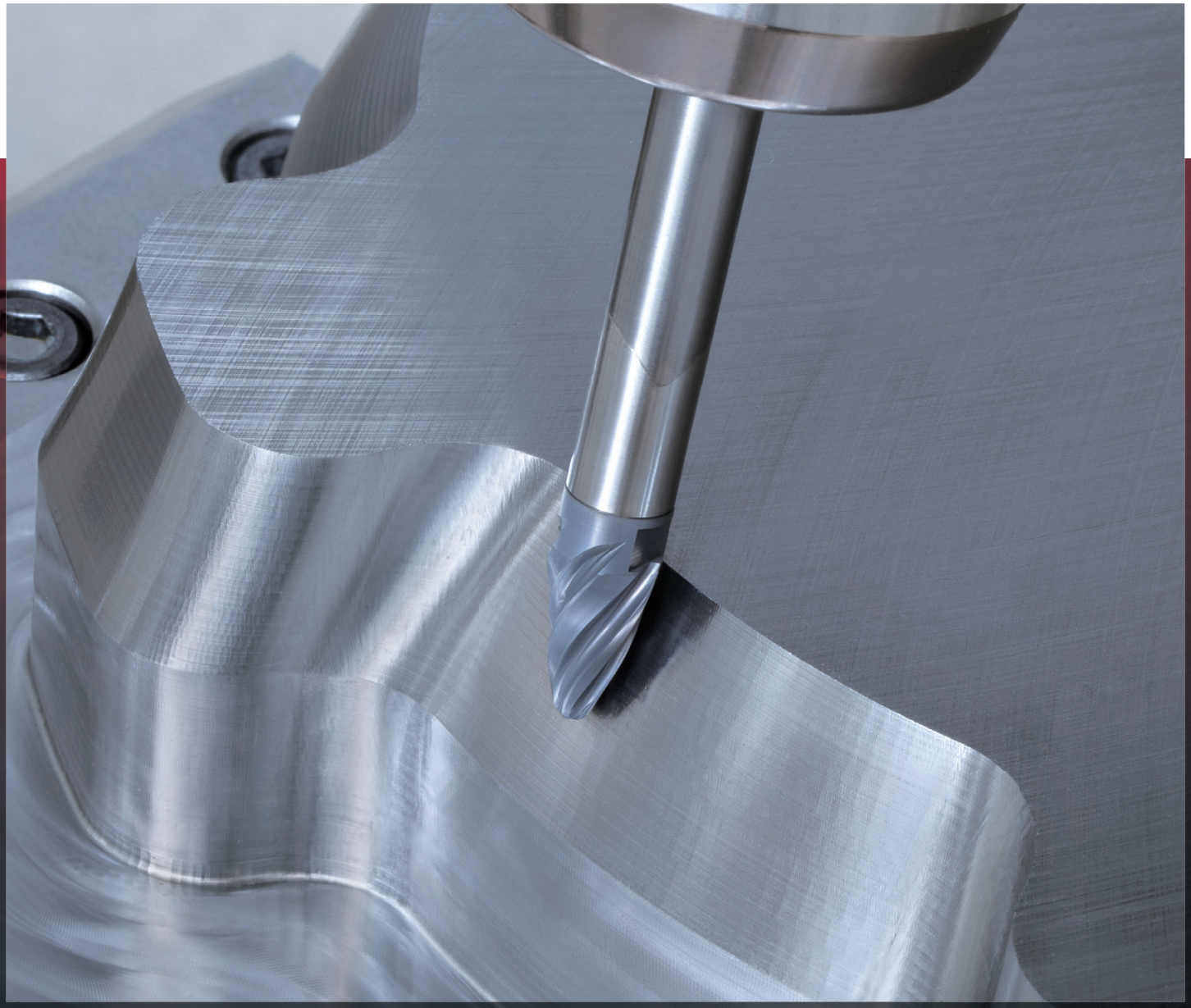
Member IMC Group Tungaloy INDUSTRY 4.0

MillLine
Expansion 3

TUNGMEISTER

Tungaloy Report No. 381S3-US

Productive 3D profiling in 5-axis machines

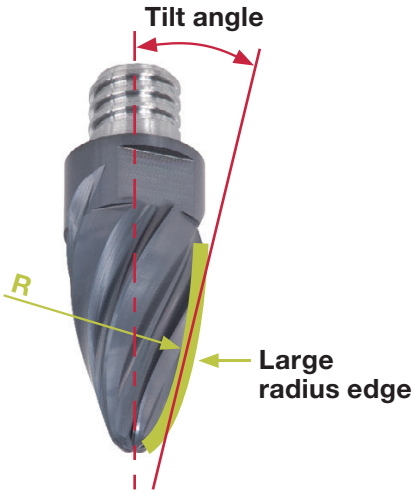


TUNGALOY ADDFORCE ACCELERATED LINES

TUNGMEISTER

For more information

Expansion to **TungMeister** series: New **VBO** and **VBN** conical barrel milling heads for 3D profiling in 5-axis machines

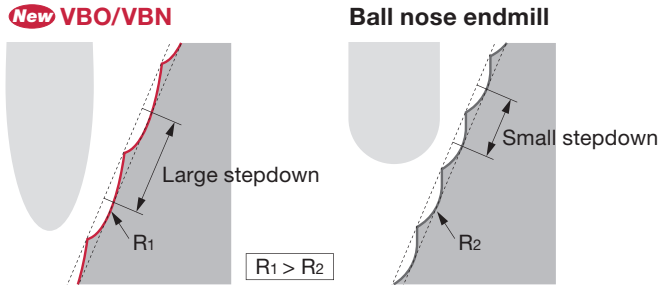


- Large radius cutting edge reduces the number of tool passes without degradation of surface quality, providing high machining efficiency
- The tool tilt angle provides an ideal cutting point for excellent surface finish
- 3 types of heads cover a wider range of parts

High productivity with larger-radius cutting edge

TUNGMEISTER VBO/VBN barrel heads vs ball nose end mills

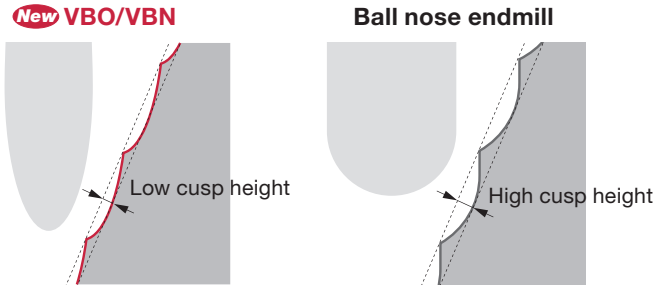
When the cusp heights are equal



Improved productivity

VBO and **VBN** provide larger stepdowns than ball nose end mill, reducing the number of tool passes.

When the stepdowns are equal



Good surface finish

VBO and **VBN** can reduce the cusp height generated by ball nose end mill, substantially increasing surface quality.

VBO-short

- Small ball nose + medium tapered radius (R25, R30, R40). A large range of tool tilt angle to allow sharp tool turns
- High productivity due to reduced tool passes compared to ball endmills
- For semi-finishing of general parts with 3D contour including die and mold parts

VBO-long

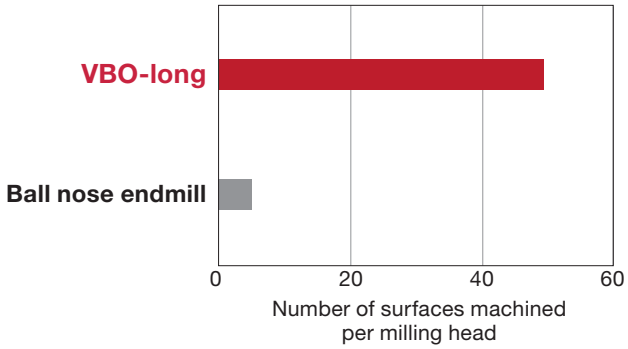
- Small ball nose + large tapered radius (R75, R80, R85). For high productivity and surface precision
- Improved productivity due to reduced tool passes compared to ball endmills
- For semi-finishing and finishing of die and mold parts

VBN

- Small corner radius + large tapered radius (R45, R50, R60). Suited for blade surfaces and roots
- High productivity due to reduced tool passes compared to ball endmills
- For semi-finishing and finishing of blades, blisks, impellers, and other aerospace parts

Long tool life

Tool life at max. flank wear width: VBmax = 0.05 mm (0.002")



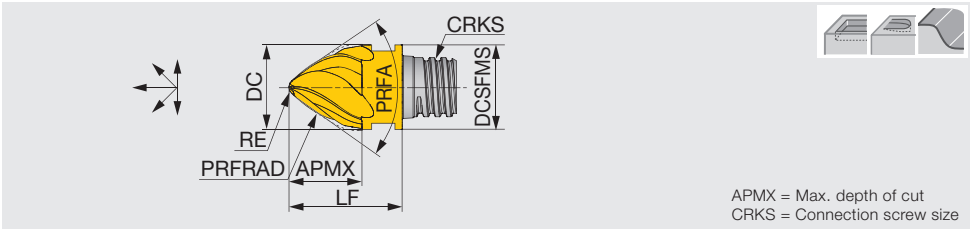
P

Head	: VBO100L15.0R850-5S06 (ø10 mm)
Workpiece material	: S55C / C55 (206HB)
Cutting speed	: *Vc* = 50 m/min
Feed per tooth	: *fz* = 0.08 mm/t
Width of cut	: *ae* = 0.03 mm
Tool overhang length	: 75 mm
Machining area	: 150 x 100 mm
Coolant	: Wet
Machine	: 5-axis (BT40)

The large-radius cutting edge of **VBO** and **VBN** milling heads allows larger stepover increments, substantially increasing cycle time and tool life relative to ball nose endmill.

VBO**S...

Short type barrel head with 4 flute, for 3D profiling with 5-axis machine



APMX = Max. depth of cut
CRKS = Connection screw size

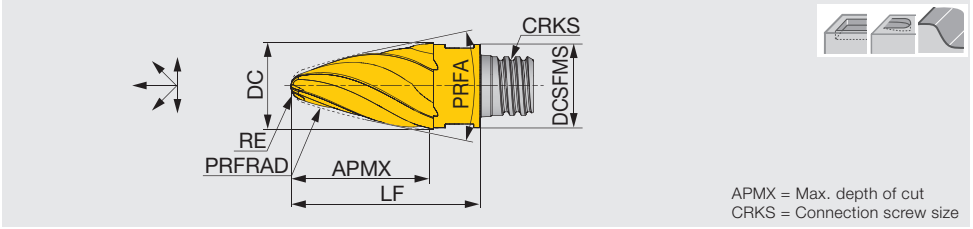
Metric	AH715	NOF	FHA	DC	DCSFMS	APMX	RE	PRFRAD	PRFA	CRKS	LF	Wrench	Torque*
VBO100L08.0R250-4S06	●	4	30°	10	9.7	8	0.8	25	70.8°	S06	13	KEYV-S06	10
VBO120L09.0R300-4S08	●	4	30°	12	11.7	9	1.2	30	71.6°	S08	16.5	KEYV-S08	15
VBO160L13.0R400-4S10	●	4	30°	16	15.3	13	1.6	40	70.3°	S10	20.5	KEYV-S10	28

* Recommended clamping torque (N·m)
2 pieces per package

●: New

VBO**L...

Long type barrel head with 5 flute, for 3D profiling with 5-axis machine



APMX = Max. depth of cut
CRKS = Connection screw size

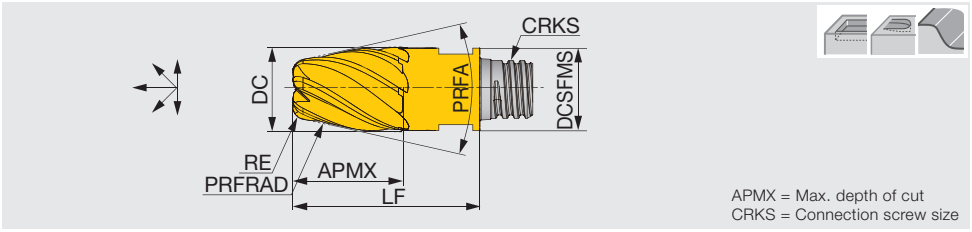
Metric	AH715	NOF	FHA	DC	DCSFMS	APMX	RE	PRFRAD	PRFA	CRKS	LF	Wrench	Torque*
VBO100L15.0R850-5S06	●	5	30°	10	9.7	15	2	85	27.3°	S06	22	KEYV-S06	10
VBO120L19.0R800-5S08	●	5	30°	12	11.7	19	2	80	29.3°	S08	27	KEYV-S08	15
VBO160L25.0R750-5S10	●	5	30°	16	15.3	25	3	75	26.7°	S10	33.5	KEYV-S10	28

* Recommended clamping torque (N·m)
2 pieces per package

●: New

VBN...

Bull nose head with 6 flute, for 3D profiling with 5-axis machine

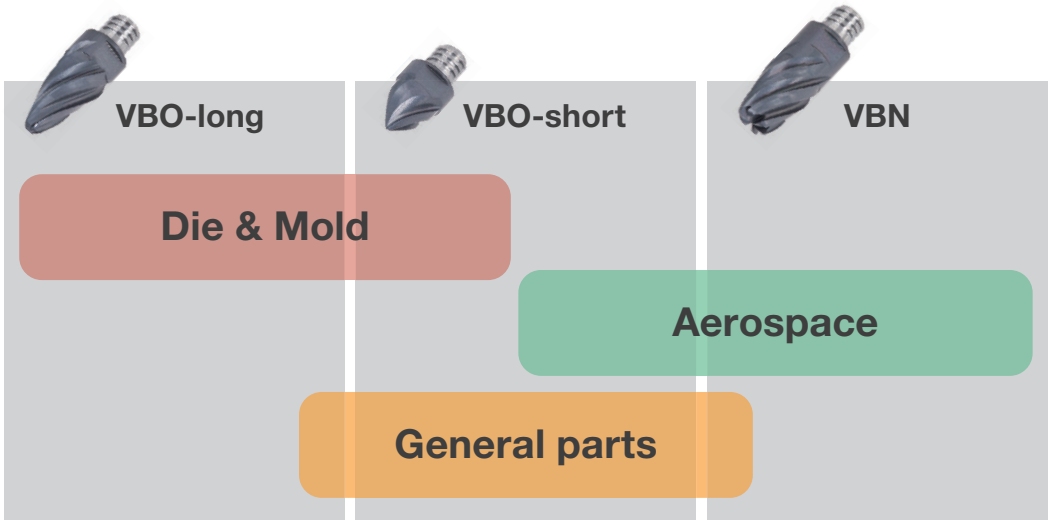


Metric	AH715	NOF	FHA	DC	DCSFMS	APMX	RE	PRFRAD	PRFA	CRKS	LF	Wrench	Torque*
VBN100L13.0R450-6S06	●	6	35°	10	9.7	13	1.5	45	15.1°	S06	22	KEYV-S06	10
VBN120L15.0R500-6S08	●	6	35°	12	11.7	15	2	50	15.1°	S08	27	KEYV-S08	15
VBN160L18.0R600-6S10	●	6	35°	16	15.3	18	2	60	15.1°	S10	33.5	KEYV-S10	28

* Recommended clamping torque (N·m)
2 pieces per package

●: New

TARGET MARKET



TUNGMEISTER

STANDARD CUTTING CONDITIONS

ISO	Workpiece material	Hardness	Cutting speed *Vc* (sfm)	Feed per tooth: *fz* (mm/t) Tool diameter: DC (mm)			Cusp height (in)
				0.390"	0.470"	0.630"	
P	Low carbon steels 1045, 1055, etc.	- 300 HB	330 - 660	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
P	High carbon steels 4140, 5120, etc.	- 300 HB	260 - 590	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
P	Prehardened steel PX5, NAK80, etc.	30 - 40 HRC	260 - 525	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
M	Stainless steels S30400, S31600, etc.	- 200 HB	200 - 330	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
K	Grey cast irons No.250B, No.300B, etc.	150 - 250 HB	330 - 720	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
K	Ductile cast irons 60-40-18, etc.	150 - 250 HB	330 - 720	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
N	Aluminum alloys Si < 13%	-	660 - 2300	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
N	Aluminum alloys Si ≥13%	-	330 - 980	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
S	Titanium alloys Ti-6Al-4V, etc.	-	130 - 260	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
S	Heat-resistant alloys Inconel 718, etc.	50 - 60 HRC	66 - 130	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
H	Hardened steel H13, etc.	-	130 - 260	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004
H	Hardened steel D2, etc.	50 - 60 HRC	66 - 220	0.002 - 0.004	0.002 - 0.004	0.003 - 0.005	0.004

TIPS FOR USING ON 3-AXIS MACHINES

The VBO/VBN milling heads are designed for the use on 5-axis machines. However, they can also bring out effective results on 3-axis machining centers when either of the following conditions is satisfied.

1. The angled walls or curved surfaces to be machined have tilt angles within the range specified in the chart on the right.
2. Use as a regular tapered ball mill with only the nose radius of the tool tip, and not the radius on the tool side, to be used. Please note that the working diameter will be smaller that those of ball mill of the same working diameter.

	Designation	Applicable ranges of tilt angles on workpiece		
		Min.	Mean	Max.
VBO-short	VBO100L08.0R250-4S06	56°	70.8°	85°
	VBO120L09.0R300-4S08	58°	71.6°	85°
	VBO160L13.0R400-4S10	56°	70.3°	85°
VBO-long	VBO100L15.0R850-5S06	20°	27.3°	35°
	VBO120L19.0R800-5S08	19°	29.3°	40°
	VBO160L25.0R750-5S10	10°	26.7°	43°
VBN	VBN100L13.0R450-6S06	0°	15.1°	29°
	VBN120L15.0R500-6S08	0°	15.1°	29°
	VBN160L18.0R600-6S10	0°	15.1°	29°

TARGET APPLICATIONS

VBO-short

Convex-curved surfaces, tapered surfaces, and surfaces consisting of combinations of a small corner radius and walls (the corner radius must be larger than the tool's nose radius).

VBO-long

Convex-curved and tapered surfaces in gentler profile than those of VBO-short.

VBN

Impellers, blisks, blades, and other aerospace parts.

Tungaloy America, Inc.

3726 N Ventura Drive, Arlington Heights, IL 60004, U.S.A.
Inside Sales: +1-888-554-8394
Technical Support: +1-888-554-8391
Fax: +1-888-554-8392
www.tungaloy.com/us

Tungaloy Canada

432 Elgin St. Unit 3, Brantford, Ontario N3S 7P7, Canada
Phone: +1-519-758-5779 Fax: +1-519-758-5791
www.tungaloy.com/ca

Tungaloy de Mexico S.A.

C Los Arellano 113, Parque Industrial Siglo XXI
Aguascalientes, AGS, Mexico 20290
Phone:+52-449-929-5410 Fax:+52-449-929-5411
www.tungaloy.com/mx

Scan for instant web access

Member IMC Group Tungaloy INDUSTRY 4.0

www.tungaloy.com/us

follow us at:
facebook.com/tungaloyamerica
twitter.com/tungaloy
instagram.com/tungaloyamerica
linkedin.com/company/tungaloy-america

To see Tungaloy product in action visit:

YouTube

www.youtube.com/tungaloycorporation

Distributed by:

FIND US ON THE CLOUD!
machiningcloud.com

TUNGALOY ATLAS

Available on the App Store

GET IT ON Google play

Dr. Carbide Tungaloy

Available on the App Store

GET IT ON Google play

Apr. 2021 (TJ)