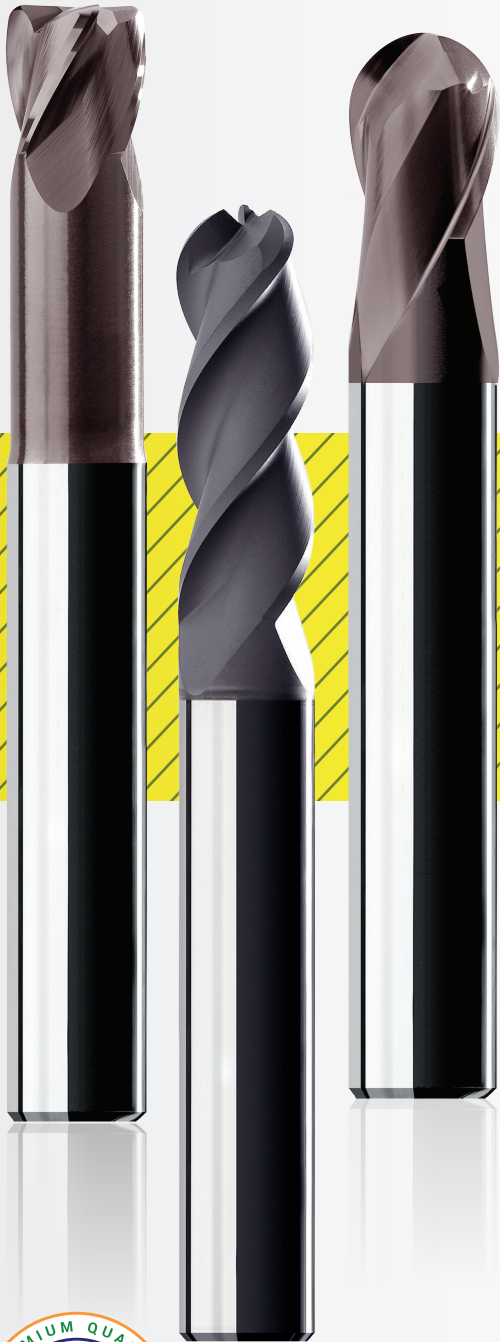




High Performance Cutting Tools



**TOOLING SOLUTIONS
FOR DIE, MOULD &
PATTERN INDUSTRY**



Forbes & Company Limited



High Performance Cutting Tools

HIGH PERFORMANCE END MILLS FOR MOULD MAKING



FEATURES

- Superior nano grain structure raw material
- Multilayer coating for Hardened moulds and Diamond Coating for graphite milling
- Wear resistant grade
- Ideal Chip flow geometry
- Close tolerance end mills for finishing for higher accuracy
- Special Roughing Pitch for graphite roughers

FUNCTIONS AND BENEFITS

- No EDM required as milling is a much faster operation
- 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 clamping and it is much easy yto achieve high accuracy
- Higher Tool Life and consistency
- High Productivity
- Superior Surface finish in graphite moulds

PRODUCT RANGE

- Standard 0.1mm- 25mm available in stub/standard/long/ extra long/ long reach
- Specials 0.1mm- 32mm available in stub/standard/long/ extra long/ long reach



High Performance Cutting Tools

TOOLING SOLUTIONS FOR DIE & MOULD INDUSTRY

	ISO Material Group	Application Hardness Range	Catalogue Series	Surface Coating	Standard Range	Size Range	No of Flute	Custom Solution	Trochoidal Milling Capability
	P2-P4	32 -45 HRC	HSM	TIALN Base	Flat Endmill	3 mm to 20 mm	2 Flute / 4 Flute	Possible	Yes
					Ball nose Endmill	3 mm to 20 mm	2 Flute / 4 Flute	Possible	Yes
					Rib Milling Cutter	0.8 mm to 3 mm	2 flute	Possible	Yes
	P6 H1-H3	45-58 HRC	Proton Plus Series	Proton Plus	Flat Endmill	1 mm to 25 mm	2 /4/5/6 Flute	Possible	Yes
					Ball nose Endmill	1 mm to 12 mm	2 Flute	Possible	Yes
	P3-P4 H1-H4	45-70 HRC	Proton HD	TIALN Base	Ball nose Endmill	1.0 mm to 16 mm	2 Flute / 4 Flute	Possible	Yes
					Torus Style	3mm to 16 mm	2 Flute / 4 Flute	Possible	Yes
					Multi flute finisher	3.0 mm to 20 mm	6-8 Flute	Possible	Yes
					Multi flute finisher with CR	3.0 mm to 20 mm	6-8 Flute	Possible	Yes
	H1-H4 P2-P6	45-70 HRC	Proton HD	TIALN Base	Micro Flat Endmill	0.1 mm to 3 mm	2 Flute	Possible	Yes
					Micro Flat Endmill	0.2 mm to 3 mm	4 Flute	Possible	Yes
					Micro Ball nose Endmill	0.1 mm to 3 mm	2 Flute	Possible	Yes
					Micro - Flat & Ball with CR	0.1 mm to 3 mm	2 Flute / 4 Flute	Possible	Yes
	H3/H4	55-70 HRC	Proton HD	TIALN Base	Ball nose 2 flute	0.1 mm to 12 mm	2 Flute	Possible	Yes
					Torus Style	0.1 mm to 12 mm	4 Flute	Possible	Yes
					Multi flute finisher	3.0 mm to 20 mm	6-16 Flute	Possible	Yes
					Multi flute finisher with CR	3.0 mm to 20 mm	6-16 Flute	Possible	Yes

SUCCESS STORIES

Customer	Material	Code	Description	Competitor	Forbes	Productivity
Mould Maker	1.2379 62 HRc	FBK0503571	EM 10.0 (FHPM 6 100 078 10 40) PHD	10 mm	10 mm	10 times Higher
Mould Maker	1.2379 62 HRc	FBK0503535	BEM 6.0 (FHPK 2 060 064 06 L070) PHD	6 mm	6 mm	4 times Higher
Mould Maker	1.21662 60 HRc	FBK0503554	EM 8.0 (FHPT 4 08B 078 08 40 L160) PHD	8 mm	8 mm	6 times Higher
Mould Maker	Elmax Hardened 62 HRc	FBK0505796	EM 1.5 (FHPT 4 015 064 06 40 L015) PHD	1.5 mm	1.5 mm	42% Higher MRR
				Ø	Z	Vc
				10 mm	6 Flutes	100 m/min
				10 mm	6 Flutes	100 m/min
				3180 rpm	3180 rpm	3180 rpm
				0.05 mm/rev	0.6 mm/rev	0.05 mm/rev
				954 mm/min	11448 mm/min	954 mm/min
				20mm	20mm	20mm
				0.1 mm	0.1 mm	0.1 mm
				Cold Air	Cold Air	Cold Air
				30 mins	2 Hours	30 mins
				6 mm	6 mm	6 mm
				8 mm	8 mm	8 mm
				4 Flutes	4 Flutes	4 Flutes
				25 m/min	200 m/min	25 m/min
				995 rpm	7958 rpm	995 rpm
				0.038 mm/rev	0.079 mm/rev	0.038 mm/rev
				150 mm/min	2500 mm/min	150 mm/min
				3 mm	3 mm	3 mm
				0.25 mm	0.1 mm	0.25 mm
				Cold Air	Cold Air	Cold Air
				0.11 mm3/min	0.75 mm3/min	0.11 mm3/min
				1.5 mm	1.5 mm	1.5 mm
				4 Flutes	4 Flutes	4 Flutes
				85 m/min	85 m/min	85 m/min
				18000 rpm	18000 rpm	18000 rpm
				0.0115 mm/rev	0.02 mm/rev	0.0115 mm/rev
				828 mm/min	1440 mm/min	828 mm/min
				0.65 mm	0.65 mm	0.65 mm
				0.04 mm	0.04 mm	0.04 mm
				Min Lubrication	Min Lubrication	Min Lubrication
				21.52 mm3/min	37.44 mm3/min	21.52 mm3/min



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	Challenge	Reduction in Cycle time	Challenge	Reduction in CPC & Chatter	Challenge	Reduction in CPC & Chatter
Component	Graphite Mould Inserts	Component	Semiconductor - Reppler	Component	Die Casting HK12	Component	Die Casting HK12
Competiton	J.J Tools Korea	Competiton	Cogo	Competiton	ZECHA	Competiton	ZECHA
Solution	FBK0504674- EM 16.0 (FHGR 2 160 150 16 02) PHD	Solution	BEM 6.00(+0.01)MMX15X100 SH6 2FLT DI	Solution	EM 4.00MMX5XREL65X100 SH6 CRO.5 4FLT DI	Solution	EM 5.00MMX5XREL65X100 SH6 CRO.5 4FLT DI
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	Cutting data	Machine : Okuma- VMC, Shrinkfit- Totem, Coolant – Vacuum RPM 6000, Feed 2500 Existing Tool Life – 10Hours Achieved Tool Life – 10 Hours	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	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	180% improvement in Tool life	Result	Similar Tool life	Result	Similar Tool life	Result	Similar Tool life
Benefit	Reduction in Cycle time by 7 times	Benefit	Reduction in CPC	Benefit	Reduction in CPC	Benefit	Reduction in CPC



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