

**YE-TP23** METRIC

BEST VALUE IN THE WORLD OF CUTTING TOOLS



FOR TITANIUM, STAINLESS STEELS AND ALLOY STEELS :

TOUGH MATERIALS  
TAKE IT ON WITH

**TitaNox Power**




INDUSTRY-LEADING SOLID CARBIDE END MILLS

HIGH-PERFORMANCE  
MACHINING MADE EASY:

- Variable Helix and Pitch
- 4 Flute and 5 Flute
- Square End, Chamfer and Radius
- Standard and Extended Lengths
- Inch and Metric Sizes
- 5 Flute Heavy Cutting Solution  
TitaNox-Power HPC **NEW**

# Take It On With TitaNox Power

**HIGH-PERFORMANCE MACHINING MADE EASY.**

-  Titanium
-  Stainless Steels
-  Alloy Steels



If you've been looking for a superior carbide end mill that won't back down when the going gets tough, it's time you look at TitaNox-Power.

The TitaNox-Power line is built to take on titanium, stainless steels, alloy steels, and more. With a choice of 4- and 5 flute designs and extra-rigid high-speed performance, TitaNox-Power makes the perfect match for aerospace, power generation and medical applications.

## TitaNox-Power - Nothing Cuts Better.

With more choices in high-performance carbide end mills, YG-1 is the undisputed leader in end mill offerings. And with the TitaNox-Power line, you have a full selection of extremely durable end mills built to take on the toughest materials in the business. From titanium to stainless steel and more - TitaNox-Power rules. In either 4 flute or 5 flute configurations you get:

- ▶ YG-1 advanced coating for better wear resistance
- ▶ Better thermal stability
- ▶ Optimized edge design provides excellent performance in heavy cutting applications
- ▶ Excellent performance in difficult-to-machine materials
- ▶ Perfect solution for aerospace, power generation and medical applications
- ▶ Premium grade substrate for longer tool life



### TitaNox-Power 4 FLUTE DOUBLE CORE END MILLS



#### Let the Chips Fly.

For heavy cutting in slotting and profiling applications, our true double-core design provides faster chip evacuation and improved dimensional stability. Experience what a difference double-core design can make in your operation.

- ▶ Highly rigid double core adds stability and improves rigidity
- ▶ Unique 4 flute design provides excellent chip evacuation
- ▶ Variable flute design featuring multiple helix helps increase performance, reduce vibration and eliminate chatter

### TitaNox-Power 5 FLUTE MULTIPLE HELIX END MILLS




#### Strong Performance — Right to the Finish.

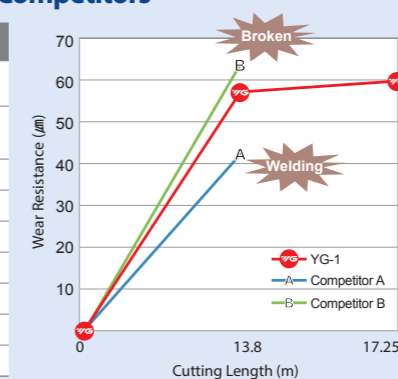
These new 5 flute end mills are built to handle high-speed machining with fine finishing ability.

- ▶ 5 flute multiple helix design for fast, fine finishing in tough materials
- ▶ Multiple-helix geometry delivers smooth cutting with reduced chatter
- ▶ The perfect choice for profiling, finishing, peel milling operations and more
- ▶ New HPC Solution for Heavy Cutting Applications


## CASE STUDY

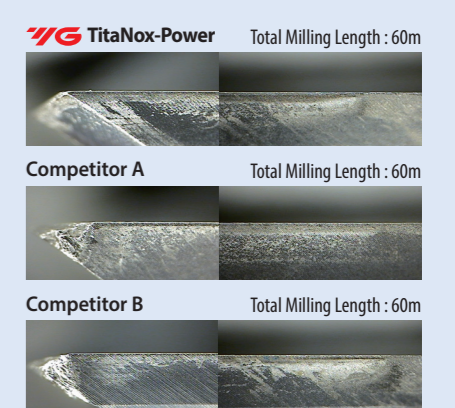
### 4 Flute Double Core TitaNox Power vs. Competitors

Cutting Conditions	
Milling Method	Slotting 
Work Material	- DIN : Ti6Al4V (Titanium) - WR : 3.7165.1
Size	Ø12(R1) x Ø12 x 26 x 80
RPM	1,591 rev./min.
FEED	254 mm/min.
Axial Depth	12mm
Coolant	Wet Cut
Overhang	36mm
Machine	Machining Center




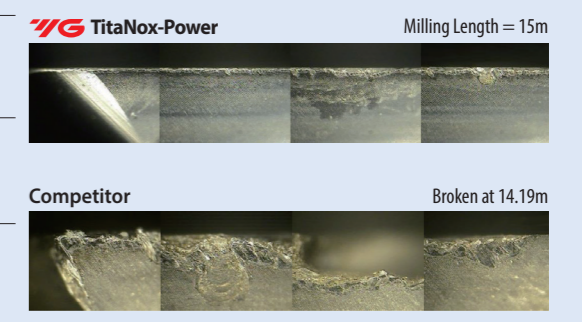
### 5 Flute Multiple Helix TitaNox Power vs. Competitors

Cutting Conditions	
Milling Method	Down & Side Cutting 
Work Material	- DIN : Ti6Al4V (Titanium) - WR : 3.7165.1
Size	Ø12(R1) x Ø12 x 26 x 83
RPM	1,591 rev./min.
FEED	398 mm/min.
Axial Depth	18mm
Radial Depth	3.6mm
Coolant	Wet Cut
Machine	Machining Center



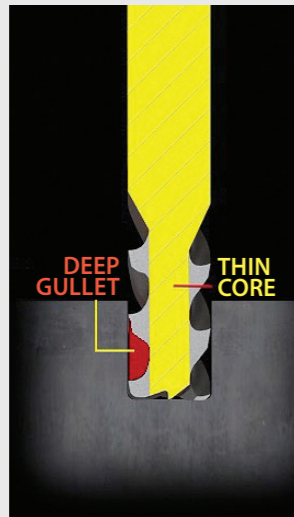
### 5 Flute TitaNox-Power HPC vs. Competitor

Cutting Conditions	
Milling Method	Side Cutting 
Work Material	- DIN : Ti6Al4V (Titanium) - WR : 3.7165.1
Size	Ø19.05(R0.76) x Ø19.05 x 38.1 x 101.6
RPM	2,000 rev./min.
FEED	762mm/min.
Milling Method	Axial : 1,905mm / Radial : 38.1mm
Coolant	Wet Cut
Machine	Machining Center

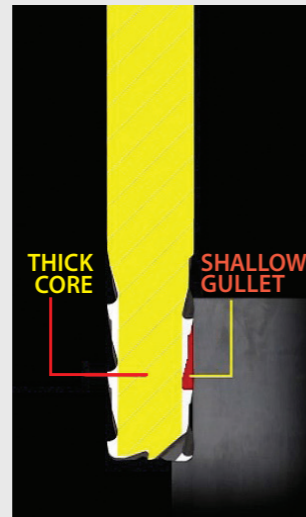


## How Our 4-Flute Double-Core Design Can Cut It Where Others Can't.

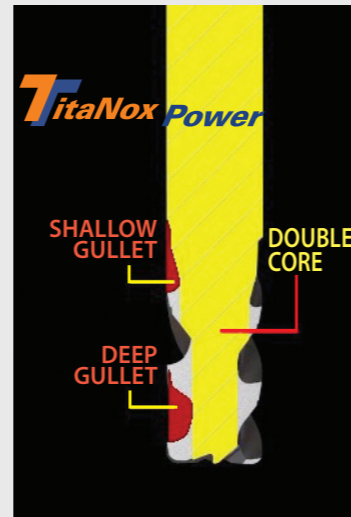
Whether in profiling or slotting conditions, the TitaNox-Power double-core design takes end milling titanium and other tough metals to a new level. With our super-rigid, heat resistant design featuring an innovative large gullet configuration, the TitaNox-Power can cut it where single-core designs can't. With outstanding chip evacuation and the added ability to maneuver in tough materials, the TitaNox-Power double-core end mills can combine heavy profiling and slotting in the same move—without vibration or chip packing.



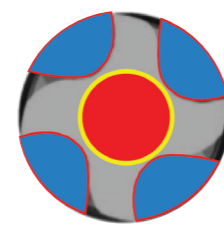
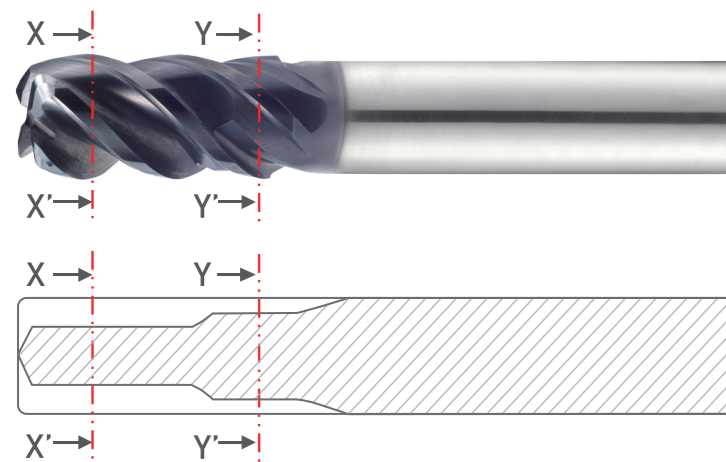
▲ Thin-core designs allow aggressive cutting at first, but are soon slowed down due to excessive vibration, and often break.



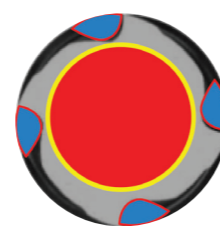
▲ Thick-core designs provide enhanced stability but don't deliver enough chip evacuation, which can often lead to catastrophic failure.



▲ The TitaNox-Power double-core design provides the best of both worlds – excellent chip evacuation combined with tool rigidity—to ensure stability, cut after cut. All this, plus quiet, vibration-free operation.



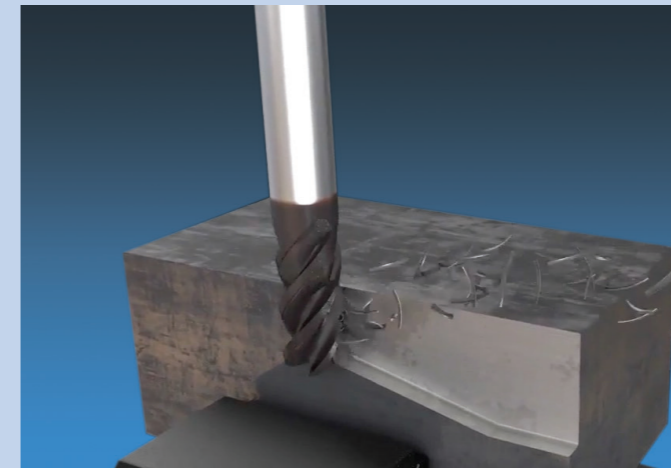
**SECTION X-X'**  
Excellent chip evacuation



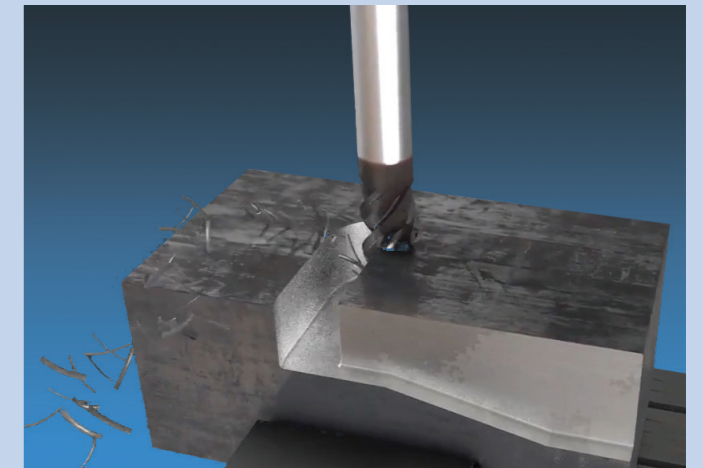
**SECTION Y-Y'**  
Higher rigidity

▲ The illustration above detailed along the X-X' axis shows how the 4 flute design starts the cut with aggressive chip evacuation. The Y-Y' axis shows how the double core comes into play, providing perfect slotting operations through its extra-rigid double-core design.

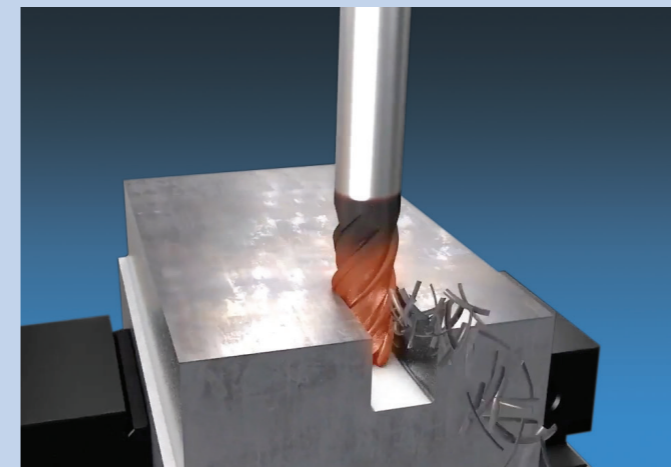
## Super-Stable, Super-Performing, Super-Productive.



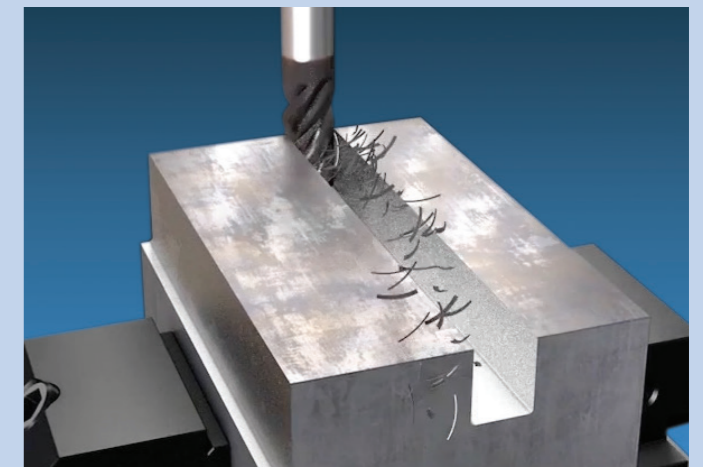
▲ For smooth, effortless profiling, the double-core design provides extremely stable cutting for increased productivity. No other end mill performs better in tough cutting conditions.



▲ Switch from profiling to slotting without excessive vibration without loading up. TitaNox-Power double-core design pushes productivity higher in tough-to-mill materials.



▲ Other 4 flute single-core tools can load up in heavy axial depths of cut and break, as shown in the illustration above.



▲ The TitaNox-Power super-rigid design and large gullet configuration provide excellent chip evacuation = in titanium.

## Our Advanced Coating cuts faster—and lasts longer.

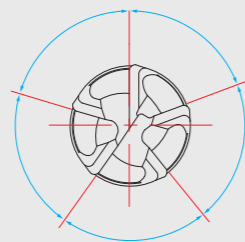
Compared to other competitive coatings currently on the market, YG-1's new advanced coating brings you the best of both worlds — increased tool hardness and higher speed performance. It all adds up to increased productivity in tough materials, and longer tool life. But what really sets our advanced coating apart is how it makes the TitaNox-Power line the best value around in cutting tools — just another way YG-1 adds more value for less.



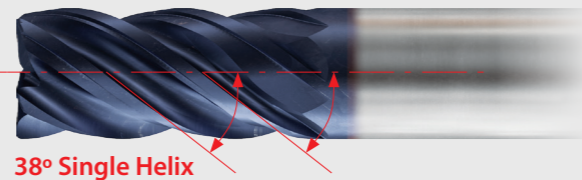
**NEW**  
**TitaNox-Power HPC**  
**NEW 5 FLUTE DESIGN for**  
**HEAVY CUTTING**  
**APPLICATIONS**  
**SLOTTING & HIGH EFFICIENCY MILLING**

**Features**

- New design enhances chip space in heavy cuts, while still maintaining rigidity in peel milling.
- Full eccentric relief for edge strength.
- YG-1 advanced coating for better wear resistance
- Unequal index design for Chatter-Free cutting



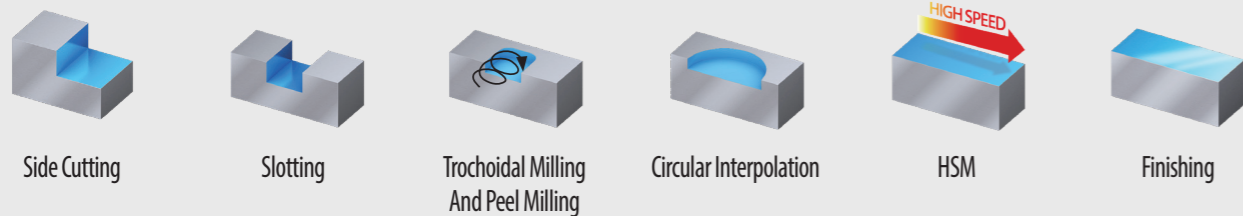
**Unequal Index**  
 Exclusively Designed Unique Geometry applied to Reduce Vibration and also to achieve Excellent surface finish



**38° Single Helix**

**Core Design**  
 YG-1's High Performance Core Geometries is designed for superior chip evacuation. It's excellent at Slotting & Heavy Profiling.

**Applications**

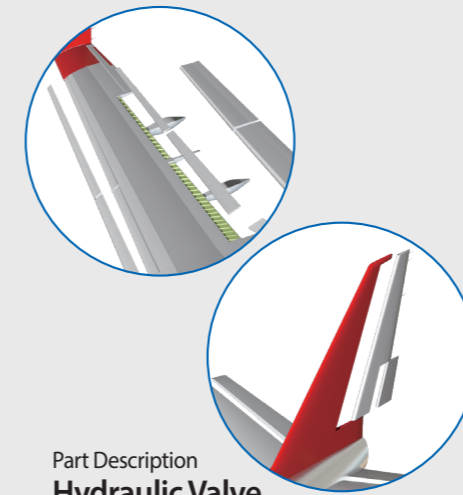


**Work Materials**



Recommended for high performance milling of Stainless Steel, Titanium, and Heat-Resistant Super Alloys

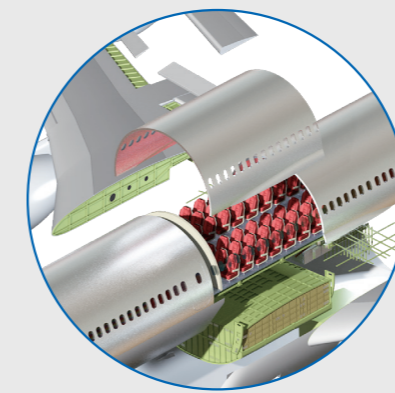
**CASE STUDY**



Part Description  
**Hydraulic Valve**

Size(inch)	Ø12.7(R0.76) × Ø12.7 × 31.75 × 88.9
Work Material	15-5PH (HRc 34-42 / HB 320-400)
Tool Holder	Shrink fit
Vc	128m/min.
FEED	2,032mm/min.
RPM	3,200 rev./min.
Milling Method	Trochoidal Cutting
Ap	25.4mm
Ae	0.635mm
Coolant	Water-Based
Machine	Machining Center

**14 Parts**  
**YG**  
**7 Parts**  
**Competitor A**



Part Description  
**Aerospace Structure part**

Size(inch)	Ø15.875(R3.05) × Ø15.875 × 38.1(50.8) × 101.6
Work Material	Ti6Al4V (HRc 36 / HB 336)
Tool Holder	Shrink Fit
Vc	83.8 - 114.3m/min.
FEED	508 - 1,143mm/min.
RPM	1680-2292 rev./min.
Milling Method	Helical Ramping, Pocket, Ramping, Profile and Slotting
Ap	7.62 - 38.1mm
Ae	1.27 - 15.875mm
Ramping	1° - 1-1/2°
Helical Interpolation	0.5°
Coolant	Water-Based
Machine	Machining Center

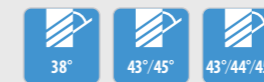
**6-7 Hours**  
**YG**  
**3-4 Hours**  
**Competitor B**

**GUIDE TO ICONS**

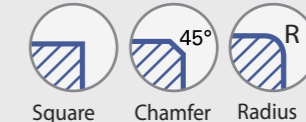
The tool is made of micrograin carbide



Helix Angle



Tool Ends:



Tool Ends:



No. of Flutes



Type of Shank



Cutting Conditions



SERIES	GMG40 GMG41	EMI94 EMI96	EMI93 EMI95	GMG28 GMG29
FLUTE	4	5	5	5
HELIX ANGLE	43°/45°	38°	38°	43°/44°/45°
CUTTING EDGE SHAPE	CORNER RADIUS	CORNER RADIUS	SQUARE	CORNER RADIUS
SIZE MIN	D6.0	D6.0	D6.0	D6.0
SIZE MAX	D25.0	D25.0	D25.0	D25.0
PAGE	10	18	20	12

GMG30 GMG31	GMG24 GMG25	GMG26 GMG27	EHE54 EHE55
5	5	5	5
43°/44°/45°	43°/44°/45°	43°/44°/45°	40°
CORNER RADIUS	SQUARE	SQUARE	ROUGHING CORNER RADIUS
D6.0	D6.0	D6.0	D6.0
D25.0	D25.0	D25.0	D25.0
13	15	16	17
LONG LENGTH	SHORT LENGTH	LONG LENGTH	-
Y-Coating	Y-Coating	Y-Coating	TiAlN

# SOLID CARBIDE

## TitaNox-Power

### END MILLS

High Speed Machining for Exotic Materials:  
Titanium and Stainless Steels



Recommended cutting conditions : p. 21-27

◎ : Excellent ○ : Good

LONG LENGTH DOUBLE CORE	-	-	SHORT LENGTH
Y-Coating	AlTiN		Y-Coating
<b>TitaNox-Power HPC</b>			

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ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	HRc	GMG40	EMI94	EMI93	GMG28	
P	1	Non-alloy steel	About 0.15% C	Annealed	125	○	○	○	○	
	2		About 0.45% C	Annealed	190	○	○	○	○	
	3		About 0.45% C	Quenched & Tempered	250	○	○	○	○	
	4		About 0.75% C	Annealed	270	○	○	○	○	
	5		About 0.75% C	Quenched & Tempered	300	○	○	○	○	
	6	Low alloy steel		Annealed	180	○	○	○	○	
	7		Quenched & Tempered	275	○	○	○	○		
	8		Quenched & Tempered	300	○	○	○	○		
	9		Quenched & Tempered	350	○	○	○	○		
	10	High alloyed steel, and tool steel		Annealed	200	○	○	○	○	
	11		Quenched & Tempered	325	○	○	○	○		
M	12	Stainless steel	Ferritic / Martensitic	Annealed	200	◎	◎	◎	◎	
	13		Martensitic	Quenched & Tempered	240	◎	◎	◎	◎	
	14		Austenitic		180	◎	◎	◎	◎	
K	15	Grey cast iron	Pearlitic / ferritic		180	○	○	○	○	
	16		Pearlitic (Martensitic)		260	○	○	○	○	
	17	Nodular cast iron	Ferritic		160	○	○	○	○	
	18		Pearlitic		250	○	○	○	○	
	19	Malleable cast iron	Ferritic		130	○	○	○	○	
20	Pearlitic			230	○	○	○	○		
N	21	Aluminum-wrought alloy	Not Curable		60					
	22		Curable	Hardened	100					
	23	Aluminum-cast alloyed	≤ 12% Si, Not Curable		75					
	24		≤ 12% Si, Curable	Hardened	90					
	25		> 12% Si, Not Curable		130					
	26		Copper and Copper Alloys (Bronze / Brass)	Cutting Alloys, PB>1%		110				
	27	Non Metallic Materials	CuZn, CuSnZn (Brass)		90					
	28		CuSn, lead-free copper and electrolytic copper		100					
	29		Duroplastic, Fiber Reinforced Plastic							
	30	Rubber, Wood, etc.								
S	31	Heat Resistant Super Alloys	Fe Based	Annealed	200	○	○	○	○	
	32		Cured	280	○	○	○	○		
	33		Annealed	250	○	○	○	○		
	34		Ni or Co Based	Cured	350	○	○	○	○	
	35		Cast	320	○	○	○	○		
	36	Titanium Alloys	Pure Titanium		400 Rm	◎	◎	◎	◎	
37	Alpha + Beta Alloys		Hardened	1050 Rm	◎	◎	◎	◎		
H	38	Hardened steel		Hardened	550					
	39		Hardened	630						
	40	Chilled Cast Iron	Cast	400						
	41	Hardened Cast Iron	Hardened	550						

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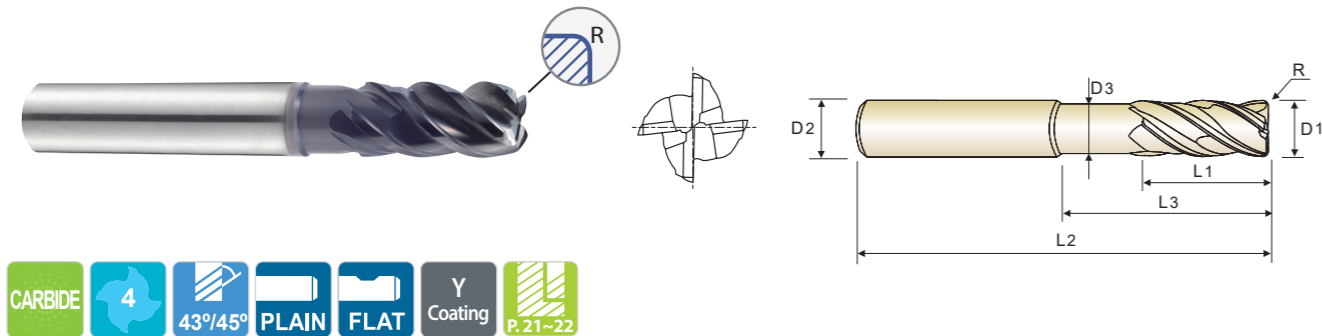
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**AEROSPACE SOLUTIONS & COMPOSITE MATERIALS**



### HIGH-PERFORMANCE SOLID CARBIDE END MILLS CARBIDE, 4 FLUTE CORNER RADIUS WITH DOUBLE CORE

SERIES  
PLAIN SHANK **GMG40**  
FLAT SHANK **GMG41**

- ▶ Double core end mill has a unique flute design for excellent chip evacuation and higher rigidity.
- ▶ The double core adds stability and aids chip flow, reducing tool deflection, improving dimensional stability and workpiece accuracy.

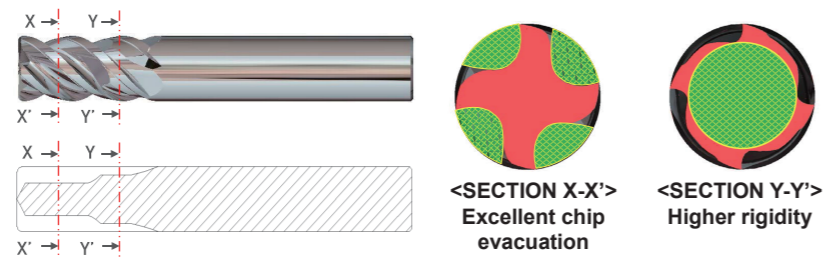


Unit : mm

EDP No.		Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
PLAIN	FLAT	R	D1	D2	L1	L3	L2	D3
GMG40060	GMG41060	R0.5	6.0	6	13	20	57	5.5
GMG40901	GMG41901	R1.0	6.0	6	13	20	57	5.5
GMG40080	GMG41080	R0.5	8.0	8	19	25	63	7.5
GMG40902	GMG41902	R1.0	8.0	8	19	25	63	7.5
GMG40903	GMG41903	R1.5	8.0	8	19	25	63	7.5
GMG40904	GMG41904	R2.0	8.0	8	19	25	63	7.5
GMG40100	GMG41100	R0.5	10.0	10	22	30	72	9.2
GMG40905	GMG41905	R1.0	10.0	10	22	30	72	9.2
GMG40906	GMG41906	R1.5	10.0	10	22	30	72	9.2
GMG40907	GMG41907	R2.0	10.0	10	22	30	72	9.2
GMG40120	GMG41120	R0.5	12.0	12	26	35	83	11.0
GMG40908	GMG41908	R1.0	12.0	12	26	35	83	11.0
GMG40909	GMG41909	R1.5	12.0	12	26	35	83	11.0
GMG40910	GMG41910	R2.0	12.0	12	26	35	83	11.0
GMG40911	GMG41911	R3.0	12.0	12	26	35	83	11.0
GMG40140	GMG41140	R1.0	14.0	14	26	35	83	13.0
GMG40912	GMG41912	R2.0	14.0	14	26	35	83	13.0
GMG40160	GMG41160	R1.0	16.0	16	35	43	92	15.0

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.03	h5 * Shank Dia. ≥ Ø12 : h6

◆ 2 STEP CORE



◎ : Excellent ○ : Good

ISO Material Description	P										M				K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel				Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	25	28	32	38	10	29	32	38	15	35	15	23	10	10	26	3	25	3	21	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	○	○	○	○	○	○	○	○	○	○	○	◎	◎	◎	○	○	○	○	○	○	○

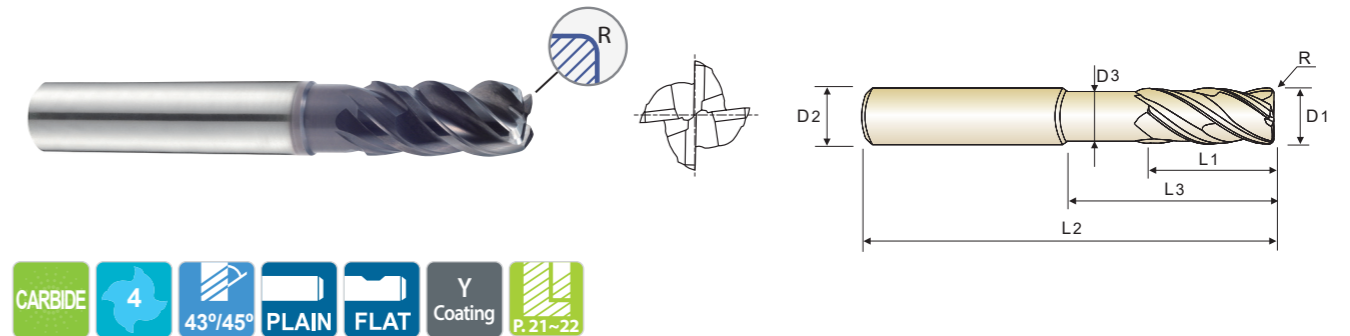
  

ISO Material Description	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed		Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials		Heat Resistant Super Alloys				Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron				
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	15	30	25	38	34	15	30	25	38	34	15	30	25	38	34	55	60	42	42	55	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◎	◎	○	○	○	○

### HIGH-PERFORMANCE SOLID CARBIDE END MILLS CARBIDE, 4 FLUTE CORNER RADIUS WITH DOUBLE CORE

SERIES  
PLAIN SHANK **GMG40**  
FLAT SHANK **GMG41**

- ▶ Double core end mill has a unique flute design for excellent chip evacuation and higher rigidity.
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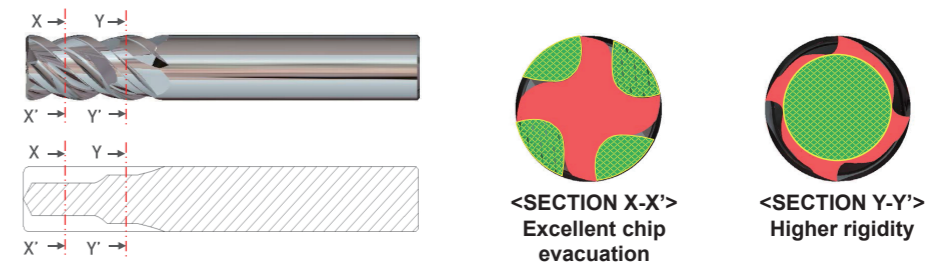


Unit : mm

EDP No.		Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
PLAIN	FLAT	R	D1	D2	L1	L3	L2	D3
GMG40913	GMG41913	R1.5	16.0	16	35	43	92	15.0
GMG40914	GMG41914	R2.0	16.0	16	35	43	92	15.0
GMG40915	GMG41915	R3.0	16.0	16	35	43	92	15.0
GMG40916	GMG41916	R4.0	16.0	16	35	43	92	15.0
GMG40200	GMG41200	R1.0	20.0	20	44	56	110	19.0
GMG40917	GMG41917	R1.5	20.0	20	44	56	110	19.0
GMG40918	GMG41918	R2.0	20.0	20	44	56	110	19.0
GMG40919	GMG41919	R3.0	20.0	20	44	56	110	19.0
GMG40920	GMG41920	R3.5	20.0	20	44	56	110	19.0
GMG40921	GMG41921	R4.0	20.0	20	44	56	110	19.0
GMG40250	GMG41250	R1.0	25.0	25	55	70	130	24.0
GMG40922	GMG41922	R1.5	25.0	25	55	70	130	24.0
GMG40923	GMG41923	R2.0	25.0	25	55	70	130	24.0
GMG40924	GMG41924	R3.0	25.0	25	55	70	130	24.0
GMG40925	GMG41925	R4.0	25.0	25	55	70	130	24.0

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.03	h5 * Shank Dia. ≥ Ø12 : h6

◆ 2 STEP CORE



◎ : Excellent ○ : Good

ISO Material Description	P										M				K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel				Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	25	28	32	38	10	29	32	38	15	35	15	23	10	10	26	3	25	3	21	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	○	○	○	○	○	○	○	○	○	○	○	◎	◎	◎	○	○	○	○	○	○	○

ISO Material Description	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed		Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials		Heat Resistant Super Alloys				Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron				
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	15	30	25	38	34	15	30	25	38	34	15	30	25	38	34	55	60	42	42	55	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◎	◎	○	○	○	○

**NEW** HIGH PERFORMANCE SOLID CARBIDE END MILLS - **TitaNox-Power HPC** SERIES  
**5-FLUTE STANDARD LENGTH** PLAIN SHANK **EMI94**  
 FLAT SHANK **EMI96**

- ▶ New design enhances chip space in heavy cuts, while still maintaining rigidity in peel milling.
- ▶ Unequal index design for Chatter-Free cutting.
- ▶ High performance milling of Stainless Steel, Titanium, and Heat-Resistant Super Alloys.



Unit : mm

EDP No.		Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
PLAIN	FLAT	R	D <sub>1</sub>	D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>
EMI94060	EMI96060	R0.3	6.0	6	13	57
EMI94901	EMI96901	R0.5	6.0	6	13	57
EMI94902	EMI96902	R1.0	6.0	6	13	57
EMI94080	EMI96080	R0.5	8.0	8	19	63
EMI94903	EMI96903	R1.0	8.0	8	19	63
EMI94904	EMI96904	R1.5	8.0	8	19	63
EMI94905	EMI96905	R2.0	8.0	8	19	63
EMI94100	EMI96100	R0.5	10.0	10	22	72
EMI94906	EMI96906	R1.0	10.0	10	22	72
EMI94907	EMI96907	R1.5	10.0	10	22	72
EMI94908	EMI96908	R2.0	10.0	10	22	72
EMI94909	EMI96909	R2.5	10.0	10	22	72
EMI94120	EMI96120	R0.5	12.0	12	26	83
EMI94910	EMI96910	R1.0	12.0	12	26	83
EMI94911	EMI96911	R1.5	12.0	12	26	83
EMI94912	EMI96912	R2.0	12.0	12	26	83
EMI94913	EMI96913	R2.5	12.0	12	26	83
EMI94914	EMI96914	R3.0	12.0	12	26	83
EMI94160	EMI96160	R0.5	16.0	16	36	92
EMI94915	EMI96915	R1.0	16.0	16	36	92
EMI94916	EMI96916	R1.5	16.0	16	36	92
EMI94917	EMI96917	R2.0	16.0	16	36	92
EMI94918	EMI96918	R2.5	16.0	16	36	92

NEXT PAGE ▶

◎ : Excellent ○ : Good

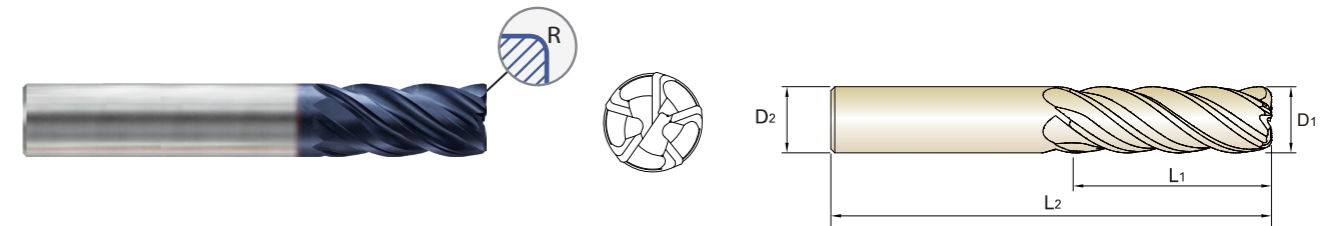
ISO	P										M				K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel				Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323																					
HRc	13	25	28	32	30	10	29	32	38	15	35	15	23	10	10	26	3	25	21		
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	○	○	○	○	○	○	○	○	○	○	○	◎	◎	◎	○	○	○	○	○	○	

ISO	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials			Heat Resistant Super Alloys			Titanium Alloys			Hardened steel	Chilled Cast Iron	Hardened Cast Iron		
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323																					
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◎	◎	○	○	○	○

**NEW** HIGH PERFORMANCE SOLID CARBIDE END MILLS - **TitaNox-Power HPC** SERIES  
**5-FLUTE STANDARD LENGTH** PLAIN SHANK **EMI94**  
 FLAT SHANK **EMI96**

- ▶ New design enhances chip space in heavy cuts, while still maintaining rigidity in peel milling.
- ▶ Unequal index design for Chatter-Free cutting.
- ▶ High performance milling of Stainless Steel, Titanium, and Heat-Resistant Super Alloys.



Unit : mm

EDP No.		Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
PLAIN	FLAT	R	D <sub>1</sub>	D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>
EMI94919	EMI96919	R3.0	16.0	16	36	92
EMI94920	EMI96920	R4.0	16.0	16	36	92
EMI94200	EMI96200	R1.0	20.0	20	44	104
EMI94921	EMI96921	R1.5	20.0	20	44	104
EMI94922	EMI96922	R2.0	20.0	20	44	104
EMI94923	EMI96923	R2.5	20.0	20	44	104
EMI94924	EMI96924	R3.0	20.0	20	44	104
EMI94925	EMI96925	R4.0	20.0	20	44	104
EMI94926	EMI96926	R5.0	20.0	20	44	104
EMI94250	EMI96250	R1.0	25.0	25	54	121
EMI94927	EMI96927	R1.5	25.0	25	54	121
EMI94928	EMI96928	R2.0	25.0	25	54	121
EMI94929	EMI96929	R2.5	25.0	25	54	121
EMI94930	EMI96930	R3.0	25.0	25	54	121
EMI94931	EMI96931	R4.0	25.0	25	54	121
EMI94932	EMI96932	R5.0	25.0	25	54	121

Mill Dia. Tolerance (in)	Shank Dia. Tolerance
0 ~ - 0.03	h5 * Shank Dia. ≥ Ø12 : h6

◎ : Excellent ○ : Good

ISO	P										M				K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel				Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323																					
HRc	13	25	28	32	30	10	29	32	38	15	35	15	23	10	10	26	3	25	21		
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	○	○	○	○	○	○	○	○	○	○	○	◎	◎	◎	○	○	○	○	○	○	

ISO	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials			Heat Resistant Super Alloys			Titanium Alloys			Hardened steel	Chilled Cast Iron	Hardened Cast Iron		
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323																					
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◎	◎	○	○	○	○

**HIGH PERFORMANCE SOLID CARBIDE END MILLS - TitaNox-Power HPC** NEW SERIES  
**5-FLUTE STANDARD LENGTH** PLAIN SHANK **EMI93**  
FLAT SHANK **EMI95**

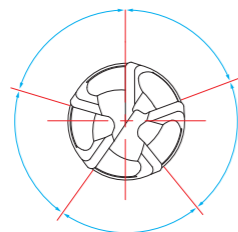
- ▶ New design enhances chip space in heavy cuts, while still maintaining rigidity in peel milling.
- ▶ Unequal index design for Chatter-Free cutting.
- ▶ High performance milling of Stainless Steel, Titanium, and Heat-Resistant Super Alloys.



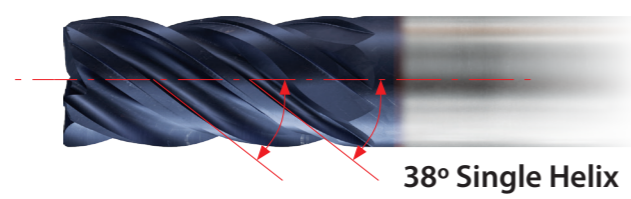
Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	Chamfer
PLAIN	FLAT	D1	D2	L1	L2	
EMI93060	EMI95060	6.0	6	13	57	0.20
EMI93080	EMI95080	8.0	8	19	63	0.20
EMI93100	EMI95100	10.0	10	22	72	0.30
EMI93120	EMI95120	12.0	12	26	83	0.35
EMI93160	EMI95160	16.0	16	36	92	0.40
EMI93200	EMI95200	20.0	20	44	104	0.50
EMI93250	EMI95250	25.0	25	54	121	0.50

Mill Dia. Tolerance (in)	Shank Dia. Tolerance
0 ~ - 0.03	h5 * Shank Dia. ≥ Ø12 : h6



**Unequal Index**  
 Exclusively Designed Unique Geometry applied to Reduce Vibration and also to achieve Excellent surface finish



**Core Design**  
 YG-1's High Performance Core Geometries is designed for superior chip evacuation. It's excellent at Slotting & Heavy Profiling.

◎ : Excellent ○ : Good

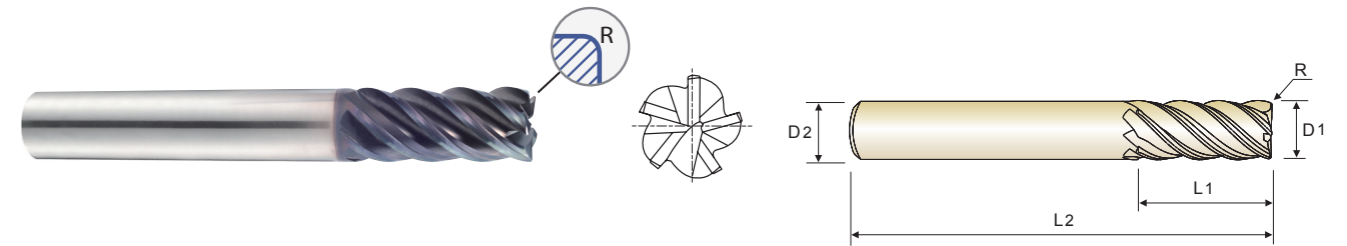
ISO	P										M					K																										
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel					Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron																				
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
HRc	13	25	28	32	38	15	35	15	23	10	10	26	3	25	10	26	3	25	10	21	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230		
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

ISO	N					S					H										
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	60	100	75	90	130	110	90	100			15	30	25	38	34	400 Rm	1050 Rm	55	60	42	55
Recommend											○	○	○	○	○	◎	◎	○	○	○	○

**HIGH-PERFORMANCE SOLID CARBIDE END MILLS** SERIES  
**CARBIDE, 5 FLUTE CORNER RADIUS SHORT LENGTH** PLAIN SHANK **GMG28**  
FLAT SHANK **GMG29**

- ▶ Excellent performance results and long tool life when machining Titanium and other tough materials.
- ▶ This tool has high rigidity of flute so that is possible to use for heavy profile and high speed milling.
- ▶ For protecting Corner chipping of end teeth, Corner Radius & Chamfer are adopted.



Unit : mm

EDP No.		Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
PLAIN	FLAT	R	D1	D2	L1	L2
GMG28060	GMG29060	R0.5	6.0	6	10	54
GMG28080	GMG29080	R0.5	8.0	8	12	58
GMG28100	GMG29100	R0.5	10.0	10	14	66
GMG28120	GMG29120	R0.5	12.0	12	16	73
GMG28160	GMG29160	R1.0	16.0	16	22	82
GMG28200	GMG29200	R1.0	20.0	20	26	92
GMG28250	GMG29250	R1.0	25.0	25	29	100

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.03	h5 * Shank Dia. ≥ Ø12 : h6

◎ : Excellent ○ : Good

ISO	P										M					K																										
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel					Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron																				
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
HRc	13	25	28	32	38	15	35	15	23	10	10	26	3	25	10	26	3	25	10	21	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230		
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

ISO	N					S					H										
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	60	100	75	90	130	110	90	100			15	30	25	38	34	400 Rm	1050 Rm	55	60	42	55
Recommend											○	○	○	○	○	◎	◎	○	○	○	○

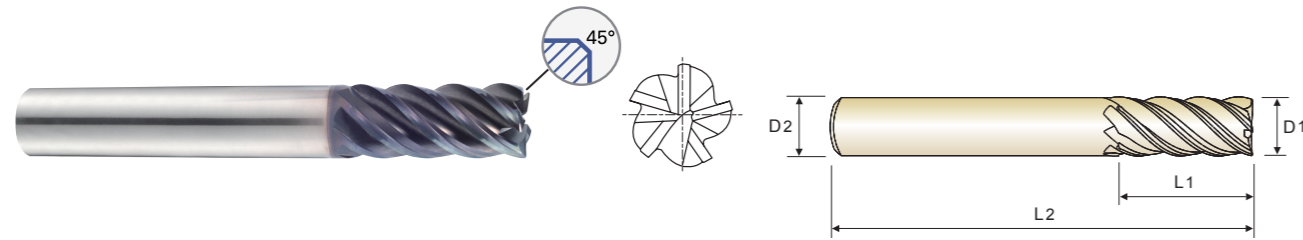




**HIGH-PERFORMANCE SOLID CARBIDE END MILLS  
CARBIDE, 5 FLUTE SHORT LENGTH**

SERIES  
PLAIN SHANK **GMG24**  
FLAT SHANK **GMG25**

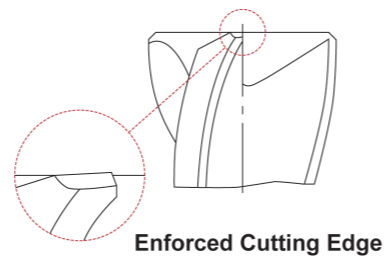
- ▶ Excellent performance results and long tool life when machining Titanium and other tough materials.
- ▶ This tool has high rigidity of flute so that is possible to use for heavy profile and high speed milling.
- ▶ For protecting Corner chipping of end teeth, Corner Radius & Chamfer are adopted.



Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	Chamfer
PLAIN	FLAT	D1	D2	L1	L2	
GMG24060	GMG25060	6.0	6	10	54	0.20
GMG24080	GMG25080	8.0	8	12	58	0.20
GMG24100	GMG25100	10.0	10	14	66	0.30
GMG24120	GMG25120	12.0	12	16	73	0.35
GMG24160	GMG25160	16.0	16	22	82	0.40
GMG24200	GMG25200	20.0	20	26	92	0.50
GMG24250	GMG25250	25.0	25	29	100	0.50

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.03	h5 * Shank Dia. ≥ Ø12 : h6



◎ : Excellent ○ : Good

ISO Material Description	P										M				K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron		
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	25	28	32	30	29	32	38	15	35	15	23	10	10	26	3	25	15	21		
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	○	○	○	○	○	○	○	○	○	○	○	◎	◎	◎	○	○	○	○	○	○	○

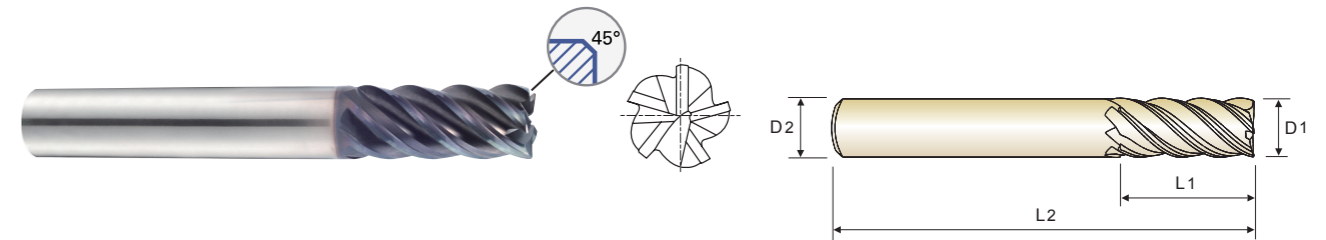
  

ISO Material Description	N					S						H										
	Aluminum- wrought alloy		Aluminum-cast, alloyed		Copper and Copper Alloys (Bronze / Brass)	Non Metallic Materials		Heat Resistant Super Alloys			Titanium Alloys			Hardened steel	Chilled Cast Iron	Hardened Cast Iron						
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
HRc	15	30	25	38	34	15	30	25	38	34	15	30	25	38	34	55	60	42	55	42	55	
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550	
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◎	◎	○	○	○	○	○

**HIGH-PERFORMANCE SOLID CARBIDE END MILLS  
CARBIDE, 5 FLUTE LONG LENGTH**

SERIES  
PLAIN SHANK **GMG26**  
FLAT SHANK **GMG27**

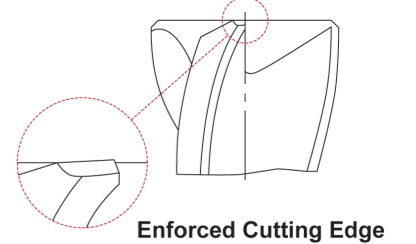
- ▶ Suitable for Titanium, Titanium Alloys, Inconel and Stainless Steels.
- ▶ Optimized flute design for chip evacuation and rigidity when machining difficult-to-cut materials.
- ▶ Special roughing profile for machining Titanium and Titanium Alloys.
- ▶ Longer tool life with special coating.



Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	Chamfer
PLAIN	FLAT	D1	D2	L1	L2	
GMG26060	GMG27060	6.0	6	13	57	0.20
GMG26080	GMG27080	8.0	8	19	63	0.20
GMG26100	GMG27100	10.0	10	22	72	0.30
GMG26120	GMG27120	12.0	12	26	83	0.35
GMG26160	GMG27160	16.0	16	36	92	0.40
GMG26200	GMG27200	20.0	20	44	104	0.50
GMG26250	GMG27250	25.0	25	54	121	0.50

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.03	h5 * Shank Dia. ≥ Ø12 : h6



◎ : Excellent ○ : Good

ISO Material Description	P										M				K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron		
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	25	28	32	30	29	32	38	15	35	15	23	10	10	26	3	25	15	21		
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	○	○	○	○	○	○	○	○	○	○	○	◎	◎	◎	○	○	○	○	○	○	○

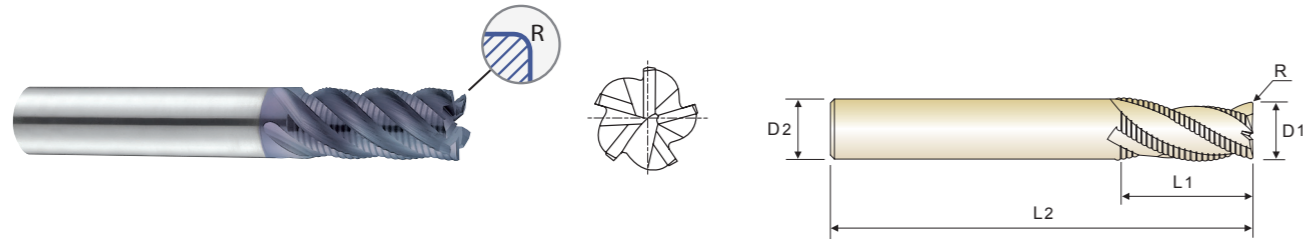
  

ISO Material Description	N					S						H										
	Aluminum- wrought alloy		Aluminum-cast, alloyed		Copper and Copper Alloys (Bronze / Brass)	Non Metallic Materials		Heat Resistant Super Alloys			Titanium Alloys			Hardened steel	Chilled Cast Iron	Hardened Cast Iron						
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
HRc	15	30	25	38	34	15	30	25	38	34	15	30	25	38	34	55	60	42	55	42	55	
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550	
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◎	◎	○	○	○	○	○

**HIGH-PERFORMANCE SOLID CARBIDE END MILLS**  
**CARBIDE, 5 FLUTE 40° HELIX CORNER RADIUS ROUGHING - FINE**

SERIES  
 PLAIN SHANK **EHE54**  
 FLAT SHANK **EHE55**

- ▶ Excellent performance results and long tool life when machining Titanium and other tough materials.
- ▶ This tool has high rigidity of flute so that is possible to use for heavy profile and high speed milling.
- ▶ For protecting Corner chipping of end teeth, Corner Radius & Chamfer are adopted.



Unit : mm

EDP No.		Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
PLAIN	FLAT	R	D1 (h10)	D2 (h6)	L1	L2
EHE54060	EHE55060	R0.2	6.0	6	16	57
EHE54080	EHE55080	R0.2	8.0	8	16	63
EHE54100	EHE55100	R0.3	10.0	10	22	72
EHE54120	EHE55120	R0.3	12.0	12	26	83
EHE54140	EHE55140	R0.3	14.0	14	26	83
EHE54160	EHE55160	R0.3	16.0	16	32	92
EHE54200	EHE55200	R0.3	20.0	20	38	104
EHE54250	EHE55250	R0.3	25.0	25	45	121

**Tolerances according to DIN 7160 & 7161**

	Tolerance range in $\mu\text{m}$				
	Nominal-Diameter in mm				
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
<b>h10</b>	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
<b>h5</b>	0 - 4	0 - 5	0 - 6	0 - 8	0 - 9

\* Shank Dia.  $\geq \phi 12$  : h6

◎ : Excellent ○ : Good

ISO	P										M				K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel				Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	25	28	32	38	42	48	52	58	62	68	72	78	82	88	92	98	102	108	112	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend												○	○	○							

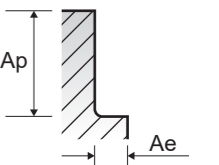
  

ISO	N					S										H					
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys			Hardened steel	Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc						15	30	25	38	34	15	30	25	38	34	55	60	42	55		
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend						○	○	○	○	○	○	○	○	○	○	◎	◎				

**RECOMMENDED CUTTING CONDITIONS**

**GMG40, GMG41 SERIES 4 FLUTES CORNER RADIUS - SIDE CUTTING** RPM = rev./min. FEED = mm/min. Vc = m/min. fz = mm/tooth

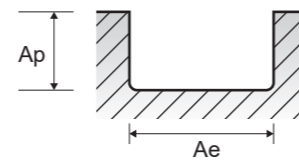
ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)								
						6.0	8.0	10.0	12.0	14.0	16.0	20.0	25.0	
P	1-4	Non-alloy steel	0.4D	1.0D	Vc	160	160	160	160	160	160	160	160	160
					fz	0.027	0.035	0.042	0.053	0.058	0.063	0.077	0.084	
					RPM FEED	8488 917	6366 891	5093 856	4244 900	3638 844	3183 802	2546 784	2037 684	
	5	Low alloy steel	0.4D	1.0D	Vc	150	150	150	150	150	150	150	150	
					fz	0.025	0.035	0.042	0.049	0.056	0.063	0.070	0.084	
					RPM FEED	7958 796	5968 836	4775 802	3979 780	3410 764	2984 752	2387 668	1910 642	
	6-7	Low alloy steel	0.4D	1.0D	Vc	160	160	160	160	160	160	160	160	
					fz	0.027	0.035	0.042	0.053	0.058	0.063	0.077	0.084	
					RPM FEED	8488 917	6366 891	5093 856	4244 900	3638 844	3183 802	2546 784	2037 684	
	8	Low alloy steel	0.4D	1.0D	Vc	150	150	150	150	150	150	150	150	
					fz	0.025	0.035	0.042	0.049	0.056	0.063	0.070	0.084	
					RPM FEED	7958 796	5968 836	4775 802	3979 780	3410 764	2984 752	2387 668	1910 642	
	9	Low alloy steel	0.4D	1.0D	Vc	150	150	150	150	150	150	150	150	
					fz	0.027	0.035	0.046	0.053	0.060	0.067	0.077	0.084	
					RPM FEED	7958 859	5968 836	4775 879	3979 844	3410 819	2984 800	2387 735	1910 642	
10-11.1	High alloyed steel, and tool steel	0.4D	1.0D	Vc	150	150	150	150	150	150	150	150		
				fz	0.027	0.035	0.046	0.053	0.060	0.067	0.077	0.084		
				RPM FEED	7958 859	5968 836	4775 879	3979 844	3410 819	2984 800	2387 735	1910 642		
M	12-13	Stainless steel	0.4D	1.0D	Vc	155	155	155	155	155	155	155	155	
					fz	0.034	0.046	0.057	0.067	0.076	0.086	0.095	0.114	
					RPM FEED	8223 1118	6167 1135	4934 1125	4112 1102	3524 1071	3084 1061	2467 937	1974 900	
	14.1	Stainless steel	0.4D	1.0D	Vc	105	105	105	105	105	105	105	105	
					fz	0.025	0.034	0.042	0.048	0.055	0.062	0.071	0.081	
					RPM FEED	5570 557	4178 568	3342 561	2785 535	2387 525	2089 518	1671 475	1337 433	
14.2	Stainless steel	0.4D	0.6D	Vc	44	44	44	44	44	44	44	44		
				fz	0.016	0.021	0.027	0.032	0.036	0.040	0.046	0.052		
				RPM FEED	2334 149	1751 147	1401 151	1167 149	1000 144	875 140	700 129	560 117		
K	15-20	Grey cast iron	0.4D	1.0D	Vc	175	175	175	175	175	175	175	175	
					fz	0.021	0.028	0.035	0.042	0.048	0.053	0.060	0.070	
					RPM FEED	9284 780	6963 780	5570 780	4642 780	3979 764	3482 738	2785 668	2228 624	
S	31-35	Heat Resistant Super Alloys	0.3D	0.6D	Vc	32	32	32	32	32	32	32	32	
					fz	0.020	0.026	0.032	0.038	0.044	0.048	0.055	0.065	
					RPM FEED	1698 136	1273 132	1019 130	849 129	728 128	637 122	509 112	407 106	
	36-37	Titanium Alloys	0.4D	1.0D	Vc	70	70	70	70	70	70	70	70	
					fz	0.034	0.048	0.057	0.067	0.076	0.086	0.095	0.114	
					RPM FEED	3714 505	2785 535	2228 508	1857 498	1592 484	1393 479	1114 423	891 406	



**GMG40, GMG41 SERIES** 4 FLUTES CORNER RADIUS - **SLOTTING**

RPM = rev./min. FEED = mm/min.  
Vc = m/min. fz = mm/tooth

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)									
						6.0	8.0	10.0	12.0	14.0	16.0	20.0	25.0		
<b>P</b>	1-4	Non-alloy steel	1.0D	1.0D	Vc	125	125	125	125	125	125	125	125		
					fz	0.025	0.034	0.042	0.049	0.056	0.063	0.070	0.084		
					RPM	6631	4974	3979	3316	2842	2487	1989	1592		
	FEED		663	676	668	650	637	627	557	535					
	5		Non-alloy steel	1.0D	1.0D	Vc	120	120	120	120	120	120	120	120	
						fz	0.025	0.034	0.042	0.049	0.056	0.063	0.070	0.077	
		RPM				6366	4775	3820	3183	2728	2387	1910	1528		
	FEED	637		649	642	624	611	602	535	471					
	6-7	Low alloy steel		1.0D	1.0D	Vc	125	125	125	125	125	125	125	125	
						fz	0.025	0.034	0.042	0.049	0.056	0.063	0.070	0.084	
			RPM			6631	4974	3979	3316	2842	2487	1989	1592		
	FEED		663	676	668	650	637	627	557	535					
8-9	Low alloy steel		1.0D	1.0D	Vc	120	120	120	120	120	120	120	120		
					fz	0.025	0.034	0.042	0.049	0.056	0.063	0.070	0.077		
		RPM			6366	4775	3820	3183	2728	2387	1910	1528			
FEED		637	649	642	624	611	602	535	471						
10-11.1		High alloyed steel, and tool steel	1.0D	1.0D	Vc	120	120	120	120	120	120	120	120		
					fz	0.027	0.035	0.042	0.053	0.058	0.063	0.077	0.084		
	RPM				6366	4775	3820	3183	2728	2387	1910	1528			
FEED	688		668	642	675	633	602	588	513						
<b>M</b>	12-13		Stainless steel	1.0D	1.0D	Vc	125	125	125	125	125	125	125	125	
						fz	0.034	0.046	0.057	0.067	0.074	0.081	0.095	0.105	
		RPM				6631	4974	3979	3316	2842	2487	1989	1592		
	FEED	902		915	907	889	841	806	756	668					
	14.1	Stainless steel		1.0D	1.0D	Vc	85	85	85	85	85	85	85	85	
						fz	0.025	0.034	0.042	0.048	0.055	0.062	0.071	0.081	
			RPM			4509	3382	2706	2255	1933	1691	1353	1082		
	FEED		451	460	455	433	425	419	384	351					
	14.2		Stainless steel	1.0D	0.5D	Vc	36	36	36	36	36	36	36	36	
fz						0.016	0.021	0.027	0.032	0.036	0.040	0.046	0.052		
RPM		1910				1432	1146	955	819	716	573	458			
FEED	122	120		124	122	118	115	105	95						
<b>K</b>	15-20	Grey cast iron		1.0D	1.0D	Vc	140	140	140	140	140	140	140	140	
						fz	0.021	0.028	0.035	0.042	0.048	0.053	0.060	0.067	
			RPM			7427	5570	4456	3714	3183	2785	2228	1783		
FEED			624	624	624	624	611	590	535	478					
<b>S</b>			31-35	Heat Resistant Super Alloys	1.0D	0.4D	Vc	25	25	25	25	25	25	25	25
							fz	0.018	0.024	0.030	0.036	0.040	0.044	0.050	0.055
	RPM	1326					995	796	663	568	497	398	318		
	FEED	95	95		95	95	91	88	80	70					
	36-37	Titanium Alloys	1.0D		1.0D	Vc	55	55	55	55	55	55	55	55	
						fz	0.034	0.046	0.057	0.067	0.076	0.086	0.095	0.105	
RPM				2918		2188	1751	1459	1251	1094	875	700			
FEED	397		403	399	391	380	376	333	294						

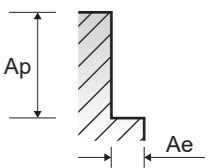


**EMI94 EMI96** | **EMI93 EMI95**

**5 FLUTES (TitaNox-Power HPC)**  
**- SIDE CUTTING (Heavy Side Cutting)**

RPM = rev./min. FEED = mm/min.  
Vc = m/min. fz = mm/tooth

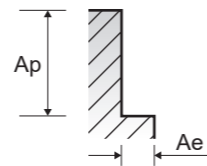
ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)									
						6.0	8.0	10.0	12.0	16.0	20.0	25.0			
<b>P</b>	1~5	Non-alloy steel	0.5D	1.5D	Vc	152	152	152	152	152	152	152	152		
					fz	0.038	0.046	0.059	0.074	0.095	0.115	0.123			
					RPM	8064	6048	4838	4032	3024	2419	1935			
	FEED		1532	1391	1427	1492	1436	1391	1190						
	6~8		Low alloy steel	0.5D	1.5D	Vc	152	152	152	152	152	152	152	152	
						fz	0.038	0.046	0.059	0.074	0.095	0.115	0.123		
		RPM				8064	6048	4838	4032	3024	2419	1935			
	FEED	1532		1391	1427	1492	1436	1391	1190						
	9	Low alloy steel		0.5D	1.5D	Vc	122	122	122	122	122	122	122	122	
						fz	0.029	0.036	0.045	0.058	0.072	0.088	0.095		
			RPM			6472	4854	3883	3236	2427	1942	1553			
	FEED		938	874	874	938	874	854	738						
10	High alloyed steel, and tool steel		0.5D	1.5D	Vc	137	137	137	137	137	137	137	137		
					fz	0.038	0.046	0.059	0.074	0.095	0.115	0.123			
		RPM			7268	5451	4361	3634	2726	2180	1744				
FEED		1381	1254	1286	1345	1295	1254	1073							
11.1		High alloyed steel, and tool steel	0.5D	1.5D	Vc	122	122	122	122	122	122	122	122		
					fz	0.029	0.036	0.045	0.058	0.072	0.088	0.095			
	RPM				6472	4854	3883	3236	2427	1942	1553				
FEED	938		874	874	938	874	854	738							
<b>M</b>	12		Stainless steel	0.5D	1.5D	Vc	76	76	76	76	76	76	76	76	
						fz	0.024	0.031	0.040	0.050	0.061	0.075	0.080		
		RPM				4032	3024	2419	2016	1512	1210	968			
	FEED	484		469	484	504	461	454	387						
	14.1	Stainless steel		0.5D	1.5D	Vc	91	91	91	91	91	91	91	91	
						fz	0.031	0.036	0.048	0.062	0.072	0.083	0.090		
			RPM			4828	3621	2897	2414	1810	1448	1159			
	FEED		748	652	695	748	652	601	522						
	14.2		Stainless steel	0.5D	1.5D	Vc	61	61	61	61	61	61	61	61	
fz						0.024	0.028	0.037	0.050	0.056	0.067	0.073			
RPM		3236				2427	1942	1618	1214	971	777				
FEED	388	340		359	405	340	325	284							
<b>K</b>	15~20	Grey cast iron		0.5D	1.5D	Vc	113	113	113	113	113	113	113	113	
						fz	0.034	0.041	0.051	0.062	0.082	0.099	0.105		
			RPM			5995	4496	3597	2997	2248	1798	1439			
FEED			1019	922	917	929	922	890	755						
<b>S</b>			33	Heat Resistant Super Alloys	0.2D	1.5D	Vc	27	27	27	27	27	27	27	27
							fz	0.024	0.031	0.037	0.046	0.054	0.061	0.068	
	RPM	1432					1074	859	716	537	430	344			
	FEED	172	166		159	165	145	131	117						
	37	Titanium Alloys	0.5D		1.5D	Vc	49	49	49	49	49	49	49	49	
						fz	0.024	0.031	0.037	0.046	0.054	0.061	0.068		
RPM				2600		1950	1560	1300	975	780	624				
FEED	312		302	289	299	263	238	212							



**EMI94 EMI93**  
**EMI96 EMI95** 5 FLUTES (TitaNox-Power HPC)  
**- SIDE CUTTING (Peel Milling)**

RPM = rev./min. FEED = mm/min.  
Vc = m/min. fz = mm/tooth

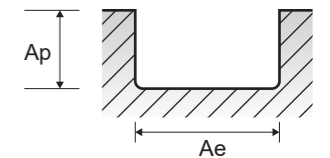
ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)							
						6.0	8.0	10.0	12.0	16.0	20.0	25.0	
P	1~5	Non-alloy steel	0.08D	2.0D	Vc	198	198	198	198	198	198	198	
					fz	0.053	0.067	0.083	0.103	0.131	0.160	0.170	
					RPM	10504	7878	6303	5252	3939	3151	2521	
	6~8	Low alloy steel	0.08D	2.0D	Vc	198	198	198	198	198	198	198	
					fz	0.053	0.067	0.083	0.103	0.131	0.160	0.170	
					RPM	10504	7878	6303	5252	3939	3151	2521	
	9	High alloyed steel, and tool steel	0.08D	2.0D	Vc	198	198	198	198	198	198	198	
					fz	0.041	0.051	0.064	0.079	0.102	0.123	0.133	
					RPM	10504	7878	6303	5252	3939	3151	2521	
	10	High alloyed steel, and tool steel	0.08D	2.0D	Vc	177	177	177	177	177	177	177	
					fz	0.053	0.067	0.083	0.103	0.131	0.160	0.170	
					RPM	9390	7043	5634	4695	3521	2817	2254	
11.1	High alloyed steel, and tool steel	0.08D	2.0D	Vc	168	168	168	168	168	168	168		
				fz	0.041	0.051	0.064	0.079	0.102	0.123	0.133		
				RPM	8913	6685	5348	4456	3342	2674	2139		
M	12	Stainless steel	0.06D	2.0D	Vc	107	107	107	107	107	107	107	
					fz	0.036	0.041	0.056	0.070	0.087	0.104	0.113	
					RPM	5677	4257	3406	2838	2129	1703	1362	
	14.1	Stainless steel	0.06D	2.0D	Vc	130	130	130	130	130	130	130	
					fz	0.043	0.049	0.067	0.086	0.100	0.117	0.128	
					RPM	6897	5173	4138	3448	2586	2069	1655	
	14.2	Stainless steel	0.06D	2.0D	Vc	91	91	91	91	91	91	91	
					fz	0.034	0.038	0.053	0.070	0.079	0.093	0.103	
					RPM	4828	3621	2897	2414	1810	1448	1159	
	K	15~20	Grey cast iron	0.07D	2.0D	Vc	168	168	168	168	168	168	168
						fz	0.048	0.056	0.072	0.089	0.115	0.139	0.148
						RPM	8913	6685	5348	4456	3342	2674	2139
33		Heat Resistant Super Alloys	0.04D	2.0D	Vc	37	37	37	37	37	37	37	
					fz	0.024	0.031	0.037	0.046	0.054	0.061	0.068	
					RPM	1963	1472	1178	981	736	589	471	
37		Titanium Alloys	0.05D	2.0D	Vc	91	91	91	91	91	91	91	
					fz	0.024	0.031	0.037	0.046	0.054	0.061	0.068	
					RPM	4828	3621	2897	2414	1810	1448	1159	



**EMI94 EMI93**  
**EMI96 EMI95** 5 FLUTES (TitaNox-Power HPC)  
**- SLOTTING**

RPM = rev./min. FEED = mm/min.  
Vc = m/min. fz = mm/tooth

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)							
						6.0	8.0	10.0	12.0	16.0	20.0	25.0	
P	1~5	Non-alloy steel	1.0D	1.0D	Vc	84	84	84	84	84	84	84	
					fz	0.031	0.038	0.048	0.058	0.074	0.091	0.098	
					RPM	4456	3342	2674	2228	1671	1337	1070	
	6~8	Low alloy steel	1.0D	1.0D	Vc	84	84	84	84	84	84	84	
					fz	0.031	0.038	0.048	0.058	0.074	0.091	0.098	
					RPM	4456	3342	2674	2228	1671	1337	1070	
	9	High alloyed steel, and tool steel	1.0D	1.0D	Vc	84	84	84	84	84	84	84	
					fz	0.024	0.028	0.037	0.046	0.059	0.069	0.075	
					RPM	4456	3342	2674	2228	1671	1337	1070	
	10	High alloyed steel, and tool steel	1.0D	0.75D	Vc	70	70	70	70	70	70	70	
					fz	0.031	0.038	0.048	0.058	0.074	0.091	0.098	
					RPM	3714	2785	2228	1857	1393	1114	891	
11.1	High alloyed steel, and tool steel	1.0D	0.75D	Vc	76	76	76	76	76	76	76		
				fz	0.024	0.028	0.037	0.046	0.059	0.069	0.075		
				RPM	4032	3024	2419	2016	1512	1210	968		
M	12	Stainless steel	1.0D	0.5D	Vc	69	69	69	69	69	69	69	
					fz	0.019	0.023	0.032	0.041	0.049	0.059	0.065	
					RPM	3661	2745	2196	1830	1373	1098	879	
	14.1	Stainless steel	1.0D	0.5D	Vc	76	76	76	76	76	76	76	
					fz	0.024	0.028	0.037	0.050	0.059	0.067	0.073	
					RPM	4032	3024	2419	2016	1512	1210	968	
	14.2	Stainless steel	1.0D	0.5D	Vc	61	61	61	61	61	61	61	
					fz	0.019	0.023	0.029	0.041	0.046	0.053	0.058	
					RPM	3236	2427	1942	1618	1214	971	777	
	K	15~20	Grey cast iron	1.0D	1.0D	Vc	79	79	79	79	79	79	79
						fz	0.026	0.033	0.040	0.050	0.067	0.080	0.085
						RPM	4191	3143	2515	2096	1572	1257	1006
33		Heat Resistant Super Alloys	0.2D	1.5D	Vc	20	20	20	20	20	20	20	
					fz	0.019	0.026	0.029	0.036	0.044	0.051	0.053	
					RPM	1061	796	637	531	398	318	255	
37		Titanium Alloys	0.5D	1.5D	Vc	49	49	49	49	49	49	49	
					fz	0.019	0.026	0.029	0.036	0.044	0.051	0.053	
					RPM	2600	1950	1560	1300	975	780	624	



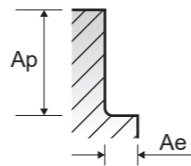
**GMG28 GMG30**  
**GMG29 GMG31**

**5 FLUTE CORNER RADIUS - SIDE CUTTING**

RPM = rev./min. FEED = mm/min.  
Vc = m/min. fz = mm/tooth

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)									
						6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	25.0	
P	1-4	Non-alloy steel	0.3D	1.5D(*)	Vc	144	144	144	144	144	144	144	144	144	
					fz	0.034	0.038	0.050	0.063	0.069	0.076	0.083	0.089	0.101	
					RPM	7639	5730	4584	3820	3274	2865	2546	2292	1833	
					FEED	1299	1089	1146	1203	1130	1089	1057	1020	926	
	5	Non-alloy steel	0.3D	1.5D(*)	Vc	101	101	101	101	101	101	101	101	101	
					fz	0.034	0.038	0.050	0.063	0.069	0.076	0.083	0.089	0.101	
					RPM	5358	4019	3215	2679	2296	2009	1786	1607	1286	
					FEED	911	764	804	844	792	764	741	715	649	
	6-7	Low alloy steel	0.3D	1.5D(*)	Vc	144	144	144	144	144	144	144	144	144	
					fz	0.034	0.038	0.050	0.063	0.069	0.076	0.083	0.089	0.101	
					RPM	7639	5730	4584	3820	3274	2865	2546	2292	1833	
					FEED	1299	1089	1146	1203	1130	1089	1057	1020	926	
8-9	Low alloy steel	0.3D	1.5D(*)	Vc	101	101	101	101	101	101	101	101	101		
				fz	0.034	0.038	0.050	0.063	0.069	0.076	0.083	0.089	0.101		
				RPM	5358	4019	3215	2679	2296	2009	1786	1607	1286		
				FEED	911	764	804	844	792	764	741	715	649		
10-11.1	High alloyed steel, and tool steel	0.3D	1.5D(*)	Vc	60	60	60	60	60	60	60	60	60		
				fz	0.024	0.027	0.035	0.044	0.049	0.054	0.058	0.062	0.071		
				RPM	3183	2387	1910	1592	1364	1194	1061	955	764		
				FEED	382	322	334	350	334	322	308	296	271		
M	12-13	Stainless steel	0.3D	1.5D(*)	Vc	117	117	117	117	117	117	117	117	117	
					fz	0.024	0.025	0.030	0.046	0.051	0.054	0.057	0.061	0.071	
					RPM	6207	4655	3724	3104	2660	2328	2069	1862	1490	
	14.1	Stainless steel	0.3D	1.5D(*)	Vc	82	82	82	82	82	82	82	82	82	
					fz	0.030	0.032	0.038	0.063	0.065	0.069	0.070	0.076	0.088	
					RPM	4350	3263	2610	2175	1864	1631	1450	1305	1044	
	14.2	Stainless steel	0.3D	1.5D(*)	Vc	59	59	59	59	59	59	59	59	59	
					fz	0.030	0.032	0.038	0.063	0.065	0.069	0.070	0.076	0.088	
					RPM	3130	2348	1878	1565	1341	1174	1043	939	751	
	K	15-20	Grey cast iron	0.3D	1.5D(*)	Vc	106	106	106	106	106	106	106	106	106
						fz	0.043	0.048	0.063	0.079	0.087	0.096	0.103	0.111	0.126
						RPM	5623	4218	3374	2812	2410	2109	1874	1687	1350
31-35		Heat Resistant Super Alloys	0.1D	1.5D	Vc	31	31	31	31	31	31	31	31	31	
					fz	0.021	0.022	0.027	0.044	0.046	0.048	0.049	0.053	0.062	
					RPM	1645	1233	987	822	705	617	548	493	395	
36-37		Titanium Alloys	0.3D	1.5D(*)	Vc	69	69	69	69	69	69	69	69	69	
					fz	0.027	0.029	0.034	0.057	0.059	0.062	0.063	0.069	0.079	
					RPM	3661	2745	2196	1830	1569	1373	1220	1098	879	

- \* Maximum recommended depth shown.
- \* Finish cuts typically require reduced feed rates and/or higher spindle speed, with radial width of 2% x D1 or less.
- \* Reduce speed and feed recommendations for materials harder than listed.
- \* Above recommendations are based on ideal conditions.
- Adjust parameters accordingly for smaller taper machining centers or less rigid conditions.



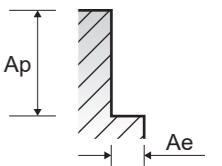
**GMG24 GMG26**  
**GMG25 GMG27**

**5 FLUTE - SIDE CUTTING**

RPM = rev./min. FEED = mm/min.  
Vc = m/min. fz = mm/tooth

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)									
						6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	25.0	
P	1-4	Non-alloy steel	0.3D	1.5D(*)	Vc	144	144	144	144	144	144	144	144	144	
					fz	0.034	0.038	0.050	0.063	0.069	0.076	0.083	0.089	0.101	
					RPM	7639	5730	4584	3820	3274	2865	2546	2292	1833	
					FEED	1299	1089	1146	1203	1130	1089	1057	1020	926	
	5	Non-alloy steel	0.3D	1.5D(*)	Vc	101	101	101	101	101	101	101	101	101	
					fz	0.034	0.038	0.050	0.063	0.069	0.076	0.083	0.089	0.101	
					RPM	5358	4019	3215	2679	2296	2009	1786	1607	1286	
					FEED	911	764	804	844	792	764	741	715	649	
	6-7	Low alloy steel	0.3D	1.5D(*)	Vc	144	144	144	144	144	144	144	144	144	
					fz	0.034	0.038	0.050	0.063	0.069	0.076	0.083	0.089	0.101	
					RPM	7639	5730	4584	3820	3274	2865	2546	2292	1833	
					FEED	1299	1089	1146	1203	1130	1089	1057	1020	926	
8-9	Low alloy steel	0.3D	1.5D(*)	Vc	101	101	101	101	101	101	101	101	101		
				fz	0.034	0.038	0.050	0.063	0.069	0.076	0.083	0.089	0.101		
				RPM	5358	4019	3215	2679	2296	2009	1786	1607	1286		
				FEED	911	764	804	844	792	764	741	715	649		
10-11.1	High alloyed steel, and tool steel	0.3D	1.5D(*)	Vc	60	60	60	60	60	60	60	60	60		
				fz	0.024	0.027	0.035	0.044	0.049	0.054	0.058	0.062	0.071		
				RPM	3183	2387	1910	1592	1364	1194	1061	955	764		
				FEED	382	322	334	350	334	322	308	296	271		
M	12-13	Stainless steel	0.3D	1.5D(*)	Vc	117	117	117	117	117	117	117	117	117	
					fz	0.024	0.025	0.030	0.046	0.051	0.054	0.057	0.061	0.071	
					RPM	6207	4655	3724	3104	2660	2328	2069	1862	1490	
	14.1	Stainless steel	0.3D	1.5D(*)	Vc	82	82	82	82	82	82	82	82	82	
					fz	0.030	0.032	0.038	0.063	0.065	0.069	0.070	0.076	0.088	
					RPM	4350	3263	2610	2175	1864	1631	1450	1305	1044	
	14.2	Stainless steel	0.3D	1.5D(*)	Vc	59	59	59	59	59	59	59	59	59	
					fz	0.030	0.032	0.038	0.063	0.065	0.069	0.070	0.076	0.088	
					RPM	3130	2348	1878	1565	1341	1174	1043	939	751	
	K	15-20	Grey cast iron	0.3D	1.5D(*)	Vc	106	106	106	106	106	106	106	106	106
						fz	0.043	0.048	0.063	0.079	0.087	0.096	0.103	0.111	0.126
						RPM	5623	4218	3374	2812	2410	2109	1874	1687	1350
31-35		Heat Resistant Super Alloys	0.1D	1.5D	Vc	31	31	31	31	31	31	31	31	31	
					fz	0.021	0.022	0.027	0.044	0.046	0.048	0.049	0.053	0.062	
					RPM	1645	1233	987	822	705	617	548	493	395	
36-37		Titanium Alloys	0.3D	1.5D(*)	Vc	69	69	69	69	69	69	69	69	69	
					fz	0.027	0.029	0.034	0.057	0.059	0.062	0.063	0.069	0.079	
					RPM	3661	2745	2196	1830	1569	1373	1220	1098	879	

- \* Maximum recommended depth shown.
- \* Finish cuts typically require reduced feed rates and/or higher spindle speed, with radial width of 2% x D1 or less.
- \* Reduce speed and feed recommendations for materials harder than listed.
- \* Above recommendations are based on ideal conditions.
- Adjust parameters accordingly for smaller taper machining centers or less rigid conditions.



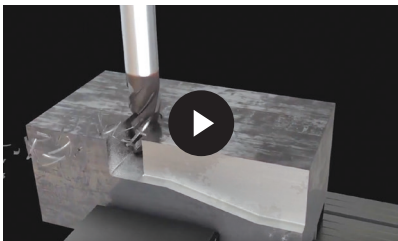
**EHE54, EHE55 SERIES** 5 FLUTES ROUGHING - SIDE CUTTING

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)								
						6.0	8.0	10.0	12.0	14.0	16.0	20.0	25.0	
M	12-13	Stainless steel	~0.10/0.15D ~0.16/0.10D ~0.25/0.05D	1.5D	Vc	80	80	80	80	80	80	80	80	80
					fz	0.025	0.034	0.041	0.051	0.057	0.063	0.081	0.091	
					RPM	4244	3183	2546	2122	1819	1592	1273	1019	
S	31-35	Heat Resistant Super Alloys	0.05D	1.0D	Vc	40	40	40	40	40	40	40	40	40
					fz	0.020	0.025	0.037	0.040	0.046	0.052	0.061	0.068	
					RPM	2122	1592	1273	1061	909	796	637	509	
S	36-37	Titanium Alloys	~0.10/0.15D ~0.16/0.10D ~0.25/0.05D	1.5D	Vc	65	65	65	65	65	65	65	65	65
					fz	0.022	0.031	0.038	0.046	0.052	0.058	0.074	0.084	
					RPM	3448	2586	2069	1724	1478	1293	1035	828	



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