MillLine

Member IMC Group Tungaloy

PROFILEMILL SERIES

www.tungaloy.com/us

Tungaloy Report No. 528-US

Robust indexable profile mills with **new ball end mills for rough profiling**

INDUSTRY 4.0

FEED the SPEED!


ACCELERATED MACHINING

MillLine

PROFILEMILL SERIES

TUNGALOY

TUNG FORCE MILL

ACCELERATED MACHINING

Excellent surface finish and stable machining due to secure clamping and minimum run-out

Indexable end mill series for die & mold and aerospace industries

Lineup and Application Ranges

- All inserts are precision ground, making them suitable for various applications ranging from roughing to finishing
- Increased reliability thanks to the innovative insert clamping design

Finishing

Semi-Finishing

Roughing

Ball type

BALLFINISH NOSE
Tool diameter ø0.375" - 1.250"
(0.188" - 0.625")

New
BALLROUGH NOSE
Tool diameter ø0.625" - 1.000"
(R0.313" - R0.500")

Radius type

BALLFINISH NOSE
Tool diameter ø0.375" -1.000"
(R0.031" – R0.125")

DOMINI MILL
Tool diameter ø16mm(ø0.630") - 25mm(ø0.984")
(R0.020", R0.039")

FINISH BALL NOSE

(See page 6)

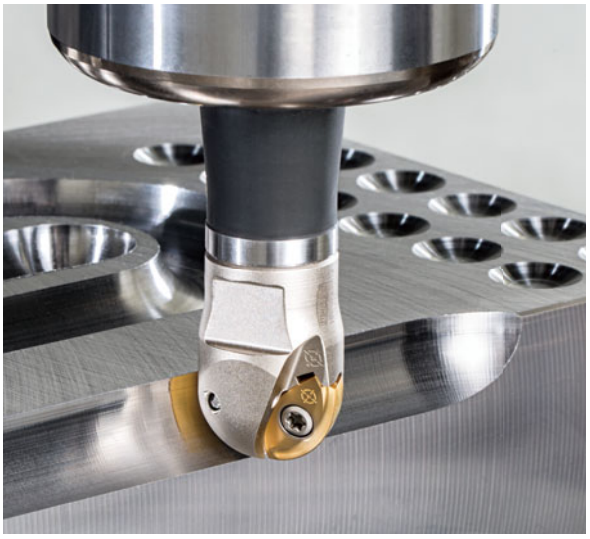
- Indexable end mill series with accurate insert repeatability thanks to its unique asymmetric V profile
- 2 insert profiles available: ball nose and square with radii
- Tool holders are available in shank and modular style

New

ROUGH BALL NOSE

(See page 12)

- Secure clamping to prevent insert movement during roughing and semi-finishing.
- Double-sided insert design allows the same insert to be used for both center and peripheral cutting.
- Tool holders available in shank and modular style



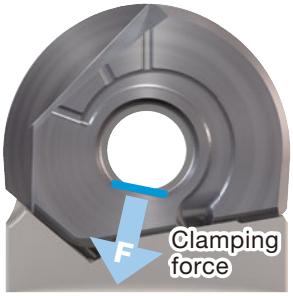
MINI DOMMILL

(See page 16)

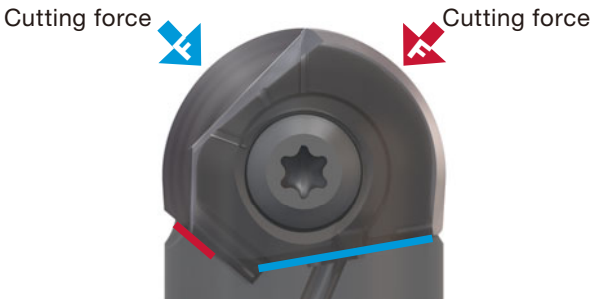
- End mill with dovetail clamping system for high productive semi-finishing operations
- Highly economical insert with 6 cutting edges
- Modular style toolholders available

New indexable end mill for die & mold and aerospace industries.

Secure clamping mechanism

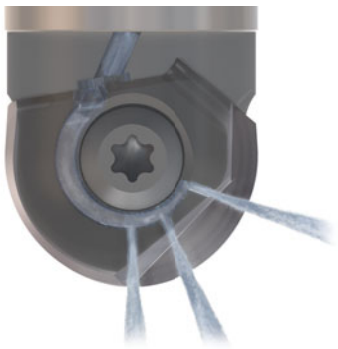


Clamping force gathers on the flat part of the insert hole as the screw is tightened. The force pushes the insert towards the cutter body, providing high repeatability and rigidity as well as minimum run-out.



Asymmetric shape of the insert and directed clamping force maintains centrally on the insert under 3 dimensional cutting force.

Unique coolant delivery system

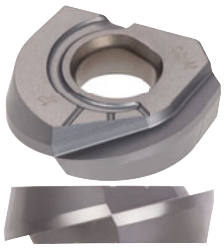


- The coolant channel on the insert surface delivers coolant to the cutting edge from three directions.
- Excellent chip evacuation and cooling effect provides good surface finish and long tool life in machining of hardened steel.

Two insert varieties

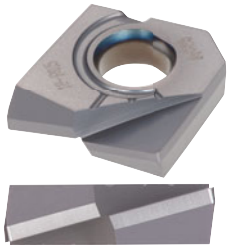
MJ chipbreaker

Ball nose type: ZFBM



- Suitable for finishing and three-dimensional milling of die & mold
- Applicable for a wide range of operations

Radius type: ZFRM



- Suitable for finishing of die & mold
- Designed for milling with high productivity

Versatile grade

AH725 P Steel M Stainless K Cast iron H Hard Materials

For steel, stainless steel, cast iron and hard materials

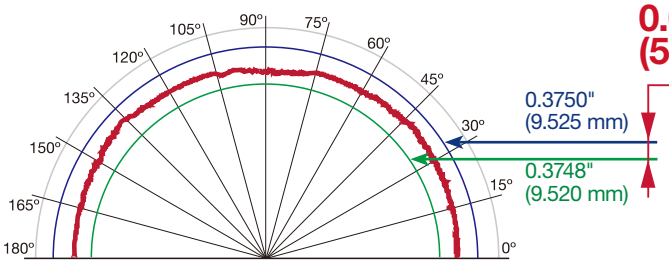
Application	Grade	Substrate			Coating layer		Features
	Application code	Relative density	Hardness HRA	T. R. S. (GPa)	Main Composition	Thickness (µm)	
P M K H	AH725	14.4	91.5	3.0	(Ti, Al)N	2	For general purpose Good balance between wear and fracture resistance
	P20 - P30						

First choice

Workpiece material	P Carbon steel, Alloy steel	M Stainless steel	P Prehardend steel, Die & mold tool steel	H High hardened steel	K Cast iron
Hardness	85 - 280 HB	135 - 200 HB	HRC 40 - 48	HRC 48 - 60	150 - 240 HB
AH725	←	←	←	←	←

Excellent machining accuracy

High radius accuracy



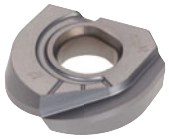
0.0002" (5 µm)

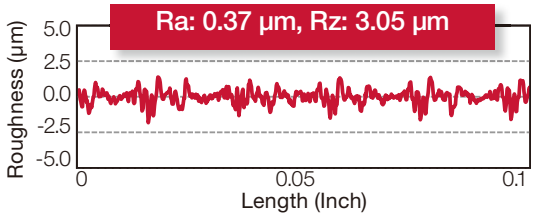
Ball nose insert has high radius accuracy within 0.0002" and precisely meets dimensional requirements.

Shank: EBFU075T100S0700
Insert: ZFBU075R00-MJ
Tool diameter: øDc = ø0.750" (*r*ε = 0.375")

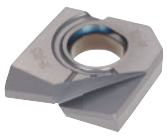
Good surface finish

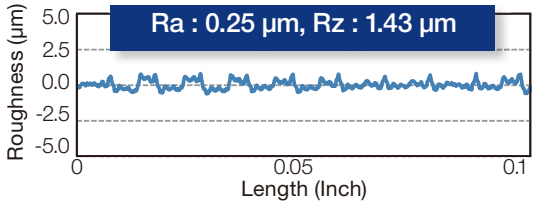
Ball nose type
ZFBU075R00-MJ





Radius type
ZFRU075R006-MJ



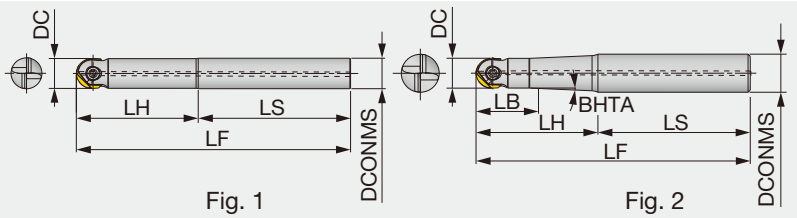


Shank : EBFU075T100S0700
Workpiece material: 1045
Cutting speed: *Vc* = 656 sfm
Feed per tooth: *fz* = 0.006 ipt
Depth of cut: *ap* =0.020"
Coolant: Wet

BALLFINISH NOSE

EBFM

Indexable end mills for high precision finish



Inch	Material	DC	DCONMS	LS	LH	LF	LB	BHTA	Air hole	Fig	Insert
EBFU037T050S0400	Steel	0.375	0.500	3.000	1.000	4.000	0.625	9.0°	with	2	ZF*U037
EBFU037S037C0550	Carbide	0.375	0.375	2.500	3.000	5.500	-	-	without	1	ZF*U037
EBFU037T062S0600	Steel	0.375	0.625	3.500	2.500	6.000	0.625	3.5°	with	2	ZF*U037
EBFU037S037C0875	Carbide	0.375	0.375	3.250	5.500	8.750	-	-	without	1	ZF*U037
EBFU050S050S0437	Steel	0.500	0.500	3.187	1.188	4.375	-	-	with	1	ZF*U050
EBFU050S050C0637	Carbide	0.500	0.500	2.750	3.625	6.375	-		without	1	ZF*U050
EBFU050T062S0637	Steel	0.500	0.625	4.000	2.375	6.375	1.000	2.5°	with	2	ZF*U050
EBFU050S050C0875	Carbide	0.500	0.500	2.750	6.000	8.750	-	-	without	1	ZF*U050
EBFU062T075S0500	Steel	0.625	0.750	3.000	2.000	5.000	0.563	2.0°	with	2	ZF*U062
EBFU062S062C0637	Carbide	0.625	0.625	3.375	3.000	6.375	-	-	without	1	ZF*U062
EBFU062T075S0637	Steel	0.625	0.750	3.625	2.750	6.375	0.563	1.5°	with	2	ZF*U062
EBFU062S062C0875	Carbide	0.625	0.625	2.750	6.000	8.750	-	-	without	1	ZF*U062
EBFU075T100S0700	Steel	0.750	1.000	4.000	3.000	7.000	1.563	4.5°	with	2	ZF*U075
EBFU075S075C0875	Carbide	0.750	0.750	4.000	4.750	8.750	-	-	without	1	ZF*U075
EBFU075T100S0875	Steel	0.750	1.000	4.000	4.750	8.750	1.000	1.5°	with	2	ZF*U075
EBFU075S075C1200	Carbide	0.750	0.750	3.250	8.750	12.000	-	-	without	1	ZF*U075
EBFU100T125S0800	Steel	1.000	1.250	4.000	4.000	8.000	1.250	2.5°	with	2	ZF*U100
EBFU100S100C0875	Carbide	1.000	1.000	4.000	4.750	8.750	-	-	without	1	ZF*U100
EBFU100T125S1000	Steel	1.000	1.250	4.000	6.000	10.000	1.188	1.4°	with	2	ZF*U100
EBFU100S100C1200	Carbide	1.000	1.000	3.250	8.750	12.000	-	-	without	1	ZF*U100
EBFU125S125S1000	Steel	1.250	1.250	6.000	4.000	10.000	-	-	with	1	ZF*U125
EBFU125S125C1200	Carbide	1.250	1.250	3.250	8.750	12.000	-	-	without	1	ZF*U125

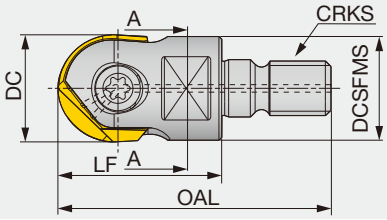
SPARE PARTS

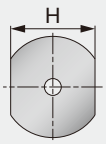
Designation	Clamping screw	Torx bit	Grip	Wrench
EBFU037...	TS30F100A	-	-	T10D
EBFU050...	TS40F120A	-	-	T15D
EBFU062...	TS50F160A	-	-	T-T20
EBFU075...	TS60F200A	BLDT25/M7	SW6-T	-
EBFU100...	TS70F250A	BLDT25/M7	SW6-T	-
EBFU125...	TS70F300A	-	-	T-T30

BALL FINISH NOSE

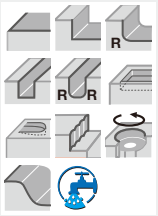
HBFM

Indexable end mills with TungFlex threaded adapter for high precision finish





A-A cross section



Metric	DC	OAL	LF	H	DCSFMS	CRKS	Air hole	Insert
HBFM10M06	10	34.5	20	7	9.7	M6	with	ZF*M100...
HBFM12M06	12	37.5	23	7	11.5	M6	with	ZF*M120...
HBFM12M08	12	40	23	10	13	M8	with	ZF*M120...
HBFM16M08	16	47	30	10	13	M8	with	ZF*M160...
HBFM20M10	20	49	30	15	19	M10	with	ZF*M200...
HBFM25M12	25	57	35	17	24	M12	with	ZF*M250...
HBFM30M16	30	66	43	22	29	M16	with	ZF*M300...
HBFM32M16	32	66	43	22	29.5	M16	with	ZF*M320...

SPARE PARTS

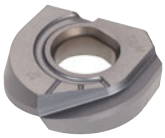


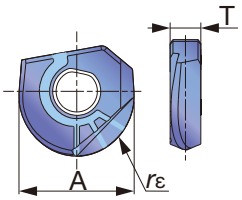

Designation	Clamping screw	Torx bit	Grip	Wrench
HBFM10...	TS 30F100A	-	-	T-10D
HBFM12...	TS 40F120A	-	-	T-15D
HBFM16...	TS 50F160A	BT20S	H-TB2W	-
HBFM20...	TS 60F200A	BLDT25/M7	H-TB2W	-
HBFM25...	TS 70F250A	BLDT25/M7	H-TB2W	-
HBFM30...	TS 80F300A	-	-	T-T30
HBFM32...	TS 80F300A	-	-	T-T30

*Torque: Recommended torque (N·m) for clamping：TS25F080A=1.3, TS30F100A=2.5, TS40F120A=3.5, TS50F160A=5, TS60F200A=7, TS70F250A=7, TS80F300A=10

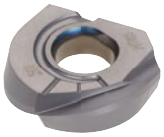
INSERT

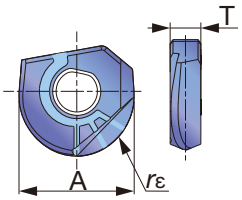
ZFBU-MJ / ZFBM-MJ





ZFBU-ML





P	Steel	★				
M	Stainless	☆				
K	Cast iron	☆				
N	Non-ferrous	☆				
S	Superalloys	★				
H	Hard materials	☆				

★ : First choice
☆ : Second choice

Inch

Designation	rε	Coated				A	T
		AH725					
ZFBU037R00-MJ	0.188	●				0.375	0.114
ZFBU050R00-MJ	0.250	●				0.500	0.134
ZFBU062R00-MJ	0.313	●				0.625	0.173
ZFBU075R00-MJ	0.375	●				0.750	0.213
ZFBU062R00-MJ	0.313	●				0.625	0.173
ZFBU100R00-MJ	0.500	●				1.000	0.252
ZFBU075R00-MJ	0.375	●				0.750	0.213
ZFBU125R00-MJ	0.625	●				1.250	0.291
ZFBU037R00-ML	0.188	●				0.375	0.114
ZFBU050R00-ML	0.250	●				0.500	0.134
ZFBU062R00-ML	0.313	●				0.625	0.173
ZFBU075R00-ML	0.375	●				0.750	0.213
ZFBU100R00-ML	0.500	●				1.000	0.252
ZFBU125R00-ML	0.625	●				1.250	0.291

●: Line up

P	Steel	☆	★			
M	Stainless		☆			
K	Cast iron	★	☆			
N	Non-ferrous		☆			
S	Superalloys		★			
H	Hard materials	★	☆			

★ : First choice
☆ : Second choice

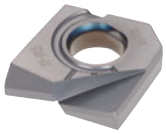
Metric

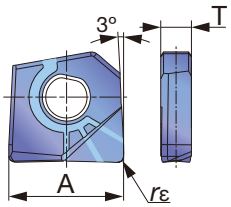
Designation	rε	Coated				A	T
		AH710	AH725				
ZFBM100R00-MJ	5	●	●			10	2.9
ZFBM120R00-MJ	6	●	●			12	3.4
ZFBM160R00-MJ	8	●	●			16	4.4
ZFBM200R00-MJ	10	●	●			20	5.4
ZFBM250R00-MJ	12.5	●	●			25	6.4
ZFBM300R00-MJ	15	●	●			30	7.4
ZFBM320R00-MJ	16	●	●			32	7.4

●: Line up

INSERT

ZFRU-MJ / ZFRM-MJ (Corner radius type)





Inch

P	Steel	★
M	Stainless	☆
K	Cast iron	☆
N	Non-ferrous	☆
S	Superalloys	★
H	Hard materials	☆

★ : First choice
☆ : Second choice

Designation	rε	Coated		A	T
		AH725			
ZFRU037R003-MJ	0.031	●		0.375	0.114
ZFRU050R003-MJ	0.031	●		0.500	0.134
ZFRU050R006-MJ	0.062	●		0.500	0.134
ZFRU050R012-MJ	0.125	●		0.500	0.134
ZFRU062R003-MJ	0.031	●		0.625	0.173
ZFRU062R006-MJ	0.062	●		0.625	0.173
ZFRU062R012-MJ	0.125	●		0.625	0.173
ZFRU075R003-MJ	0.031	●		0.750	0.213
ZFRU075R006-MJ	0.062	●		0.750	0.213
ZFRU075R012-MJ	0.125	●		0.750	0.213
ZFRU100R003-MJ	0.031	●		1.000	0.252
ZFRU100R006-MJ	0.062	●		1.000	0.252
ZFRU100R012-MJ	0.125	●		1.000	0.252
ZFRU125R003-MJ	0.031	●		1.250	0.291
ZFRU125R006-MJ	0.062	●		1.250	0.291
ZFRU125R012-MJ	0.125	●		1.250	0.291

●: Line up

Metric

P	Steel	☆	★
M	Stainless		☆
K	Cast iron	★	☆
N	Non-ferrous		☆
S	Superalloys		★
H	Hard materials	★	☆

★ : First choice
☆ : Second choice

Designation	rε	Coated		A	T
		AH710	AH725		
ZFRM120R05-MJ	0.5	●	●	12	3.4
ZFRM120R10-MJ	1	●	●	12	3.4
ZFRM160R05-MJ	0.5	●	●	16	4.4
ZFRM160R10-MJ	1	●	●	16	4.4
ZFRM160R15-MJ	1.5	●	●	16	4.4
ZFRM200R10-MJ	1	●	●	20	5.4
ZFRM200R15-MJ	1.5	●	●	20	5.4

●: Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Grades	Recommended		Max. axial depth of cut *ap* (in)	Cutting speed *Vc* (sfm)	Feed per tooth: *fz* (ipt) øDc (Inch)					
				Selection criteria	Chip-breaker			ø0.375	ø0.500	ø0.625	ø0.750	ø1.000	ø1.250
P	Low carbon steel, alloy steel	85 - 180 HB	AH725	First choice	MJ	≤0.04D	590 - 850	0.008	0.008	0.010	0.010	0.012	0.014
		85 - 180 HB	AH725	For wear resistance	ML	≤0.04D	590 - 850	0.008	0.008	0.010	0.010	0.012	0.014
	High carbon steel, alloy steel	180 - 280 HB	AH725	First choice	MJ	≤0.03D	490 - 750	0.008	0.008	0.010	0.010	0.012	0.014
		180 - 280 HB	AH725	For wear resistance	ML	≤0.03D	490 - 750	0.008	0.008	0.010	0.010	0.012	0.014
	Prehardened steel Die & mold tool steel	40 - 48 HRC	AH725	First choice	ML	≤0.03D	590 - 980	0.008	0.008	0.010	0.010	0.012	0.014
		40 - 48 HRC	AH725	For impact resistance	MJ	≤0.03D	590 - 980	0.008	0.008	0.010	0.010	0.012	0.014
M	Stainless steel	135 - 200 HB	AH725	First choice	ML	≤0.03D	330 - 820	0.006	0.008	0.008	0.010	0.010	0.012
K	Cast iron	150 - 240 HB	AH725	First choice	MJ	≤0.04D	300 - 1150	0.008	0.010	0.012	0.012	0.014	0.016
		150 - 240 HB	AH725	For impact resistance	ML	≤0.04D	300 - 1150	0.008	0.010	0.012	0.012	0.014	0.016
N	Aluminum	-	AH725	First choice	MJ	≤0.03D	660 - 1310	0.010	0.014	0.014	0.014	0.016	0.018
H	High hardened steel	48 - 65 HRC	AH725	First choice	ML	≤0.02D	330 - 720	0.003	0.004	0.005	0.006	0.008	0.010

· Remove excessive chip accumulation with an air blast.
· For operations with depth of cut which varies (ex.casting skin) and machining of workpiece materials with interrupted surface, the feed per tooth (*fz*) should be set to the lower recommended value shown in the above table.
· Cutting conditions may be limited depending on machine power, workpiece rigidity, and spindle output. When the cutting width, depth, or overhang length is large, set *Vc* and *fz* to the lower recommended values and check the machine power and vibration.

How to clamp the insert

1. Clear chips and dust from the pocket.
2. Place the insert in the pocket. The insert can be placed only in one direction.
3. Tighten the screw while pressing the insert into the pocket.

How to check the run-out

1. Clamp the insert on the shank.
2. Clamp the shank on a high-precision arbor.
3. Measure the run-out on tool presetter or by dial gauge.

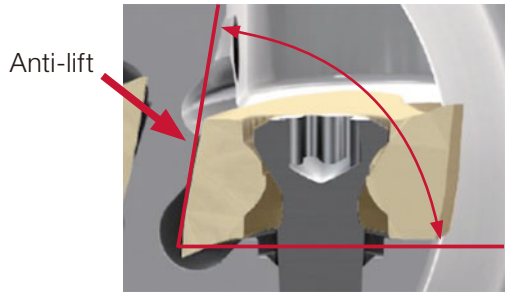
Notes:
1. Due to the helical cutting edge, it is important that the run-out is inspected with the insert clamped on the shank.
2. Do not use micrometer or caliper to inspect the insert diameter as inaccurate dimensions may be provided.

ROUGH BALLRNOSE

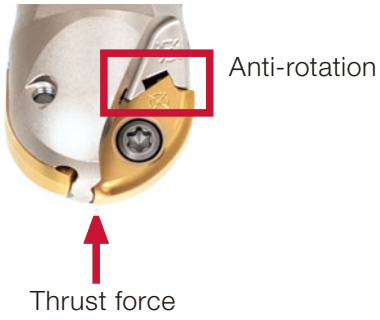
Profiling Reliability

Dovetail clamping design and axial support prevents insert movement for reliability

Dovetail-clamping system

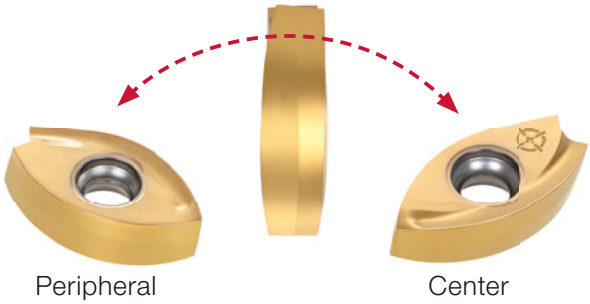


Axial stopper



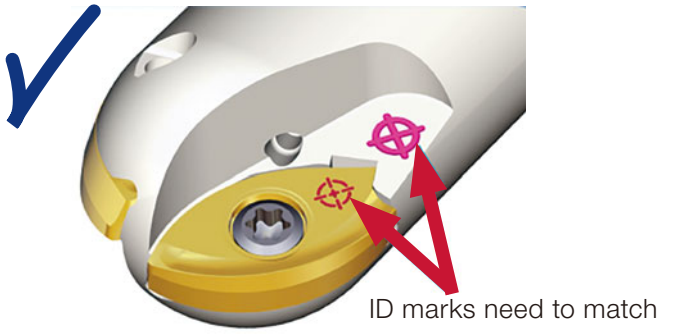
Unique 2-in-1 insert design

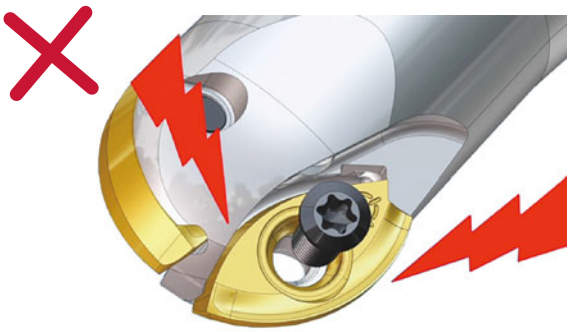
The BallRoughNose insert is double-sided. The same insert can be used for center cutting as well as peripheral, thus streamlining tool inventory with reduced tool costs.



Helical cutting edge for smoother entry into the material

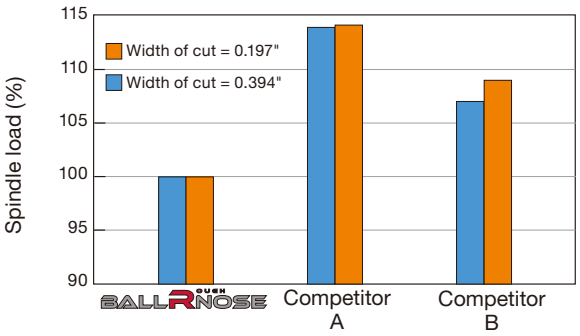
Insert will not fit the pocket when ID marks do not match





CUTTING PERFORMANCE

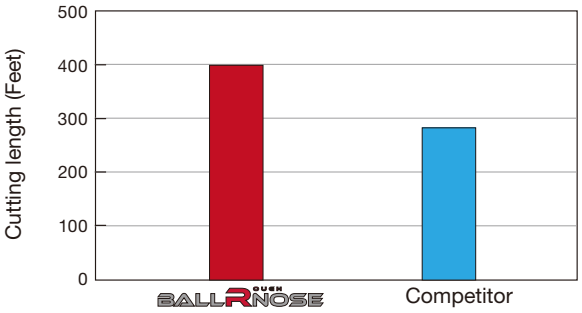
Cutting force



P Steel

Cutter	: EBRU075SW075S0600 (ø*D*c = 0.750", Z = 2)
Insert	: ZRBM200-MM APH730
Application	: Shouldering
Cutting speed	: *V*c = 492 sfm
Feed per tooth	: *f*z = 0.006 ipt
Depth of cut	: *a*p = 0.394"
Machine	: Vertical M/C (CAT50, 30kW)
Workpiece material	: 1055 (200HB)

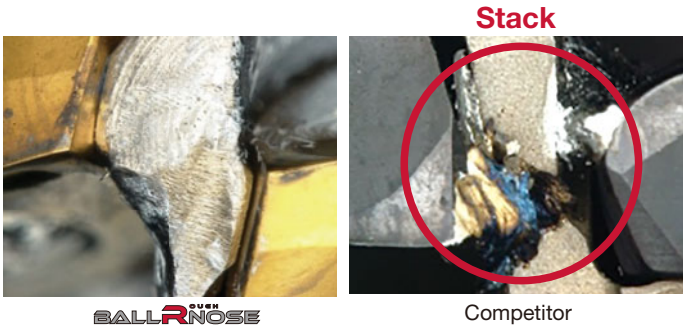
Tool life



P Steel

Cutter	: EBRU075SW075S0600 (ø*D*c = 0.750", Z = 2)
Insert	: ZRBM200-MM APH730
Application	: Shouldering
Cutting speed	: *V*c = 656 sfm
Feed per tooth	: *f*z = 0.006 ipt
Depth of cut	: *a*p = 0.197"
Width of cut	: *a*e = 0.315"
Machine	: Vertical M/C (CAT50, 30kW)
Workpiece material	: 1055 (200HB)

Plunging performance



P Steel

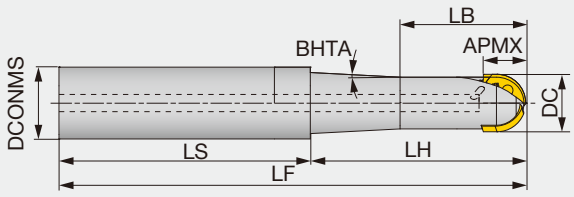
Cutter	: EBRU075SW075S0600 (ø*D*c = 0.750", Z = 2)
Insert	: ZRBM200-MM APH730
Application	: Plunging
Cutting speed	: *V*c = 492 sfm
Feed per tooth	: *f*z = 0.016 ipt
Max.drilling depth	: 0.118"
Machine	: Vertical M/C (CAT50, 30kW)
Workpiece material	: 1055 (200HB)

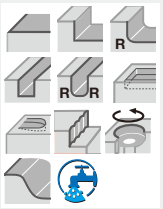
No chip build on the cutting edge of BallRoughNose inserts.

ROUGH BALL NOSE

EBRM...

Indexable ball nose end mill for semi-roughing, shank type





Inch	APMX	DC	CICT	DCONMS	LS	LF	LH	WT(kg)	Air hole	Insert
EBRU062SW062S0475	0.470	0.625	2	0.625	3.375	4.748	1.373	0.330	with	ZRBU062-MM
EBRU075SW075S0600	0.510	0.750	2	0.750	4.000	6.000	2.000	0.610	with	ZRBU075-MM
EBRU100SW100S0600	0.690	1.000	2	1.000	3.250	6.000	2.750	1.080	with	ZRBU100-MM

SPARE PARTS

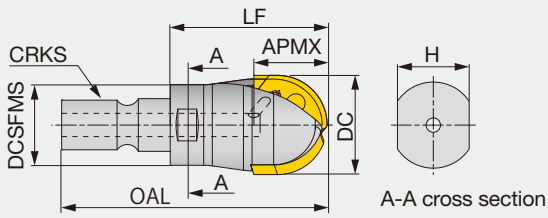
Designation	Clamping screw	Wrench
EBRU062...	TS25064I	T-8D
EBRU075...	TS30C72I	T-9D
EBRU100...	TS35085I/HG	T-15D

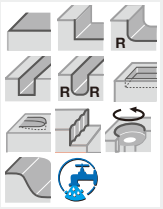
*Torque: Recommended torque (lbf·ft) for clamping ：TS25064I=0.96, TS30C72I=1.70, TS35085I/HG=2.58

ROUGH BALL NOSE

HBRM...

Indexable ball nose end mill for semi-roughing, modular type (TungFlex)





Metric	APMX	DC	CICT	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HBRM16M08	11.8	16	2	42.8	25.3	10	13	M8	0.025	with	ZRBM160...
HBRM20M10	13.6	20	2	50	30	15	18	M10	0.05	with	ZRBM200...
HBRM25M12	17.7	25	2	57	35	17	21	M12	0.08	with	ZRBM250...

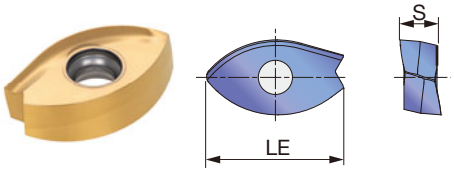
SPARE PARTS

Designation	Clamping screw	Wrench
HBRM16...	TS25064I	T-8D
HBRM20...	TS30085I/HG	T-9D
HBRM25...	TS35085I/HG	T-15D

*Torque: Recommended torque (N·m) for clamping ：TS25064I=1.3, TS30085I/HG=2.3, TS35085I/HG=3.5

INSERT

ZRBM...



P	Steel	★
M	Stainless	☆
K	Cast iron	☆
N	Non-ferrous	
S	Superalloys	☆
H	Hard materials	☆

★ : First choice
☆ : Second choice

Designation	RE	Coated APH730	LE	S
ZRBU062-MM	0.313	●	0.586	0.118
ZRBU075-MM	0.375	●	0.648	0.146
ZRBU100-MM	0.5	●	0.865	0.177

●: Line up
Pack quantity = 5 pcs.

Standard cutting conditions

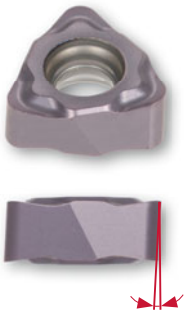
ISO	Workpiece materials	Hardness	Selection criteria	Recommended grade	Chip-breaker	Cutting speed *Vc* (sfm)	Feed per tooth *fz* (ipt)
P	Low carbon steel (1015, 1020, etc.)	- 200 HB	First choice	APH730	MM	490 - 1145	0.004 - 0.024
	High carbon and alloy steel (1055, 4140, etc.)	- 300HB	First choice	APH730	MM	390 - 1045	0.002 - 0.020
	Prehardened steels (NAK80, PX5, etc.)	30 - 40HRC	First choice	APH730	MM	325 - 655	0.002 - 0.020
M	Austenitic stainless steel (304SS, 316SS, etc.)	- 200HB	First choice	APH730	MM	325 - 915	0.002 - 0.024
	Martensitic stainless steel (420SS etc.)	- 200HB	First choice	APH730	MM	325 - 980	0.002 - 0.024
K	Gray cast irons (Class 25, Class 30, etc.)	150 - 250HB	First choice	APH730	MM	390 - 1245	0.004 - 0.024
	Ductile cast iron (60-40-18, 80-55-06, etc.)	150 - 250HB	First choice	APH730	MM	325 - 915	0.004 - 0.020
S	Titanium alloy (Ti-6Al-4V, etc.)	-	First choice	APH730	MM	65 - 260	0.002 - 0.024
	Heat-resistant alloys (Inconel718, etc.)	-	First choice	APH730	MM	65 - 195	0.002 - 0.016
H	Hardened steel (H13 etc.)	40 - 50 HRC	First choice	APH730	MM	130 - 260	0.002 - 0.008
	Hardened steel (D2, etc.)	50 - 60 HRC	First choice	APH730	MM	95 - 195	0.002 - 0.008

The above cutting parameters are for reference. Adjustments may be required depending on applications, machine powers and rigidity, and/or workpiece fixture/clamping methods.

DOMINIMILL

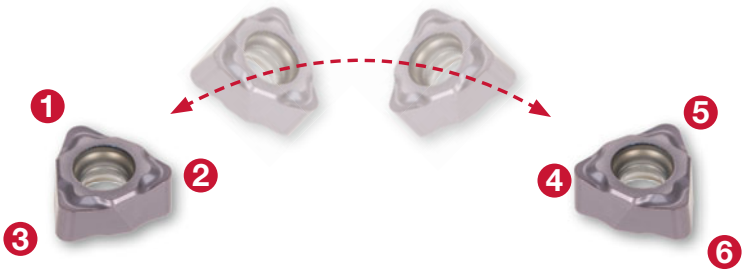
Double sided with positive edge - innovative geometry

- The unique twisted peripheral shape provides positive flank clearance for double sided insert.
- Positive insert positioning and sharper cutting edge improves cutting action and surface finish.



Positive flank clearance

- Highly economical insert with 6 cutting edges.

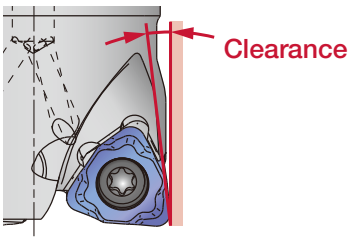


High stability

- Dovetail clamping system allows rigidity for accurate 3 dimensional machining.
- Improves reliability in plunging operations.

Dovetail clamping system

- Back clearance angle with wall surface avoids chip packing allowing smooth cutting even in machining of square walls.



- Optimized geometry of cutting edge offers resistance to chipping in machining of steel and hardened material.

Inserts

- H-class insert with high accuracy provides minimized runout.

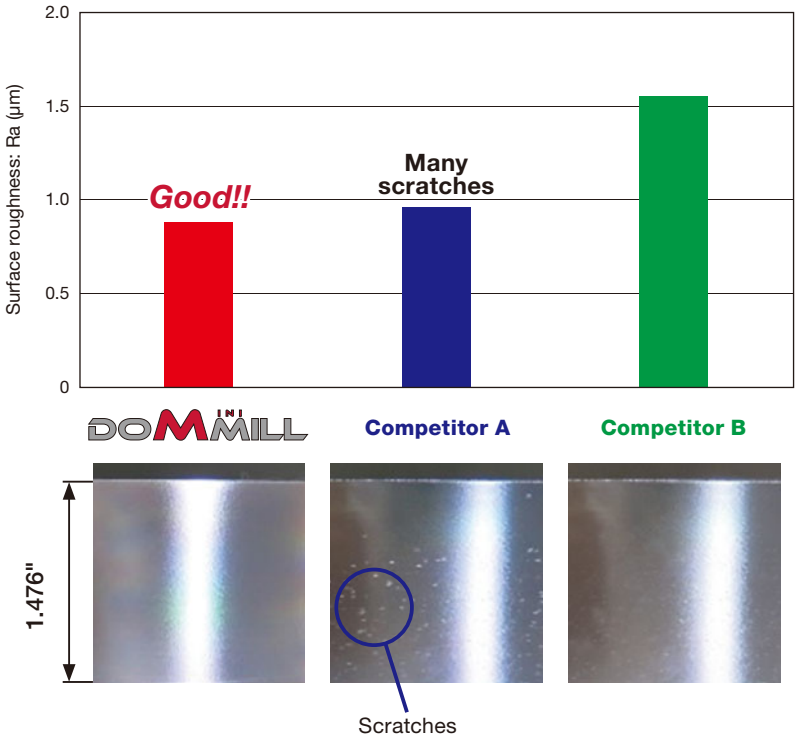
- 2 sizes of corner radii available for various types of machining.
  R = 0.020" : Suitable for general purpose with low depth and width of cut
  R = 0.039" : Ideal for hardened steel machining due to improved corner strength

- AH110 grade with PremiumGTec and high wear resistance is ideal for hardened material machining.

WXHU04-MJ

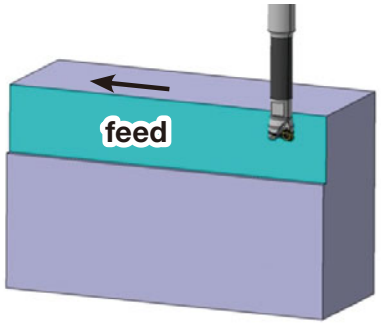
CUTTING PERFORMANCE

Surface finish

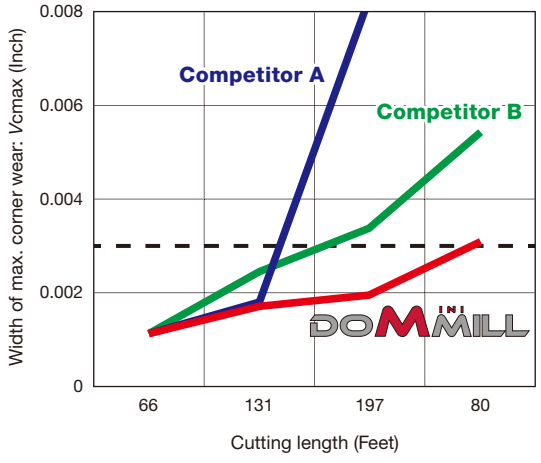


P
Steel

Cutter : HFWX04M016M08R02 (ø*D*c = 0.630", z = 2)
Insert : WXHU040310R-MJ
Workpiece material : 4140 (302HB)
Cutting speed : *V*c = 984 sfm
Feed per tooth : *f*z = 0.006 ipt
Depth of cut : *a*p = 0.006"
Width of cut : *a*e = 0.020"

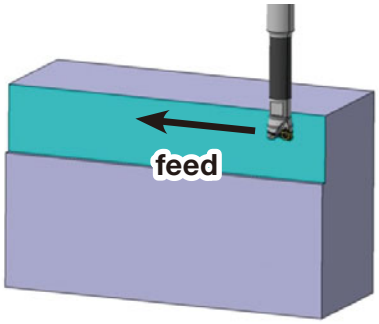


Tool life



H
Hard Materials

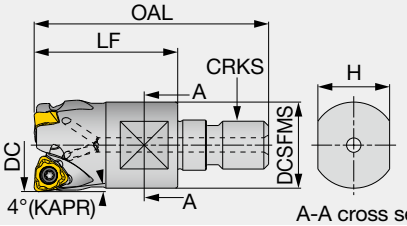
Cutter : HFWX04M016M08R02 (ø*D*c = 0.630", z = 2)
Insert : WXHU040305R-MJ
Workpiece material : D2 (58.5HRC)
Cutting speed : *V*c = 330 sfm
Feed per tooth : *f*z = 0.006 ipt
Depth of cut : *a*p = 0.006"
Width of cut : *a*e = 0.008"



DOMMILL

HFWX04-M

Small-radius cutter for finishing operation; Modular head with TungFlex thread connection



Metric	DC	CICT	OAL	LF	H	DCSFMS	CRKS	WT(kg)	Air hole	Insert
HFWX04M016M08R02	16.00	2	42.0	25.0	10.0	13	M8	0.03	with	WXHU04**
HFWX04M020M10R03	20.00	3	49.0	30.0	15.0	18	M10	0.05	with	WXHU04**
HFWX04M025M12R04	25.00	4	52.0	30.0	17.0	21	M12	0.09	with	WXHU04**

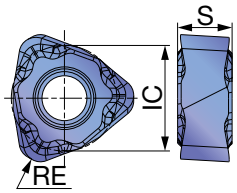
SPARE PARTS

Designation	Clamping screw	Lubricant (Optional)	Wrench
HFWX04M...	SR34-514	(M-1000)	T-7F

*Torque: Recommended torque (N·m) for clamping : SR34-514=0.9

INSERT

WXHU-MJ



P	Steel	★	
M	Stainless		
K	Cast iron		
N	Non-ferrous		
S	Superalloys		
H	Hard materials	★	

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated AH110	IC	S
WXHU040305R-MJ	0.0197	0.020	●	0.250	0.125
WXHU040310R-MJ	0.0394	0.039	●	0.250	0.122

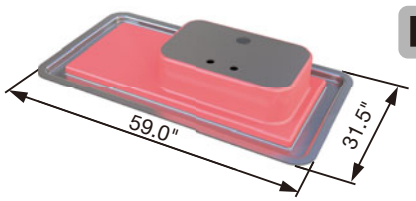
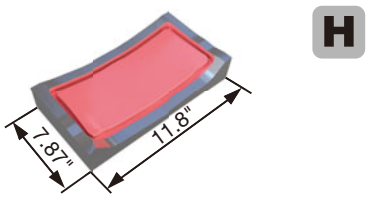
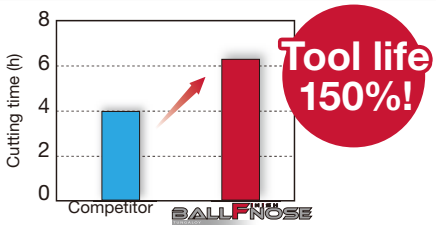
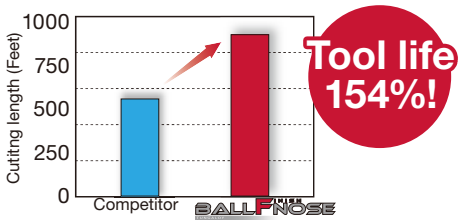
* For plunging, width up to 2 mm is possible.

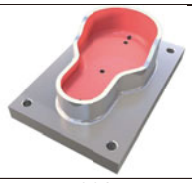
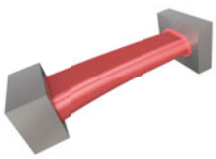
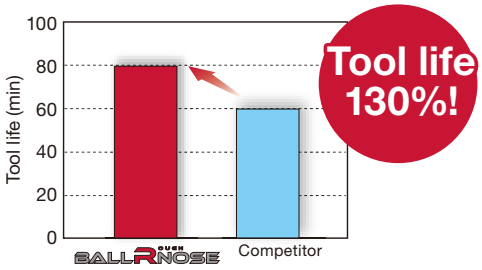
●: Line up

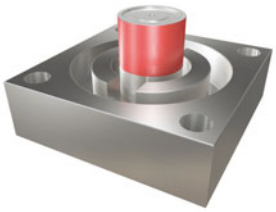
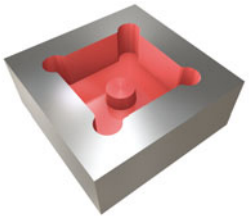
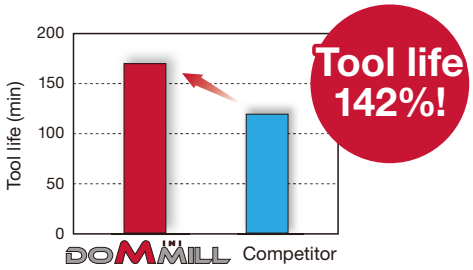
STANDARD CUTTING CONDITIONS

ISO	Workpiece materials		Hardness (HB)	Grades	Cutting speed *Vc* (sfm)	Feed per tooth *fz* (ipt)
P	High carbon steel (1045, 1055, etc.)		200 - 300	AH110	328 - 984	0.004 - 0.012
P	Alloy steel (4140, etc.)		150 - 300	AH110	328 - 984	0.004 - 0.012
P	Prehardened steel (NAK80, PX5, etc.)		-	AH110	328 - 984	0.002 - 0.012
H	Hardened steel	(H13, etc.)	-	AH110	262 - 427	0.004 - 0.012
H	Hardened steel	(D2, etc.)	-	AH110	164 - 328	0.002 - 0.006

PRACTICAL EXAMPLES

Workpiece type		Carrier	Cylinder
Cutter		EBFU075S075C0875	EBFU050S050S0437
Insert		ZFBU075R00-MJ	ZFBU050R00-MJ
Grade		AH725	AH725
Workpiece material		SKD11	STAVAX
			
Cutting conditions	Cutting speed : *Vc* (sfm)	1148	1180
	Feed per tooth : *fz* (ipt)	0.006	0.004
	Depth of cut : *ap* (inch)	0.008	0.02
	Pick feed : pf (Inch)	0.012	0.039
	Method of machining	Profiling	Profiling
	Coolant	Dry	Internal supply, water-soluble coolant
	Machine	M/C, CAT50	Vertical M/C, CAT40
Results		 BallFinishNose's tool life was 50% longer than the competitor's due to high wear resistance.	 BallFinishNose's cutting length was 54% longer than the competitor's due to excellent chip evacuation.

Workpiece type		New Mold part	New Turbine blade
Cutter		EBRU100SW100S0600	EBRU075SW075S0600
Insert		ZRBM250-MM	ZRBM200-MM
Grade		APH730	APH730
Workpiece material		4140	Stainless steel (forged)
			
Cutting conditions	Cutting speed: *Vc* (sfm)	820	574
	Feed per tooth : *fz* (ipt)	0.010	0.028
	Feed speed : *Vf* (ipm)	63	158
	Depth of cut : *ap* (Inch)	0.315	0.004 - 0.024
	Width of cut : *ae* (Inch)	0.157	-
	Method of machining	Profiling	Profiling
	Coolant	Air	Air blow
	Machine	Vertical M/C	Specialized machine
Results		 Thanks to its tough cutting edge and APH730 grade, BallRoughNose achieved 30% longer tool life compared to the competitor.	 Low rigidity workpiece was limiting the competitor's tool from increasing the feed rate. Thanks to its free cutting geometry, BallRoughNose has increased the feed rate by 40% over that of the competitor's.

Workpiece type		Mold	Mold
Cutter		HFWX04M020M10R03 (ø0.787", z = 3)	HFWX04M025M12R04 (ø25 mm, z = 4)
Insert		WXHU040310R-MJ	WXHU040310R-MJ
Grade		AH110	AH110
Workpiece material		Die steel (28 – 32 HRC) 	Die steel (50 – 52HRC) 
Cutting conditions	Cutting speed : *Vc* (sfm)	640	900
	Feed per tooth: *fz* (ipt)	0.006	0.006
	Feed speed : *Vf* (ipm)	59.1	78.7
	Depth of cut : *ap* (inch)	0.010	0.004
	Width of cut : *ae* (inch)	0.014	-
	Machining	Profiling	Profiling
	Coolant	Wet (internal, 40bar)	Dry
	Machine	Vertical M/C	Vertical M/C
Results		 DoMini-Mill increased tool life by 42% because of lower cutting force compared to competitor's tool and grade with high wear resistance.	**5 hours machining!** New PremiumGTec grade with improved wear resistance achieved long tool life.

Check our site and **our App** to get more info!

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EC97J1123
1997.11.26

Produced from Recycled paper Jan. 2026 (TJ)