Member IMC Group Tungaloy INDUSTRY 4.0

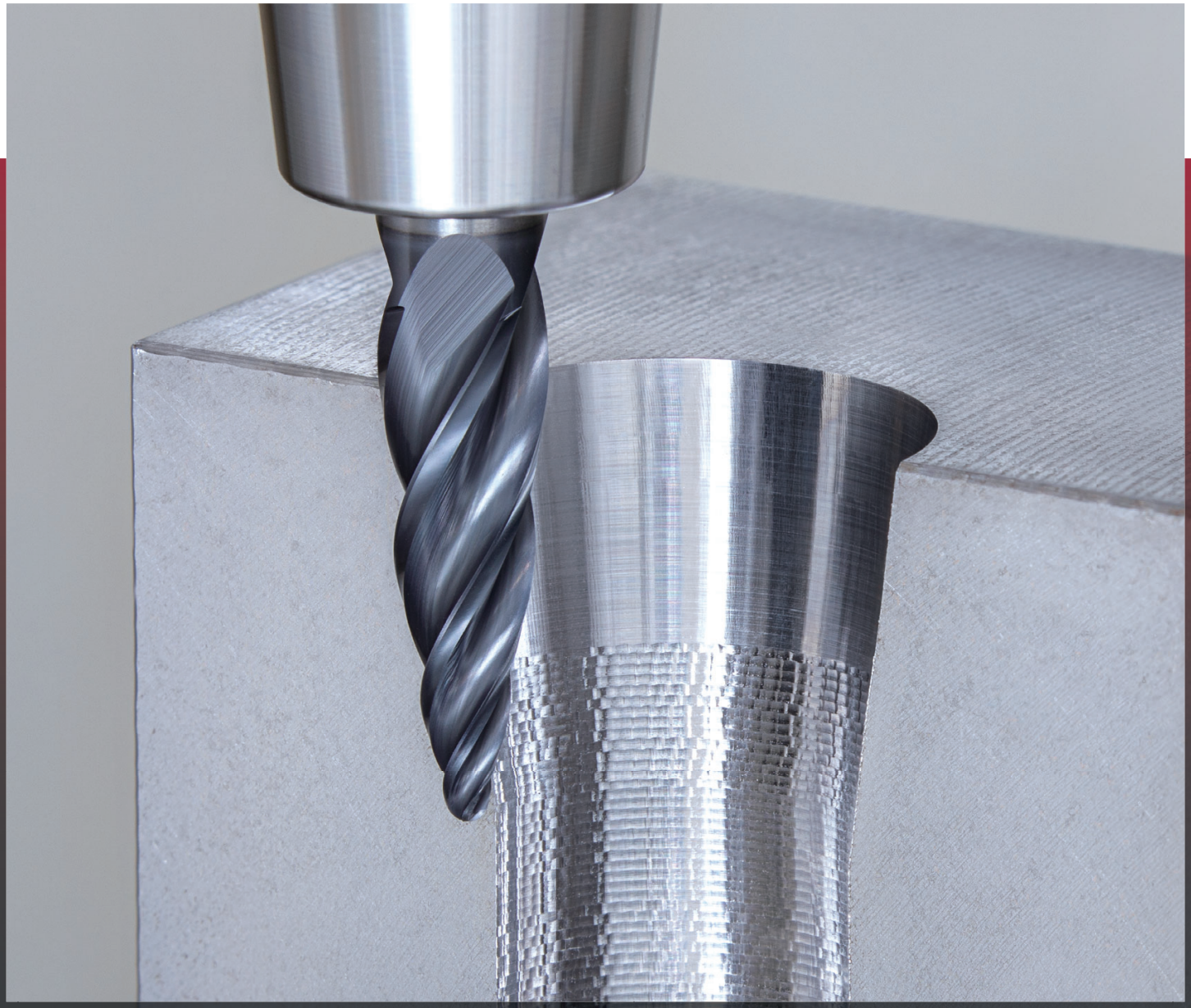
MillLine

Solid carbide endmill

# SOLIDMEISTER

Tungaloy Report No. 396S1-G

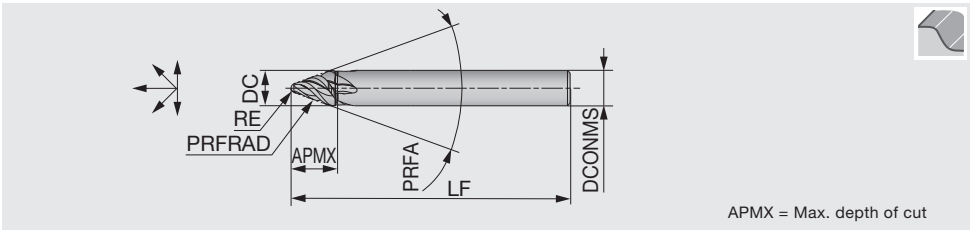
# Barrel endmills for accelerated finish profile milling



TUNGALOY ADDFORCE ACCELERATED LINES

## TEBO...

4 flute, semi-finishing - finishing, barrels, short edge, high productive profiling



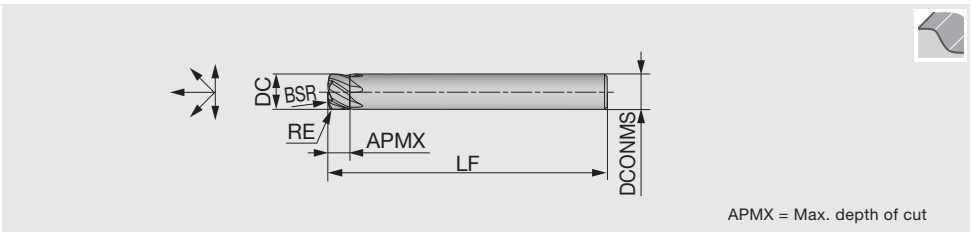

APMX = Max. depth of cut

| Designation | AH710 | NOF | FHA | DC | DCONMS | APMX | RE | PRFRAD | PRFA | LF | Shank |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TEBO080A4-10/20.0-R250R1 | ● | 4 | 30° | 8 | 8 | 10 | 1 | 250 | 40° | 63 | Cylindrical |
| TEBO100A4-11/20.0-R250R2 | ● | 4 | 30° | 10 | 10 | 11 | 2 | 250 | 40° | 72 | Cylindrical |
| TEBO120A4-12/20.0-R250R3 | ● | 4 | 30° | 12 | 12 | 12 | 3 | 250 | 40° | 83 | Cylindrical |

● : Line up

## TEBL...

4, 6 flute, semi-finishing - finishing, lens, high productive profiling




APMX = Max. depth of cut

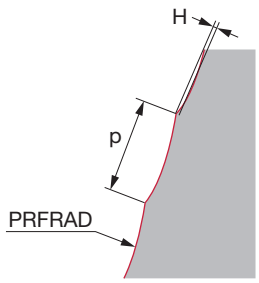
| Designation | AH710 | NOF | FHA | DC | DCONMS | APMX | RE | BSR | LF | Shank |
|---|---|---|---|---|---|---|---|---|---|---|
| TEBL080A4-05R15R0.75-63 | ● | 4 | 30° | 8 | 8 | 5 | 0.75 | 16 | 63 | Cylindrical |
| TEBL100A6-07R20R1-72 | ● | 6 | 30° | 10 | 10 | 7 | 1 | 20 | 72 | Cylindrical |
| TEBL120A6-09R25R1-83 | ● | 6 | 30° | 12 | 12 | 9 | 1 | 25 | 83 | Cylindrical |

● : Line up

## STANDARD CUTTING CONDITIONS

| ISO | Workpiece material | | Hardness | Priority | Grade | Cutting speed *Vc* (m/min) | Feed per tooth: *fz* (mm/t) Tool diameter: DC (mm) 8 | 10 | 12 |
|---|---|---|---|---|---|---|---|---|---|
| P | Low carbon steel SS400, S15C, etc. E275A, C15E4, etc., C15E, etc. | | - 200 HB | First choice | AH710 | 210 - 300 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.12 |
| P | Carbon steel, Alloy steel S55C, SCM440, etc. C55, 42CrMo4, etc. | | - 300 HB | First choice | AH710 | 160 - 240 | 0.024 - 0.064 | 0.03 - 0.08 | 0.036 - 0.096 |
| P | Prehardened steel PX5, NAK80, etc. | | 30 - 40 HRC | First choice | AH710 | 130 - 200 | 0.016 - 0.064 | 0.02 - 0.08 | 0.024 - 0.096 |
| M | Stainless steel SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc. | | - | First choice | AH710 | 60 - 110 | 0.016 - 0.056 | 0.02 - 0.07 | 0.024 - 0.084 |
| K | Grey cast iron FC250, FC300, etc. 250, 300, etc., GG25, GG30, etc. | | 150 - 250 HB | First choice | AH710 | 150 - 275 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.12 |
| K | Ductile cast iron FCD400, etc. | | 150 - 250 HB | First choice | AH710 | 150 - 200 | 0.04 - 0.08 | 0.05 - 0.1 | 0.06 - 0.12 |
| S | Titanium alloys Ti-6Al-4V, etc. | | - | First choice | AH710 | 60 - 90 | 0.016 - 0.032 | 0.02 - 0.04 | 0.024 - 0.048 |
| S | Heat-resistant alloys Inconel718, etc. | | - | First choice | AH710 | 20 - 35 | 0.016 - 0.032 | 0.02 - 0.04 | 0.024 - 0.048 |
| H | Hard material | SKD61, etc. X40CrMoV5-1, etc. | 40 - 50 HRC | First choice | AH710 | 40 - 80 | 0.008 - 0.024 | 0.01 - 0.03 | 0.012 - 0.036 |
| H | Hard material | SKD11, etc. X153CrMoV12, etc. | 50 - 60 HRC | First choice | AH710 | 40 - 80 | 0.008 - 0.024 | 0.01 - 0.03 | 0.012 - 0.036 |

## ■ 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)

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

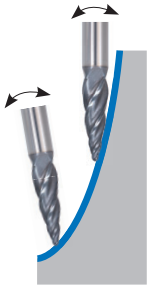
| Designation | H (mm) / PRFRAD(mm) | 0.001 | 0.002 | 0.003 | 0.004 | 0.005 | 0.01 |
|---|---|---|---|---|---|---|---|
| TEBO080A4-10/20.0-R250R1 | **250** | 1.4 | 2 | 2.4 | 2.8 | 3.2 | 4.5 |
| TEBO100A4-11/20.0-R250R2 | **250** | 1.4 | 2 | 2.4 | 2.8 | 3.2 | 4.5 |
| TEBO120A4-12/20.0-R250R3 | **250** | 1.4 | 2 | 2.4 | 2.8 | 3.2 | 4.5 |
| TEBO080A4-25/7.4-R90R1 | **90** | 0.8 | 1.2 | 1.5 | 1.7 | 1.9 | 2.7 |
| TEBO120A4-27/9.2-R85R2 | **85** | 0.8 | 1.2 | 1.4 | 1.6 | 1.8 | 2.6 |
| TEBL080A4-05R15R0.75-63 | **16** | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 1.1 |
| TEBL100A6-07R20R1-72 | **20** | 0.4 | 0.6 | 0.7 | 0.8 | 0.9 | 1.3 |
| TEBL120A6-09R25R1-83 | **25** | 0.4 | 0.6 | 0.8 | 0.9 | 1 | 1.4 |

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

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

| Designation | p (mm) / PRFRAD (mm) | 0.5 | 0.75 | 1 | 1.25 | 1.5 | 1.75 |
|---|---|---|---|---|---|---|---|
| TEBO080A4-10/20.0-R250R1 | **250** | 0.0001 | 0.0003 | 0.0005 | 0.0008 | 0.0011 | 0.0015 |
| TEBO100A4-11/20.0-R250R2 | **250** | 0.0001 | 0.0003 | 0.0005 | 0.0008 | 0.0011 | 0.0015 |
| TEBO120A4-12/20.0-R250R3 | **250** | 0.0001 | 0.0003 | 0.0005 | 0.0008 | 0.0011 | 0.0015 |
| TEBO080A4-25/7.4-R90R1 | **90** | 0.0003 | 0.0008 | 0.0014 | 0.0022 | 0.0031 | 0.0043 |
| TEBO120A4-27/9.2-R85R2 | **85** | 0.0004 | 0.0008 | 0.0015 | 0.0023 | 0.0033 | 0.0045 |
| TEBL080A4-05R15R0.75-63 | **16** | 0.002 | 0.0044 | 0.0078 | 0.0122 | 0.0176 | 0.0239 |
| TEBL100A6-07R20R1-72 | **20** | 0.0016 | 0.0035 | 0.0063 | 0.0098 | 0.0141 | 0.0191 |
| TEBL120A6-09R25R1-83 | **25** | 0.0013 | 0.0028 | 0.005 | 0.0078 | 0.0113 | 0.0153 |

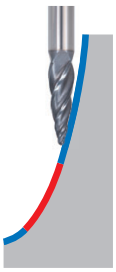
**When using with 5-axis machine**



By using the barrel R with tilted tool axis, tilted section can be cut with large pitch. Furthermore, it is possible to cut with less machining steps by using the tip R.

Processable with barrel type endmill

**When using with 3-axis machine**



Barrel R is able to cut a steep face with a large pitch. However, it is necessary to process the bottom corner section with a separate tool.

Needs separate tool

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