Member IMC Group Tungaloy INDUSTRY 4.0

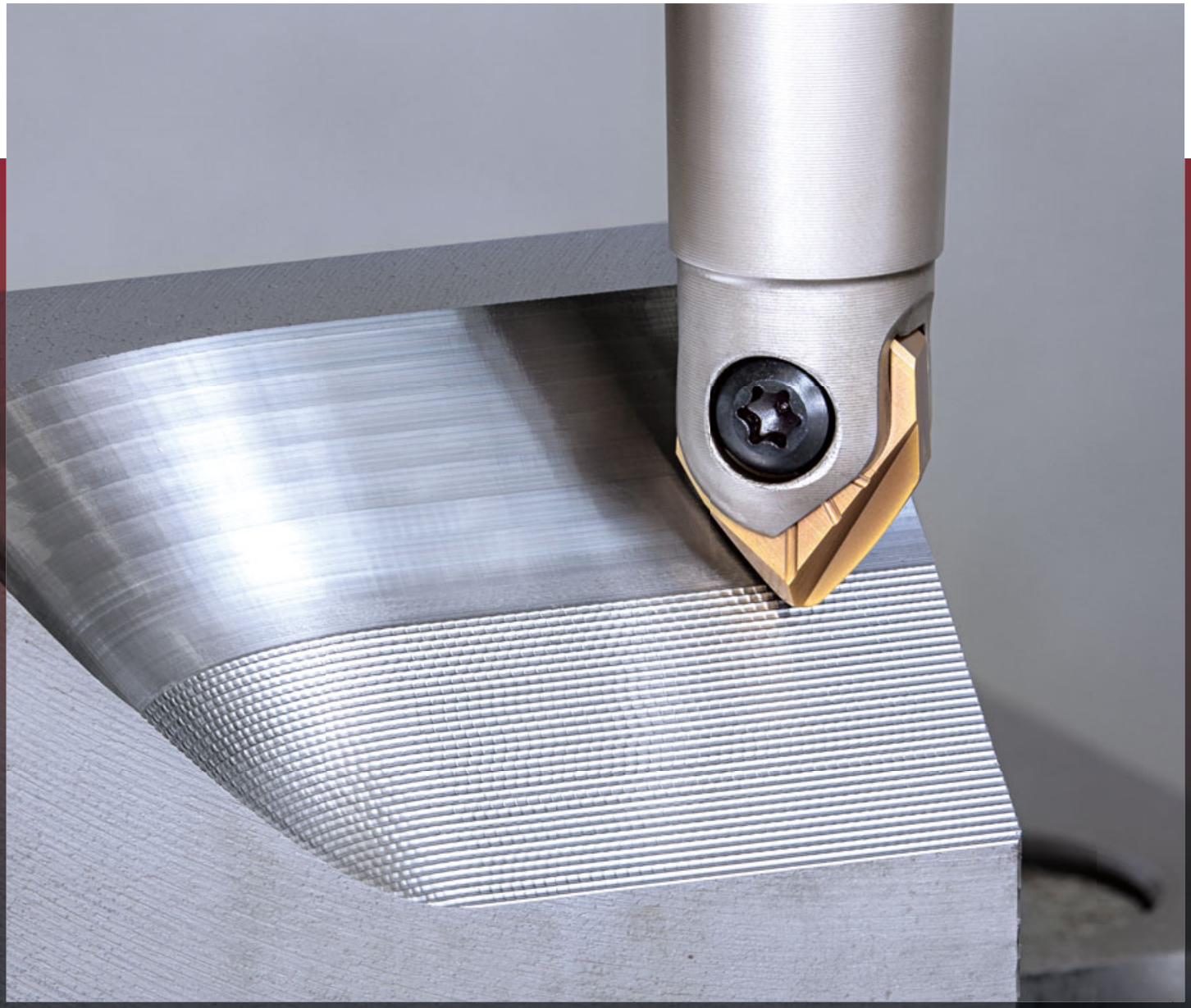
MillLine

Profile milling cutter

FINISH BALLFNOSE

Tungaloy Report No. 431S1-US

New barrel type insert with large R cutting edge for high productivity



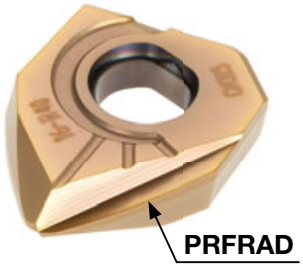
TUNGALOY ADDFORCE ACCELERATED LINES

BALLFINISHNOSE

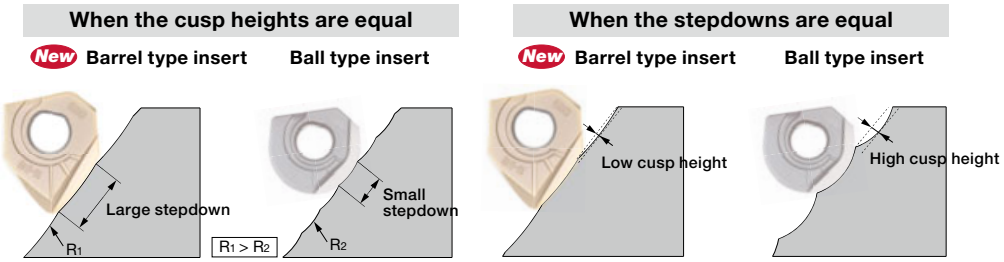
For more information

Large R cutting edge for high productivity and high accuracy

The barrel insert has a 5 times larger profile radius (PRFRAD) than the ball nose insert of the same tool diameter, enabling high part quality and increased efficiency.

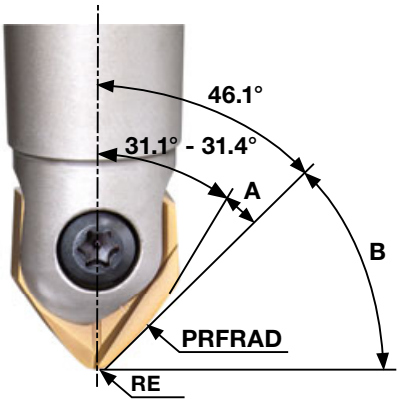


BALLFINISHNOSE Barrel type insert vs ball type insert



Improved productivity Barrel type insert provide larger stepdowns than ball type insert, reducing the number of tool passes.

Good surface finish Barrel type insert can reduce the cusp height generated by ball type insert, substantially increasing surface quality.



Applicable tilt angle ranges

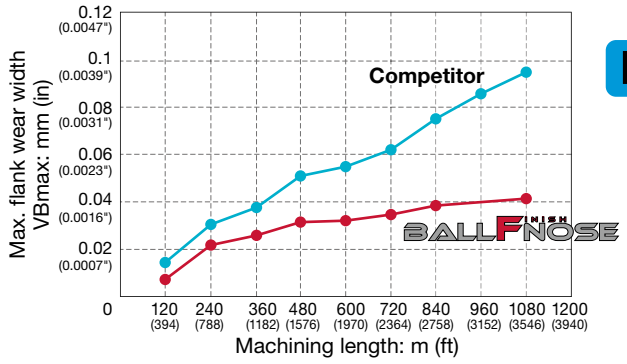
Designation	Tool dia. (in)	PRFRAD (in)	Applicable ranges of tilt angles on workpiece	
			A (PRFRAD)	B (RE)
ZFCBM120R300-MM	ø0.472	1.181	31.4° - 46.1°	46.1° - 90°
ZFCBM160R400-MM	ø0.630	1.575	31.4° - 46.1°	46.1° - 90°
ZFCBM200R500-MM	ø0.787	1.969	31.4° - 46.1°	46.1° - 90°
ZFCBM250R625-MM	ø0.984	2.461	31.2° - 46.1°	46.1° - 90°
ZFCBM300R750-MM	ø1.181	2.953	31.1° - 46.1°	46.1° - 90°

GRADE

CH315 P M K S H

- Unique grade with high wear resistance
- Suitable for semi-finishing to finishing applications

Tool life machining carbon steel

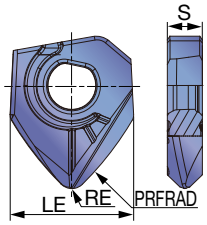


P

Cutter	: EBFM16T20S130 (DCX = 16 mm (0.630", CICT = 2)
Insert	: ZFCBM160R400-MM CH315
Workpiece material	: S55C / C55 (1055) (204HB)
Cutting speed	: *Vc* = 550 m/min (1804 sfm)
Feed per tooth	: *fz* = 0.2 mm/t (0.008 ipt)
Pitch	: p = 0.15 mm (0.006")
Width of cut	: *ae* = 0.1 mm (0.004")
Coolant	: Dry
Overhang length	: 80 mm (3.150")
Machine	: Vertical M/C, BT40 (CAT40)

INSERTS

ZFCBM-MM



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

★ : First choice
☆ : Second choice

Designation	PRFRAD (in)	RE (in)	Coated	LE (in)	S (in)	Cutter
			CH315			
ZFCBM120R300-MM	1.181	0.059	●	0.472	0.134	E/HBFM12...
ZFCBM160R400-MM	1.575	0.079	●	0.630	0.173	E/HBFM16...
ZFCBM200R500-MM	1.969	0.098	●	0.787	0.213	E/HBFM20...
ZFCBM250R625-MM	2.461	0.118	●	0.984	0.252	E/HBFM25...
ZFCBM300R750-MM	2.953	0.138	●	1.181	0.291	E/HBFM30...

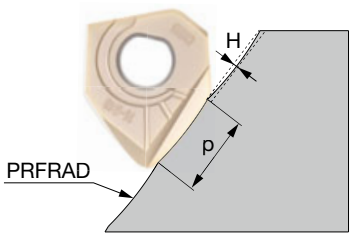
With ZFCBM insert, the functional length (LF) of the EBFM and HBFM cutters becomes longer for the amount as indicated below:
For E/HBFM12, +2.6 mm (0.102"); E/HBFM16, +4 mm (0.146"); E/HBFM20, +4.4 mm (0.173"); E/HBFM25, +5.8 mm (0.228");
and E/HBFM30, +5.9 mm (0.272").

● : Line up

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Cutting speed *Vc* (sfm)	Feed per tooth *fz* (ipt)	Width of cut *ae* (in)
P	Low carbon steel 1020, etc.	- 200HB	328 - 1969	0.002 - 0.012	< 0.012
	Carbon steel 1045, etc.	- 300HB	328 - 1969	0.002 - 0.012	< 0.012
	Prehardened steel NAK80, PX5, etc.	30 - 40HRC	328 - 1969	0.002 - 0.012	< 0.012
M	Austenitic stainless steel 304SS, etc.	- 200HB	328 - 1969	0.002 - 0.012	< 0.012
	Precipitation hardening stainless steel 17-4 PH, etc.	- 45HRC	328 - 984	0.002 - 0.01	< 0.008
K	Gray cast iron Class 25, etc.	150 - 250HB	328 - 1969	0.002 - 0.012	< 0.012
	Ductile cast iron 60-40-18, etc.	150 - 250HB	328 - 1969	0.002 - 0.012	< 0.012
S	Titanium alloys Ti-6Al-4V, etc.	- 45HRC	131 - 394	0.002 - 0.008	< 0.008
	Superalloys Inconel718, etc.	- 45HRC	66 - 262	0.002 - 0.008	< 0.008
H	Hardened steel H-13, etc.	40 - 55HRC	164 - 984	0.002 - 0.008	< 0.008

■ Cusp height and pitch



H: Cusp height
p: Pitch
PRFRAD: Radius of barrel-shaped cutting edge

To obtain the pitch (p) from the given cusp height (H)

PRFRAD (in) \ H (in)	0.00004	0.00008	0.00012	0.00016	0.00020	0.00039	0.00059	0.00079
30 (ZFCBM120R300...)	0.019	0.027	0.033	0.039	0.043	0.061	0.075	0.086
40 (ZFCBM160R400...)	0.022	0.031	0.039	0.044	0.050	0.070	0.086	0.100
50 (ZFCBM200R500...)	0.025	0.035	0.043	0.050	0.056	0.079	0.096	0.111
62.5 (ZFCBM250R625...)	0.028	0.039	0.048	0.056	0.062	0.088	0.108	0.124
75 (ZFCBM300R750...)	0.030	0.043	0.053	0.061	0.068	0.096	0.118	0.136

$$p = \sqrt{8 \times H \times PRFRAD} \quad \text{(mm)}$$

To obtain the cusp height (H) from the given pitch (p)

PRFRAD (in) \ p (in)	0.020	0.030	0.039	0.049	0.059	0.069	0.079
30 (ZFCBM120R300...)	0.00004	0.00008	0.00016	0.00028	0.00035	0.00051	0.00067
40 (ZFCBM160R400...)	0.00004	0.00008	0.00010	0.00020	0.00028	0.00039	0.00051
50 (ZFCBM200R500...)	0.00004	0.00004	0.00010	0.00016	0.00024	0.00032	0.00039
62.5 (ZFCBM250R625...)	0.00004	0.00004	0.00008	0.00010	0.00020	0.00024	0.00032
75 (ZFCBM300R750...)	< 0.00004	0.00004	0.00008	0.00010	0.00016	0.00020	0.00028

$$H = \frac{p^2}{8 \times PRFRAD} \quad \text{(mm)}$$

Oct. 2023 (TJ)