



Leading Through Innovation



HSS-PM

TANK-POWER END MILLS

TANK - POWER HSS-PM - Fräser

- High Toughness for Stainless Steels, Carbon steels and Alloy Steels
- Hohe Zähigkeit, für rostfreie Stähle, Kohlenstoffstähle und legierte Stähle



UNCOATED **E9940** SERIES
 TiAIN COATED **GA940** SERIES

HSS-PM, 2 FLUTE SHORT LENGTH BALL NOSE

● **HSS-PM, 2 SCHNEIDEN KURZ STIRNRADIUS**
 ○ **FRAISES HSS-PM, 2 DENTS À BOUT HÉMISPHERIQUE, SÉRIE COURTE**
 ◎ **2 TAGLIENTI, SERIE CORTA, HSS-PM, SEMISFERICA**

- ▶ Designed to machine carbon steels, alloyed steels, stainless steels.
- ▶ Designed for milling of radius bottom slots, fillets and special contours.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.
- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Entworfen zum Fräsen von Nuten mit Radien, Rippen und speziellen Konturen.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.



p.C670~C671

Unit : mm

EDP No.	Radius of Ball Nose		Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	UNCOATED	TiAIN				
E9940010	GA940010	R0.5	1.0	6	2.5	47
-	GA940020	R1.0	2.0	6	4	48
E9940030	GA940030	R1.5	3.0	6	5	49
-	GA940040	R2.0	4.0	6	7	51
-	GA940050	R2.5	5.0	6	8	52
-	GA940070	R3.5	7.0	10	10	60
-	GA940080	R4.0	8.0	10	11	61
E9940090	GA940090	R4.5	9.0	10	11	61
E9940100	GA940100	R5.0	10.0	10	13	63
E9940120	GA940120	R6.0	12.0	12	16	73
E9940140	GA940140	R7.0	14.0	12	16	73
-	GA940160	R8.0	16.0	16	19	79
E9940180	GA940180	R9.0	18.0	16	19	79
-	GA940200	R10.0	20.0	20	22	88
-	GA940220	R11.0	22.0	20	22	88
E9940250	GA940250	R12.5	25.0	25	26	102

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.03	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	38	10	29	32	38	45	15	23	25	28	10	26	3	25	3	21
HB	125	190	250	270	300	180	275	300	350	200	200	240	180	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	42	43
HRc	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550	400	550
Recommend						○	○	○															

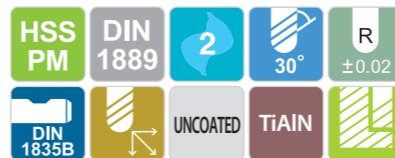


UNCOATED **E9A32** SERIES
 TiAIN COATED **GAA32** SERIES

HSS-PM, 2 FLUTE LONG LENGTH BALL NOSE

● **HSS-PM, 2 SCHNEIDEN LANG STIRNRADIUS**
 ○ **FRAISES HSS-PM, 2 DENTS À BOUT HÉMISPHERIQUE, SÉRIE LONGUE**
 ◎ **2 TAGLIENTI, SERIE LUNGA, HSS-PM, SEMISFERICA**

- ▶ Designed to machine carbon steels, alloyed steels, stainless steels.
- ▶ Designed for milling of radius bottom slots, fillets and special contours.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.
- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Entworfen zum Fräsen von Nuten mit Radien, Rippen und speziellen Konturen.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.



p.C670~C671

Unit : mm

EDP No.	Radius of Ball Nose		Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	UNCOATED	TiAIN				
-	GAA32020	R1.0	2.0	6	7	54
-	GAA32040	R2.0	4.0	6	11	63
-	GAA32050	R2.5	5.0	6	13	68
-	GAA32060	R3.0	6.0	6	13	68
E9A32080	-	R4.0	8.0	10	19	88
E9A32100	GAA32100	R5.0	10.0	10	22	95
E9A32160	GAA32160	R8.0	16.0	16	32	123
-	GAA32180	R9.0	18.0	16	32	123
-	GAA32200	R10.0	20.0	20	38	141
-	GAA32220	R11.0	22.0	20	38	141
E9A32250	GAA32250	R12.5	25.0	25	45	166

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.03	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	38	10	29	32	38	45	15	23	25	28	10	26	3	25	3	21
HB	125	190	250	270	300	180	275	300	350	200	200	240	180	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	42	43
HRc	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550	400	550
Recommend						○	○	○															

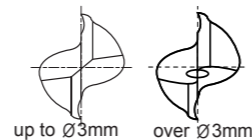


UNCOATED **E9936** SERIES
 TiAIN COATED **GA936** SERIES

HSS-PM, 2 FLUTE SHORT LENGTH

- HSS-PM, 2 SCHNEIDEN KURZ
- FRAISES HSS-PM, 2 DENTS, SÉRIE COURTE
- 2 TAGLIENTI, SERIE CORTA, HSS-PM

- ▶ Designed to machine carbon steels, alloyed steels, stainless steels.
- ▶ 2 Flute design for slotting.
- ▶ Suitable for high speed cutting of difficult-to-cut materials.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.
- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ 2 Schneiden, Geeignet für Nutenfräsen.
- ▶ Geeignet für Hochgeschwindigkeitsfräsen von schwer zu zerspanenden Materialien.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.



HSS PM DIN 327 2 30° UNCOATED TiAIN p.C672~C673

Unit : mm

EDP No.	Mill Diameter		Shank Diameter		Length of Cut	Overall Length
	UNCOATED	TiAIN	e8	h6		
-		GA936010	1.0	6	2.5	47
-		GA936020	2.0	6	4	48
-		GA936030	3.0	6	5	49
-		GA936040	4.0	6	7	51
E9936050		GA936050	5.0	6	8	52
E9936060		GA936060	6.0	6	8	52
-		GA936070	7.0	10	10	60
E9936080		GA936080	8.0	10	11	61
-		GA936090	9.0	10	11	61
-		GA936100	10.0	10	13	63
E9936120		GA936120	12.0	12	16	73
-		GA936140	14.0	12	16	73
E9936160		GA936160	16.0	16	19	79
E9936180		GA936180	18.0	16	19	79
-		GA936200	20.0	20	22	88
-		GA936220	22.0	20	22	88
-		GA936250	25.0	25	26	102

Tolerances according to DIN 7160 & 7161

Nominal-Diameter in mm	Tolerance range in μm				
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73
h6	0 -6	0 -8	0 -9	0 -11	0 -13

◎ : 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	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	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

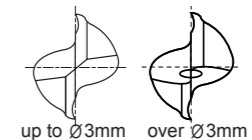


UNCOATED **E9A29** SERIES
 TiAIN COATED **GAA29** SERIES

HSS-PM, 2 FLUTE LONG LENGTH

- HSS-PM, 2 SCHNEIDEN LANG
- FRAISES HSS-PM, 2 DENTS, SÉRIE LONGUE
- 2 TAGLIENTI, SERIE LUNGA, HSS-PM

- ▶ Designed to machine carbon steels, alloyed steels, stainless steels.
- ▶ 2 Flute design for slotting.
- ▶ Suitable for high speed cutting of difficult-to-cut materials.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.
- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ 2 Schneiden, Geeignet für Nutenfräsen.
- ▶ Geeignet für Hochgeschwindigkeitsfräsen von schwer zu zerspanenden Materialien.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.



HSS PM DIN 844 2 30° UNCOATED TiAIN p.C672~C673

Unit : mm

EDP No.	Mill Diameter		Shank Diameter		Length of Cut	Overall Length
	UNCOATED	TiAIN	e8	h6		
-		GAA29020	2.0	6	7	51
-		GAA29030	3.0	6	8	52
-		GAA29040	4.0	6	11	55
E9A29050		GAA29050	5.0	6	13	57
-		GAA29060	6.0	6	13	57
-		GAA29070	7.0	10	16	66
-		GAA29080	8.0	10	19	69
-		GAA29090	9.0	10	19	69
-		GAA29100	10.0	10	22	72
E9A29120		GAA29120	12.0	12	26	83
-		GAA29140	14.0	12	26	83
E9A29160		GAA29160	16.0	16	32	92
-		GAA29180	18.0	16	32	92
-		GAA29200	20.0	20	38	104
-		GAA29220	22.0	20	38	104

Tolerances according to DIN 7160 & 7161

Nominal-Diameter in mm	Tolerance range in μm				
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73
h6	0 -6	0 -8	0 -9	0 -11	0 -13

◎ : 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	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	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎



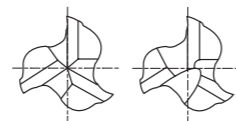
UNCOATED **E9942** SERIES
 TiAIN COATED **GA942** SERIES

HSS-PM, 3 FLUTE STUB LENGTH

● **HSS-PM, 3 SCHNEIDEN EXTRA KURZ**
 ○ **FRAISES HSS-PM, 3 DENTS, SÉRIE EXTRA-COURTE**
 ○ **3 TAGLIENTI, SERIE EXTRA CORTA, HSS-PM**

- ▶ Designed to machine carbon steels, alloyed steels, stainless steels.
- ▶ Well balanced web design to minimize deflection and chattering.
- ▶ 3 flute design possess the advantage of 2 flute and 4 flute end mill.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.

- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Verstärkter Kern zur Erhöhung der Stabilität.
- ▶ 3 Schneiden Design besitzt die Vorteile von 2-bzw 4 Schneiden Fräsem.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.



up to Ø1mm over Ø1mm



Unit : mm

EDP No.	Mill Diameter		Shank Diameter		Length of Cut	Overall Length
	UNCOATED	TiAIN	e8	h6		
E9942020		GA942020	2.0	6	4	48
-		GA942030	3.0	6	5	49
-		GA942040	4.0	6	7	51
E9942050		GA942050	5.0	6	8	52
-		GA942060	6.0	6	8	52
-		GA942080	8.0	10	11	61
-		GA942090	9.0	10	11	61
-		GA942100	10.0	10	13	63
E9942120		-	12.0	12	16	73
-		GA942140	14.0	12	16	73
-		GA942160	16.0	16	19	79
E9942180		GA942180	18.0	16	19	79
-		GA942200	20.0	20	22	88
-		GA942220	22.0	20	22	88
E9942250		GA942250	25.0	25	26	102

Tolerances according to DIN 7160 & 7161

	Tolerance range in µm				
	Nominal-Diameter in mm				
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
e8	- 14 - 28	- 20 - 38	- 25 - 47	- 32 - 59	- 40 - 73
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

◎ : 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	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	35	38	40	42	45	48	50	52	54	56	58	60	62	64	66	68
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎



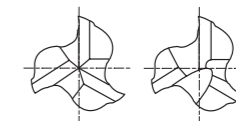
UNCOATED **E9A30** SERIES
 TiAIN COATED **GAA30** SERIES

HSS-PM, 3 FLUTE SHORT LENGTH

● **HSS-PM, 3 SCHNEIDEN KURZ**
 ○ **FRAISES HSS-PM, 3 DENTS, SÉRIE COURTE**
 ○ **3 TAGLIENTI, SERIE CORTA, HSS-PM**

- ▶ Designed to machine carbon steels, alloyed steels, stainless steels.
- ▶ Well balanced web design to minimize deflection and chattering.
- ▶ 3 flute design possess the advantage of 2 flute and 4 flute end mill.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.

- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Verstärkter Kern zur Erhöhung der Stabilität.
- ▶ 3 Schneiden Design besitzt die Vorteile von 2-bzw 4 Schneiden Fräsem.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.



up to Ø1mm over Ø1mm



Unit : mm

EDP No.	Mill Diameter		Shank Diameter		Length of Cut	Overall Length
	UNCOATED	TiAIN	e8	h6		
-		GAA30010	1.0	6	3	47
-		GAA30020	2.0	6	7	51
-		GAA30030	3.0	6	8	52
E9A30040		GAA30040	4.0	6	11	55
E9A30050		GAA30050	5.0	6	13	57
-		GAA30060	6.0	6	13	57
-		GAA30070	7.0	10	16	66
-		GAA30080	8.0	10	19	69
-		GAA30090	9.0	10	19	69
-		GAA30100	10.0	10	22	72
-		GAA30120	12.0	12	26	83
-		GAA30140	14.0	12	26	83
-		GAA30160	16.0	16	32	92
-		GAA30180	18.0	16	32	92
-		GAA30200	20.0	20	38	104
-		GAA30220	22.0	20	38	104
-		GAA30250	25.0	25	45	121

Tolerances according to DIN 7160 & 7161

	Tolerance range in µm				
	Nominal-Diameter in mm				
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
e8	- 14 - 28	- 20 - 38	- 25 - 47	- 32 - 59	- 40 - 73
h6	0 - 6	0 - 8	0 - 9	0 - 11	0 - 13

◎ : 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	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	35	38	40	42	45	48	50	52	54	56	58	60	62	64	66	68
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎



UNCOATED **E9938** SERIES
TiAIN COATED **GA938** SERIES

HSS-PM, 4 FLUTE SHORT LENGTH

- HSS-PM, 4 SCHNEIDEN KURZ
- FRAISES HSS-PM, 4 DENTS, SÉRIE COURTE
- 4 TAGLIENTI, SERIE CORTA, HSS-PM

- ▶ Designed to machine carbon steels, alloyed steels, stainless steels.
- ▶ Recommended for pocketing, cam milling, die sinking and slotting.
- ▶ Designed for high speed cutting of difficult-to-cut materials.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.

- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Empfohlen für Taschenfräsen, Nockenfräsen, Gussformen und Nutenfräsen.
- ▶ Geeignet für Hochgeschwindigkeitsfräsen von schwer zu zerspanenden Materialien.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.



HSS PM DIN 844 4 30°

DIN 1835B UNCOATED TiAIN p.C678~C679

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	
					UNCOATED
-	GA938010	1.0	6	3	49
-	GA938020	2.0	6	7	51
-	GA938030	3.0	6	8	52
E9938040	GA938040	4.0	6	11	55
E9938050	GA938050	5.0	6	13	57
-	GA938060	6.0	6	13	57
E9938070	GA938070	7.0	10	16	66
-	GA938080	8.0	10	19	69
-	GA938090	9.0	10	19	69
E9938100	GA938100	10.0	10	22	72
-	GA938120	12.0	12	26	83
-	GA938140	14.0	12	26	83
E9938160	GA938160	16.0	16	32	92
E9938180	GA938180	18.0	16	32	92
E9938200	GA938200	20.0	20	38	104
-	GA938250	25.0	25	45	121

▶ Mill Diameter 1mm: Center match end teeth

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ -0.03	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	10	29	32	38	15	35	15	23	10	10	26	3	25	21	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	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend						○	○	○													



UNCOATED **E9A31** SERIES
TiAIN COATED **GAA31** SERIES

HSS-PM, 4 FLUTE LONG LENGTH

- HSS-PM, 4 SCHNEIDEN LANG
- FRAISES HSS-PM, 4 DENTS, SÉRIE LONGUE
- 4 TAGLIENTI, SERIE LUNGA, HSS-PM

- ▶ Designed to machine carbon steels, alloyed steels, stainless steels.
- ▶ Recommended for pocketing, cam milling, die sinking and slotting.
- ▶ Designed for high speed cutting of difficult-to-cut materials.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.

- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Empfohlen für Taschenfräsen, Nockenfräsen, Gussformen und Nutenfräsen.
- ▶ Geeignet für Hochgeschwindigkeitsfräsen von schwer zu zerspanenden Materialien.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.



HSS PM DIN 844 4 30°

DIN 1835B UNCOATED TiAIN p.C678~C679

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	
					UNCOATED
-	GAA31020	2.0	6	10	54
-	GAA31030	3.0	6	12	56
-	GAA31040	4.0	6	19	63
-	GAA31060	6.0	6	24	68
-	GAA31070	7.0	10	30	80
-	GAA31080	8.0	10	38	88
-	GAA31090	9.0	10	38	88
-	GAA31100	10.0	10	45	95
E9A31120	GAA31120	12.0	12	53	110
-	GAA31140	14.0	12	53	110
E9A31160	GAA31160	16.0	16	63	123
E9A31180	GAA31180	18.0	16	63	123
-	GAA31200	20.0	20	75	141
-	GAA31220	22.0	20	75	141
-	GAA31250	25.0	25	90	166

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ -0.03	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	10	29	32	38	15	35	15	23	10	10	26	3	25	21	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	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend						○	○	○													



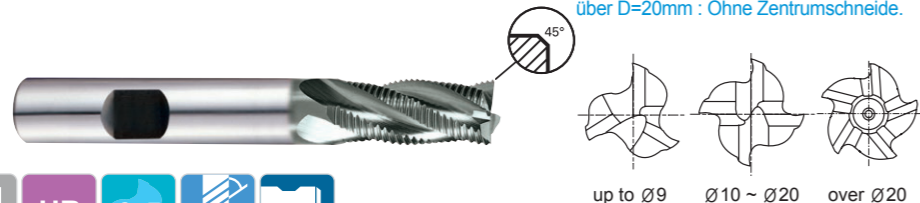
UNCOATED **E9941** SERIES
X-COATING **GA941** SERIES

HSS-PM, MULTI FLUTE SHORT LENGTH ROUGHING - FINE

- HSS-PM, MULTI SCHNEIDEN KURZ SCHRUPPFRÄSER - FEIN
- FRAISES HSS-PM, MULTI-DENTS RAVAGEUSE - PAS FINS, SÉRIE COURTE
- MULTI TAGL., PER SGROSSATURA, SERIE CORTA, BOMBATO FINE - HSS PM

- ▶ Suitable for high-feed roughing milling.
- ▶ Designed to machine carbon steels, alloyed steels, stainless steels.
- ▶ Providing excellent finished surfaces in many cases.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.
- ▶ up to Ø20 : center cut, over Ø20 : non center cut

- ▶ Geeignet zum HSC - Schrupp - Fräsen.
- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Liefert in vielen Fällen exzellente bearbeitete Oberflächen.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.
- ▶ Bis D=20mm : Mit Zentrumschneide, über D=20mm : Ohne Zentrumschneide.



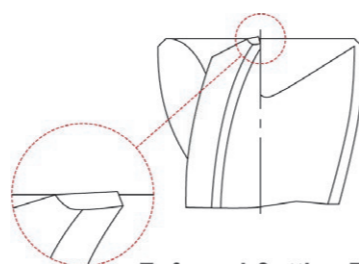
HSS PM, DIN 844, HR, 3-5, 30°, DIN 1835B, UNCOATED, X Coating, p.C680~C681

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer
-	6.0	6	13	57	3	0.18
E9941070	GA941070	7.0	10	16	3	0.18
-	8.0	10	19	69	3	0.18
-	9.0	10	19	69	3	0.18
-	10.0	10	22	72	4	0.18
-	12.0	12	26	83	4	0.18
-	14.0	12	26	83	4	0.25
-	16.0	16	32	92	4	0.25
-	18.0	16	32	92	4	0.25
-	20.0	20	38	104	4	0.25
-	22.0	20	38	104	5	0.36
-	25.0	25	45	121	5	0.36

Tolerances according to DIN 7160 & 7161

	Tolerance range in µm					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16



Enforced Cutting Edge

◎ : 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	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	35	38	42	45	48	52	55	58	62	65	68	72	75	78	82	85	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎



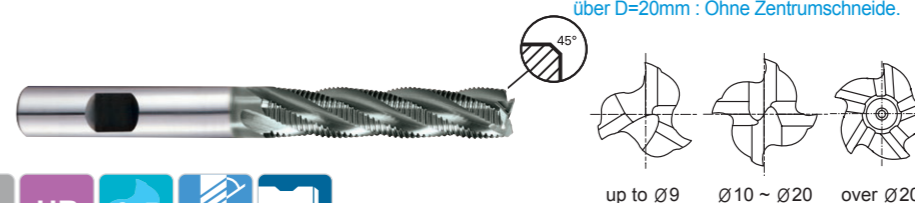
UNCOATED **E9A35** SERIES
X-COATING **GAA35** SERIES

HSS-PM, MULTI FLUTE LONG LENGTH ROUGHING - FINE

- HSS-PM, MULTI SCHNEIDEN LANG SCHRUPPFRÄSER - FEIN
- FRAISES HSS-PM, MULTI-DENTS RAVAGEUSE - PAS FINS, SÉRIE LONGUE
- MULTI TAGL., PER SGROSSATURA, SERIE LUNGA, BOMBATO FINE - HSS PM

- ▶ Suitable for high-feed roughing milling.
- ▶ Designed to machine carbon steels, alloyed steels, stainless steels.
- ▶ Providing excellent finished surfaces in many cases.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.
- ▶ up to Ø20 : center cut, over Ø20 : non center cut

- ▶ Geeignet zum HSC - Schrupp - Fräsen.
- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Liefert in vielen Fällen exzellente bearbeitete Oberflächen.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.
- ▶ Bis D=20mm : Mit Zentrumschneide, über D=20mm : Ohne Zentrumschneide.



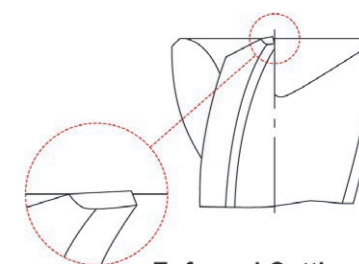
HSS PM, DIN 844, HR, 3-5, 30°, DIN 1835B, UNCOATED, X Coating, p.C680~C681

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer
-	6.0	6	24	68	3	0.18
-	7.0	10	30	80	3	0.18
-	8.0	10	38	88	3	0.18
-	9.0	10	38	88	3	0.18
-	10.0	10	45	95	4	0.18
-	12.0	12	53	110	4	0.18
-	14.0	12	53	110	4	0.25
-	16.0	16	63	123	4	0.25
-	18.0	16	63	123	4	0.25
-	20.0	20	75	141	4	0.25
-	22.0	20	75	141	5	0.36
-	25.0	25	90	166	5	0.36

Tolerances according to DIN 7160 & 7161

	Tolerance range in µm					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16



Enforced Cutting Edge

◎ : 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	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	35	38	42	45	48	52	55	58	62	65	68	72	75	78	82	85	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

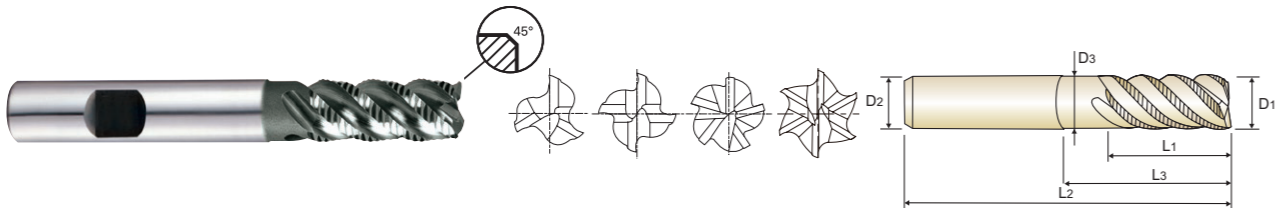


UNCOATED **E9A26** SERIES
X-COATING **GAA26** SERIES

HSS-PM, MULTI FLUTE 45°HELIX SHORT LENGTH ROUGHING - FINE

- HSS-PM, MULTI SCHNEIDEN 45°RECHTSSPIRALE KURZ SCHRUPFRÄSER - FEIN
- FRAISES HSS-PM, MULTI-DENTS RAVAGEUSE HÉLICE À 45° - PAS FINS, SÉRIE COURTE
- MULTI TAGL., ELICA 45°, PER SGROS., SERIE CORTA, BOMBATO FINE - HSS PM

- ▶ High chip removal and minimizing breakages of cutting edges.
- ▶ Designed to machine carbon steels, alloyed steels, stainless steels
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting
- ▶ Schnelle Spanabfuhr und Minimierung von Schneidkantenausbrüchen
- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.



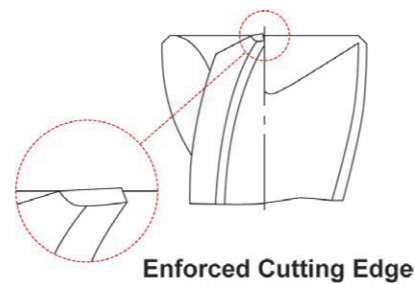
HSS PM DIN 844 HR 3-6 45° DIN 1835B
UNCOATED X Coating p.C682~C683

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	No. of Flute	Chamfer	
									UNCOATED
-	GAA26040	4.0	6	11	-	57	-	3	0.1
E9A26050	GAA26050	5.0	6	13	-	57	-	4	0.13
-	GAA26060	6.0	6	13	-	57	-	4	0.15
-	GAA26070	7.0	10	16	-	66	-	4	0.15
-	GAA26080	8.0	10	19	-	69	-	4	0.18
-	GAA26090	9.0	10	19	-	69	-	4	0.18
-	GAA26100	10.0	10	22	31	72	9.5	4	0.20
-	GAA26120	12.0	12	26	37	83	11.5	4	0.20
-	GAA26140	14.0	12	26	-	83	-	5	0.20
-	GAA26160	16.0	16	32	44	92	15	5	0.20
-	GAA26180	18.0	16	32	-	92	-	6	0.20
-	GAA26200	20.0	20	38	54	104	19	6	0.20
E9A26250	GAA26250	25.0	25	45	63	121	24	6	0.20

Tolerances according to DIN 7160 & 7161

	Tolerance range in μm					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16



Enforced Cutting Edge

◎ : 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	35	38	42	45	48	52	55	58	62	65	68	72	75	78	82	85
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

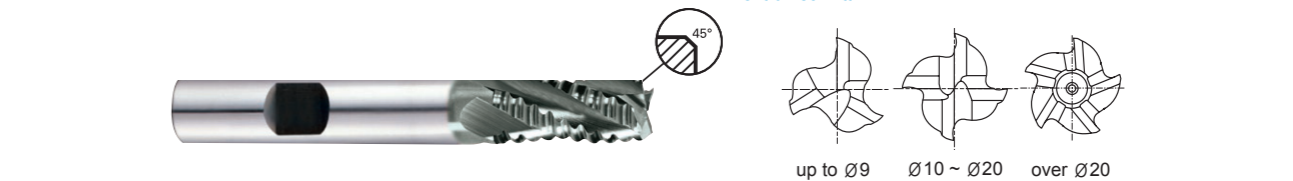


UNCOATED **E9A33** SERIES
X-COATING **GAA33** SERIES

HSS-PM, MULTI FLUTE SHORT LENGTH ROUGHING - COARSE

- HSS-PM, MULTI SCHNEIDEN KURZ SCHRUPFRÄSER - GROB
- FRAISES HSS-PM, MULTI-DENTS RAVAGEUSE - PAS GROSSIERS, SÉRIE COURTE
- MULTI TAGL., PER SGROS., SERIE CORTA, BOMBATO GROSSO - HSS PM

- ▶ Suitable for high-feed roughing milling.
- ▶ Designed to machine carbon steels, alloyed steels, stainless steels.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.
- ▶ up to $\varnothing 20$: center cut, over $\varnothing 20$: non center cut
- ▶ Geeignet zum HSC - Schrupp - Fräsen.
- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.
- ▶ Bis $D \leq 20\text{mm}$: mit Zentrumschnitt, über $D > 20\text{mm}$: Ohne Zentrumschnitt.



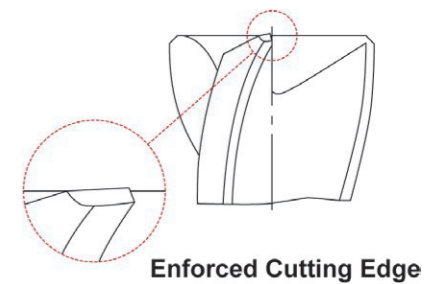
HSS PM DIN 844 NR 3-5 30° DIN 1835B
UNCOATED X Coating p.C680~C681

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer	
							UNCOATED
-	GAA33060	6.0	6	13	57	3	0.25
-	GAA33070	7.0	10	16	66	3	0.25
-	GAA33080	8.0	10	19	69	3	0.25
-	GAA33090	9.0	10	19	69	3	0.36
-	GAA33100	10.0	10	22	72	4	0.36
-	GAA33120	12.0	12	26	83	4	0.5
-	GAA33140	14.0	12	26	83	4	0.55
E9A33160	GAA33160	16.0	16	32	92	4	0.55
-	GAA33180	18.0	16	32	92	4	0.55
-	GAA33200	20.0	20	38	104	4	0.55
-	GAA33220	22.0	20	38	104	5	0.55
-	GAA33250	25.0	25	45	121	5	0.55

Tolerances according to DIN 7160 & 7161

	Tolerance range in μm					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16



Enforced Cutting Edge

◎ : 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	35	38	42	45	48	52	55	58	62	65	68	72	75	78	82	85
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎



UNCOATED **E9A34** SERIES

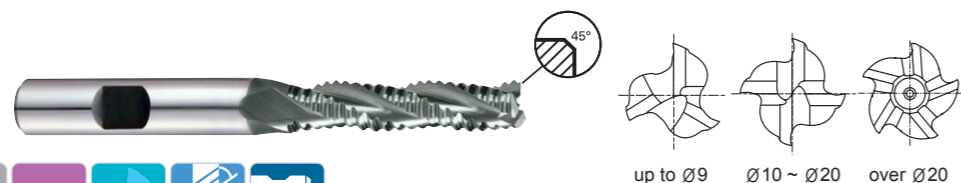
X-COATING **GAA34** SERIES

HSS-PM, MULTI FLUTE LONG LENGTH ROUGHING - COARSE

- HSS-PM, MULTI SCHNEIDEN LANG SCHRUPFRÄSER - GROB
- FRAISES HSS-PM, MULTI-DENTS RAVAGEUSE - PAS GROSSIERS, SÉRIE LONGUE
- MULTI TAGL., PER SGROSSATURA, SERIE LUNGA, BOMBATO GROSSO - HSS PM

- ▶ Suitable for high-feed roughing milling.
- ▶ Designed to machine carbon steels, alloyed steels, stainless steels.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.
- ▶ up to $\varnothing 20$: center cut, over $\varnothing 20$: non center cut

- ▶ Geeignet zum HSC - Schrupp - Fräsen.
- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.
- ▶ Bis $D \leq 20\text{mm}$: mit Zentrumschnitt, über $D > 20\text{mm}$: Ohne Zentrumschnitt.

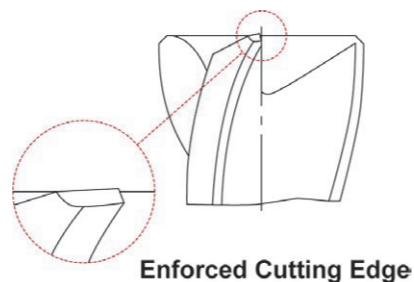


Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer	
							UNCOATED
-	GAA34060	6.0	6	24	68	3	0.25
-	GAA34070	7.0	10	30	80	3	0.25
-	GAA34080	8.0	10	38	88	3	0.25
E9A34090	-	9.0	10	38	88	3	0.36
E9A34100	GAA34100	10.0	10	45	95	4	0.36
-	GAA34140	14.0	12	53	110	4	0.55
-	GAA34160	16.0	16	63	123	4	0.55
-	GAA34180	18.0	16	63	123	4	0.55
-	GAA34200	20.0	20	75	141	4	0.55
-	GAA34220	22.0	20	75	141	5	0.55
-	GAA34250	25.0	25	90	166	5	0.55

Tolerances according to DIN 7160 & 7161

	Tolerance range in μm					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16



Enforced Cutting Edge

◎ : 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	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 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	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend						○	○	○													



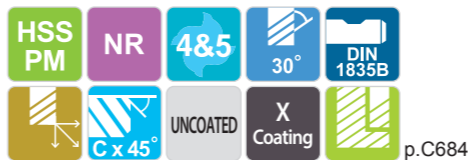
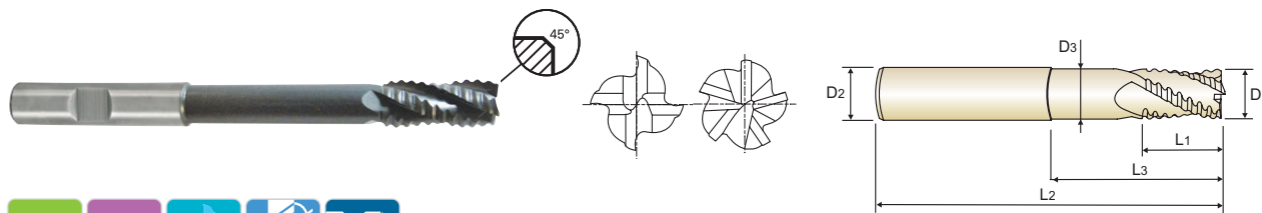
X-COATING **GAE43** SERIES

HSS-PM, 4&5 FLUTE ROUGHING WITH NECK - COARSE

- HSS-PM, 4&5 SCHNEIDEN SCHRUPFRÄSER mit ABGESETZTEM SCHAFTTETL - GROB
- FRAISES HSS-PM, 4&5-DENTS RAVAGEUSE AVEC DÉGAGEMENT - PAS GROSSIERS
- 4&5 TAGL., PER SGROSSATURA, SCARICATA - HSS PM

- ▶ High chip removal and minimizing breakages of cutting edges.
- ▶ Design to machine carbon steels, alloyed steels, stainless steels.
- ▶ YG-1's new developed TANK-POWER Coating suitable for high speed cutting.

- ▶ Schnelle Spanabfuhr und Minimierung von Schneidkantenausbrüchen
- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.

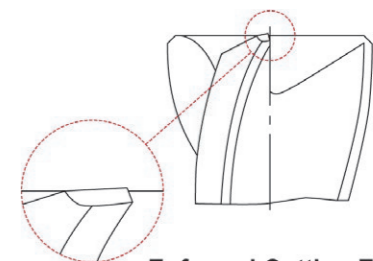


Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	No. of Flute	Chamfer
GAE43100	10.0	10	22	69	110	8.5	4	0.34
GAE43120	12.0	12	26	78	125	10.5	4	0.50
GAE43160	16.0	16	32	87	138	14	4	0.55
GAE43200	20.0	20	38	108	160	18	5	0.55
GAE43250	25.0	25	45	155	216	23	5	0.55

Tolerances according to DIN 7160 & 7161

	Tolerance range in μm					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
js12	± 50	± 60	± 75	± 90	± 105	± 125
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16



Enforced Cutting Edge

◎ : 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	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	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

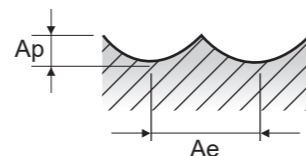
ISO Material Description	N					S					H										
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials			Heat Resistant Super Alloys		Titanium Alloys	Hardened steel	Chilled Cast Iron	Hardened Cast Iron					
VDI 3323	21	22	23	24	25	26	27	28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

GA940 , GAA32 SERIES 2 FLUTE BALL NOSE

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

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)									
						3.0	4.0	6.0	8.0	10.0	12.0	16.0	20.0	25.0	
P	1	Non-alloy steel	0.5D	0.2D	Vc	70	75	85	85	85	85	85	85	85	75
					fz	0.023	0.036	0.055	0.079	0.109	0.115	0.141	0.156	0.163	
					RPM	7427	5968	4509	3382	2706	2255	1691	1353	955	
					FEED	342	430	496	534	590	519	477	422	311	
	2		Vc	55	60	65	65	65	70	65	65	60			
			fz	0.02	0.031	0.046	0.067	0.095	0.097	0.123	0.14	0.142			
			RPM	5836	4775	3448	2586	2069	1857	1293	1035	764			
			FEED	233	296	317	347	393	360	318	290	217			
	3-4		Vc	35	40	45	45	45	45	45	45	35			
			fz	0.016	0.027	0.039	0.056	0.082	0.083	0.101	0.11	0.122			
			RPM	3714	3183	2387	1790	1432	1194	895	716	446			
FEED		119	172	186	201	235	198	181	158	109					
5	Vc	20	20	25	20	20	20	20	25	20					
	fz	0.014	0.023	0.035	0.048	0.075	0.073	0.091	0.097	0.104					
	RPM	2122	1592	1326	796	637	531	398	398	255					
	FEED	59	73	93	76	95	77	72	77	53					
6	Vc	55	60	65	65	65	70	65	65	60					
	fz	0.02	0.031	0.046	0.067	0.095	0.097	0.123	0.14	0.142					
	RPM	5836	4775	3448	2586	2069	1857	1293	1035	764					
	FEED	233	296	317	347	393	360	318	290	217					
7	Vc	35	40	45	45	45	45	45	45	35					
	fz	0.016	0.027	0.039	0.056	0.082	0.083	0.101	0.11	0.122					
	RPM	3714	3183	2387	1790	1432	1194	895	716	446					
	FEED	119	172	186	201	235	198	181	158	109					
8-9	Vc	20	20	25	20	20	20	20	25	20					
	fz	0.014	0.023	0.035	0.048	0.075	0.073	0.091	0.097	0.104					
	RPM	2122	1592	1326	796	637	531	398	398	255					
	FEED	59	73	93	76	95	77	72	77	53					
10	Vc	55	60	65	65	65	70	65	65	60					
	fz	0.02	0.031	0.046	0.067	0.095	0.097	0.123	0.14	0.142					
	RPM	5836	4775	3448	2586	2069	1857	1293	1035	764					
	FEED	233	296	317	347	393	360	318	290	217					
11.1	Vc	20	20	25	20	20	20	20	25	20					
	fz	0.014	0.023	0.035	0.048	0.075	0.073	0.091	0.097	0.104					
	RPM	2122	1592	1326	796	637	531	398	398	255					
	FEED	59	73	93	76	95	77	72	77	53					
M	14.1	Stainless steel	0.5D	0.2D	Vc	20	20	25	25	25	25	25	25	20	
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	0.2D	fz	0.014	0.023	0.036	0.048	0.073	0.074	0.092	0.1	0.1	
					RPM	2122	1592	1326	995	796	663	497	398	255	
					FEED	59	73	95	95	116	98	92	80	51	
					Vc	55	60	65	65	65	70	65	65	60	
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	0.2D	fz	0.02	0.031	0.046	0.067	0.095	0.097	0.123	0.14	0.142	
					RPM	5836	4775	3448	2586	2069	1857	1293	1035	764	
					FEED	233	296	317	347	393	360	318	290	217	
					Vc	55	60	65	65	65	70	65	65	60	

※ The FEED, in long & extra long types, should be reduced by around 50%

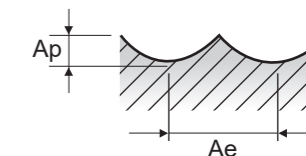


E9940 , E9A32 SERIES 2 FLUTE BALL NOSE

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

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)								
						3.0	4.0	6.0	8.0	10.0	12.0	16.0	20.0	25.0
P	1	Non-alloy steel	0.5D	0.2D	Vc	45	50	55	60	55	55	55	60	50
					fz	0.021	0.033	0.05	0.072	0.103	0.11	0.136	0.14	0.148
					RPM	4775	3979	2918	2387	1751	1459	1094	955	637
					FEED	201	263	292	344	361	321	298	267	188
	2		Vc	35	40	45	45	45	45	45	45	40		
			fz	0.018	0.029	0.043	0.061	0.089	0.092	0.111	0.12	0.13		
			RPM	3714	3183	2387	1790	1432	1194	895	716	509		
			FEED	134	185	205	218	255	220	199	172	132		
	3-4		Vc	25	25	30	30	30	30	30	30	25		
			fz	0.015	0.024	0.034	0.052	0.07	0.076	0.092	0.099	0.103		
			RPM	2653	1989	1592	1194	955	796	597	477	318		
FEED		80	95	108	124	134	121	110	95	66				
5	Vc	10	15	15	15	15	15	15	15	15				
	fz	0.013	0.023	0.034	0.046	0.068	0.069	0.083	0.094	0.086				
	RPM	1061	1194	796	597	477	398	298	239	191				
	FEED	28	55	54	55	65	55	50	45	33				
6	Vc	35	40	45	45	45	45	45	45	40				
	fz	0.018	0.029	0.043	0.061	0.089	0.092	0.111	0.12	0.13				
	RPM	3714	3183	2387	1790	1432	1194	895	716	509				
	FEED	134	185	205	218	255	220	199	172	132				
7	Vc	25	25	30	30	30	30	30	30	25				
	fz	0.015	0.024	0.034	0.052	0.07	0.076	0.092	0.099	0.103				
	RPM	2653	1989	1592	1194	955	796	597	477	318				
	FEED	80	95	108	124	134	121	110	95	66				
8-9	Vc	10	15	15	15	15	15	15	15	15				
	fz	0.013	0.023	0.034	0.046	0.068	0.069	0.083	0.094	0.086				
	RPM	1061	1194	796	597	477	398	298	239	191				
	FEED	28	55	54	55	65	55	50	45	33				
10	Vc	35	40	45	45	45	45	45	45	40				
	fz	0.018	0.029	0.043	0.061	0.089	0.092	0.111	0.12	0.13				
	RPM	3714	3183	2387	1790	1432	1194	895	716	509				
	FEED	134	185	205	218	255	220	199	172	132				
11.1	Vc	10	15	15	15	15	15	15	15	15				
	fz	0.013	0.023	0.034	0.046	0.068	0.069	0.083	0.094	0.086				
	RPM	1061	1194	796	597	477	398	298	239	191				
	FEED	28	55	54	55	65	55	50	45	33				
M	14.1	Stainless steel	0.5D	0.2D	Vc	15	15	15	15	15	15	15	15	15
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	0.2D	fz	0.014	0.025	0.036	0.049	0.075	0.074	0.091	0.104	0.09
					RPM	1592	1194	796	597	477	398	298	239	191
					FEED	45	60	57	58	72	59	54	50	34
					Vc	35	40	45	45	45	45	45	45	40
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	0.2D	fz	0.018	0.029	0.043	0.061	0.089	0.092	0.111	0.12	0.13
					RPM	3714	3183	2387	1790	1432	1194	895	716	509
					FEED	134	185	205	218	255	220	199	172	132
					Vc	35	40	45	45	45	45	45	45	40

※ The FEED, in long & extra long types, should be reduced by around 50%

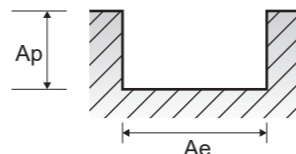


GA936 , GAA29 SERIES 2 FLUTE - SLOTTING

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

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)														
						2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	25.0	
P	1	Non-alloy steel	1.0D	0.5D	Vc	45	45	55	60	65	65	65	70	70	70	65	60	60	60	
					fz	0.008	0.016	0.027	0.033	0.038	0.053	0.071	0.076	0.083	0.098	0.104	0.116	0.11	0.103	
					RPM	7162	4775	4377	3820	3448	2586	2069	1857	1592	1393	1149	955	868	764	
	2		Vc	35	40	45	50	55	55	55	55	55	60	55	50	50	50			
			fz	0.008	0.016	0.024	0.031	0.036	0.055	0.074	0.083	0.084	0.085	0.103	0.106	0.106	0.111			
			RPM	5570	4244	3581	3183	2918	2188	1751	1459	1251	1194	973	796	723	637			
	3-4		Vc	30	30	40	40	45	45	45	45	45	45	45	45	40	40			
			fz	0.008	0.017	0.025	0.036	0.041	0.056	0.079	0.091	0.098	0.101	0.101	0.107	0.104	0.117			
			RPM	4775	3183	3183	2546	2387	1790	1432	1194	1023	895	796	716	579	509			
	5		Vc	45	45	55	60	65	65	65	70	70	70	65	60	60	60			
			fz	0.008	0.016	0.027	0.033	0.038	0.053	0.071	0.076	0.083	0.098	0.104	0.116	0.11	0.103			
RPM		7162	4775	4377	3820	3448	2586	2069	1857	1592	1393	1149	955	868	764					
6	Vc	35	40	45	50	55	55	55	55	55	60	55	50	50	50					
	fz	0.008	0.016	0.024	0.031	0.036	0.055	0.074	0.083	0.084	0.085	0.103	0.106	0.106	0.111					
	RPM	5570	4244	3581	3183	2918	2188	1751	1459	1251	1194	973	796	723	637					
7	Vc	30	30	40	40	45	45	45	45	45	45	45	40	40	40					
	fz	0.008	0.017	0.025	0.036	0.041	0.056	0.079	0.091	0.098	0.101	0.101	0.107	0.104	0.117					
	RPM	4775	3183	3183	2546	2387	1790	1432	1194	1023	895	796	716	579	509					
8	Vc	45	45	55	60	65	65	65	70	70	70	65	60	60	60					
	fz	0.008	0.016	0.027	0.033	0.038	0.053	0.071	0.076	0.083	0.098	0.104	0.116	0.11	0.103					
	RPM	7162	4775	4377	3820	3448	2586	2069	1857	1592	1393	1149	955	868	764					
9	Vc	35	40	45	50	55	55	55	55	55	60	55	50	50	50					
	fz	0.008	0.016	0.024	0.031	0.036	0.055	0.074	0.083	0.084	0.085	0.103	0.106	0.106	0.111					
	RPM	5570	4244	3581	3183	2918	2188	1751	1459	1251	1194	973	796	723	637					
10	Vc	35	40	45	50	55	55	55	55	55	60	55	50	50	50					
	fz	0.008	0.016	0.024	0.031	0.036	0.055	0.074	0.083	0.084	0.085	0.103	0.106	0.106	0.111					
	RPM	5570	4244	3581	3183	2918	2188	1751	1459	1251	1194	973	796	723	637					
11.1	Vc	45	45	55	60	65	65	65	70	70	70	65	60	60	60					
	fz	0.008	0.016	0.027	0.033	0.038	0.053	0.071	0.076	0.083	0.098	0.104	0.116	0.11	0.103					
	RPM	7162	4775	4377	3820	3448	2586	2069	1857	1592	1393	1149	955	868	764					
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	1.0D	0.5D	Vc	35	40	45	50	55	55	55	55	55	60	50	50			
					fz	0.008	0.016	0.024	0.031	0.036	0.055	0.074	0.083	0.084	0.085	0.103	0.106	0.106	0.111	
					RPM	5570	4244	3581	3183	2918	2188	1751	1459	1251	1194	973	796	723	637	

※ The FEED, in long & extra long types, should be reduced by around 50%

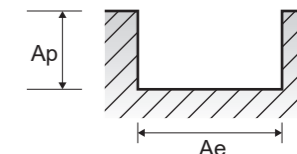


E9936 , E9A29 SERIES 2 FLUTE - SLOTTING

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

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)														
						2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	25.0	
P	1	Non-alloy steel	1.0D	0.5D	Vc	30	30	35	40	45	45	45	45	45	45	45	40	40		
					fz	0.007	0.015	0.024	0.031	0.035	0.047	0.064	0.071	0.073	0.089	0.094	0.102	0.096	0.093	
					RPM	4775	3183	2785	2546	2387	1790	1432	1194	1137	1061	955	868	764	509	
	2		Vc	25	25	30	35	40	40	40	40	40	40	40	35	35	35			
			fz	0.007	0.015	0.023	0.028	0.034	0.05	0.069	0.075	0.082	0.09	0.094	0.093	0.094	0.099			
			RPM	3979	2653	2387	2228	2122	1592	1273	1061	796	619	557	506	446				
	3-4		Vc	20	20	25	30	30	30	30	30	30	30	30	30	30	25			
			fz	0.008	0.017	0.024	0.032	0.038	0.052	0.07	0.081	0.088	0.092	0.094	0.099	0.094	0.103			
			RPM	3183	2122	1989	1910	1592	1194	955	796	637	531	455	398	354	318			
	5		Vc	15	15	15	15	20	20	20	20	20	20	20	20	20	20			
			fz	0.01	0.016	0.023	0.03	0.033	0.047	0.067	0.07	0.076	0.086	0.081	0.092	0.093	0.094			
RPM		2387	1592	1194	955	1061	796	637	531	455	398	354	318	289	255					
6	Vc	25	25	30	35	40	40	40	40	40	40	40	35	35	35					
	fz	0.007	0.015	0.023	0.028	0.034	0.05	0.069	0.075	0.082	0.09	0.094	0.093	0.094	0.099					
	RPM	3979	2653	2387	2228	2122	1592	1273	1061	796	619	557	506	446						
7	Vc	20	20	25	30	30	30	30	30	30	30	30	30	30	25					
	fz	0.008	0.017	0.024	0.032	0.038	0.052	0.07	0.081	0.088	0.092	0.094	0.099	0.094	0.103					
	RPM	3183	2122	1989	1910	1592	1194	955	796	637	531	455	398	354	318					
8	Vc	15	15	15	15	20	20	20	20	20	20	20	20	20	20					
	fz	0.01	0.016	0.023	0.03	0.033	0.047	0.067	0.07	0.076	0.086	0.081	0.092	0.093	0.094					
	RPM	2387	1592	1194	955	1061	796	637	531	455	398	354	318	289	255					
9	Vc	10	10	15	15	15	15	15	15	15	15	15	15	15	15					
	fz	0.01	0.017	0.021	0.025	0.037	0.046	0.068	0.069	0.074	0.083	0.083	0.083	0.083	0.086					
	RPM	1592	1061	1194	955	796	597	477	398	341	298	265	239	217	191					
10	Vc	25	25	30	35	40	40	40	40	40	40	40	35	35	35					
	fz	0.007	0.015	0.023	0.028	0.034	0.05	0.069	0.075	0.082	0.09	0.094	0.093	0.094	0.099					
	RPM	3979	2653	2387	2228	2122	1592	1273	1061	796	619	557	506	446						
11.1	Vc	15	15	15	15	20	20	20	20	20	20	20	20	20	20					
	fz	0.01	0.016	0.023	0.03	0.033	0.047	0.067	0.07	0.076	0.086	0.081	0.092	0.093	0.094					
	RPM	2387	1592	1194	955	1061	796	637	531	455	398	354	318	289	255					
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	1.0D	0.5D	Vc	25	25	30	35	40	40	40	40	40	35	35	35			
					fz	0.007	0.015	0.023	0.028	0.034	0.05	0.069	0.075	0.082	0.09	0.094	0.093	0.094	0.099	
					RPM	3979	2653	2387	2228	2122	1592	1273	1061	796	619	557	506	446		

※ The FEED, in long & extra long types, should be reduced by around 50%





RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER



RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

GA942, GAA30 SERIES 3 FLUTE - SLOTTING

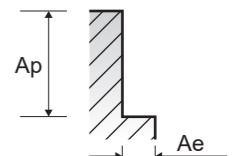
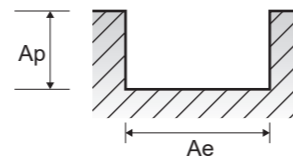
Vc = m/min.
fz = mm/tooth
RPM = rev./min.
FEED = mm/min.

GA942, GAA30 SERIES 3 FLUTE - SIDE CUTTING

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

Table with columns: ISO, VDI 3323, Material Description, Ae, Ap, Parameter, Diameter (Ø) (2.0 to 25.0), and cutting parameters (Vc, fz, RPM, FEED) for various materials like Non-alloy steel, Low alloy steel, and High alloyed steel.

Table with columns: ISO, VDI 3323, Material Description, Ae, Ap, Parameter, Diameter (Ø) (2.0 to 25.0), and cutting parameters (Vc, fz, RPM, FEED) for various materials like Non-alloy steel, Low alloy steel, and High alloyed steel.



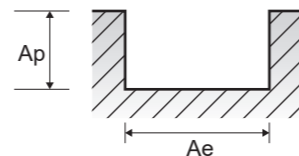


RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

E9942 , E9A30 SERIES 3 FLUTE - SLOTTING

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

Table with columns for ISO, VDI 3323, Material Description, Ae, Ap, Parameter, and Diameter (Ø) from 2.0 to 25.0. Rows include Non-alloy steel, Low alloy steel, and High alloyed steel, and tool steel.

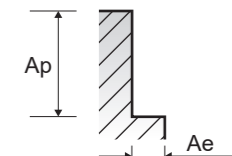


RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

E9942 , E9A30 SERIES 3 FLUTE - SIDE CUTTING

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

Table with columns for ISO, VDI 3323, Material Description, Ae, Ap, Parameter, and Diameter (Ø) from 2.0 to 25.0. Rows include Non-alloy steel, Low alloy steel, and High alloyed steel, and tool steel.

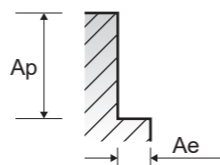


GA938 , GAA31 SERIES 4 FLUTE - SIDE CUTTING

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

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)														
						2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	25.0	
P	1	Non-alloy steel	0.1D	1.5D	Vc	60	60	65	70	75	80	70	75	80	80	85	80	75	80	
					fz	0.008	0.016	0.023	0.029	0.035	0.046	0.068	0.071	0.076	0.08	0.077	0.088	0.098	0.093	
					RPM	9549	6366	5173	4456	3979	3183	2228	1989	1819	1592	1503	1273	1085	1019	
	2		0.1D	1.5D	Vc	55	55	60	65	70	65	65	70	70	70	65	65	65		
					fz	0.007	0.015	0.021	0.026	0.031	0.046	0.063	0.067	0.072	0.077	0.08	0.088	0.084	0.091	
					RPM	8754	5836	4775	4138	3714	2586	2069	1857	1592	1393	1238	1035	940	828	
	3-4		0.1D	1.5D	Vc	40	40	45	45	50	50	50	55	50	50	50	45	50		
					fz	0.007	0.014	0.021	0.028	0.032	0.046	0.059	0.066	0.08	0.085	0.087	0.088	0.094	0.091	
					RPM	6366	4244	3581	2865	2653	1989	1592	1459	1137	995	884	796	651	637	
	5		0.1D	1.5D	Vc	25	25	30	30	35	35	30	35	35	35	35	35	30	35	
					fz	0.008	0.017	0.022	0.028	0.032	0.043	0.066	0.067	0.073	0.081	0.077	0.083	0.085	0.089	
RPM		3979			2653	2387	1910	1857	1393	955	928	796	696	619	557	434	446			
6	0.1D	1.5D	Vc	55	55	60	65	70	65	65	70	70	70	65	65	65				
			fz	0.007	0.015	0.021	0.026	0.031	0.046	0.063	0.067	0.072	0.077	0.08	0.088	0.084	0.091			
			RPM	8754	5836	4775	4138	3714	2586	2069	1857	1592	1393	1238	1035	940	828			
7	0.1D	1.5D	Vc	40	40	45	45	50	50	50	55	50	50	50	45	50				
			fz	0.007	0.014	0.021	0.028	0.032	0.046	0.059	0.066	0.08	0.085	0.087	0.088	0.094	0.091			
			RPM	6366	4244	3581	2865	2653	1989	1592	1459	1137	995	884	796	651	637			
8	0.1D	1.5D	Vc	25	25	30	30	35	35	30	35	35	35	35	35	30	35			
			fz	0.008	0.017	0.022	0.028	0.032	0.043	0.066	0.067	0.073	0.081	0.077	0.083	0.085	0.089			
			RPM	3979	2653	2387	1910	1857	1393	955	928	796	696	619	557	434	446			
9	0.1D	1.5D	Vc	20	25	25	25	30	30	30	25	30	30	30	30	30	30			
			fz	0.006	0.013	0.019	0.024	0.031	0.04	0.056	0.064	0.067	0.075	0.075	0.08	0.081	0.087			
			RPM	3183	2653	1989	1592	1326	1194	955	663	682	597	531	477	434	382			
10	0.1D	1.5D	Vc	55	55	60	65	70	65	65	70	70	70	65	65	65				
			fz	0.007	0.015	0.021	0.026	0.031	0.046	0.063	0.067	0.072	0.077	0.08	0.088	0.084	0.091			
			RPM	8754	5836	4775	4138	3714	2586	2069	1857	1592	1393	1238	1035	940	828			
11.1	0.1D	1.5D	Vc	25	25	30	30	35	35	30	35	35	35	35	35	30	35			
			fz	0.008	0.017	0.022	0.028	0.032	0.043	0.066	0.067	0.073	0.081	0.077	0.083	0.085	0.089			
			RPM	3979	2653	2387	1910	1857	1393	955	928	796	696	619	557	434	446			
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.1D	1.5D	Vc	55	55	60	65	70	65	65	70	70	70	65	65	65		
					fz	0.007	0.015	0.021	0.026	0.031	0.046	0.063	0.067	0.072	0.077	0.08	0.088	0.084	0.091	
					RPM	8754	5836	4775	4138	3714	2586	2069	1857	1592	1393	1238	1035	940	828	
					FEED	245	350	401	430	460	476	521	498	458	429	396	364	316	301	

※ The FEED, in long & extra long types, should be reduced by around 50%

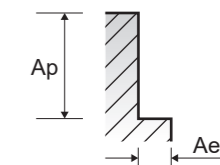


E9938 , E9A31 SERIES 4 FLUTE - SIDE CUTTING

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

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)														
						2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	25.0	
P	1	Non-alloy steel	0.1D	1.5D	Vc	40	40	45	45	50	55	50	50	55	50	50	55	55	55	
					fz	0.007	0.014	0.021	0.026	0.032	0.043	0.061	0.069	0.071	0.07	0.07	0.079	0.092	0.085	
					RPM	6366	4244	3581	2865	2653	2188	1592	1326	1251	1094	973	875	723	700	
	2		0.1D	1.5D	Vc	35	40	40	40	45	45	45	45	50	45	50	45	45	45	
					fz	0.007	0.013	0.02	0.025	0.029	0.042	0.059	0.063	0.065	0.074	0.074	0.081	0.078	0.083	
					RPM	5570	4244	3183	2546	2387	1790	1432	1194	1137	895	884	716	651	573	
	3-4		0.1D	1.5D	Vc	25	30	30	30	35	35	35	35	35	35	35	35	30	35	
					fz	0.007	0.013	0.02	0.024	0.028	0.041	0.053	0.064	0.069	0.075	0.079	0.081	0.087	0.081	
					RPM	3979	3183	2387	1910	1857	1393	1114	928	796	696	619	557	434	446	
	5		0.1D	1.5D	Vc	20	20	20	20	25	25	20	25	25	25	25	25	20	20	
					fz	0.007	0.014	0.02	0.024	0.029	0.042	0.058	0.063	0.066	0.075	0.07	0.076	0.078	0.085	
RPM		3183			2122	1592	1273	1326	995	637	663	568	497	442	398	289	255			
6	0.1D	1.5D	Vc	35	40	40	40	45	45	45	45	50	45	50	45	45	45			
			fz	0.007	0.013	0.02	0.025	0.029	0.042	0.059	0.063	0.065	0.074	0.074	0.081	0.078	0.083			
			RPM	5570	4244	3183	2546	2387	1790	1432	1194	1137	895	884	716	651	573			
7	0.1D	1.5D	Vc	25	30	30	30	35	35	35	35	35	35	35	35	30	35			
			fz	0.007	0.013	0.02	0.024	0.028	0.041	0.053	0.064	0.069	0.075	0.079	0.081	0.087	0.081			
			RPM	3979	3183	2387	1910	1857	1393	1114	928	796	696	619	557	434	446			
8	0.1D	1.5D	Vc	20	20	20	20	25	25	20	25	25	25	25	25	20	20			
			fz	0.007	0.014	0.02	0.024	0.029	0.042	0.058	0.063	0.066	0.075	0.07	0.076	0.078	0.085			
			RPM	3183	2122	1592	1273	1326	995	637	663	568	497	442	398	289	255			
9	0.1D	1.5D	Vc	15	15	15	20	20	20	20	20	20	20	20	20	20	20			
			fz	0.006	0.012	0.018	0.022	0.028	0.038	0.052	0.058	0.061	0.067	0.07	0.071	0.074	0.083			
			RPM	2387	1592	1194	1273	1061	796	637	531	455	398	354	318	289	255			
10	0.1D	High alloyed steel, and tool steel	Vc	35	40	40	40	45	45	45	45	50	45	50	45	45	45			
			fz	0.007	0.013	0.02	0.025	0.029	0.042	0.059	0.063	0.065	0.074	0.074	0.081	0.078	0.083			
			RPM	5570	4244	3183	2546	2387	1790	1432	1194	1137	895	884	716	651	573			
11.1	0.1D	High alloyed steel, and tool steel	Vc	20	20	20	20	25	25	20	25	25	25	25	25	20	20			
			fz	0.007	0.014	0.02	0.024	0.029	0.042	0.058	0.063	0.066	0.075	0.07	0.076	0.078	0.085			
			RPM	3183	2122	1592	1273	1326	995	637	663	568	497	442	398	289	255			
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.1D	1.5D	Vc	35	40	40	40	45	45	45	45	50	45	50	45	45		
					fz	0.007	0.013	0.02	0.025	0.029	0.042	0.059	0.063	0.065	0.074	0.074	0.081	0.078	0.083	
					RPM	5570	4244	3183	2546	2387	1790	1432	1194	1137	895	884	716	651	573	
					FEED	156	221	255	255	277	301	338	301	296	265	262	232	203	190	

※ The FEED, in long & extra long types, should be reduced by around 50%

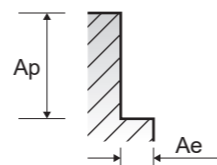


GA941, GAA35, GAA33, GAA34 SERIES MULTI FLUTE ROUGHING - SIDE CUTTING

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

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)											
						6.0	8.0	10.0	12.0	22.0	25.0	18.0	20.0	22.0	25.0		
P	1	Non-alloy steel	0.5D	1.5D	Vc	55	60	60	60	60	60	60	60	60	60	60	60
					fz	0.027	0.04	0.055	0.065	0.074	0.086	0.099	0.111	0.096	0.105		
					RPM	2918	2387	1910	1592	1364	1194	1061	955	868	764		
	2		Vc	40	50	45	45	45	50	50	50	45	45				
			fz	0.027	0.04	0.053	0.069	0.079	0.087	0.093	0.109	0.102	0.105				
			RPM	2122	1989	1432	1194	1023	995	884	796	651	573				
	3-4		Vc	30	35	35	35	35	35	35	35	30	35				
			fz	0.024	0.038	0.046	0.064	0.076	0.087	0.094	0.108	0.098	0.105				
			RPM	1592	1393	1114	928	796	696	619	557	434	446				
	5		Vc	25	25	30	30	30	30	30	30	30	30				
			fz	0.027	0.04	0.045	0.061	0.071	0.082	0.092	0.102	0.09	0.1				
RPM		1326	995	955	796	682	597	531	477	434	382						
6	Vc	40	50	45	45	45	50	50	50	45	45						
	fz	0.027	0.04	0.053	0.069	0.079	0.087	0.093	0.109	0.102	0.105						
	RPM	2122	1989	1432	1194	1023	995	884	796	651	573						
7	Vc	30	35	35	35	35	35	35	35	30	35						
	fz	0.024	0.038	0.046	0.064	0.076	0.087	0.094	0.108	0.098	0.105						
	RPM	1592	1393	1114	928	796	696	619	557	434	446						
8-9	Vc	25	25	30	30	30	30	30	30	30	30						
	fz	0.027	0.04	0.045	0.061	0.071	0.082	0.092	0.102	0.09	0.1						
	RPM	1326	995	955	796	682	597	531	477	434	382						
10	Vc	40	50	45	45	45	50	50	50	45	45						
	fz	0.027	0.04	0.053	0.069	0.079	0.087	0.093	0.109	0.102	0.105						
	RPM	2122	1989	1432	1194	1023	995	884	796	651	573						
11.1	Vc	25	25	30	30	30	30	30	30	30	30						
	fz	0.027	0.04	0.045	0.061	0.071	0.082	0.092	0.102	0.09	0.1						
	RPM	1326	995	955	796	682	597	531	477	434	382						
M	14.1	Stainless steel	0.5D	1.5D	Vc	25	30	30	30	30	30	30	30	30	30		
					fz	0.025	0.039	0.045	0.064	0.074	0.085	0.093	0.107	0.095	0.103		
					RPM	1326	1194	955	796	682	597	531	477	434	382		
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	40	50	45	45	45	50	50	50	45	45		
					fz	0.027	0.04	0.053	0.069	0.079	0.087	0.093	0.109	0.102	0.105		
					RPM	2122	1989	1432	1194	1023	995	884	796	651	573		

※ The FEED, in long & extra long types, should be reduced by around 50%

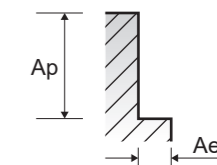


E9941, E9A35, E9A33, E9A34 SERIES MULTI FLUTE ROUGHING - SIDE CUTTING

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

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)										
						6.0	8.0	10.0	12.0	22.0	25.0	18.0	20.0	22.0	25.0	
P	1	Non-alloy steel	0.5D	1.5D	Vc	35	40	40	40	40	40	40	40	40	40	40
					fz	0.018	0.028	0.05	0.059	0.056	0.063	0.061	0.067	0.072	0.08	
					RPM	1857	1592	1273	1061	909	796	707	637	579	509	
	2		Vc	30	35	30	30	30	35	30	30	30	30			
			fz	0.018	0.027	0.049	0.063	0.058	0.064	0.056	0.067	0.078	0.081			
			RPM	1592	1393	955	796	682	597	619	477	434	382			
	3-4		Vc	20	25	20	25	20	25	25	25	20	20			
			fz	0.017	0.028	0.044	0.058	0.055	0.062	0.057	0.065	0.073	0.08			
			RPM	1061	995	637	663	455	497	442	398	289	255			
	5		Vc	15	20	20	20	20	20	20	20	20	20			
			fz	0.018	0.027	0.042	0.055	0.051	0.059	0.056	0.061	0.068	0.076			
RPM		796	796	637	531	455	398	354	318	289	255					
6	Vc	30	35	30	30	30	35	30	30	30	30					
	fz	0.018	0.027	0.049	0.063	0.058	0.064	0.056	0.067	0.078	0.081					
	RPM	1592	1393	955	796	682	597	619	477	434	382					
7	Vc	20	25	20	25	20	25	25	25	20	20					
	fz	0.017	0.028	0.044	0.058	0.055	0.062	0.057	0.065	0.073	0.08					
	RPM	1061	995	637	663	455	497	442	398	289	255					
8-9	Vc	15	20	20	20	20	20	20	20	20	20					
	fz	0.018	0.027	0.042	0.055	0.051	0.059	0.056	0.061	0.068	0.076					
	RPM	796	796	637	531	455	398	354	318	289	255					
10	Vc	30	35	30	30	30	35	30	30	30	30					
	fz	0.018	0.027	0.049	0.063	0.058	0.064	0.056	0.067	0.078	0.081					
	RPM	1592	1393	955	796	682	597	619	477	434	382					
11.1	Vc	15	20	20	20	20	20	20	20	20	20					
	fz	0.018	0.027	0.042	0.055	0.051	0.059	0.056	0.061	0.068	0.076					
	RPM	796	796	637	531	455	398	354	318	289	255					
M	14.1	Stainless steel	0.5D	1.5D	Vc	20	20	20	20	20	20	20	20	20	20	
					fz	0.02	0.03	0.045	0.065	0.06	0.069	0.064	0.073	0.081	0.086	
					RPM	1061	796	637	531	455	398	354	318	289	255	
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	30	35	30	30	30	30	35	30	30	30	
					fz	0.018	0.027	0.049	0.063	0.058	0.064	0.056	0.067	0.078	0.081	
					RPM	1592	1393	955	796	682	597	619	477	434	382	

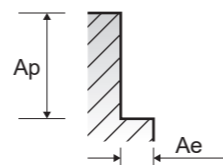
※ The FEED, in long & extra long types, should be reduced by around 50%



GAA26 SERIES MULTI FLUTE ROUGHING - SIDE CUTTING

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

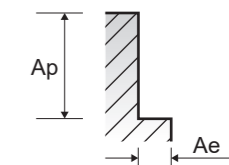
ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)										
						6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	22.0	25.0	
P	1	Non-alloy steel	0.5D	1.5D	Vc	55	60	60	60	60	60	60	60	60	60	60
					fz	0.021	0.03	0.055	0.065	0.059	0.069	0.066	0.074	0.08	0.088	
					RPM	2918	2387	1910	1592	1364	1194	1061	955	868	764	
	2		Vc	40	50	45	45	45	50	50	50	45	45			
			fz	0.02	0.03	0.053	0.069	0.063	0.069	0.062	0.072	0.085	0.088			
			RPM	2122	1989	1432	1194	1023	995	884	796	651	573			
	3-4		Vc	30	35	35	35	35	35	35	35	30	35			
			fz	0.018	0.029	0.046	0.064	0.061	0.07	0.063	0.072	0.082	0.087			
			RPM	1592	1393	1114	928	796	696	619	557	434	446			
	5		Vc	25	25	30	30	30	30	30	30	30	30			
			fz	0.02	0.03	0.045	0.061	0.057	0.065	0.061	0.068	0.075	0.083			
RPM		1326	995	955	796	682	597	531	477	434	382					
6	Vc	40	50	45	45	45	50	50	50	45	45					
	fz	0.02	0.03	0.053	0.069	0.063	0.069	0.062	0.072	0.085	0.088					
	RPM	2122	1989	1432	1194	1023	995	884	796	651	573					
7	Vc	30	35	35	35	35	35	35	35	30	35					
	fz	0.018	0.029	0.046	0.064	0.061	0.07	0.063	0.072	0.082	0.087					
	RPM	1592	1393	1114	928	796	696	619	557	434	446					
8-9	Vc	25	25	30	30	30	30	30	30	30	30					
	fz	0.02	0.03	0.045	0.061	0.057	0.065	0.061	0.068	0.075	0.083					
	RPM	1326	995	955	796	682	597	531	477	434	382					
10	Vc	40	50	45	45	45	50	50	50	45	45					
	fz	0.02	0.03	0.053	0.069	0.063	0.069	0.062	0.072	0.085	0.088					
	RPM	2122	1989	1432	1194	1023	995	884	796	651	573					
11.1	Vc	25	25	30	30	30	30	30	30	30	30					
	fz	0.02	0.03	0.045	0.061	0.057	0.065	0.061	0.068	0.075	0.083					
	RPM	1326	995	955	796	682	597	531	477	434	382					
M	14.1	Stainless steel	0.5D	1.5D	Vc	25	30	30	30	30	30	30	30	30		
					fz	0.019	0.029	0.045	0.064	0.059	0.068	0.062	0.071	0.079	0.085	
					RPM	1326	1194	955	796	682	597	531	477	434	382	
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	40	50	45	45	45	50	50	45	45		
					fz	0.02	0.03	0.053	0.069	0.063	0.069	0.062	0.072	0.085	0.088	
					RPM	2122	1989	1432	1194	1023	995	884	796	651	573	
M	14.1	Stainless steel	0.5D	1.5D	Vc	25	30	30	30	30	30	30	30	30		
					fz	0.019	0.029	0.045	0.064	0.059	0.068	0.062	0.071	0.079	0.085	
					RPM	1326	1194	955	796	682	597	531	477	434	382	
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	40	50	45	45	45	50	50	45	45		
					fz	0.02	0.03	0.053	0.069	0.063	0.069	0.062	0.072	0.085	0.088	
					RPM	2122	1989	1432	1194	1023	995	884	796	651	573	
M	14.1	Stainless steel	0.5D	1.5D	Vc	25	30	30	30	30	30	30	30	30		
					fz	0.019	0.029	0.045	0.064	0.059	0.068	0.062	0.071	0.079	0.085	
					RPM	1326	1194	955	796	682	597	531	477	434	382	
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	40	50	45	45	45	50	50	45	45		
					fz	0.02	0.03	0.053	0.069	0.063	0.069	0.062	0.072	0.085	0.088	
					RPM	2122	1989	1432	1194	1023	995	884	796	651	573	



E9A26 SERIES MULTI FLUTE ROUGHING - SIDE CUTTING

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

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	22.0	25.0
P	1	Non-alloy steel	0.5D	1.5D	Vc	35	40	40	40	40	40	40	40	40	40
					fz	0.018	0.028	0.05	0.059	0.056	0.063	0.061	0.067	0.072	0.08
					RPM	1857	1592	1273	1061	909	796	707	637	579	509
	2		Vc	30	35	30	30	30	35	30	30	30	30		
			fz	0.018	0.027	0.049	0.063	0.058	0.064	0.056	0.067	0.078	0.081		
			RPM	1592	1393	955	796	682	597	619	477	434	382		
	3-4		Vc	20	25	20	25	20	25	20	25	20	20		
			fz	0.017	0.028	0.044	0.058	0.055	0.062	0.057	0.065	0.073	0.08		
			RPM	1061	995	637	663	455	497	442	398	289	255		
	5		Vc	15	20	20	20	20	20	20	20	20	20		
			fz	0.018	0.027	0.042	0.055	0.051	0.059	0.056	0.061	0.068	0.076		
RPM		796	796	637	531	455	398	354	318	289	255				
6	Vc	30	35	30	30	30	35	30	30	30	30				
	fz	0.018	0.027	0.049	0.063	0.058	0.064	0.056	0.067	0.078	0.081				
	RPM	1592	1393	955	796	682	597	619	477	434	382				
7	Vc	20	25	20	25	20	25	20	25	20	20				
	fz	0.017	0.028	0.044	0.058	0.055	0.062	0.057	0.065	0.073	0.08				
	RPM	1061	995	637	663	455	497	442	398	289	255				
8-9	Vc	15	20	20	20	20	20	20	20	20	20				
	fz	0.018	0.027	0.042	0.055	0.051	0.059	0.056	0.061	0.068	0.076				
	RPM	796	796	637	531	455	398	354	318	289	255				
10	Vc	30	35	30	30	30	35	30	30	30	30				
	fz	0.018	0.027	0.049	0.063	0.058	0.064	0.056	0.067	0.078	0.081				
	RPM	1592	1393	955	796	682	597	619	477	434	382				
11.1	Vc	15	20	20	20	20	20	20	20	20	20				
	fz	0.018	0.027	0.042	0.055	0.051	0.059	0.056	0.061	0.068	0.076				
	RPM	796	796	637	531	455	398	354	318	289	255				
M	14.1	Stainless steel	0.5D	1.5D	Vc	20	20	20	20	20	20	20	20	20	
					fz	0.02	0.03	0.045	0.065	0.06	0.069	0.064	0.073	0.081	0.086
					RPM	1061	796	637	531	455	398	354	318	289	255
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	30	35	30	30	30	30	35	30	30	
					fz	0.018	0.027	0.049	0.063	0.058	0.064	0.056	0.067	0.078	0.081
					RPM	1592	1393	955	796	682	597	619	477	434	382
M	14.1	Stainless steel	0.5D	1.5D	Vc	20	20	20	20	20	20	20	20	20	
					fz	0.02	0.03	0.045	0.065	0.06	0.069	0.064	0.073	0.081	0.086
					RPM	1061	796	637	531	455	398	354	318	289	255
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	30	35	30	30	30	30	35	30	30	
					fz	0.018	0.027	0.049	0.063	0.058	0.064	0.056	0.067	0.078	0.081
					RPM	1592	1393	955	796	682	597	619	477	434	382
M	14.1	Stainless steel	0.5D	1.5D	Vc	20	20	20	20	20	20	20	20	20	
					fz	0.02	0.03	0.045	0.065	0.06	0.069	0.064	0.073	0.081	0.086
					RPM	1061	796	637	531	455	398	354	318	289	255
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	30	35	30	30	30	30	35	30	30	
					fz	0.018	0.027	0.049	0.063	0.058	0.064	0.056	0.067	0.078	0.081
					RPM	1592	1393	955	796	682	597	619	477	434	382



GAE43 SERIES MULTI FLUTE ROUGHING - **SIDE CUTTING**

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

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	10.0	12.0	16.0	20.0	25.0									
						Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz	RPM	FEED	Vc	fz
P	1	Non-alloy steel	0.5D	1.5D	Vc	60	60	60	60	60									
					fz	0.047	0.055	0.074	0.094	0.09									
					RPM	1910	1592	1194	955	764									
	FEED		359	350	353	359	344												
	2		Vc	47	47	47	47	47											
			fz	0.045	0.058	0.074	0.092	0.09											
			RPM	1496	1247	935	748	598											
	FEED		269	289	277	275	269												
	3-4		Vc	33	33	33	33	33											
			fz	0.039	0.054	0.074	0.092	0.088											
			RPM	1050	875	657	525	420											
FEED	164	189	194	193	185														
5	Vc	28	28	28	28	28													
	fz	0.038	0.052	0.07	0.088	0.086													
	RPM	891	743	557	446	357													
FEED	135	154	156	157	153														
6	Vc	47	47	47	47	47													
	fz	0.045	0.058	0.074	0.092	0.09													
	RPM	1496	1247	935	748	598													
FEED	269	289	277	275	269														
7	Vc	33	33	33	33	33													
	fz	0.039	0.054	0.074	0.092	0.088													
	RPM	1050	875	657	525	420													
FEED	164	189	194	193	185														
8-9	Vc	28	28	28	28	28													
	fz	0.038	0.052	0.07	0.088	0.086													
	RPM	891	743	557	446	357													
FEED	135	154	156	157	153														
10	Vc	47	47	47	47	47													
	fz	0.045	0.058	0.074	0.092	0.09													
	RPM	1496	1247	935	748	598													
FEED	269	289	277	275	269														
11.1	Vc	28	28	28	28	28													
	fz	0.038	0.052	0.07	0.088	0.086													
	RPM	891	743	557	446	357													
FEED	135	154	156	157	153														
M	14.1	Stainless steel	0.5D	1.5D	Vc	30	30	30	30	30									
					fz	0.038	0.055	0.073	0.091	0.087									
					RPM	955	796	597	477	382									
					FEED	145	175	174	174	166									
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	47	47	47	47	47									
					fz	0.045	0.058	0.074	0.092	0.09									
					RPM	1496	1247	935	748	598									
					FEED	269	289	277	275	269									

