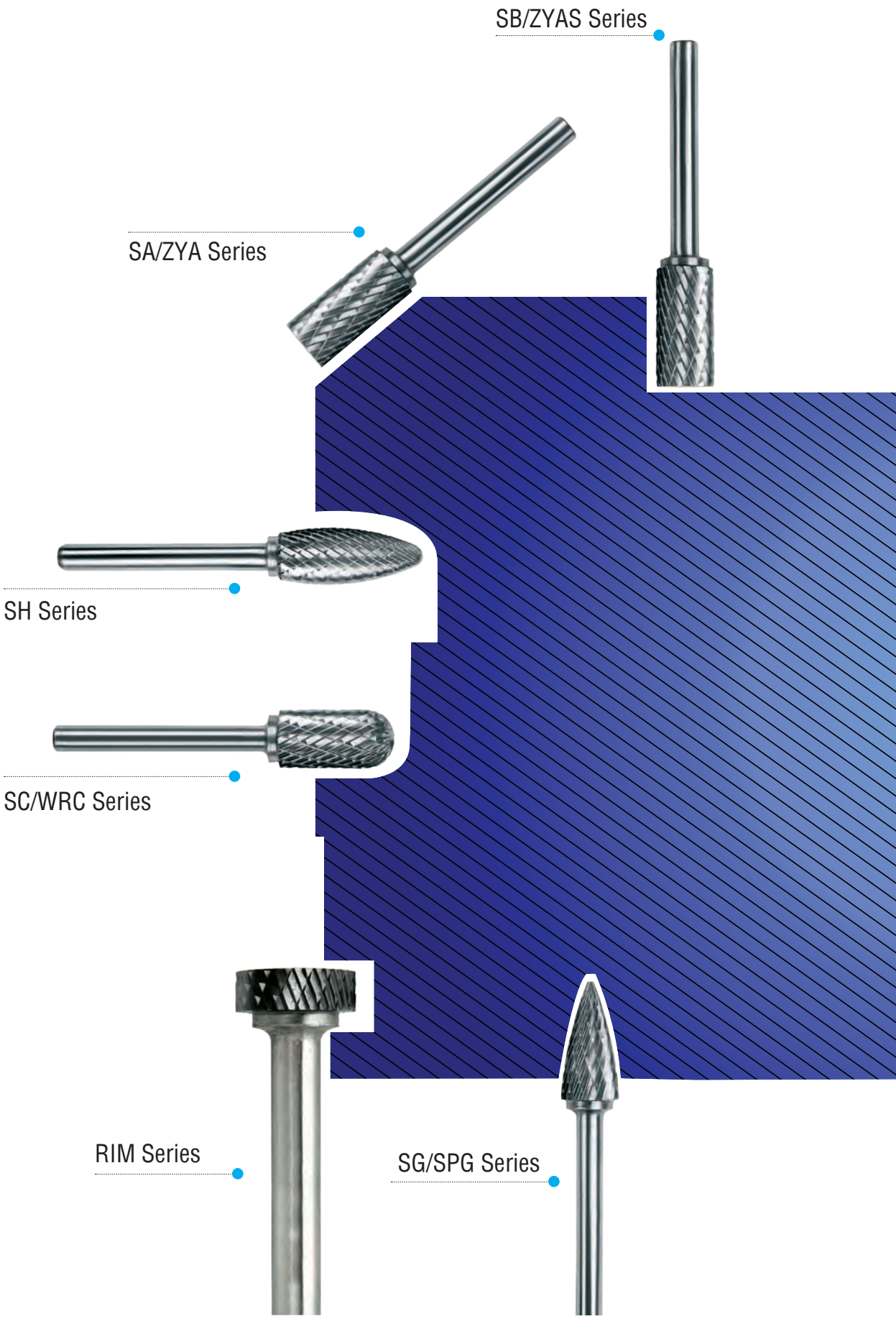
This design of tool is like triangular style of point, which produces extremely small chips (powder like chips). The cut eliminates pulling action of the main cut, and offers the operator good control over the tool and produces excellent finish. Effective in heat treated Steels and Tough alloy steels.

Aluma Cut (NF):

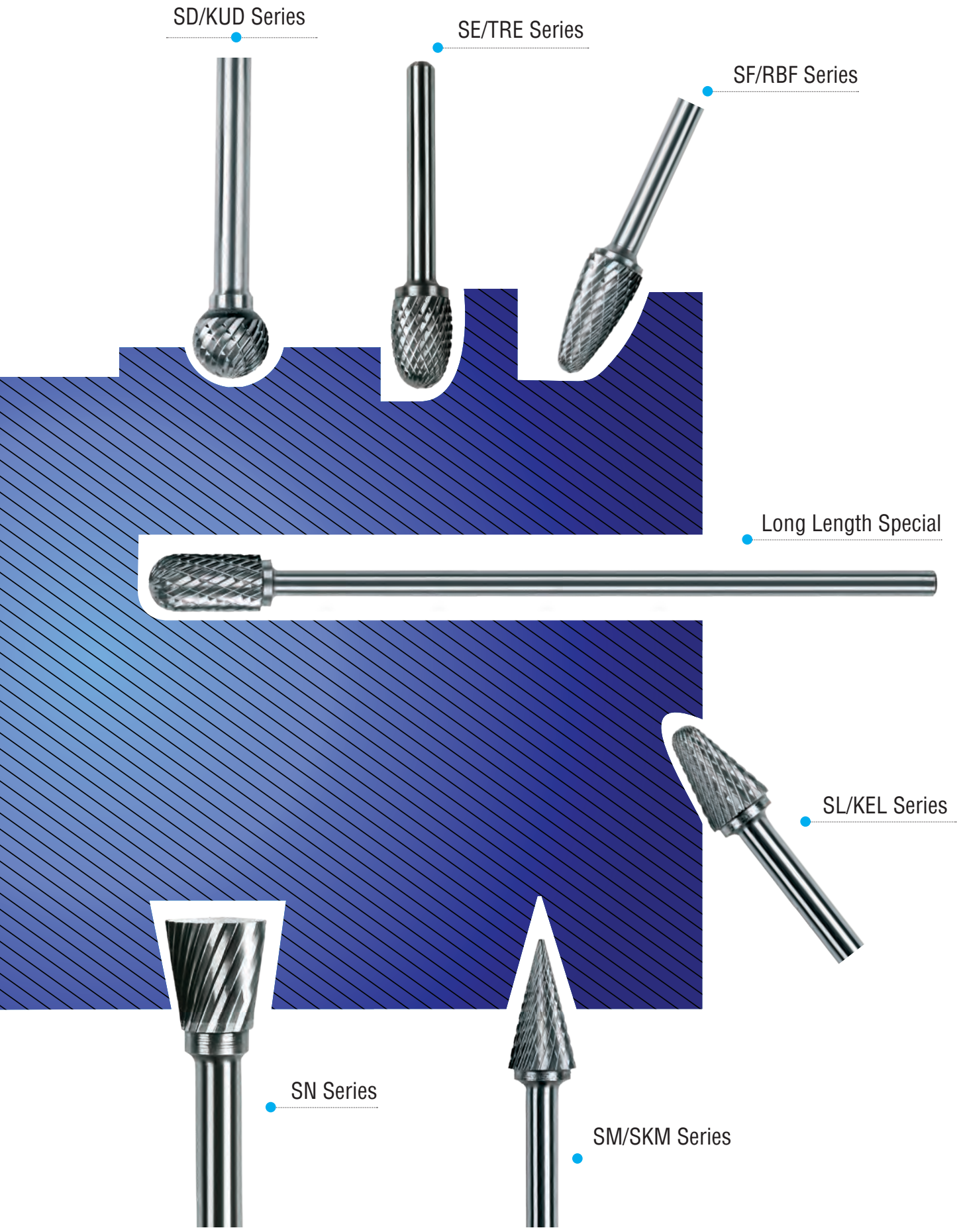
Designed for rapid stock removal on Non-ferrous materials. Recommended to work on Aluminium, Zinc alloy, Hand rubber and Wood.

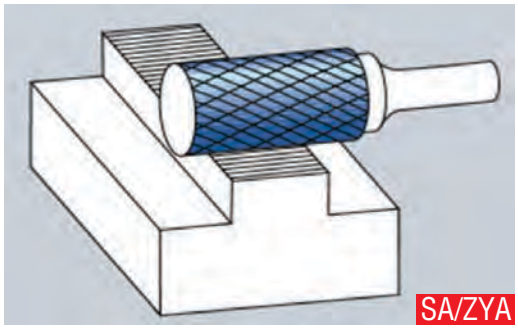
Coarse Cut

Designed for hard aluminum alloys with an Si-content greater than 12% and non-ferrous metals.


SB/ZYAS Series
SA/ZYA Series
SH Series
SC/WRC Series
RIM Series
SG/SPG Series

Typical Shapes

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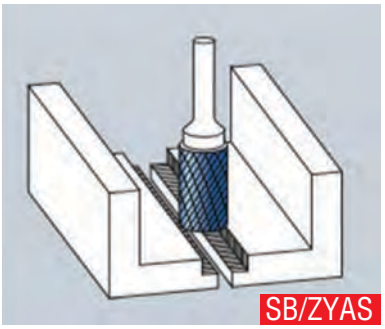
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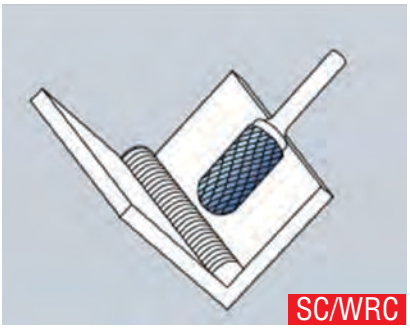
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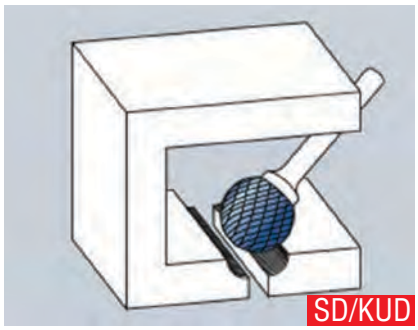
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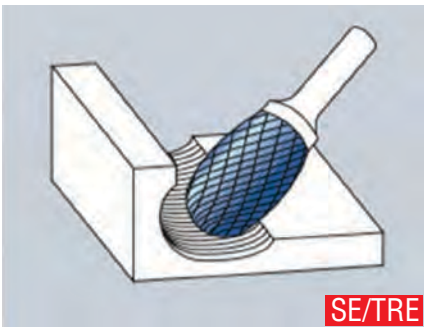
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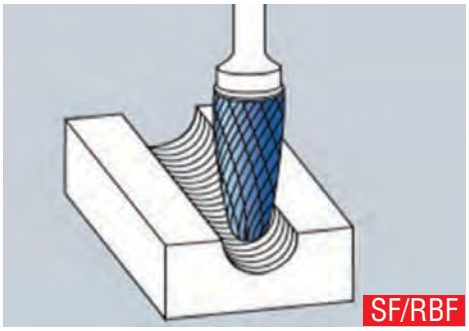
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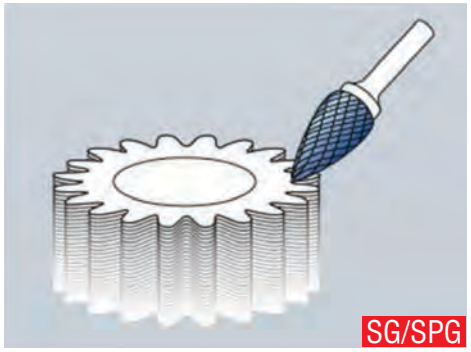
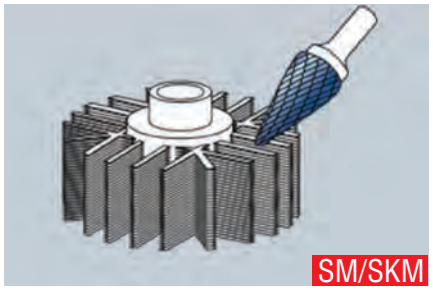

SG/SPG

SH

SL/KEL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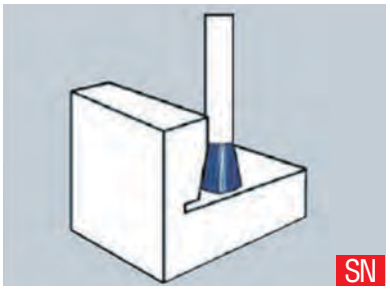
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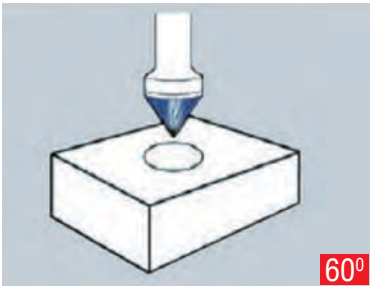
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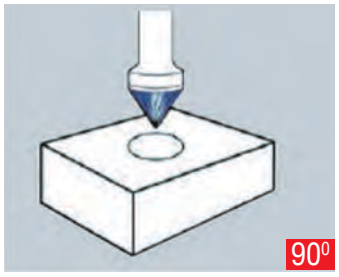
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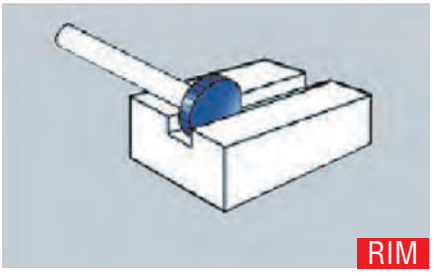
RIM

CARBIDE BURRS

Material application

Material Groups			Application	Cut Type				
				Standard	Supreme	Deluxe	Aluma	Coarse
Steel and Steel castings	Non Hardened, non heat treated steels upto 1200 N/mm² (<35 HRC)	Constructional steels Carbon steels Tool steels Non-alloyed steels Case-hardened steels Steel castings	Coarse machining = high stock removal	X	X			
			Fine maching - eg: deburring			X		
	Hardened, heattreated steels exceeding 1200 N/mm² (>35 HRC)	Tool steels Tempering steels Alloyed steels Steel castings	Coarse machining = high stock removal	X	X			
			Fine maching - eg: deburring			X		
High-grade steels	Stainless steels	Austenitic and ferritic high-grade steels	Coarse machining = high stock removal					X
			Fine maching - eg: deburring			X		
Non - ferrous metals	Soft non-ferrous metals	Aluminium alloys Brass Copper Zinc	Coarse machining = high stock removal				X	
			Fine maching - eg: deburring				X	
	Hard non-ferrous metals	Bronze Titanium / titanium alloys Very hard aluminium alloys (high Si content)	Coarse machining = high stock removal	X	X			
			Fine maching - eg: deburring			X		
	Heat resisting alloys	Nickel based alloys NiCo alloys (aircraft engine and turbine construction)	Coarse machining = high stock removal	X	X			
			Fine maching - eg: deburring			X		
Cast Iron		Grey Cast Iron Spherodial Graphite cast iron	Coarse machining = high stock removal	X	X			
			Fine maching - eg: deburring			X		
Plastics / Other materials		Fibre Reinforced plastics Thermoplastics hard rubber	Coarse machining = high stock removal				X	
			Fine maching - eg: deburring				X	

Cutting parameters

Material	3mm	6mm	8mm	10mm	12mm	16mm	20mm	25mm
Steel	60-90	30-45	25-35	20-30	15-25	10-18	10-14	8-10
Hardened / Tool Steel	30-40	15-20	10-15	10-15	8-10	5-8	4-7	3-5
Stainless Steel	30-50	15-25	12-20	10-15	9-12	7-10	5-7	4-5
Nickel / Titanium	30-40	15-20	10-15	10-15	8-10	5-8	4-7	3-5
Cast Iron	60-90	30-45	25-35	20-30	15-20	10-18	10-14	8-10
Aluminium / Plastics	30-90	15-60	12-50	10-50	8-35	6-30	5-20	4-15
Brass	40-50	20-30	15-20	13-17	10-15	8-12	6-8	5-6
Copper	30-90	15-60	12-50	10-50	8-35	6-30	5-20	4-15
Zinc	60-90	30-45	25-35	20-30	15-25	10-18	10-14	8-10

The table lists recommended rotational speeds (RPM) as a function of burr diameter.

SAFETY NOTE:-

Tools with long shanks must be placed on the workpiece, or inserted into the bore or groove, before the power source is switched on. For safety reasons we urge you to reduce idling speeds (RPM) by up to one-third from the values stated.

Recommendations for use:

TOTEM Tungsten Carbide Burrs are designed for machining materials of virtually any strength; the superior performance reflects an optimum combination of key parameters such as shape, number of flutes, spiral angle, rake angle and concentricity. The precise concentricity of TOTEM tungsten carbide burrs

- Ensures an improved protection of operator safety and health
- Reduces power tool wear
- Provides smooth operating behaviour
- Prevents chatter marks

An optimum power output and RPM of the power source (air-powered or electric machine, flexible shaft system) are necessary conditions for an economically efficient use of tungsten carbide burrs. We therefore recommend you to observe the following rules:

- Work with maximum RPM. Do not use speeds below 3000 RPM except in special cases (eg: on stationery machines or when countersinking with fully immersed burr).
- Chucks and collets must be absolutely concentric to avoid chipping. Tool runout and chatter will result in premature wear.
- Work with significantly reduced RPM on poorly heat conducting materials (eg: stainless steel, titanium alloys, etc.) to prevent tool damage. Avoid the typical blue Discoloration of the shank and the tool.
- In light cutting applications (deburring, chamfering, light surface work) the tool speed may be increased uo to twice indicated rate.
- When machining very sticky materials, the use of a suitable lubricant (grease, kerosene, chalk or similar) is recommended to prevent loading.

TOTEM®

High Performance Cutting Tools

CARBON STEEL HAND TAPS

CONTENTS

CARBON STEEL HAND TAPS

THREAD FORM	BLANK STANDARD	TOLERANCE	CHAMFER	PAGE
M	BS 949	Zone 5	T/S/B	7.003
MF	BS 949	Zone 5	T/S/B	7.005
BSW	BS 949	Zone 5	T/S/B	7.007
BSF	BS 949	Zone 5	T/S/B	7.009
BA	BS 949	Zone 5	T/S/B	7.010
BSB	BS 949	Zone 5	T/S/B	7.011
BS Con	BS 949	Zone 5	T/B	7.012
ME	BS 949	Zone 5	T/S/B	7.013
BS Cy	BS 949	Zone 5	T/S/B	7.014
WF	BS 949	Zone 5	T/S/B	7.015
BSP	BS 949	Zone 5	T/B	7.016
BSPT	BS 949	Zone 5	T/B	7.017
UNC	ANSI 94.9	2B	T/S/B	7.018
UNF	ANSI 94.9	2B	T/S/B	7.019
NPT	ANSI 94.9	2B	T/B	7.021
NPS	ANSI 94.9	2B	T/B	7.022
UNS	ANSI 94.9	2B	T/S/B	7.023

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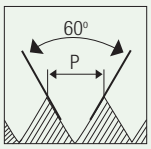
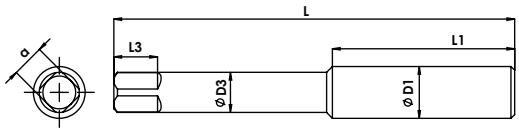
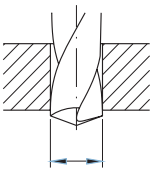
M Metric coarse threads



HOLE TYPE

CS | BS 949 | ZONE 5 | T/S/B

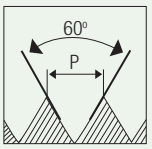




Unit : mm

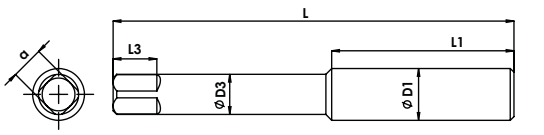
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 2	0.4	44.03	11.5	3.25	2.58	4.46	1.6	FBA0204977
M 2.2	0.45	45.72	15	3.25	2.58	4.46	1.75	FBA0205005
M 2.5	0.45	47.51	15	3.25	2.58	4.46	2.05	FBA0205061
M 3	0.5	49.4	17	3.25	2.58	4.46	2.5	FBA0205117
M 3.5	0.6	52.85	20.6	3.66	2.86	4.46	2.9	FBA0205174
M 4	0.7	56.33	22.5	4.22	3.26	6.05	3.3	FBA0205231
M 4.5	0.75	62.99	26.6	4.8	3.69	6.05	3.7	FBA0205318
M 5	0.8	63.29	26.6	5.41	4.15	6.05	4.2	FBA0205404
M 6	1	67.04	30.7	6.15	4.71	6.84	5	FBA0205632
M 7	1	67.68	30.7	7.21	5.5	7.64	6	FBA0205716
M 8	1.25	69.85	30.5	8.2	6.23	8.43	6.8	FBA0205831
M 9	1.25	74.61	33.7	9.12	6.9	10.02	7.8	FBA0205943
M 10	1.5	74.61	33.7	10.29	7.73	10.02	8.5	FBA0206091
M 11	1.5	80.17	36.5	8.2	6.06	10.02	9.5	FBA0206204
M 12	1.75	85.83	42.1	9.32	6.9	10.81	10.2	FBA0206356
M 14	2	91.28	42	10.91	8.07	12.4	12	FBA0206560

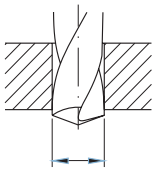
M Metric coarse threads



HOLE TYPE

CS | BS 949 | ZONE 5 | T/S/B

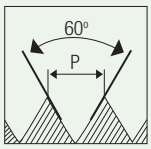




Unit : mm

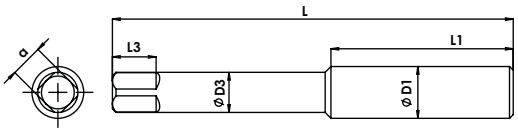
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 16	2	96.84	46	12.2	9.04	13.99	14	FBA0206759
M 18	2.5	102.4	46	13.78	10.2	15.58	15.5	FBA0206986
M 20	2.5	107.95	50.8	15	11.12	17.16	17.5	FBA0207100
M 22	2.5	119.06	56.4	17.71	13.17	18.75	19.5	FBA0207215
M 24	3	124.62	56.35	19.31	14.37	18.75	21	FBA0207359
M 27	3	129.8	63.5	20.35	15.13	20.2	24	FBA0207559
M 30	3.5	137.8	65	22.79	16.96	21.9	26.5	FBA0207815
M 33	3.5	145.8	65	25.98	19.34	25.2	29.5	FBA0208015
M 36	4	153.8	76	28.17	20.99	26.7	32	FBA0208155
M 39	4	161.8	76	31.35	23.38	28.2	35	FBA0208211
M 42	4.5	169.8	81	33.18	24.75	28.2	37.5	FBA0208295
M 45	4.5	177.8	81	36.35	27.12	31.7	40.5	FBA0208323
M 48	5	185.3	90.5	38.61	28.82	31.7	43	FBA0208351
M 52	5	193.3	90.5	38.61	28.82	31.7	47	FBA0208407

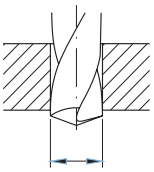
MF Metric fine threads



HOLE TYPE

CS | BS 949 | ZONE 5 | T/S/B

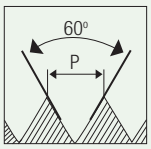




Unit : mm

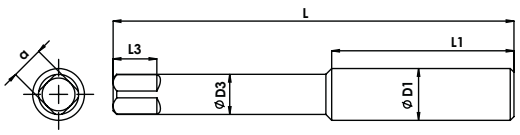
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1	p	L	L1	Ø D3	a	L3	Ø d1	
M 2.3	0.4	45.81	15.00	3.25	2.58	4.46	1.9	FBA0205033
M 2.6	0.45	49.16	17.00	3.25	2.58	4.46	2.1	FBA0205089
M 3	0.6	49.36	17.00	3.25	2.58	4.46	2.4	FBA0205146
M 4	0.5	56.33	22.50	4.22	3.26	6.05	3.5	FBA0205202
M 4	0.75	56.33	22.50	4.22	3.26	6.05	3.25	FBA0205259
M 5	0.5	63.29	26.60	5.41	4.15	6.05	4.5	FBA0205346
M 5	0.9	63.29	26.60	5.41	4.15	6.05	4.1	FBA0205432
M 5.5	0.9	63.58	26.60	5.61	4.30	6.05	4.6	FBA0205517
M 6	0.75	67.13	30.70	6.15	4.71	6.84	5.2	FBA0205573
M 8	0.75	69.85	30.50	8.20	6.23	8.43	7.2	FBA0205772
M 8	1	69.85	30.50	8.20	6.23	8.43	7	FBA0205800
M 9	1	74.61	33.70	9.12	6.90	10.02	8	FBA0205915
M 10	0.75	74.61	33.70	10.29	7.73	10.02	9.2	FBA0205999
M 10	1	74.61	33.70	10.29	7.73	10.02	9	FBA0206027
M 10	1.25	74.61	33.70	10.29	7.73	10.02	8.8	FBA0206059
M 12	1	76.20	31.75	9.32	6.90	10.81	11	FBA0206260
M 12	1.25	76.20	31.75	9.32	6.90	10.81	10.75	FBA0206292
M 12	1.5	85.83	42.1	9.32	6.9	10.81	10.5	FBA0206324
M 14	1.25	76.20	31.75	10.91	8.07	12.40	12.75	FBA0206497
M 14	1.5	91.28	42	10.91	8.07	12.4	12.5	FBA0206529

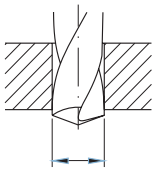
MF Metric fine threads



HOLE TYPE

CS | BS 949 | ZONE 5 | T/S/B

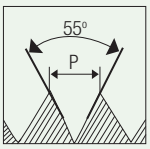




Unit : mm

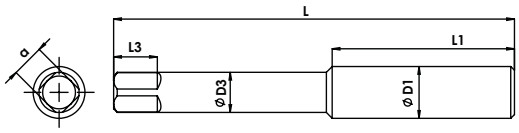
Nominal Diameter	Pitch	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1	p	L	L1	ØD3	a	L3	Ød1	
M 16	1	76.20	31.75	12.20	9.04	13.99	15	FBA0206672
M 18	1.5	76.20	31.75	13.78	10.20	15.58	16.5	FBA0206927
M 20	1	82.55	38.10	15.00	11.12	17.16	19	FBA0207014
M 22	1.5	82.55	38.10	17.71	13.17	18.75	20.5	FBA0207156
M 24	1.5	82.55	38.10	19.31	14.37	18.75	22.5	FBA0207271
M 25	1.5	82.55	38.10	20.33	15.13	20.34	23.5	FBA0207387
M 26	1.5	82.35	38.10	20.35	15.13	20.20	24.5	FBA0207445
M 27	1.5	82.35	38.10	20.35	15.13	20.20	25.5	FBA0207501
M 28	1.5	101.40	38.10	21.21	15.77	20.30	26.5	FBA0207615
M 30	1.5	101.40	38.10	22.79	16.96	21.90	28.5	FBA0207700
M 30	2	101.40	38.10	22.79	16.96	21.90	28	FBA0207729
M 32	1.5	101.40	38.10	25.98	19.34	25.20	31.5	FBA0207871
M 40	1.5	101.40	38.10	31.35	23.38	28.20	38	FBA0208239

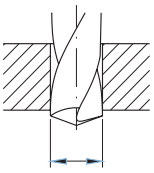
BSW Whitworth coarse threads



HOLE TYPE

CS | BS 949 | ZONE 5 | T/S/B

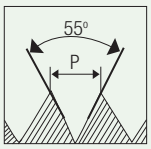




Unit : mm

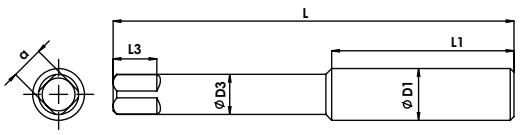
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1		L	L1	Ø D3	a	L3	Ø d1	
1/16"	60	42.19	10.5	3.25	2.58	4.46	-	FBA0200001
3/32"	48	47.41	15	3.25	2.58	4.46	-	FBA0200029
1/8"	40	51.05	18.8	3.25	2.58	4.46	-	FBA0200057
5/32"	32	56.28	22.3	4.04	3.03	6.05	-	FBA0200085
3/16"	24	63.04	26.6	4.8	3.69	6.05	3.7	FBA0200113
7/32"	24	63.56	26.6	5.61	4.3	6.05	4.5	FBA0200141
1/4"	20	67.17	30.7	6.43	4.91	6.84	5.1	FBA0200169
9/32"	20	67.68	30.7	7.21	5.5	7.64	5.8	FBA0200197
5/16"	18	69.85	30.5	8	6.06	8.43	6.5	FBA0200225
3/8"	16	74.61	33.7	9.58	7.38	10.02	7.9	FBA0200253
7/16"	14	80.17	36.5	8.2	6.06	10.02	9.3	FBA0200281
1/2"	12	85.83	42.1	9.32	6.9	10.81	10.5	FBA0200309
9/16"	12	91.28	42	10.91	8.07	12.4	12.1	FBA0200338
5/8"	11	96.84	46	12.2	9.04	13.99	13.5	FBA0200366
11/16"	11	102.4	46	13.78	10.2	15.58	15	FBA0200394

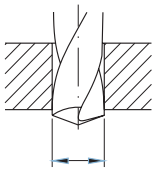
BSW Whitworth coarse threads



HOLE TYPE

CS | BS 949 | ZONE 5 | T/S/B

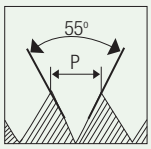




Unit : mm

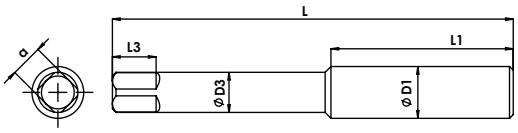
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
ØD1		L	L1	ØD3	a	L3	Ø d1	
3/4"	10	107.95	50.8	15	11.12	17.16	16.25	FBA0200422
7/8"	9	119.06	56.4	17.71	13.18	18.75	19.25	FBA0200478
1"	8	130.18	63.5	20.33	15.13	20.34	22	FBA0200534
1.1/8"	7	137.8	65	22.79	16.96	21.7	24.75	FBA0200562
1.1/4"	7	145.8	65	25.96	19.34	25.2	28	FBA0200590
1.3/8"	6	153.8	76	28.17	20.99	26.7	31	FBA0200618
1.1/2"	6	161.8	76	31.35	23.38	28.2	33.5	FBA0200646
1.3/4"	5	177.8	81	36.35	27.12	31.7	39	FBA0200702
2"	4.5	193.3	90.5	41.79	31.21	34.7	44.5	FBA0200758

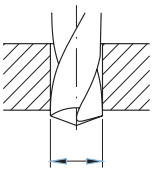
BSF Whitworth fine threads



HOLE TYPE

CS | BS 949 | ZONE 5 | T/S/B

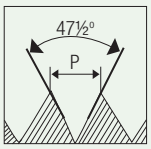




Unit : mm

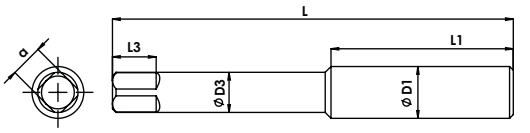
Nominal Diameter ØD1	TPI	Overall Length L	Thread Length L1	Shank Diameter ØD3	Square Size a	Square Length L3	Tapping Drill Diameter Ød1	EDP No.
3/16"	32	63.15	26.6	4.8	3.69	6.05	4	FBA0200842
7/32"	28	63.61	26.6	5.61	4.3	6.05	4.6	FBA0200870
1/4"	26	67.27	30.7	6.43	4.91	6.84	5.3	FBA0200898
9/32"	26	67.79	30.7	7.21	5.5	7.64	6.1	FBA0200926
5/16"	22	69.85	30.5	8	6.06	8.43	6.8	FBA0200954
3/8"	20	74.61	33.7	9.58	7.38	10.02	8.3	FBA0200982
7/16"	18	80.17	36.5	8.2	6.06	10.02	9.7	FBA0201011
1/2"	16	85.83	42.1	9.32	6.9	10.81	11.1	FBA0201039
9/16"	16	91.28	42	10.91	8.07	12.4	12.7	FBA0201067
5/8"	14	96.84	46	12.2	9.04	13.99	14	FBA0201095
11/16"	14	102.4	46	13.78	10.19	15.58	15.5	FBA0201123
3/4"	12	107.95	50.8	15	11.12	17.16	16.75	FBA0201151
7/8"	11	119.06	56.4	17.71	13.18	18.75	19.75	FBA0201207
1"	10	130.18	63.5	20.33	15.13	20.34	22.75	FBA0201263
1.1/8"	9	137.8	65	22.79	16.96	21.7	25.5	FBA0201291
1.1/4"	9	145.8	65	25.96	19.34	25.2	28.5	FBA0201319
1.3/8"	8	153.8	76	28.17	20.99	26.7	31.5	FBA0201347
1.1/2"	8	161.8	76	31.35	23.38	28.2	34.5	FBA0201375

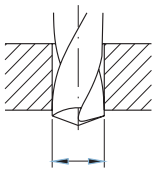
BA British association threads



HOLE TYPE

CS | BS 949 | ZONE 5 | T/S/B

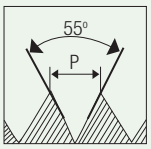




Unit : mm

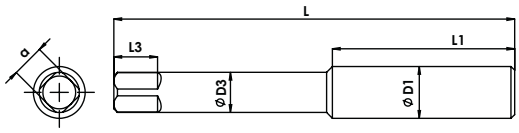
Nominal Diameter	p	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1		L	L1	Ø D3	a	L3	Ø d1	
# 12	0.28	42.00	10.50	3.25	2.58	4.46	1.05	FBA0209359
# 11	0.31	42.08	10.50	3.25	2.58	4.46	1.2	FBA0209387
# 10	0.35	42.29	11.50	3.25	2.58	4.46	1.4	FBA0209415
# 9	0.39	43.98	11.50	3.25	2.58	4.46	1.55	FBA0209443
# 8	0.43	45.76	15.00	3.25	2.58	4.46	1.8	FBA0209471
# 7	0.48	47.52	15.00	3.25	2.58	4.46	2.05	FBA0209499
# 6	0.53	49.29	17.00	3.25	2.58	4.46	2.3	FBA0209527
# 5	0.59	51.11	18.80	3.25	2.58	4.46	2.65	FBA0209555
# 4	0.66	52.92	20.60	3.66	2.86	4.46	3	FBA0209583
# 3	0.73	56.42	22.50	4.22	3.26	6.05	3.4	FBA0209611
# 2	0.81	63.13	26.60	4.80	3.69	6.05	4	FBA0209639
# 1	0.9	63.47	26.60	5.41	4.15	6.05	4.5	FBA0209667
# 0	1	67.07	30.70	6.15	4.71	6.84	5.1	FBA0209695

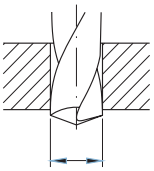
BSB British brass threads



HOLE TYPE

CS | BS 949 | ZONE 5 | T/S/B



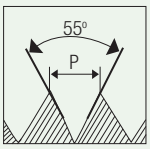


Unit : mm

Nominal Diameter ØD1	TPI	Overall Length L	Thread Length L1	Shank Diameter ØD3	Square Size a	Square Length L3	Tapping Drill Diameter Ød1	EDP No.
1/4"	26	67.27	30.7	6.43	4.91	6.84	5.3	FBA0201487
5/16"	26	69.85	30.5	8	6.06	8.43	6.9	FBA0201515
3/8"	26	74.61	33.7	9.58	7.38	10.02	8.4	FBA0201543
7/16"	26	76.2	31.75	8.2	6.06	10.02	9.9	FBA0201571
1/2"	26	76.2	31.75	9.32	6.9	10.81	11.5	FBA0201599
9/16"	26	76.2	31.75	10.91	8.07	12.4	13.1	FBA0201627
5/8"	26	76.2	31.75	12.2	9.04	13.99	14.65	FBA0201655
3/4"	26	82.55	38.1	15	11.12	17.16	17.86	FBA0201683
1"	26	82.55	38.1	20.33	15.13	20.34	17.86	FBA0201711

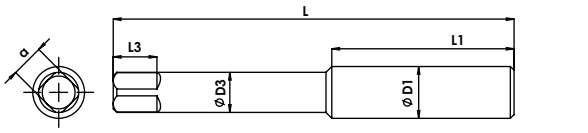
BS Con

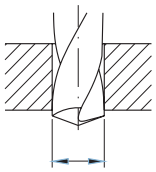
British conduit threads



HOLE TYPE

CS | BS 949 | ZONE 5 | T/B

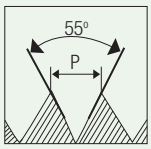




Unit : mm

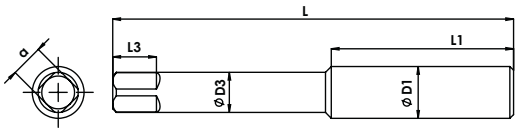
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1		L	L1	Ø D3	a	L3	Ø d1	
1/2"	18	76.2	31.75	9.32	6.9	10.81	11.1	FBA0209023
5/8"	18	76.2	31.75	12.2	9.04	13.99	14	FBA0209051
3/4"	16	82.55	38.1	15	11.12	17.16	17.5	FBA0209079
1"	16	82.55	38.1	20.33	15.13	20.34	23.5	FBA0209107

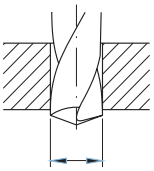
ME Model engineer threads



HOLE TYPE

CS | BS 949 | ZONE 5 | T/S/B

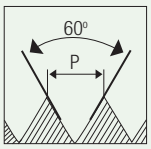




Unit : mm

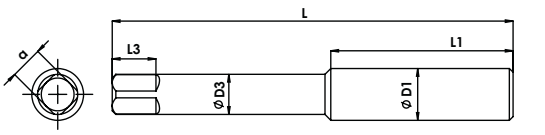
Nominal Diameter ØD1	TPI	Overall Length L	Thread Length L1	Shank Diameter ØD3	Square Size a	Square Length L3	Tapping Drill Diameter Ød1	EDP No.
1/8"	40	51.05	18.8	3.25	2.58	4.46	2.55	FBA0203295
5/32"	40	56.34	22.5	4.04	3.03	6.05	3.25	FBA0203323
3/16"	40	63.21	26.6	4.8	3.69	6.05	4.1	FBA0203351
7/32"	40	63.73	26.6	5.61	4.3	6.05	4.9	FBA0203379
1/4"	40	67.4	30.7	6.43	4.91	6.84	5.8	FBA0203407
9/32"	32	67.87	30.7	7.21	5.5	7.64	6.1	FBA0203435
5/16"	32	69.85	30.5	8	6.06	8.43	7.1	FBA0203463
3/8"	32	74.61	33.7	9.58	7.38	10.02	8.6	FBA0203491

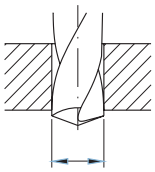
BS Cy British cycle threads



HOLE TYPE

CS | BS 949 | ZONE 5 | T/S/B

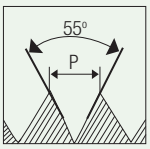




Unit : mm

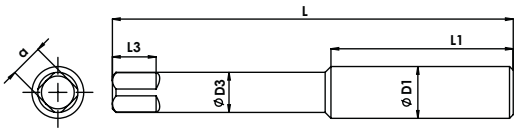
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1		L	L1	Ø D3	a	L3	Ø d1	
3/16”	32	63.21	26.6	4.8	3.69	6.05	4.1	FBA0208435
1/4”	26	67.36	30.7	6.43	4.91	6.84	5.6	FBA0208491
5/16”	26	69.85	30.5	8	6.06	8.43	7.1	FBA0208519
3/8”	26	74.61	33.7	9.58	7.38	10.02	8.7	FBA0208547
7/16”	26	76.2	31.75	8.2	6.06	10.02	10.3	FBA0208575
1/2”	26	76.2	31.75	9.32	6.9	10.81	11.9	FBA0208603

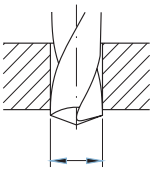
WF Whitworth fine threads special



HOLE TYPE

CS | BS 949 | ZONE 5 | T/S/B

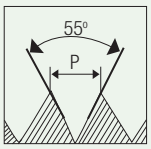




Unit : mm

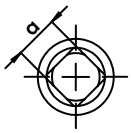
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1		L	L1	Ø D3	a	L3	Ø d1	
3/16"	28	63.1	26.6	4.8	3.69	6.05	-	FBA0204641
7/32"	32	63.73	26.6	5.61	4.3	6.05	-	FBA0204669
1/4"	32	67.36	30.7	6.43	4.91	6.84	5.6	FBA0204697
5/16"	40	69.85	30.5	8	6.06	8.43	7.3	FBA0204753
3/8"	40	74.61	33.7	9.58	7.38	10.02	8.9	FBA0204809
7/16"	40	76.2	31.75	8.2	6.06	10.02	-	FBA0204837
7/16"	32	76.2	31.75	8.2	6.06	10.02	-	FBA0204865
1/2"	40	76.2	31.75	9.32	6.9	10.81	-	FBA0204893
1/2"	32	76.2	31.75	9.32	6.9	10.81	-	FBA0204921
11/64"	40	62.95	26.60	4.80	3.76	6.35	-	FBA0204473
11/64"	48	63	26.60	4.80	3.76	6.35	-	FBA0204501
15/64"	28	67.04	30.70	6.15	4.78	7.14	-	FBA0204585
15/64"	40	67.18	30.70	6.15	4.78	7.14	-	FBA0204613

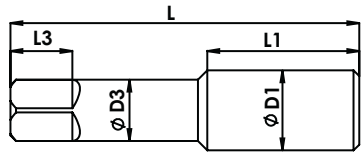
BSP British standard pipe threads

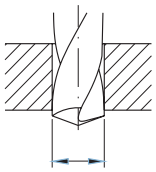


HOLE TYPE

CS | BS 949 | ZONE 5 | T/B



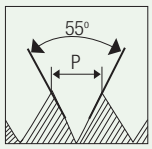




Unit : mm

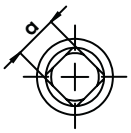
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1		L	L1	Ø D3	a	L3	Ø d1	
1/8"	28	53.98	19.05	8.08	5.96	7.64	8.8	FBA0208631
1/4"	19	61.91	26.99	10.91	8.07	10.81	11.8	FBA0208659
3/8"	19	65.09	26.99	13.78	10.2	12.4	15.25	FBA0208687
1/2"	14	79.38	34.92	17.46	12.97	15.58	19	FBA0208715
5/8"	14	80.96	34.92	20.33	15.13	17.16	21	FBA0208743
3/4"	14	82.55	34.92	22.99	17.14	17.16	24.5	FBA0208771
7/8"	14	88.9	39.69	27.74	20.51	18.75	28.25	FBA0208799
1"	11	95.25	44.45	28.56	21.3	20.34	30.75	FBA0208827
1.1/4"	11	101.3	44.5	33.35	24.88	23.7	39.5	FBA0208883
1.1/2"	11	107.8	44.5	38.13	28.46	25.2	45	FBA0208939
1.3/4"	11	110.8	44.5	41.3	30.82	26.7	51	FBA0208967
2"	11	114.3	44.5	47.65	35.54	28.2	57	FBA0208995

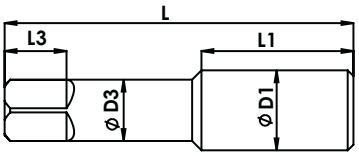
BSPT British standard taper pipe threads

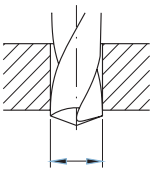


HOLE TYPE

CS | BS 949 | ZONE 5 | T/B



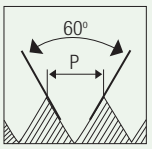




Unit : mm

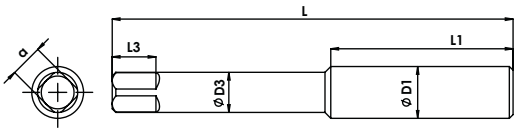
Nominal Diameter ØD1	TPI	Overall Length L	Thread Length L1	Shank Diameter ØD3	Square Size a	Square Length L3	Tapping Drill Diameter ød1	EDP No.
1/8”	28	54	19.1	8.08	6.05	7.9	8.4	FBA0209135
1/4”	19	61.9	27	10.9	8.18	11.1	11.5	FBA0209163
3/8”	19	65.1	27	13.77	10.31	12.7	14.75	FBA0209191
1/2”	14	79.4	34.9	17.45	13.08	15.9	18.25	FBA0209219
5/8”	14	81	34.9	20.32	15.24	17.5	20.25	FBA0211009
3/4”	14	82.6	34.9	23.01	17.25	17.5	23.4	FBA0209247
1”	11	95.3	44.5	28.58	21.41	20.6	29.75	FBA0209275
1.1/4”	11	101.6	44.5	33.32	24.99	23.8	38.1	FBA0209303
1.1/2”	11	108	44.5	38.1	28.58	25.4	44.5	FBA0209331
2"	11	114.3	44.5	47.63	35.71	28.6	56.4	FBA0211037

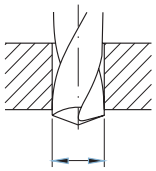
UNC Unified coarse threads



HOLE TYPE

CS | BS 949 | 2B | T/S/B

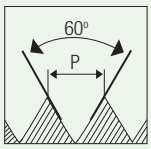




Unit : mm

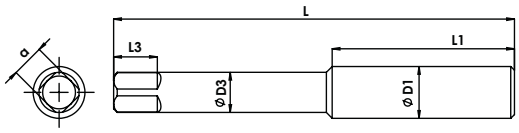
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1		L	L1	Ø D3	a	L3	Ø d1	
# 4	40	49.26	17	3.58	2.7	4.46	2.35	FBA0202566
# 5	40	51.04	18.8	3.58	2.7	4.46	2.65	FBA0202622
# 6	32	52.79	20.6	3.58	2.7	4.46	2.85	FBA0202650
# 8	32	56.39	22.5	4.27	3.24	6.05	3.5	FBA0202706
# 10	24	63.07	26.6	4.93	3.77	6.05	3.9	FBA0202734
# 12	24	63.5	28.5	5.61	4.1	6.84	4.5	FBA0202790
1/4"	20	67.15	30.7	6.48	4.76	7.64	5.1	FBA0202818
5/16"	18	73.68	35.2	8.08	5.96	9.23	6.6	FBA0202846
3/8"	16	74.61	33.7	9.68	7.17	10.81	8	FBA0202874
7/16"	14	80.17	36.5	8.2	6.06	10.02	9.4	FBA0202902
1/2"	13	85.83	42.1	9.32	6.9	10.81	10.8	FBA0202930
9/16"	12	91.28	42	10.91	8.07	12.4	12.2	FBA0202958
5/8"	11	96.84	46	12.2	9.04	13.99	13.5	FBA0202986
3/4"	10	107.95	50.8	15	11.12	17.16	16.5	FBA0203042
7/8"	9	119.06	56.4	17.71	13.18	18.75	19.5	FBA0203070
1"	8	130.18	63.5	20.33	15.13	20.34	22.25	FBA0203098
1.1/8"	7	137.8	65	22.79	16.96	21.7	25	FBA0203126
1.1/4"	7	145.8	65	25.96	19.34	25.2	28	FBA0203155
1.3/8"	6	153.8	76	28.17	20.99	26.7	30.75	FBA0203183
1.1/2"	6	161.8	76	31.35	23.38	28.2	34	FBA0203211
1.3/4"	5	177.8	81	36.35	27.12	31.7	39.5	FBA0203239
2"	4.1/2	193.7	90.5	41.79	31.21	34.7	45	FBA0203267

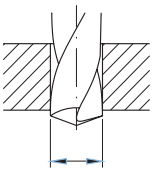
UNF Unified fine threads



HOLE TYPE

CS | BS 949 | 2B | T/S/B

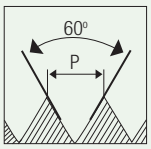




Unit : mm

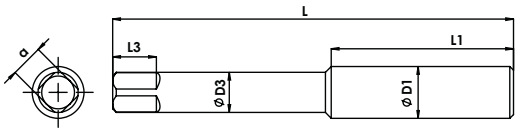
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1		L	L1	Ø D3	a	L3	Ø d1	
# 5	44	51.06	18.8	3.58	2.7	4.46	2.7	FBA0201879
# 6	40	52.85	20.6	3.58	2.7	4.46	2.95	FBA0201907
# 8	36	56.43	22.5	4.27	3.24	6.05	3.5	FBA0201963
# 10	32	63.17	26.6	4.93	3.77	6.05	4.1	FBA0201991
# 12	28	63.56	28.5	5.61	4.1	6.84	4.7	FBA0202048
1/8”	44	51.06	18.8	3.58	2.7	4.46	-	FBA0201851
5/32”	36	63.13	22.5	4.27	3.24	6.05	-	FBA0201935
3/16”	32	63.13	26.6	4.93	3.77	6.05	-	FBA0202020
1/4”	28	67.28	30.7	6.48	4.76	7.64	5.5	FBA0202077
5/16”	24	73.82	35.2	8.08	5.96	9.23	6.9	FBA0202106
3/8”	24	74.61	33.7	9.68	7.17	10.81	8.5	FBA0202135
7/16”	20	80.17	36.5	8.2	6.06	10.02	9.9	FBA0202164
1/2”	20	85.83	42.1	9.32	6.9	10.81	11.5	FBA0202193
9/16”	18	91.28	42	10.91	8.07	12.4	12.9	FBA0202222
5/8”	18	96.84	46	12.2	9.04	13.99	14.5	FBA0202252
3/4”	16	107.95	50.8	15	11.12	17.16	17.5	FBA0202281

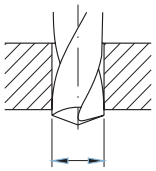
UNF Unified fine threads



HOLE TYPE

CS | BS 949 | 2B | T/S/B

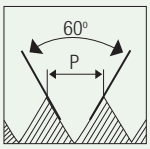




Unit : mm

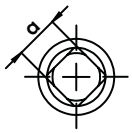
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1		L	L1	Ø D3	a	L3	Ø d1	
7/8"	14	119.06	56.4	17.71	13.18	18.75	20.4	FBA0202310
1"	12	130.18	63.5	20.33	15.13	20.34	23.25	FBA0202339
1.1/8"	12	137.8	65	22.79	16.96	21.7	26.5	FBA0202368
1.1/4"	12	145.8	65	25.96	19.34	25.2	29.5	FBA0202396
1.3/8"	12	153.8	76	28.17	20.99	26.7	32.75	FBA0202425
1.1/2"	12	161.8	76	31.35	23.38	28.2	36	FBA0202454

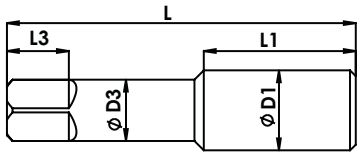
NPT American taper pipe threads

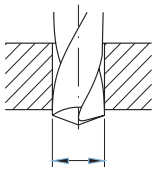


HOLE TYPE

CS | ANSI 94.9 | 2B | T/B



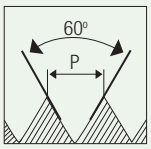




Unit : mm

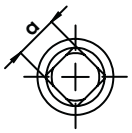
Nominal Diameter ØD	TPI	Overall Length L	Thread Length L1	Shank Diameter ØD3	Square Size a	Square Length L3	Tapping Drill Diameter Ø d1	EDP No.
1/8"	27	54	19.1	8.08	6.05	7.9	8.7	FBA0209891
1/4"	18	61.9	27	10.9	8.18	11.1	11.1	FBA0209919
3/8"	18	65.1	27	13.77	10.31	12.7	14.7	FBA0209947
1/2"	14	79.4	34.9	17.45	13.08	15.9	17.9	FBA0209975
3/4"	14	82.6	34.9	23.01	17.25	17.5	23.4	FBA0210031
1"	11.1/2	95.3	44.5	28.58	21.41	20.6	29.4	FBA0210059
1.1/4"	11.1/2	101.6	44.5	33.32	24.99	23.8	38.1	FBA0210087
1.1/2"	11.1/2	108	44.5	38.1	28.58	25.4	44	FBA0210115
2"	11.1/2	114.3	44.5	47.63	35.71	28.6	56.4	FBA0210143

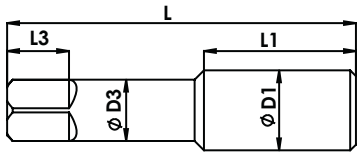
NPS National pipe threads special

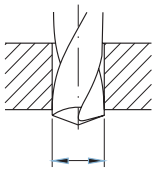


HOLE TYPE

CS | ANSI 949 | 2B | T/B



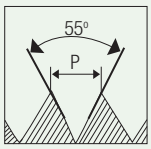




Unit : mm

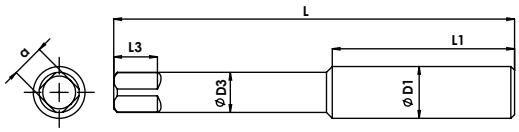
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1		L	L1	Ø D3	a	L3	Ø d1	
1/8"	27	53.97	19.05	8.08	5.96	7.64	9.1	FBA0209723
1/4"	18	61.91	26.98	10.91	8.07	10.81	11.9	FBA0209751
3/8"	18	65.09	26.99	13.78	10.2	12.4	15.25	FBA0209779
1/2"	14	79.38	34.92	17.46	12.97	15.58	19	FBA0209807
3/4"	14	82.55	34.92	22.99	17.14	17.16	27	FBA0209835
1"	11.5	95.25	44.45	28.56	21.3	20.34	30.5	FBA0209863

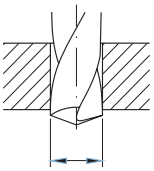
UNS Unified threads special



HOLE TYPE

CS | ANSI 949 | 2B | T/S/B

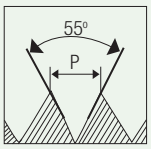




Unit : mm

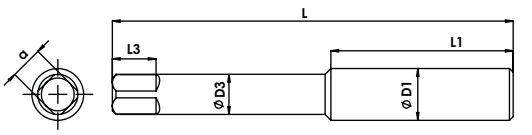
Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1		L	L1	Ø D3	a	L3	Ø d1	
1/8"	40	51.04	18.8	3.58	2.7	4.46	-	FBA0203547
5/32"	32	56.26	22.5	4.27	3.24	6.05	3.6	FBA0203631
5/32"	36	56.31	22.5	4.27	3.24	6.05	3.65	FBA0203659
7/32"	24	63.55	28.5	5.61	4.1	6.84	-	FBA0203743
7/32"	28	63.65	28.5	5.61	4.1	6.84	-	FBA0203715
7/32"	32	63.65	28.5	5.61	4.1	6.84	-	FBA0203771
3/16"	24	63.03	26.6	4.93	3.77	6.05	4.25	FBA0203799
3/16"	32	63.13	26.6	4.93	3.77	6.05	4.4	FBA0203829
1/4"	20	67.01	30.7	6.48	4.76	7.64	-	FBA0203857
1/4"	24	67.23	30.7	6.48	4.76	7.64	-	FBA0203885
1/4"	32	67.34	30.7	6.48	4.76	7.64	-	FBA0203913
5/16"	32	73.68	35.2	8.08	5.96	10.02	7.5	FBA0203941
11/16"	11	102.4	46	13.78	10.2	15.58	16.4	FBA0203969
11/16"	16	102.4	46	13.78	10.2	15.58	16.7	FBA0203997
7/8"	12	119.06	56.4	17.71	13.18	18.75	-	FBA0204053
7/8"	18	119.06	56.4	17.71	13.18	18.75	-	FBA0204025
1"	14	130.18	63.5	20.33	15.13	20.34	24.6	FBA0204081
1-1/8"	8	137.8	65	22.79	16.96	21.7	-	FBA0204137

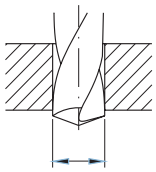
UNS Unified threads special



HOLE TYPE

CS | ANSI 949 | 2B | T/S/B





Unit : mm

Nominal Diameter	TPI	Overall Length	Thread Length	Shank Diameter	Square Size	Square Length	Tapping Drill Diameter	EDP No.
Ø D1		L	L1	Ø D3	a	L3	Ø d1	
1-1/4"	8	145.8	65	25.96	19.34	25.2	-	FBA0204165
1-3/8"	8	153.8	76	28.17	20.99	26.7	-	FBA0204193
1-1/2"	8	161.8	76	31.35	23.38	28.2	-	FBA0204221
1-5/8"	8	169.8	81	33.18	24.75	28.2	-	FBA0204249
1-3/4"	8	177.8	81	36.35	27.12	31.7	-	FBA0204277
1-3/4"	12	177.8	81	36.35	27.12	31.7	-	FBA0204305
1-7/8"	8	185.3	90.5	38.61	28.82	31.7	-	FBA0204333
2"	8	193.3	90.5	41.79	31.21	34.7	-	FBA0204389
2"	12	193.3	90.5	41.79	31.21	34.7	-	FBA0204417

Tap and die case sets

Description	EDP No	Content
Ref. No METRIC 1 M6-M20 SECS (20Pc)	FBI0200001	"Taps (Second): M6, M8, M10, M12, M14, M16, M20 Dies: 1"" OD- M6 TO M10 & 1.1/2"" OD - M12 TO M20 Accessories: Tap Wrenches - 2nos. & Die stock - 2nos."
Ref. No METRIC 2 M6-M20 T&B (28Pc)	FBI0200002	"Taps (Taper & Bottom): M6, M8, M10, M12, M14, M16, M20 Dies: 1"" OD- M6 TO M10 & 1.1/2"" OD - M12 TO M20 Accessories: Tap Wrenches - 2nos. & Die stock - 2nos."
Ref. No METRIC C119 M6-M20 T&B (37Pc)	FBI0200003	"Taps (Taper & Bottom): M6, M7, M8, M9, M10, M11, M12, M14, M16, M20 Dies: 1"" OD- M6 TO M10 & 1.1/2"" OD - M11 TO M20 Accessories: Tap Wrenches - 2nos. & Die stock - 2nos."
Ref. No METRIC 3 M3-M10 T&B (21Pc)	FBI0200004	"Taps (Taper & Bottom): M3, M4, M5, M6, M8, M10 Dies: 13/16"" OD- M3 TO M5 & 1"" OD - M6 TO M10 Accessories: Tap Wrenches - 1no. & Die stock - 2nos."
Ref. No METRIC 4P M2-M6 T&B (17Pc)	FBI0200005	"Taps (Taper & Bottom): M2, M3, M4, M5, M6 Dies: 13/16"" OD- M2 TO M6 Accessories: Tap Wrenches - 1no. & Die stock - 1no."
Ref. No METRIC 4S M2-M6 SET (22Pc)	FBI0200006	"Taps (Taper, Second & Bottom): M2, M3, M4, M5, M6 Dies: 13/16"" OD- M2 TO M6 Accessories: Tap Wrenches - 1no. & Die stock - 1no."
Ref. No METRIC 5F M6-M24 T&B (35Pc)	FBI0200007	"Taps (Taper & Bottom): MF6, MF8, MF10, MF12, MF14, MF16, MF18, MF20, MF22, MF24 Dies: 1"" OD- MF6 TO MF10 & 1.1/2"" OD - MF12 TO MF20 & 2"" OD -MF22 TO MF24 Accessories: Tap Wrenches - 2nos. & Die stock - 3nos."
Ref. No METRIC C120 M6-M24 T&B (44Pc)	FBI0200008	"Taps (Taper & Bottom): M6, M7, M8, M9, M10, M11, M12, M14, M16, M20, M22, M24 Dies: 1"" OD- M6 TO M10 & 1.1/2"" OD - M11 TO M16 & 2"" OD -M18 TO M24 Accessories: Tap Wrenches - 2nos. & Die stock - 3nos."
Ref. No METRIC 5C M6-M24 T&B (35Pc)	FBI0200009	"Taps (Taper & Bottom): M6, M8, M10, M12, M14, M16, M18, M20, M22, M24 Dies: 1"" OD- M6 TO M10 & 1.1/2"" OD - M12 TO M20 & 2"" OD -M22 TO M24 Accessories: Tap Wrenches - 2nos. & Die stock - 3nos."
Ref. No METRIC 6P M3-M12 T&B (24Pc)	FBI0200010	"Taps (Taper & Bottom): M3, M4, M5, M6, M8, M10, M12 Dies: 1"" OD- M3 TO M12 Accessories: Tap Wrenches - 2nos. & Die stock - 1nos."
Ref. No METRIC 6S M3-M12 SET (31Pc)	FBI0200011	"Taps (Taper, Second & Bottom): M3, M4, M5, M6, M8, M10, M12 Dies: 1"" OD- M3 TO M12 Accessories: Tap Wrenches - 2nos. & Die stock - 1nos."
Ref. No METRIC C114 M2-M12 T&B (36Pc)	FBI0200012	"Taps (Taper, Second & Bottom): M2, M3, M4, M5, M6, M7, M8, ,M9, M10, M11, M12 Dies: 13/16"" OD - M2 TO M6 & 1"" OD- M7 TO M12 Accessories: Tap Wrenches - 1nos. & Die stock - 2nos."
Ref. No METRIC 7 M6-M12 T&B (18Pc)	FBI0200013	"Taps (Taper, Second & Bottom): M6, M8, M10, M11, M12 Dies: 1"" OD - M6 TO M10 & 1.1/2"" OD- M11, M12 Accessories: Tap Wrenches - 1nos. & Die stock - 2nos."
Ref. No METRIC C118 M6-M12 T&B (23Pc)	FBI0200014	"Taps (Taper, Second & Bottom): M6, M7, M8, M9, M10, M11, M12 Dies: 1"" OD- M6 TO M12 Accessories: Tap Wrenches - 1nos. & Die stock - 1nos."
Ref. No METRIC 8 M3-M12 T&B (23Pc)	FBI0200015	"Taps (Taper, Second & Bottom): M3, M4, M5, M6, M8, M10, M12 Dies: 1"" OD- M3 TO M12 Accessories: Tap Wrenches - 1nos. & Die stock - 1nos."
Ref. No C37 1/4-3/4 BSW T&B (24Pc)	FBI0200016	"Taps (Taper, Second & Bottom): 1/4", 5/16",3/8", 7/16", 1/2", 5/8", 3/4" Dies: 1" OD- 1/4", 5/16", 3/8" & 1.1/2" OD - 7/16", 1/2", 5/8", 3/4" Accessories: Tap Wrenches - 1nos. & Die stock - 2nos."
Ref. No C37 1/4-3/4 BSF T&B (24Pc)	FBI0200017	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4" Dies: 1" OD- 1/4", 5/16", 3/8" & 1.1/2" OD - 7/16", 1/2", 5/8", 3/4" Accessories: Tap Wrenches - 1nos. & Die stock - 2nos."

Tap and die case sets

Description	EDP No	Content
Ref. No C37 1/4-3/4 NF T&B (24Pc)	FBI0200018	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4" Dies: 1"" OD- 1/4", 5/16", 3/8" & 1.1/2" OD - 7/16", 1/2", 5/8", 3/4" Accessories: Tap Wrenches - 1nos. & Die stock - 2nos."
Ref. No C37 1/4-3/4 NC T&B (24Pc)	FBI0200019	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4" Dies: 1"" OD- 1/4", 5/16", 3/8" & 1.1/2" OD - 7/16", 1/2", 5/8", 3/4" Accessories: Tap Wrenches - 1nos. & Die stock - 2nos."
Ref. No INCHES 9 1/4-3/4 BSW T&B (28Pc)	FBI0200020	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 1/2", 9/16", 5/8", 11/16", 3/4" Dies: 1" OD- 1/4", 5/16", 3/8" & 1.1/2" OD - 9/16", 5/8", 11/16", 3/4" Accessories: Tap Wrenches - 2nos. & Die stock - 2nos."
Ref. No INCHES 9 1/4-3/4 BSF T&B (28Pc)	FBI0200021	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 1/2", 9/16", 5/8", 11/16", 3/4" Dies: 1" OD- 1/4", 5/16", 3/8" & 1.1/2" OD - 9/16", 5/8", 11/16", 3/4" Accessories: Tap Wrenches - 2nos. & Die stock - 2nos."
Ref. No INCHES 9 1/4-3/4 NC T&B (28Pc)	FBI0200022	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 1/2", 9/16", 5/8", 11/16", 3/4" Dies: 1" OD- 1/4", 5/16", 3/8" & 1.1/2" OD - 9/16", 5/8", 11/16", 3/4" Accessories: Tap Wrenches - 2nos. & Die stock - 2nos."
Ref. No C31 1/8-1/2 BSW T&B (24Pc)	FBI0200023	"Taps (Taper, Second & Bottom): 1/8", 3/16", 1/4", 5/16", 3/8", 7/16",1/2" Dies: 13/16" OD- 1/8", 3/16" & 1" OD - 1/4", 5/16", 3/8", 7/16", 1/2" Accessories: Tap Wrenches - 1nos. & Die stock - 2nos."
Ref. No C82 1/4-1/2 BSW T&B (17Pc)	FBI0200024	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 7/16", 1/2" Dies: 1" OD- 1/4", 5/16", 3/8", 7/16", 1/2" Accessories: Tap Wrenches - 1nos. & Die stock - 1nos."
Ref. No C82 1/4-1/2 BSF T&B (17Pc)	FBI0200025	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 7/16", 1/2" Dies: 1" OD- 1/4", 5/16", 3/8", 7/16", 1/2" Accessories: Tap Wrenches - 1nos. & Die stock - 1nos."
Ref. No C82 1/4-1/2 NF T&B (17Pc)	FBI0200026	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 7/16", 1/2" Dies: 1" OD- 1/4", 5/16", 3/8", 7/16", 1/2" Accessories: Tap Wrenches - 1nos. & Die stock - 1nos."
Ref. No C82 1/4-1/2 NC T&B (17Pc)	FBI0200027	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 7/16", 1/2" Dies: 1" OD- 1/4", 5/16", 3/8", 7/16", 1/2" Accessories: Tap Wrenches - 1nos. & Die stock - 1nos."
Ref. No C52 3/16-1/2 BSW T&B (20Pc)	FBI0200028	"Taps (Taper, Second & Bottom): 3/16", 1/4", 5/16", 3/8", 7/16",1/2" Dies: 1" OD - 3/16", 1/4", 5/16", 3/8", 7/16", 1/2" Accessories: Tap Wrenches - 1nos. & Die stock - 1nos."
Ref. No C52 3/16-1/2 BSF T&B (20Pc)	FBI0200029	"Taps (Taper, Second & Bottom): 3/16", 1/4", 5/16", 3/8", 7/16",1/2" Dies: 1" OD - 3/16", 1/4", 5/16", 3/8", 7/16", 1/2" Accessories: Tap Wrenches - 1nos. & Die stock - 1nos."
Ref. No C85 1/4-1" BSW T&B (32Pc)	FBI0200030	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1" Dies: 1" OD- 1/4", 5/16", 3/8" & 1.1/2" OD - 7/16", 1/2", 5/8" & 2" OD- 3/4", 7/8", 1" Accessories: Tap Wrenches - 2nos. & Die stock - 3nos."
Ref. No C85 1/4-1" BSF T&B (32Pc)	FBI0200031	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1" Dies: 1" OD- 1/4", 5/16", 3/8" & 1.1/2" OD - 7/16", 1/2", 5/8" & 2" OD- 3/4", 7/8", 1" Accessories: Tap Wrenches - 2nos. & Die stock - 3nos."
Ref. No C85 1/4-1" NF T&B (32Pc)	FBI0200032	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1" Dies: 1" OD- 1/4", 5/16", 3/8" & 1.1/2" OD - 7/16", 1/2", 5/8" & 2" OD- 3/4", 7/8", 1" Accessories: Tap Wrenches - 2nos. & Die stock - 3nos."
Ref. No C85 1/4-1" NC T&B (32Pc)	FBI0200033	"Taps (Taper, Second & Bottom): 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1" Dies: 1" OD- 1/4", 5/16", 3/8" & 1.1/2" OD - 7/16", 1/2", 5/8" & 2" OD- 3/4", 7/8"", 1" Accessories: Tap Wrenches - 2nos. & Die stock - 3nos."

Adjustable tap wrenches (forged steel)

Tap Capacity		Overall Nominal Length		EDP No.
Inch	mm	Inch	mm	
1/16"- 1/4"	2 - 6	6- 1/4"	172	FBN2200009
1/8"- 1/2"	3 - 12	8-1/16"	205	FBN2200010
5/32"- 3/8"	4 - 10	8-1/16"	205	FBN2200011
3/16"- 1/2"	5 - 12	10-3/16"	258	FBN2200012
3/16"-5/8"	5 - 16	10-1/4"	264	FBN2200013
1/4"-3/4"	6 - 20	13-3/4"	350	FBN2200014
5/16"-1"	8 - 25	17-1/4"	435	FBN2200015
3/8"-1"	10 - 25	17-5/16"	440	FBN2200016
3/4"-1.1/2"	18 - 38	27"	685	FBN2200017
1"-2"	25 - 50	34-1/2"	875	FBN2200018

T-Handle tap wrenches

Tap Capacity		Overall Nominal Length		EDP No.
Inch	mm	Inch	mm	
1/16"-5/32"	2 - 4	2-3/8"	60	FBN2200019
5/32"-1/4"	4 - 6	2-11/16"	69	FBN2200020
3/16"-5/16	5 - 8	2-5/32"	80	FBN2200021
1/4"-1/2	6 - 12	3-1/2"	88	FBN2200022

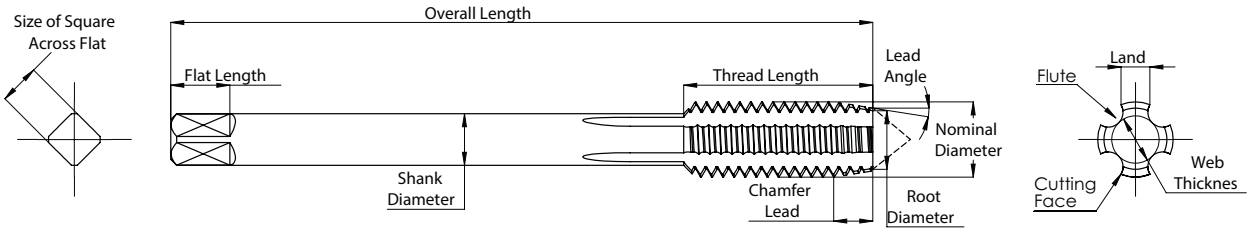
T-Handle tap wrenches rachet type

Tap Capacity		Overall Nominal Length		EDP No.
Inch	mm	Inch	mm	
5/32"-1/4"	4 - 6	2-11/16"	69	FBN2200023
1/4"-1/2"	6 - 12	3-1/2"	88	FBN2200024
5/32"-1/4"	4 - 6	10-1/4"	260	ABM000022
1/4"-1/2"	6 - 12	12"	305	ABM000023

Die stocks

Tap Capacity		Overall Nominal Length		EDP No.
Inch	mm	Inch	mm	
13/16"	20	6-3/4"	170	FBN2200001
1"	25	8-3/4"	222	FBN2200002
1.5/16"	33	10"	254	FBN2200003
1.1/2"	38	12-1/2"	317	FBN2200004
2"	50	15-9/16"	395	FBN2200005
2.1/4"	57	16.1/2"	420	FBN2200006
2.1/2"	63	19"	480	FBN2200007
3"	75	22-1/2"	572	FBN2200008
4"	100	35"	890	FBN2200028

Carbon steel taps nomenclature



Carbon taps application

AUTOMOBILE INDUSTRY

- Cylinder liner and cylinder head manufacturers
- General purpose applications in small workshops, garages, tool rooms and maintenance departments
- Motor cycle body frames: spatter cleaning and removing paint from threaded portion.
- Carburetor and speedometer manufacturers
- High speed steel dies are used in removing paint from threaded portion in rear axles of cars, trucks, buses, etc.
- Dies are used by gas valve manufacturers.

ENGINEERING INDUSTRY

- Air compressors / blower manufacturers
- Cooling towers and heat exchangers
- Brass component manufacturers
- Pipe and pipe fitting manufacturers.
- Sheet metal industry
- Thread dressing of diesel engine components
- Steel furniture manufacturers
- Steel window manufacturers
- Bus and truck body building workshops
- Textile industry
- Electrical industry

HOUSEHOLD APPLIANCE MANUFACTURERS

- Pressure cookers
- Fans, air coolers, air conditioners
- Flour mills, mixers and grinders

TOTEM®

High Performance Cutting Tools

HSS & CARBON STEEL ROUND & HEXAGONAL DIES

CONTENTS

ROUND SPLIT DIES

MATERIAL		THREAD FORM	STANDARD	TOLERANCE	PAGE
CS	HSS	M	BS1127	6G	8.004
CS	HSS	MF	BS1127	6G	8.006
CS	HSS	BSW	BS1127	6G	8.010
CS	HSS	BSF	BS1127	6G	8.012
CS	HSS	BA	BS1127	6G	8.014
CS	HSS	BSB	BS1127	6G	8.015
CS	HSS	ME	BS1127	6G	8.016
CS	HSS	WF	BS1127	6G	8.017
CS	HSS	BSP	BS1127	6G	8.018
CS	HSS	BSPT	BS1127	6G	8.019
CS	HSS	UNC	BS1127	2A	8.020
CS	HSS	UNF	BS1127	2A	8.022

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CONTENTS

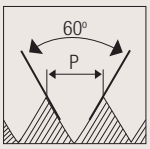
ROUND SOLID DIES

MATERIAL		THREAD FORM	STANDARD	TOLERANCE	PAGE
CS	HSS	NPT	BS1127	2A	8.024
CS	HSS	M	BS1127	6G	8.025
CS	HSS	MF	BS1127	6G	8.026

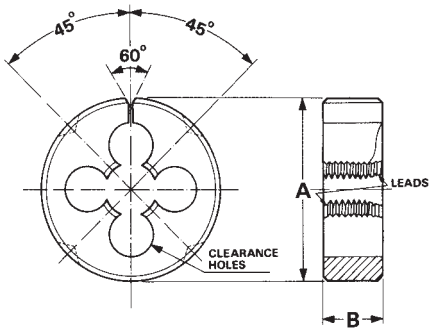
HEXAGONAL DIES

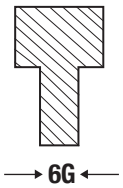
MATERIAL		THREAD FORM	STANDARD	TOLERANCE	PAGE
CS	HSS	M	BS1127	6G	8.028
CS	HSS	MF	BS1127	6G	8.029
CS	HSS	BSW	BS1127	6G	8.031
CS	HSS	BSF	BS1127	6G	8.032
CS	HSS	BSP	BS1127	6G	8.033
CS	HSS	BSPT	BS1127	6G	8.034
CS	HSS	UNC	BS1127	2A	8.035
CS	HSS	UNF	BS1127	2A	8.036
CS	HSS	NPT	BS1127	2A	8.037

M Metric coarse threads



HSS | CS | BS 1127 | 6G

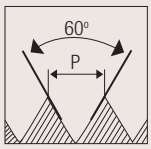




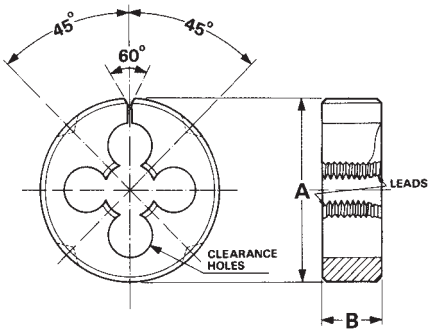
Unit : mm

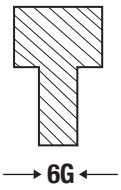
Nominal Diameter	Pitch	Outer Diameter	Thickness	Clearance Holes	Threading Diameter	HSS	Carbon Steel
ØD	p	A	B			EDP No	EDP No
M 2	0.4	13/16"	1/4"	3	1.96	FBC0201098	FBB0201147
M 3	0.5	13/16"	1/4"	3	2.95	FBC0201150	FBB0201196
M 4	0.7	13/16"	1/4"	3	3.95	FBC0201196	FBB0201248
M 5	0.8	13/16"	1/4"	3	4.95	FBC0201253	FBB0201310
M 6	1	13/16"	1/4"	4	5.93	FBC0201334	FBB0201371
M 7	1	13/16"	1/4"	4	6.93	FBC0201385	FBB0201407
M 6	1	1"	3/8"	4	5.93	FBC0201346	FBB0201380
M 7	1	1"	3/8"	4	6.93	FBC0201391	FBB0201416
M 8	1.25	1"	3/8"	4	7.92	FBC0201432	FBB0201456
M 9	1.25	1"	3/8"	4	8.93	FBC0201470	FBB0201496
M 10	1.5	1"	3/8"	4	9.91	FBC0201538	FBB0201560
M 12	1.75	1.1/2"	1/2"	4	11.90	FBC0201663	FBB0201697
M 14	2	1.1/2"	1/2"	5	13.89	FBC0201734	FBB0201762
M 16	2	1.1/2"	1/2"	5	15.89	FBC0201803	FBB0201826
M 18	2.5	1.1/2"	1/2"	6	17.88	FBC0201838	FBB0201880
M 20	2.5	1.1/2"	1/2"	6	19.88	FBC0201904	FBB0201926

M Metric coarse threads



HSS | CS | BS 1127 | 6G

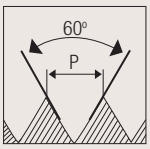




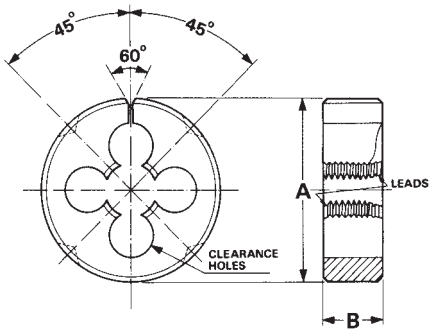
Unit : mm

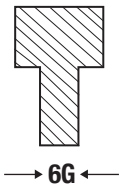
Nominal Diameter	Pitch	Outer Diameter	Thickness	Clearance Holes	Threading Diameter	HSS	Carbon Steel
ØD	p	A	B			EDP No	EDP No
M 20	2.5	2"	5/8"	5	19.88	FBC0201910	FBB0201931
M 22	2.5	2"	5/8"	5	21.88	FBC0201934	FBB0201949
M 24	3	2"	5/8"	5	23.88	FBC0201958	FBB0201968
M 27	3	2.1/4"	11/16"	6		FBM2300071	FBM2300344
M 30	3.5	2.1/4"	11/16"	6		FBM2300084	FBM2300364
M 33	3.5	2.1/4"	11/16"	6		FBM2300094	FBM2300377
M 36	4	2.1/2"	7/8"	6		FBM2300106	FBM2300391
M 36	4	3"	7/8"	6		FBM2300107	FBM2300392
M 39	4	3"	7/8"	6		FBM2300113	FBM2300402
M 42	4.5	3"	7/8"	6		FBM2300120	FBM2300408
M 48	5	4"	1"	6		FBM2300130	FBM2300413

MF Metric fine threads



HSS | CS | BS 1127 | 6G

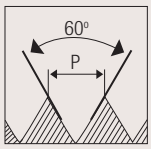




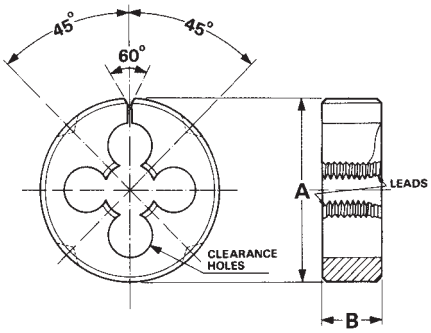
Unit : mm

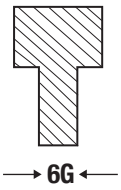
Nominal Diameter	Pitch	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD	p	A	B			EDP No	EDP No
M 1.6	0.35	13/16"	1/4"	3	1.56	FBC0201092	FBB0201143
M 2.2	0.45	13/16"	1/4"	3	2.15	FBC0201109	FBB0201160
M 2.3	0.4	13/16"	1/4"	3	2.25	FBC0201115	FBB0201169
M 2.5	0.45	13/16"	1/4"	3	2.45	FBC0201121	FBB0201173
M 2.6	0.45	13/16"	1/4"	3	2.55	FBC0201132	FBB0201182
M 3	0.6	13/16"	1/4"	3	2.96	FBC0201161	FBB0201209
M 3.5	0.6	13/16"	1/4"	3	3.46	FBC0201167	FBB0201218
M 4	0.5	13/16"	1/4"	3	3.95	FBC0201184	FBB0201231
M 4	0.75	13/16"	1/4"	3	3.95	FBC0201212	FBB0201261
M 4.5	0.5	13/16"	1/4"	3	4.45	FBC0201218	FBB0201270
M 4.5	0.75	13/16"	1/4"	3	4.45	FBC0201224	FBB0201275
M 5	0.5	13/16"	1/4"	3	4.95	FBC0201235	FBB0201284
M 5	0.75	13/16"	1/4"	3	4.95	FBC0201241	FBB0201297
M 5	0.9	13/16"	1/4"	3	4.95	FBC0201274	FBB0201323
M 5.5	0.5	13/16"	1/4"	4	5.45	FBC0201280	FBB0201331
M 5.5	0.9	13/16"	1/4"	4	5.45	FBC0201292	FBB0201335
M 6	0.5	13/16"	1/4"	4	5.95	FBC0201298	FBB0201343
M 6	0.75	13/16"	1/4"	4	5.95	FBC0201310	FBB0201353
M 7	0.75	13/16"	1/4"	4	6.95	FBC0201373	FBB0201393

MF Metric fine threads



HSS | CS | BS 1127 | 6G

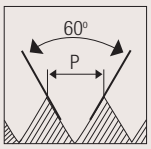




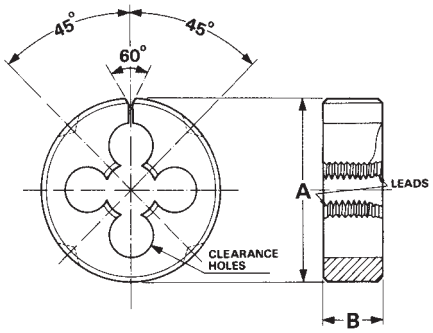
Unit : mm

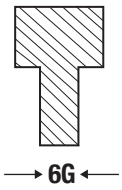
Nominal Diameter	Pitch	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD	p	A	B			EDP No	EDP No
M 6	0.5	1"	3/8"	4	5.95	FBC0201304	FBB0201348
M 6	0.75	1"	3/8"	4	5.95	FBC0201316	FBB0201358
M 7	0.75	1"	3/8"	4	6.95	FBC0201379	FBB0201398
M 8	0.75	1"	3/8"	4	7.97	FBC0201408	FBB0201429
M 8	1	1"	3/8"	4	7.93	FBC0201420	FBB0201434
M 9	0.75	1"	3/8"	4	8.95	FBC0201453	FBB0201482
M 9	1	1"	3/8"	4	8.93	FBC0201464	FBB0201487
M 10	0.5	1"	3/8"	4	9.93	FBC0201481	FBB0202548
M 10	0.75	1"	3/8"	4	9.95	FBC0201487	FBB0201509
M 10	1	1"	3/8"	4	9.93	FBC0201499	FBB0201518
M 10	1.25	1"	3/8"	4	9.93	FBC0201516	FBB0201535
M 11	1	1.1/2"	1/2"	5	10.93	FBC0201554	FBB0201597
M 11	1.5	1.1/2"	1/2"	4	10.91	FBC0201576	FBB0201613
M 12	1	1.1/2"	1/2"	5	11.93	FBC0201604	FBB0201634
M 12	1.25	1.1/2"	1/2"	5	11.92	FBC0201620	FBB0201647
M 12	1.5	1.1/2"	1/2"	4	11.91	FBC0201636	FBB0201668
M 14	1	1.1/2"	1/2"	5	13.93	FBC0201685	FBB0201726
M 14	1.25	1.1/2"	1/2"	5	13.92	FBC0201696	FBB0201731

MF Metric fine threads



HSS | CS | BS 1127 | 6G

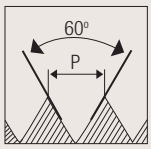




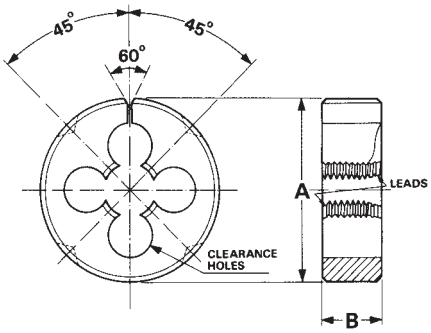
Unit : mm

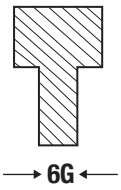
Nominal Diameter	Pitch	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD	p	A	B			EDP No	EDP No
M 14	1.5	1.1/2"	1/2"	5	13.91	FBC0201707	FBB0201744
M 15	1.5	1.1/2"	1/2"	5	14.91	FBC0201757	FBB0201786
M 16	1	1.1/2"	1/2"	5	15.93	FBC0201763	FBB0201795
M 16	1.5	1.1/2"	1/2"	5	15.91	FBC0201781	FBB0201813
M 18	1.5	1.1/2"	1/2"	6	17.91	FBC0201820	FBB0201861
M 20	1.5	1.1/2"	1/2"	6	19.91	FBC0201874	FBB0201902
M 20	1.5	2"	5/8"	5	19.91	FBC0201880	FBB0201907
M 22	1.5	2"	5/8"	6	21.91	FBC0201922	FBB0201940
M 24	1	2"	5/8"	6	23.93	FBC0201940	FBB0201953
M 24	1.5	2"	5/8"	6	23.90	FBC0201946	FBB0201958
M 25	1.5	2"	5/8"	6	24.91	FBC0201970	FBB0201977
M 26	1.5	2"	5/8"	6	25.90	FBC0201988	FBB0201986
M 27	1.5	2"	5/8"	6+6	26.9	FBC0202000	FBB0202641
M 28	1.5	2"	5/8"	6+6	27.9	FBC0202012	FBB0202711
M 30	1.5	2"	5/8"	6+6	29.9	FBC0202024	FBB0201991
M 32	1.5	2.1/4"	11/16"	6+6		FBM2300087	FBM2300368
M 33	1.5	2.1/4"	11/16"	6+6		FBM2300091	FBM2300595

MF Metric fine threads



HSS | CS | BS 1127 | 6G

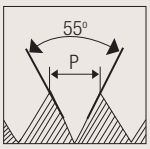




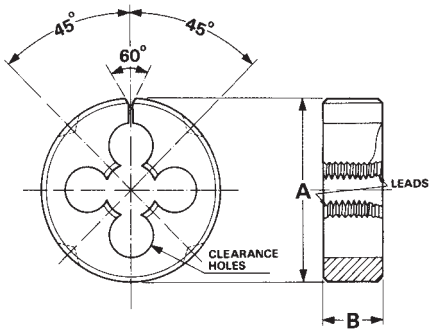
Unit : mm

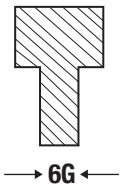
Nominal Diameter	Pitch	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD	p	A	B			EDP No	EDP No
M 34	1.5	2.1/2"	7/8"	6		FBM2300097	FBM2300381
M 35	1.5	2.1/2"	7/8"	6		FBM2300100	FBM2300383
M 36	1.5	2.1/2"	7/8"	6		FBM2300102	FBM2300385
M 40	1.5	2.1/2"	7/8"	6		FBM2300114	FBM2300404
M 34	1.5	3"	7/8"	6		FBM2300098	FBM2300382
M 35	1.5	3"	7/8"	6		FBM2300101	FBM2300384
M 36	1.5	3"	7/8"	6		FBM2300103	FBM2300386
M 38	1.5	3"	7/8"	6		FBM2300109	FBM2300396
M 45	1.5	3"	7/8"	6		FBM2300123	-
M 45	1.5	4"	1"	6		FBM2300124	FBM2300410
M 46	1.5	4"	1"	6		FBM2300126	FBM2300411
M 48	1.5	4"	1"	8		FBM2300127	FBM2300412
M 50	1.5	4"	1"	6		FBM2300131	FBM2300414
M 52	1.5	4"	1"	6		FBM2300132	FBM2300415
M 55	1.5	4"	1"	6		FBM2300133	FBM2300416
M 60	1.5	4"	1"	6		FBM2300134	FBM2300418

BSW Whitworth coarse threads



HSS | CS | BS 1127 | 6G

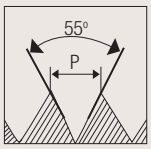




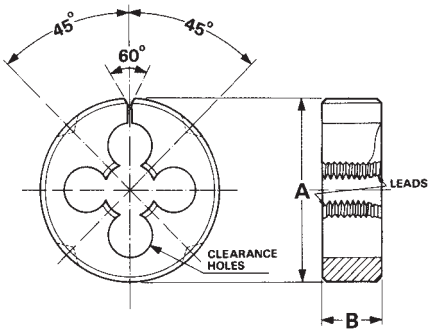
Unit : mm

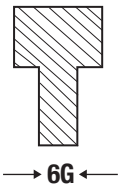
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
1/16"	60	13/16"	1/4"	3	1.56	FBC0200001	FBB0200001
3/32"	48	13/16"	1/4"	3	2.35	FBC0200007	FBB0200005
1/8"	40	13/16"	1/4"	3	3.14	FBC0200013	FBB0200017
5/32"	32	13/16"	1/4"	3	3.93	FBC0200019	FBB0200034
3/16"	24	13/16"	1/4"	3	4.72	FBC0200036	FBB0200051
7/32"	24	13/16"	1/4"	4	5.51	FBC0200047	FBB0200064
1/4"	20	13/16"	1/4"	4	6.31	FBC0200059	FBB0200081
1/4"	20	1"	3/8"	3	6.31	FBC0200071	FBB0200090
9/32"	20	1"	3/8"	4	7.10	FBC0200089	FBB0200111
5/16"	18	1"	3/8"	4	7.88	FBC0200101	FBB0200119
3/8"	16	1"	3/8"	4	9.47	FBC0200128	FBB0200144
7/16"	14	1.1/2"	1/2"	4	11.05	FBC0200159	FBB0200173
1/2"	12	1.1/2"	1/2"	4	12.63	FBC0200181	FBB0200197
9/16"	12	1.1/2"	1/2"	5	14.21	FBC0200198	FBB0200210
5/8"	11	1.1/2"	1/2"	5	15.80	FBC0200210	FBB0200223
11/16"	11	1.1/2"	1/2"	6	17.39	FBC0200221	FBB0200232
3/4"	10	1.1/2"	1/2"	6	18.97	FBC0200233	FBB0200244

BSW Whitworth coarse threads



HSS | CS | BS 1127 | 6G

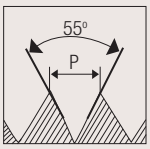




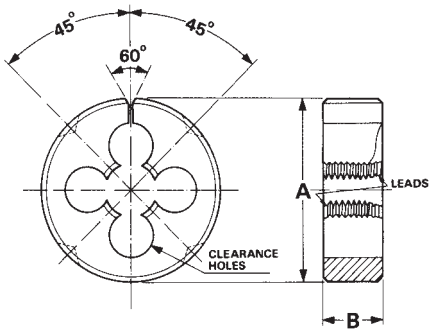
Unit : mm

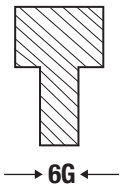
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
7/8"	9	2"	5/8"	5	22.14	FBC0200245	FBB0200253
1"	8	2"	5/8"	6	25.30	FBC0200251	FBB0200257
1.1/8"	7	2.1/4"	11/16"	6		FBM2300001	FBM2300297
1.1/4"	7	2.1/4"	11/16"	6		FBM2300004	FBM2300299
1.1/4"	7	2.1/2"	7/8"	6		FBM2300005	FBM2300300
1.3/8"	6	2.1/2"	7/8"	6		FBM2300010	FBM2300301
1.1/2"	6	2.1/2"	7/8"	6		FBM2300012	FBM2300302
1.1/2"	6	3"	7/8"	6		FBM2300013	FBM2300303
1.3/4"	5	4"	1"	6		FBM2300014	FBM2300304
2"	4.5	4"	1"	6		FBM2300015	FBM2300305

BSF Whitworth fine threads



HSS | CS | BS 1127 | 6G

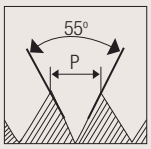




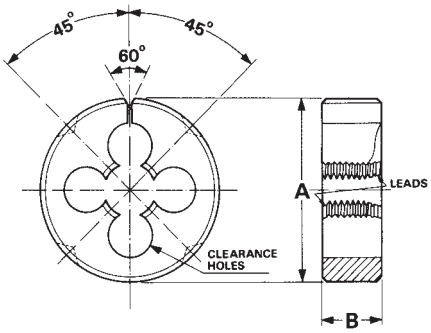
Unit : mm

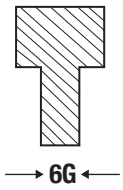
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
3/16"	32	13/16"	1/4"	3	4.73	FBC0200257	FBB0200261
7/32"	28	13/16"	1/4"	4	5.51	FBC0200263	FBB0200270
1/4"	26	13/16"	1/4"	4	6.31	FBC0200269	FBB0200279
1/4"	26	1"	3/8"	4	6.31	FBC0200275	FBB0200283
9/32"	26	1"	3/8"	4	7.1	FBC0200281	FBB0200299
5/16"	22	1"	3/8"	4	7.89	FBC0200287	FBB0200303
3/8"	20	1"	3/8"	4	9.47	FBC0200293	FBB0200320
7/16"	18	1.1/2"	1/2"	4	11.05	FBC0200314	FBB0200341
1/2"	16	1.1/2"	1/2"	4	12.63	FBC0200330	FBB0200349
9/16"	16	1.1/2"	1/2"	5	14.22	FBC0200336	FBB0200358
5/8"	14	1.1/2"	1/2"	5	15.80	FBC0200342	FBB0200366
3/4"	12	1.1/2"	1/2"	5	18.97	FBC0200353	FBB0200383
7/8"	11	2"	5/8"	5	22.14	FBC0200359	FBB0200391
1"	10	2"	5/8"	6	25.30	FBC0200365	FBB0200395
1.1/8"	9	2.1/4"	11/16"	6		FBM2300016	FBM2300306

BSF Whitworth fine threads



HSS | CS | BS 1127 | 6G

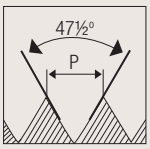




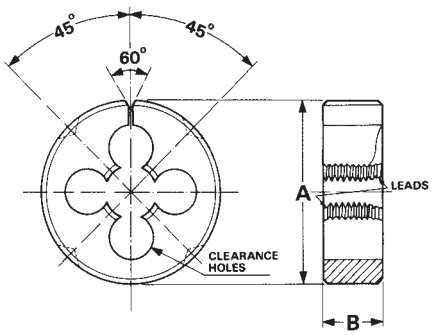
Unit : mm

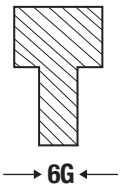
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
1.1/4"	9	2.1/4"	11/16"	6		FBM2300020	FBM2300308
1.3/8"	8	2.1/2"	7/8"	6		FBM2300025	FBM2300310
1.1/2"	8	2.1/2"	7/8"	6		FBM2300027	FBM2300311
1.1/2"	8	3"	7/8"	6		FBM2300028	FBM2300312
1.3/4"	7	4"	1"	6		FBM2300029	FBM2300313
2"	7	4"	1"	6		FBM2300030	–

BA British association threads



HSS | CS | BS 1127 | 6G

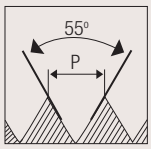




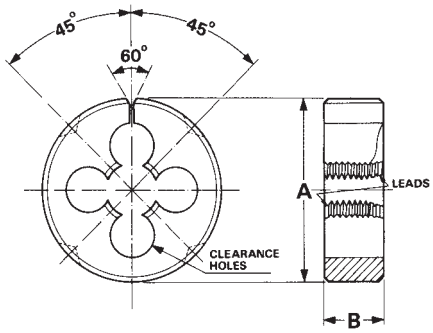
Unit : mm

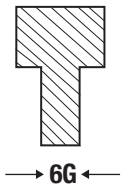
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
# 12	90.9	13/16"	1/4"	3	1.27	FBC0202220	FBB0202153
# 11	81.9	13/16"	1/4"	3	1.47	FBC0202226	FBB0202158
# 10	72.6	13/16"	1/4"	3	1.67	FBC0202232	FBB0202163
# 9	65.1	13/16"	1/4"	3	1.87	FBC0202238	FBB0202168
# 8	59.1	13/16"	1/4"	3	2.16	FBC0202244	FBB0202173
# 7	52.9	13/16"	1/4"	3	2.46	FBC0202250	FBB0202178
# 6	47.9	13/16"	1/4"	3	2.76	FBC0202256	FBB0202183
# 5	43	13/16"	1/4"	3	3.15	FBC0202262	FBB0202188
# 4	38.5	13/16"	1/4"	3	3.55	FBC0202268	FBB0202193
# 3	34.8	13/16"	1/4"	3	4.04	FBC0202274	FBB0202198
# 2	31.4	13/16"	1/4"	3	4.64	FBC0202280	FBB0202203
# 1	28.2	13/16"	1/4"	4	5.23	FBC0202286	FBB0202208
# 0	25.4	13/16"	1/4"	4	5.92	FBC0202292	FBB0202213

BSB British brass threads



HSS | CS | BS 1127 | 6G

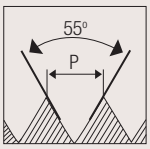




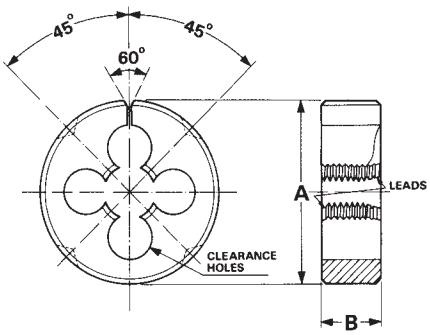
Unit : mm

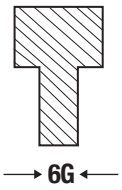
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
1/4"	26	13/16"	1/4"	4	6.31	FBC0200371	FBB0200399
1/4"	26	1"	3/8"	4	6.31	FBC0200377	FBB0200403
5/16"	26	1"	3/8"	4	7.89	FBC0200383	FBB0200416
3/8"	26	1"	3/8"	4	9.48	FBC0200389	FBB0200425
7/16"	26	1.1/2"	1/2"	5	11.06	FBC0200395	FBB0200442
1/2"	26	1.1/2"	1/2"	5	12.64	FBC0200401	FBB0200455
9/16"	26	1.1/2"	1/2"	5	14.23	FBC0200407	FBB0200468
5/8"	26	1.1/2"	1/2"	5	15.81	FBC0200413	FBB0200476
3/4"	26	1.1/2"	1/2"	6	18.98	FBC0200419	FBB0200485

ME Model engineer threads



HSS | CS | BS 1127 | 6G

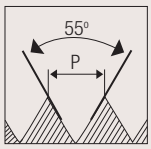




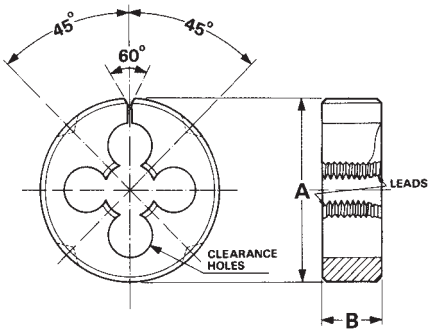
Unit : mm

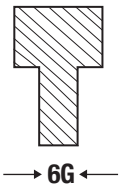
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
1/8"	40	13/16"	1/4"	3	3.14	FBC0200906	FBB0200888
5/32"	32	13/16"	1/4"	3	3.93	FBC0200912	FBB0200892
3/16"	40	13/16"	1/4"	3	4.72	FBC0200918	FBB0200897
7/32"	40	13/16"	1/4"	4	5.51	FBC0200924	FBB0200902
1/4"	40	13/16"	1/4"	4	6.31	FBC0200930	FBB0200911
1/4"	40	1"	3/8"	4	6.31	FBC0202482	FBB0200916
9/32"	32	1"	3/8"	4	7.10	FBC0200936	FBB0200928
5/16"	32	1"	3/8"	4	7.90	FBC0200948	FBB0200946
3/8"	32	1"	3/8"	4	9.48	FBC0200954	FBB0200953

WF Whitworth fine special threads



HSS | CS | BS 1127 | 6G

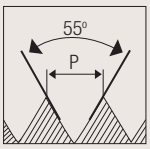




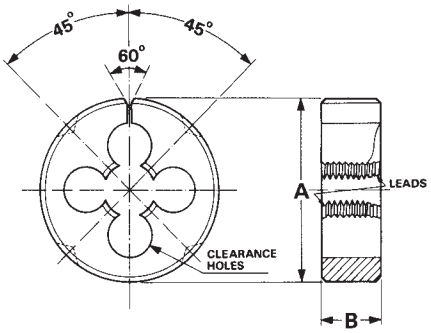
Unit : mm

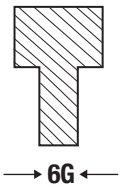
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
11/64"	40	13/16"	1/4"	3	4.33	FBC0201032	FBB0201035
3/16'	28	13/16"	1/4"	3	4.73	FBC0201050	FBB0201045
13/64"	24	13/16"	1/4"	3	5.13	FBC0201038	FBB0201054
15/64"	28	13/16"	1/4"	4	5.92	FBC0201044	FBB0201068
1/4"	32	1"	3/8"	4	6.31	–	FBB0201083
9/32"	40	1"	3/8"	4	7.11	–	FBB0201087
5/16"	40	1"	3/8"	4	7.9	–	FBB0201091
3/8"	40	1"	3/8"	4	9.48	–	FBB0201095
7/16"	40	1.1/2"	1/2"	5	11.07	–	FBB0201107
1/2"	40	1.1/2"	1/2"	5	12.64	–	FBB0201131

BSP British standard pipe threads



HSS | CS | BS 1127 | 6G

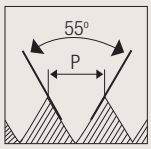




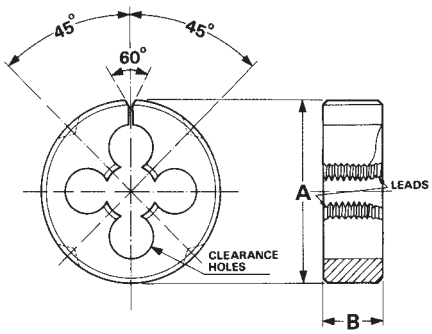
Unit : mm

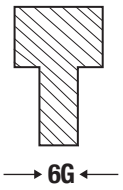
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
1/8"	28	1"	3/8"	4	9.68	FBC0202117	FBB0202071
1/4"	19	1.1/2"	1/2"	5	13.11	FBC0202138	FBB0202088
3/8"	19	1.1/2"	1/2"	5	16.6	FBC0202149	FBB0202097
1/2"	14	1.1/2"	1/2"	6	20.89	FBC0202160	FBB0202106
1/2"	14	2"	5/8"	5	20.89	FBC0202166	FBB0202111
5/8"	14	2"	5/8"	6	22.84	FBC0202172	FBB0202116
3/4"	14	2"	5/8"	6	26.36	FBC0202178	FBB0202120
7/8"	14	2"	5/8"	6+6	30.11	FBC0202184	FBB0202125
1"	11	2"	5/8"	6+6	33.16	FBC0202190	FBB0202129
1.1/8"	11	2.1/2"	7/8"	6		FBM2300139	FBM2300426
1.1/4"	11	2.1/2"	7/8"	6		FBM2300140	FBM2300427
1.1/4"	11	3"	7/8"	6		FBM2300141	FBM2300428
1.3/8	11	4"	1"			FBM2300142	FBM2300430
1.1/2"	11	4"	1"	6		FBM2300144	FBM2300431
1.3/4"	11	4"	1"			FBM2300145	FBM2300432
2"	11	4"	1"	6		FBM2300146	FBM2300433

BSPT British standard taper pipe threads



HSS | CS | BS 1127 | 6G

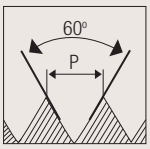




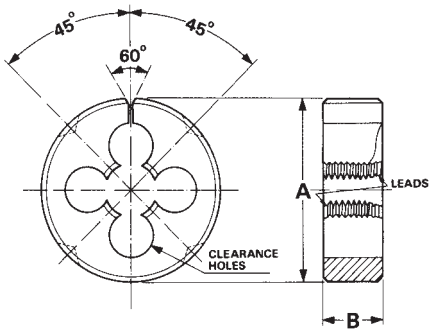
Unit : mm

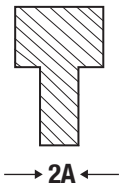
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
1/8"	28	1"	10	4		FBM2300147	FBM2300434
1/8"	28	1.1/2"	10	4		FBM2300148	FBM2300435
1/4"	19	1.1/2"	14	4		FBM2300149	FBM2300437
3/8"	19	1.1/2"	14	5		FBM2300150	FBM2300439
3/8"	19	2"	14	5		FBM2300151	FBM2300440
1/2"	14	2"	19	5		FBM2300152	FBM2300441
3/4"	14	2"	20	6		FBM2300153	FBM2300442
3/4"	14	2.1/2"	22	6		FBM2300154	FBM2300443
1"	11	2.1/2"	25	6		FBM2300156	FBM2300444
1"	11	3"	25	6		FBM2300157	FBM2300445
1.1/4"	11	3"	25	6		FBM2300159	FBM2300446
1.1/2"	11	4"	25	6		FBM2300160	FBM2300447
2"	11	4"	27	6		FBM2300161	FBM2300448

UNC Unified coarse threads



HSS | CS | BS 1127 | 2A

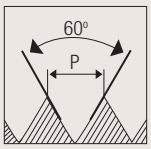




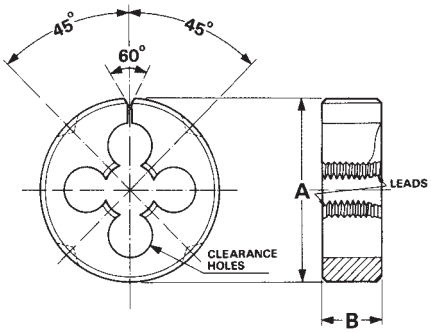
Unit : mm

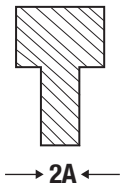
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
# 4	40	13/16"	1/4"	3	2.83	FBC0200682	FBB0200706
# 5	40	13/16"	1/4"	3	3.15	FBC0200688	FBB0200714
# 6	32	13/16"	1/4"	3	3.48	FBC0200704	FBB0200722
# 8	32	13/16"	1/4"	3	4.14	FBC0200715	FBB0200730
# 10	24	13/16"	1/4"	3	4.79	FBC0200726	FBB0200738
# 12	24	13/16"	1/4"	4	5.45	FBC0200742	FBB0200750
1/4"	20	13/16"	1/4"	4	6.31	FBC0200747	FBB0200758
1/4"	20	1"	3/8"	4	6.31	FBC0200753	FBB0200766
5/16"	18	1"	3/8"	4	7.89	FBC0200769	FBB0200782
3/8"	16	1"	3/8"	4	9.47	FBC0200791	FBB0200799
7/16"	14	1.1/2"	1/2"	4	11.05	FBC0200817	FBB0200824
1/2"	13	1.1/2"	1/2"	4	12.62	FBC0200843	FBB0200840
9/16"	12	1.1/2"	1/2"	5	14.21	FBC0200859	FBB0200852
5/8"	11	1.1/2"	1/2"	5	15.79	FBC0200865	FBB0200860
3/4"	10	1.1/2"	1/2"	6	18.96	FBC0200882	FBB0200872

UNC Unified coarse threads



HSS | CS | BS 1127 | 2A

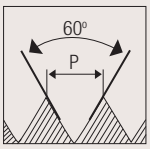




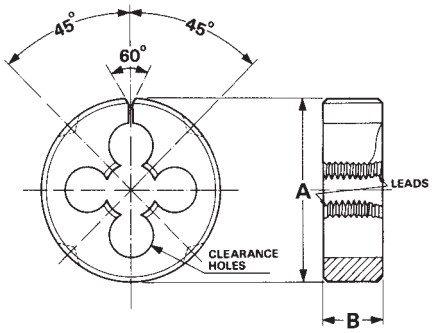
Unit : mm

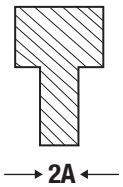
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
7/8"	9	2"	5/8"	5	22.14	FBC0200894	FBB0200880
1"	8	2"	5/8"	6	25.3	FBC0200900	FBB0200884
1.1/8"	7	2.1/4"	11/16"	6		FBM2300048	FBM2300322
1.1/4"	7	2.1/4"	11/16"	6		FBM2300050	FBM2300325
1.3/8"	6	2.1/2"	7/8"	6		FBM2300054	FBM2300327
1.1/2"	6	2.1/2"	7/8"	6		FBM2300056	FBM2300329
1.1/2"	6	3"	7/8"	6		FBM2300057	FBM3000530
1.3/4"	5	4"	1"	8		FBM2300058	FBM2300330
2"	4.5	4"	1"	6		FBM2300059	FBM2300331

UNF Unified fine threads



HSS | CS | BS 1127 | 2A

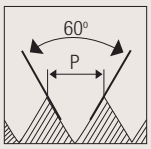




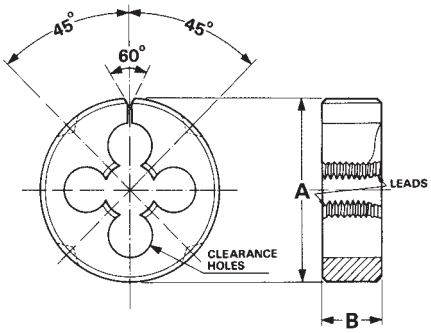
Unit : mm

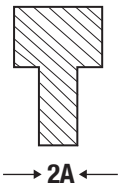
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
# 3	56	13/16"	1/4"	3		FBC0200437	FBB0200498
# 4	48	13/16"	1/4"	3	2.83	FBC0200443	FBB0200502
# 5	44	13/16"	1/4"	3	3.16	FBC0200449	FBB0200506
# 6	40	13/16"	1/4"	3	3.48	FBC0200465	FBB0200514
# 8	36	13/16"	1/4"	3	4.14	FBC0200476	FBB0200522
# 10	32	13/16"	1/4"	3	4.8	FBC0200487	FBB0200530
# 12	28	13/16"	1/4"	4	5.46	FBC0200498	FBB0200542
1/4"	28	13/16"	1/4"	4	6.32	FBC0200515	FBB0200550
1/4"	28	1"	3/8"	4	6.32	FBC0200527	FBB0200558
5/16"	24	1"	3/8"	4	7.9	FBC0200538	FBB0200578
3/8"	24	1"	3/8"	4	9.48	FBC0200560	FBB0200599
7/16"	20	1.1/2"	1/2"	4	11.06	FBC0200586	FBB0200627
1/2"	20	1.1/2"	1/2"	5	12.65	FBC0200607	FBB0200647
9/16"	18	1.1/2"	1/2"	5	14.23	FBC0200618	FBB0200660
5/8"	18	1.1/2"	1/2"	5	15.82	FBC0200629	FBB0200669
3/4"	16	1.1/2"	1/2"	6	18.99	FBC0200646	FBB0200682

UNF Unified fine threads



HSS | CS | BS 1127 | 2A

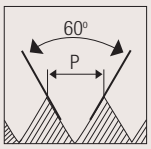




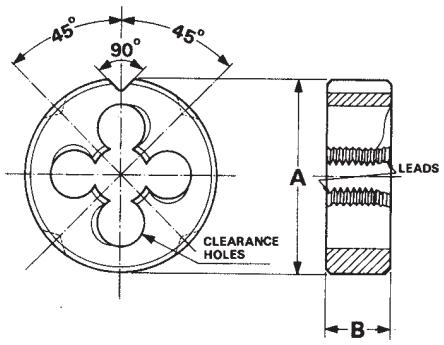
Unit : mm

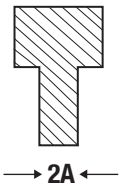
Nominal Diameter	Pitch	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD	TPI	A	B			EDP No	EDP No
7/8"	14	2"	5/8"	5	22.13	FBC0200658	FBB0200690
1"	12	2"	5/8"	6	25.31	FBC0200664	FBB0200694
1.1/8"	12	2.1/4"	11/16"	6		FBM2300034	FBM2300314
1.1/4"	12	2.1/4"	11/16"	6		FBM2300037	FBM2300317
1.3/8"	12	2.1/2"	7/8"	6		FBM2300041	–
1.1/2"	12	2.1/2"	7/8"	6		FBM2300043	FBM2300319
1.1/2"	12	3"	7/8"	6		FBM2300044	FBM2300320
1.3/4"	14	4"	1"	6		FBM2300046	FBM2300647
2"	-	4"	1"	6		FBM2300047	FBM2300321

NPT National taper pipe threads



HSS | CS | BS 1127 | 2A

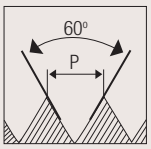




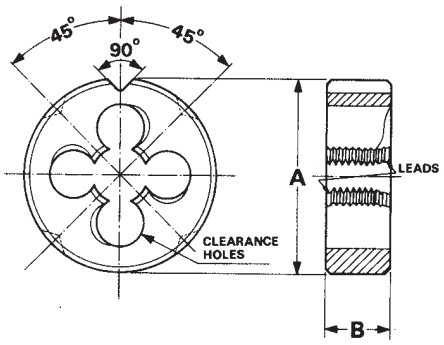
Unit : mm

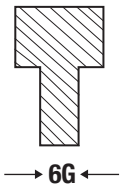
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS	Carbon Steel
ØD		A	B			EDP No	EDP No
1/8"	27	1"	10	4		FBM2300162	FBM2300449
1/8"	27	1.1/2"	10	4		FBM2300163	FBM2300450
1/4"	18	1.1/2"	15	4		FBM2300164	FBM2300453
3/8"	18	1.1/2"	15	5		FBM2300165	FBM2300456
3/8"	18	2"	14	5		FBM2300166	FBM2300457
1/2"	14	2"	19	5		FBM2300167	FBM2300459
3/4"	14	2"	20	6		FBM2300168	FBM2300461
3/4"	14	2.1/2"	22	6		FBM2300169	FBM2300462
1"	11.1/2	2.1/2"	25	6		FBM2300171	FBM2300464
1"	11.1/2	3"	25	6		FBM2300172	FBM2300465
1.1/4"	11.1/2	3"	25	6		FBM2300173	FBM2300467
1.1/2"	11.1/2	4"	25	6		FBM2300174	FBM2300468
2"	11.1/2	4"	27	6		FBM2300175	FBM2300469

M Metric coarse threads



HSS | DIN 22568 | 6G

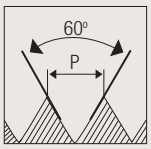




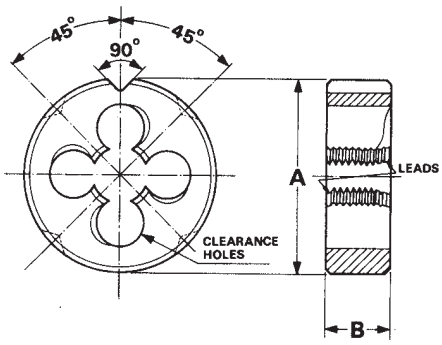
Unit : mm

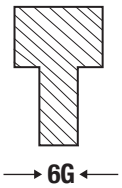
Nominal Diameter ØD	TPI	Outer Diameter A	Thickness B	No. Clearance Hole	Threading Diameter	HSS EDP No
M3	0.5	20	5	3	2.92	FBC0202397
M3.5	0.6	20	5	3	3.41	FBC3202399
M4	0.7	20	5	3	3.9	FBC0202401
M4.5	0.75	20	7	3	4.4	FBC3202404
M5	0.8	20	7	3	4.9	FBC0202408
M6	1	20	7	4	5.88	FBC0202414
M7	1	25	9	4	6.88	FBC3202478
M8	1.25	25	9	4	7.86	FBC0202423
M9	1.25	25	9	4	8.86	FBC3202479
M10	1.5	30	11	4	9.85	FBC0202498
M11	1.5	30	11	4	10.85	FBC3202480
M12	1.75	38	14	4	11.83	FBC0202443
M14	2	38	14	4	13.82	FBC0202451
M16	2	45	18	5	15.82	FBM3200278
M18	2.5	45	18	5	17.79	FBM3200282
M20	2.5	45	18	5	19.79	FBM2300611
M22	2.5	55	22	5	21.79	FBC3202481
M24	3	55	22	5	23.76	FBM3200291

MF Metric fine threads



HSS | DIN 22568 | 6G

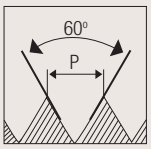




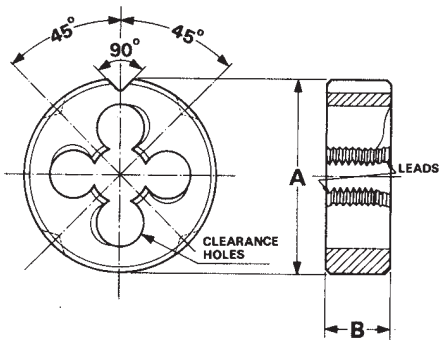
Unit : mm

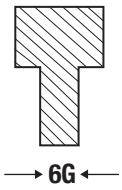
Nominal Diameter	TPI	Outer Diameter	Thickness	No. Clearance Hole	Threading Diameter	HSS
Ø D		A	B			EDP No
M3.5	0.6	20	5	3	3.43	FBC3202465
M4	0.5	20	5	4	3.92	FBC3202400
M4.5	0.5	20	5	4	4.43	FBC3202466
M5	0.5	20	5	4	4.92	FBC3202405
M5	0.75	20	5	4	4.91	FBC3202406
M5.5	0.75	20	7	4	5.43	FBC3202467
M6	0.5	20	7	4	5.92	FBC3202411
M6	0.75	20	7	4	5.9	FBC3202413
M7	0.75	25	9	4	6.9	FBC3202418
M8	0.5	25	9	4	7.92	FBC3202468
M8	0.75	25	9	4	7.9	FBC3202419
M8	1	25	9	4	7.88	FBC3202421
M9	0.75	25	9	4	8.9	FBC3202469
M9	1	25	9	4	8.88	FBC3202426
M10	0.75	30	11	4	9.9	FBC3202470
M10	1	30	11	5	9.88	FBC3202428
M10	1.25	30	11	4	9.86	FBC3202430
M11	0.75	30	11	5	10.91	FBC3202471
M11	1	30	11	4	10.88	FBC3202435
M12	1	38	10	4	11.88	FBC0202551
M12	1.25	38	10	4	11.86	FBC3202439
M12	1.5	38	10	4	11.85	FBC3202441
M14	1	38	10	5	13.88	FBC3202447

MF Metric fine threads



HSS | DIN 22568 | 6G

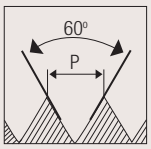




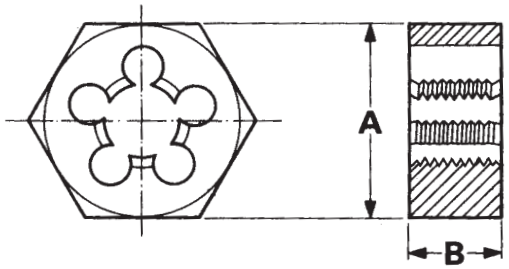
Unit : mm

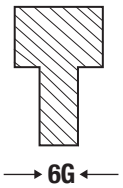
Nominal Diameter ØD	TPI	Outer Diameter A	Thickness B	No. Clearance Hole	Threading Diameter	HSS EDP No
M14	1.5	38	10	5	13.85	FBC3202449
M15	1	38	10	5	14.88	FBC3202472
M15	1.5	38	10	5	14.85	FBC3202473
M16	1	45	14	5	15.88	FBM3200276
M16	1.5	45	14	5	15.85	FBM3200277
M17	1	45	14	5	16.88	FBC3202474
M17	1.5	45	14	5	16.85	FBC3202475
M18	1	45	14	5	17.88	FBM3200280
M18	1.5	45	14	5	17.85	FBM3200281
M18	2	45	14	5	17.82	FBC3202476
M20	1	45	14	6	19.8	FBM3200283
M20	1.5	45	14	6	19.85	FBM3200284
M20	2	45	14	6	19.82	FBM3200285
M22	1	55	16	6	21.88	FBM2400492
M22	1.5	55	16	6	21.85	FBM3200288
M22	2	55	16	6	21.82	FBC3202477
M24	1	55	16	6	21.88	FBM3200289
M24	1.5	55	16	6	23.85	FBM3200290
M24	2	55	16	6	23.82	FBM2400496
M25	1	55	16	6	24.88	FBM2400627
M25	1.5	55	16	6	24.85	FBM2400498
M25	2	55	16	6	24.82	FBM2400628
M26	1.5	55	16	6	25.85	FBM2400629

M Metric coarse threads



HSS | CS | BS 1127 | 6G

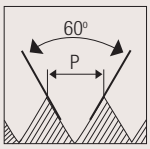




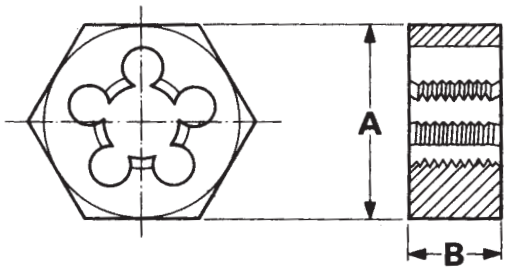
Unit : mm

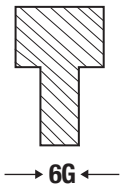
Nominal Diameter	Pitch	Across Flat	Thickness	HSS	Carbon Steel
ØD	p	A		EDP No	EDP No
M 2	0.4	0.710"	6.35	FBE2300078	FBD2300122
M 2.5	0.45	0.710"	6.35	FBE2300079	FBD2300123
M 3	0.5	0.710"	6.35	FBE2300080	FBD2300124
M 4	0.7	0.710"	6.35	FBE2300081	FBD2300127
M 5	0.8	0.710"	6.35	FBE2300082	FBD2300130
M 6	1	0.710"	6.35	FBE2300084	FBD2300135
M 7	1	0.710"	6.35	FBE2300085	FBD2300136
M 8	1.25	0.820"	7.94	FBE2300087	FBD2300139
M 9	1.25	0.920"	9.53	FBE2300088	FBD2300140
M 10	1.5	0.920"	9.53	FBE2300091	FBD2300144
M 12	1.75	1.100"	12.70	FBE2300096	FBD2300150
M 14	2	1.300"	15.88	FBE2300098	FBD2300154
M 16	2	1.300"	15.88	FBE2300100	FBD2300160
M 18	2.5	1.480"	17.46	FBE2300102	FBD2300163
M 20	2.5	1.480"	17.46	FBE2300104	FBD2300166
M 22	2.5	1.670"	20.63	FBE2300106	FBD2300169
M 24	3	2.050"	23.81	FBE2300108	FBD2300172
M 27	3	2.220"	26.99	FBE2300110	FBD2300176
M 30	3.5	2.220"	26.99	FBE2300112	FBD2300182
M 36	4	2.760"	31.75	FBE2300113	FBD2300191
M 39	4	2.760"	31.75	FBE2300115	FBD2300194
M 42	4.5	3.150"	31.75 44.45	FBE2300366	FBD2300198
M 45	4.5	3.150"	31.75 44.45	–	FBD2300201
M 48	5	3.150"	31.75 44.45	–	FBD2300203

MF Metric fine threads



HSS | CS | BS 1127 | 6G

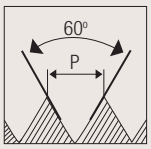




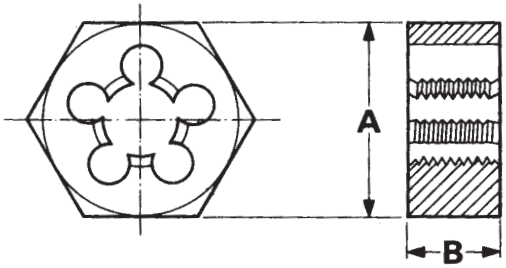
Unit : mm

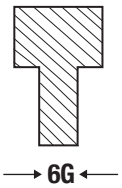
Nominal Diameter	Pitch	Across Flat	Thickness	HSS	Carbon Steel
ØD	p	A		EDP No	EDP No
M 3	0.6	0.710"	6.35	–	FBD2300125
M 3.5	0.6	0.710"	6.35	–	FBD2300126
M 4	0.75	0.710"	6.35	–	FBD2300128
M 5	0.5	0.710"	6.35	–	FBD2300129
M 6	0.75	0.710"	6.35	FBE2300083	FBD2300134
M 7	1	0.710"	6.35	FBE2300085	FBD2300136
M 8	1	0.820"	7.94	FBE2300086	FBD2300138
M 9	1.25	0.920"	9.53	FBE2300088	FBD2300140
M 10	1	0.920"	9.53	FBE2300089	FBD2300142
M 10	1.25	0.920"	9.53	FBE2300090	FBD2300143
M 11	1.5	1.010"	11.11	FBE2300092	FBD2300146
M 12	1	1.100"	12.70	FBE2300093	FBD2300147
M 12	1.25	1.100"	12.70	FBE2300094	FBD2300148
M 12	1.5	1.100"	12.70	FBE2300095	FBD2300149

MF Metric fine threads



HSS | CS | BS 1127 | 6G

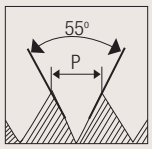




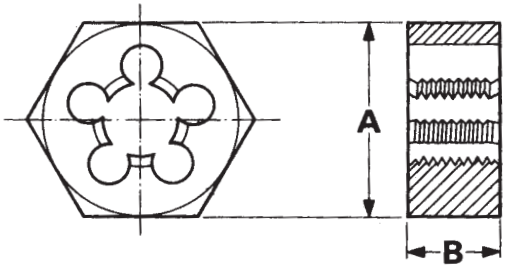
Unit : mm

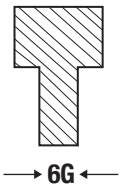
Nominal Diameter	Pitch	Across Flat	Thickness	HSS	Carbon Steel
ØD	p	A		EDP No	EDP No
M 14	1.25	1.300"	15.88	–	FBD2300152
M 14	1.5	1.300"	15.88	FBE2300097	FBD2300153
M 16	1.5	1.300"	15.88	FBE2300099	FBD2300158
M 18	1.5	1.480"	17.46	FBE2300101	FBD2300162
M 20	1.5	1.480"	17.46	FBE2300103	FBD2300164
M 22	1.5	1.670"	20.63	FBE2300105	FBD2300167
M 24	1.5	2.050"	23.81	FBE2300107	FBD2300170
M 25	1.5	2.220"	26.99	–	FBD2300173
M 27	1.5	2.220"	26.99	FBE2300109	FBD2300174
M 27	2	2.220"	26.99	–	FBD2300175
M 30	1.5	2.220"	26.99	FBE2300111	FBD2300179
M 30	2	2.220"	26.99	–	FBD2300180
M 30	3	2.220"	26.99	–	FBD2300181
M 32	1.5	2.220"	26.99	–	FBD2300183
M 33	3.5	2.580"	28.58	–	FBD2300187

BSW Whitworth coarse threads



HSS | CS | BS 1127 | 6G

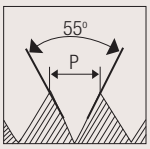




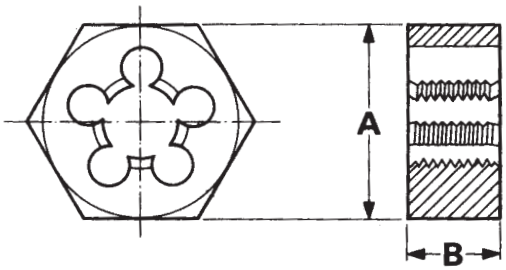
Unit : mm

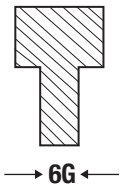
Nominal Diameter ØD	TPI	Across Flat A	Thickness	HSS EDP No	Carbon Steel EDP No
1/8"	40	0.710"	6.35	FBE2300001	FBD2300001
5/32"	32	0.710"	6.35	FBE2300002	FBD2300002
3/16"	24	0.710"	6.35	FBE2300003	FBD2300003
7/32"	24	0.710"	6.35	–	FBD2300004
1/4"	20	0.710"	6.35	FBE2300004	FBD2300005
9/32"	20	0.820"	7.94	–	FBD2300006
5/16"	18	0.820"	7.94	FBE2300005	FBD2300007
3/8"	16	0.920"	9.53	FBE2300006	FBD2300008
7/16"	14	1.010"	11.11	FBE2300007	FBD2300009
1/2"	12	1.100"	12.70	FBE2300008	FBD2300010
9/16"	12	1.300"	15.88	FBE2300009	FBD2300011
5/8"	11	1.300"	15.88	FBE2300010	FBD2300012
3/4"	10	1.480"	17.46	FBE2300011	FBD2300013
7/8"	9	1.670"	20.63	FBE2300012	FBD2300014
1"	8	2.050"	23.81	FBE2300013	FBD2300015
1.1/8"	7	2.220"	26.99	FBE2300014	FBD2300016
1.1/4"	7	2.220"	26.99	FBE2300015	FBD2300017
1.3/8"	6	2.580"	28.58	FBE2300016	FBD2300018
1.1/2"	6	2.760"	31.75	FBE2300017	FBD2300019
1.3/4"	6	3.150"	31.75 44.45	FBE2300018	FBD2300021
2"	4.1/2	3.550"	31.75 44.45	FBE2300019	FBD2300022

BSF Whitworth fine threads



HSS | CS | BS 1127 | 6G

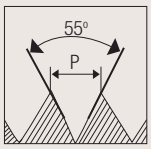




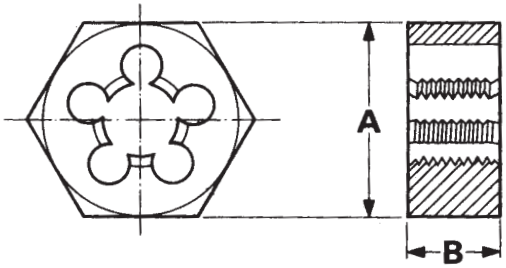
Unit : mm

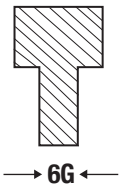
Nominal Diameter ØD	TPI	Across Flat A	Thickness	HSS EDP No	Carbon Steel EDP No
3/16"	32	0.710"	6.35	FBE2300022	FBD2300026
7/32"	28	0.710"	6.35	–	FBD2300027
1/4"	26	0.710"	6.35	FBE2300023	FBD2300028
5/16"	22	0.820"	7.94	FBE2300024	FBD2300029
3/8"	20	0.920"	9.53	FBE2300025	FBD2300030
7/16"	18	1.010"	11.11	FBE2300026	FBD2300031
1/2"	16	1.100"	12.70	FBE2300027	FBD2300032
9/16"	16	1.300"	15.88	FBE2300346	FBD2300033
5/8"	14	1.300"	15.88	FBE2300028	FBD2300034
3/4"	12	1.480"	17.46	FBE2300029	FBD2300035
7/8"	11	1.670"	20.63	FBE2300030	FBD2300036
1"	10	2.050"	23.81	FBE2300031	FBD2300037

BSP British standard pipe threads



HSS | CS | BS 1127 | 6G

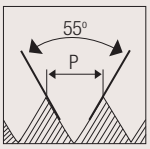




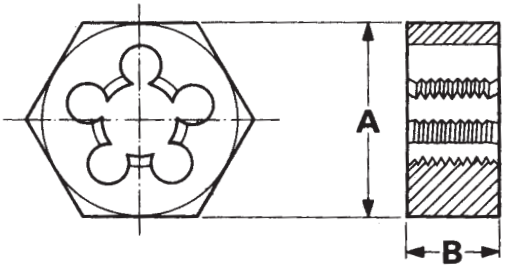
Unit : mm

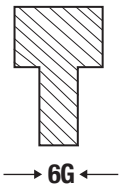
Nominal Diameter ØD	TPI	Across Flat A	Thickness	HSS EDP No	Carbon Steel EDP No
1/8"	28	0.920"	9.53	FBE2300067	FBD2300094
1/4"	19	1.100"	12.70	FBE2300068	FBD2300095
3/8"	19	1.300"	15.88	FBE2300069	FBD2300096
1/2"	14	1.670"	20.63	FBE2300070	FBD2300097
5/8"	14	1.670"	20.63	FBE2300071	FBD2300098
3/4"	14	2.050"	23.81	FBE2300072	FBD2300099
7/8"	14	2.220"	26.99	–	FBD2300100
1"	11	2.580"	28.58	FBE2300073	FBD2300101
1.1/4"	11	2.760"	31.75	FBE2300078	FBD2300102
1.1/2"	11	3.150"	31.75 44.45	FBE2300075	FBD2300104
2"	11	3.890"	31.75 44.45	FBE2300077	FBD2300106

BSPT British standard taper pipe threads



HSS | CS | BS 1127 | 6G

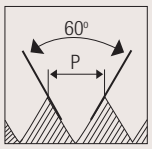




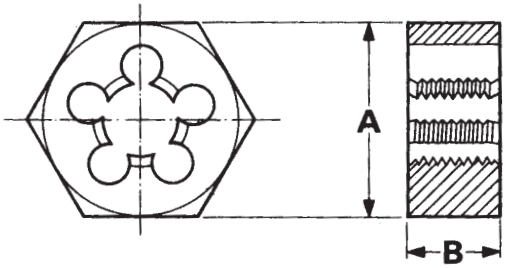
Unit : mm

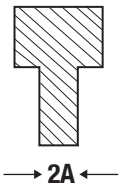
Nominal Diameter ØD	TPI	Across Flat A	Thickness	HSS EDP No	Carbon Steel EDP No
1/8"	28	0.920"	10	FBE2300367	FBD2300107
1/4"	19	1.100"	14	FBE2300368	FBD2300108
3/8"	19	1.300"	14	FBE2300369	FBD2300109
1/2"	14	1.670"	19	–	FBD2300110
3/4"	14	2.050"	20	–	FBD2300111
1"	11	2.580"	25	–	FBD2300112

UNC Unified coarse threads



HSS | CS | BS 1127 | 2A

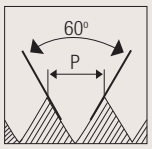




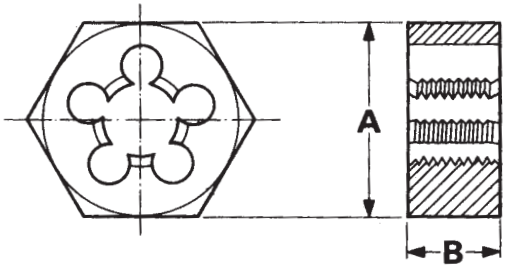
Unit : mm

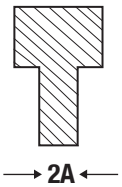
Nominal Diameter ØD	TPI	Across Flat A	Thickness	HSS EDP No	Carbon Steel EDP No
# 5	40	0.710"	6.35	–	FBD2300042
# 6	32	0.710"	6.35	–	FBD2300043
# 8	32	0.710"	6.35	–	FBD2300044
# 10	24	0.710"	6.35	–	FBD2300045
# 12	24	0.710"	6.35	–	FBD2300046
1/4"	20	0.710"	6.35	FBE2300033	FBD2300048
5/16"	18	0.820"	7.94	FBE2300034	FBD2300049
3/8"	16	0.920"	9.53	FBE2300035	FBD2300050
7/16"	14	1.010"	11.11	FBE2300036	FBD2300051
1/2"	13	1.100"	12.70	FBE2300037	FBD2300052
9/16"	12	1.300"	15.88	FBE2300038	FBD2300053
5/8"	11	1.300"	15.88	FBE2300039	FBD2300054
3/4"	10	1.480"	17.46	FBE2300040	FBD2300055
7/8"	9	1.670"	20.63	FBE2300041	FBD2300056
1"	8	2.050"	23.81	FBE2300042	FBD2300057
1.1/8"	7	2.220"	26.99	FBE2300043	FBD2300058
1.1/4"	7	2.220"	26.99	FBE2300044	FBD2300059
1.3/8"	6	2.580"	28.58	FBE2300045	FBD2300060
1.1/2"	6	2.760"	31.75	FBE2300046	FBD2300061

UNF Unified fine threads



HSS | CS | BS 1127 | 2A

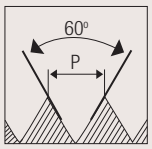




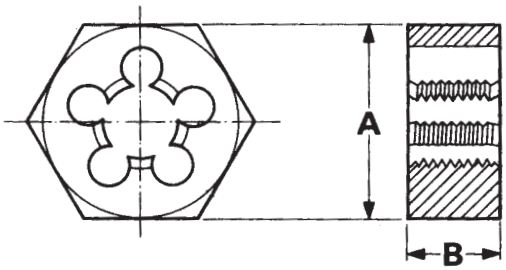
Unit : mm

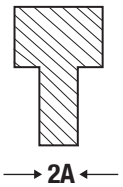
Nominal Diameter ØD	TPI	Across Flat A	Thickness	HSS EDP No	Carbon Steel EDP No
# 5	44	0.710"	6.35	–	FBD2300066
# 6	40	0.710"	6.35	–	FBD2300067
# 8	36	0.710"	6.35	–	FBD2300068
# 10	32	0.710"	6.35	FBE2300049	FBD2300069
# 12	28	0.710"	6.35	–	FBD2300070
1/4"	28	0.710"	6.35	FBE2300051	FBD2300072
5/16"	24	0.820"	7.94	FBE2300052	FBD2300073
3/8"	24	0.920"	9.53	FBE2300053	FBD2300074
7/16"	20	1.010"	11.11	FBE2300054	FBD2300075
1/2"	20	1.100"	12.70	FBE2300055	FBD2300076
9/16"	18	1.300"	15.88	FBE2300056	FBD2300077
5/8"	18	1.300"	15.88	FBE2300057	FBD2300078
3/4"	16	1.480"	17.46	FBE2300058	FBD2300079
7/8"	14	1.670"	20.63	FBE2300059	FBD2300080
1"	12	2.050"	23.81	FBE2300060	FBD2300081
1.1/8"	12	2.220"	26.99	FBE2300061	FBD2300082
1.1/4"	12	2.220"	26.99	FBE2300062	FBD2300083
1.3/8"	12	2.580"	28.58	FBE2300063	FBD2300084
1.1/2"	12	2.760"	31.75	FBE2300064	FBD2300085

NPT National taper pipe threads



HSS | CS | BS 1127 | 2A

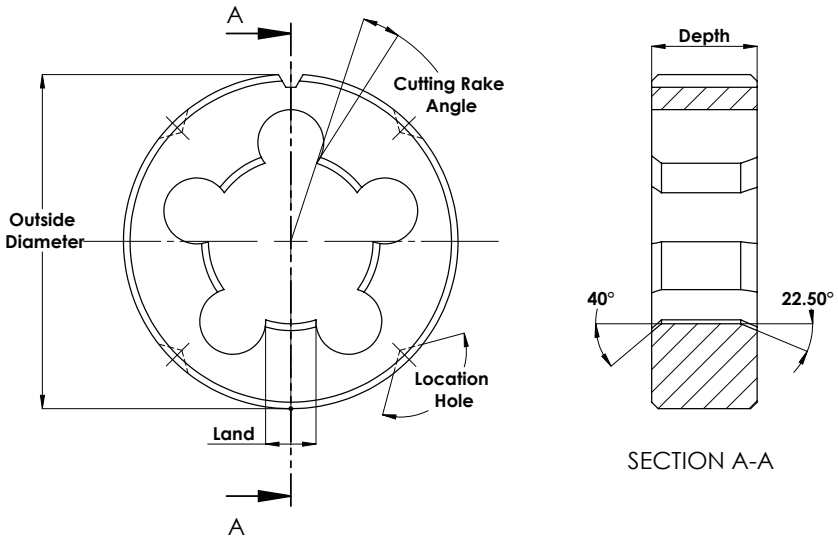




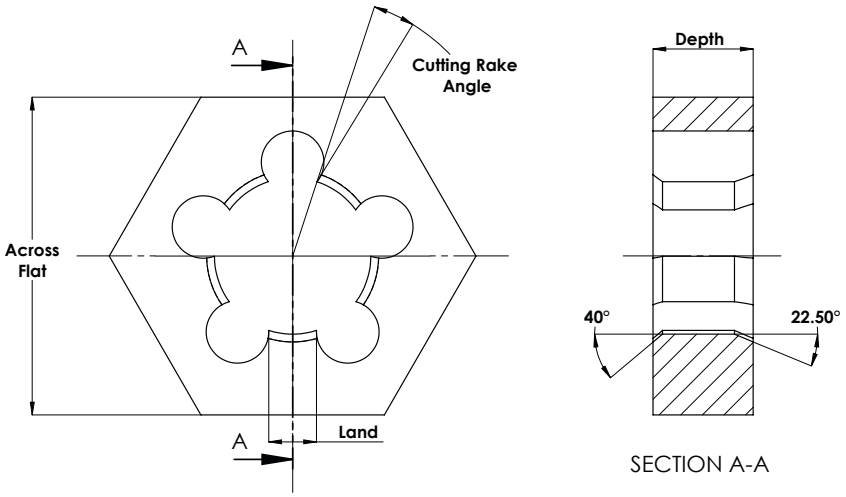
Unit : mm

Nominal Diameter ØD	TPI	Across Flat A	Thickness	HSS EDP No	Carbon Steel EDP No
1/8"	27	0.920"	10	FBE2300370	FBD2300114
1/4"	18	1.100"	15	FBE2300371	FBD2300115
3/8"	18	1.300"	15	FBE2300372	FBD2300116
1/2"	14	1.670"	19	FBE2300373	FBD2300117
3/4"	14	2.050"	20	FBE2300374	FBD2300118
1"	11.1/2	2.580"	25	FBE2300375	FBD2300119
1.1/2"	11.1/2	3.150"		FBE2300376	FBD2300121
2"	11.1/2	3.890"		FBE2300379	–

Round dies nomenclature



Hexagonal dies nomenclature



Dos and dont's - threading with dies

- **CHAMFER:** Make a chamfer at the end of the bar at an angle of 45 degrees to remove sudden loading of the leading edges. This has to be done before starting the die or die nut. Also it has to be made certain that the die or dienut is presented to the bolt squarely.
- **TOLERANCE:** Major diameter of the bolt usually has large tolerances. Use this to your advantage by reducing the diameter of the bar. Thus, the cutting force will be reduced to a minimum. If tolerance class is not specified, consider tolerance applicable for medium range i.e. 6H and 6G.
- **SWARF:** To direct the swarf away from cutting area, it is always preferable to use the gun nose type of die.
- **LUBRICANT:** The cutting area should always be supplied with a steady flow of the correct lubricant.
- **SPLIT DIES:** To avoid rubbing, the adjustable split die should not open out. Move the adjustable screws equally by say, 0.15 mm to close the split die. If it is done unequally, there may be pressure on one side which may lead to breakage.
- **CLEANING:** As a norm, dienuts are used for cleaning out existing threads. Usually the process is done by hand. Avoid using die nuts for thread cutting unless it is an exception.
- **RAKE ANGLE:** Large rake angle for long chip formation whereas a small rake angle for short chip formation. Its applicable and or workpiece material isn't specified, assume it as intermediate tensile strength.

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