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

SELECTION GUIDE

YG MILLING TOOLS

HSS-PM
TANK-POWER END MILLS

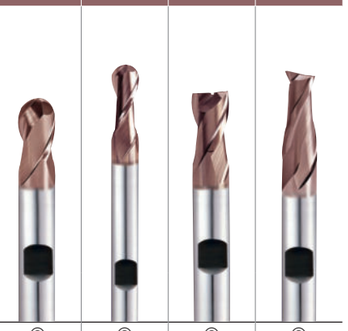
High Toughness, for Stainless Steels, Carbon steels, Alloy Steels
For General Application, Rough & Finish

Please visit globalyg1.com/mat for material search

◎ : Excellent ○ : Good

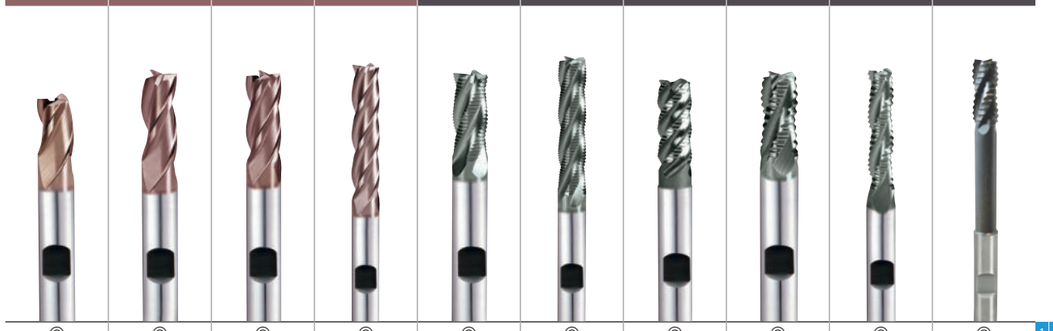
Recommended cutting conditions : p. C670

SERIES	E9940 GA940	E9A32 GAA32	E9936 GA936	E9A29 GAA29
FLUTE	2	2	2	2
HELIX ANGLE	30°	30°	30°	30°
CUTTING EDGE SHAPE	BALL NOSE	BALL NOSE	SQUARE	SQUARE
SIZE MIN	R0.5	R1.0	D1.0	D2.0
SIZE MAX	R12.5	R12.5	D25.0	D22.0
PAGE	C656	C657	C658	C659
	SHORT LENGTH	LONG LENGTH	SHORT LENGTH	LONG LENGTH
	TiAlN	TiAlN	TiAlN	TiAlN



ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment		HB	HRc	E9940 GA940	E9A32 GAA32	E9936 GA936	E9A29 GAA29
P	1	Non-alloy steel	About 0.15% C	Annealed	125		◎	◎	◎	◎
	2		About 0.45% C	Annealed	190	13	◎	◎	◎	◎
	3		About 0.45% C	Quenched & Tempered	250	25	◎	◎	◎	◎
	4		About 0.75% C	Annealed	270	28	◎	◎	◎	◎
	5		About 0.75% C	Quenched & Tempered	300	32	◎	◎	◎	◎
	6	Low alloy steel		Annealed	180	10	◎	◎	◎	◎
	7			Quenched & Tempered	275	29	◎	◎	◎	◎
	8			Quenched & Tempered	300	32	◎	◎	◎	◎
	9			Quenched & Tempered	350	38	○	○	○	○
	10	High alloyed steel, and tool steel		Annealed	200	15	◎	◎	◎	◎
	11			Quenched & Tempered	325	35	○	○	○	○
M	12	Stainless steel	Ferritic / Martensitic	Annealed	200	15	◎	◎	◎	◎
	13		Martensitic	Quenched & Tempered	240	23	◎	◎	◎	◎
	14		Austenitic		180	10	◎	◎	◎	◎
K	15	Grey cast iron	Pearlitic / ferritic		180	10	◎	◎	◎	◎
	16		Pearlitic (Martensitic)		260	26	◎	◎	◎	◎
	17	Nodular cast iron	Ferritic		160	3	◎	◎	◎	◎
	18		Pearlitic		250	25	◎	◎	◎	◎
	19	Malleable cast iron	Ferritic		130		◎	◎	◎	◎
	20		Pearlitic		230	21	◎	◎	◎	◎
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		CuZn, CuSnZn (Brass)		90		○	○	○	○
	28		CuSn, lead-free copper and electrolytic copper		100		○	○	○	○
	29	Non Metallic Materials	Duroplastic, Fiber Reinforced Plastic							
	30		Rubber, Wood, etc.							
S	31	Heat Resistant Super Alloys	Fe Based	Annealed	200	15				
	32			Cured	280	30				
	33		Ni or Co Based	Annealed	250	25				
	34			Cured	350	38				
	35			Cast	320	34				
	36	Titanium Alloys	Pure Titanium		400 Rm					
	37		Alpha + Beta Alloys	Hardened	1050 Rm					
H	38	Hardened steel		Hardened	550	55				
	39			Hardened	630	60				
	40	Chilled Cast Iron		Cast	400	42				
	41	Hardened Cast Iron		Hardened	550	55				

SERIES	E9942 GA942	E9A30 GAA30	E9938 GA938	E9A31 GAA31	E9941 GA941	E9A35 GAA35	E9A26 GAA26	E9A33 GAA33	E9A34 GAA34	GAE43
FLUTE	3	3	4	4	Multi Flute	Multi Flute	Multi Flute	Multi Flute	Multi Flute	Multi Flute
HELIX ANGLE	30°	30°	30°	30°	30°	30°	45°	30°	30°	30°
CUTTING EDGE SHAPE	SQUARE	SQUARE	SQUARE	SQUARE	ROUGHING	ROUGHING	ROUGHING	ROUGHING	ROUGHING	ROUGHING
SIZE MIN	D2.0	D1.0	D1.0	D2.0	D6.0	D6.0	D4.0	D6.0	D6.0	D10.0
SIZE MAX	D25.0	D25.0	D25.0	D25.0	D25.0	D25.0	D25.0	D25.0	D25.0	D25.0
PAGE	C660	C661	C662	C663	C664	C665	C666	C667	C668	C669
	STUB LENGTH	SHORT LENGTH	SHORT LENGTH	LONG LENGTH	SHORT LENGTH	LONG LENGTH	SHORT LENGTH	SHORT LENGTH	LONG LENGTH	WITH NECK
	TiAlN	TiAlN	TiAlN	TiAlN	X-Coating	X-Coating	X-Coating	X-Coating	X-Coating	X-Coating



E9942 GA942	E9A30 GAA30	E9938 GA938	E9A31 GAA31	E9941 GA941	E9A35 GAA35	E9A26 GAA26	E9A33 GAA33	E9A34 GAA34	GAE43	
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TANK-POWER END MILLS

UNCOATED **E9940 SERIES**
TiAlN COATED **GA940 SERIES**

HSS-PM, 2 FLUTE SHORT LENGTH BALL NOSE

HSS-PM, 2 SCHNEIDEN KURZ STIRNRADIUS
FRAISES HSS-PM, 2 DENTS À BOUT HÉMISPHÉRIQUE, 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.

HSS PM | DIN 327 | 2 | 30° | R ±0.02 | DIN 1835B | UNCOATED | TiAlN

p.C670~C671

Unit : mm

EDP No.		Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
UNCOATED	TiAlN	R(±0.02)				
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	P											M			K					
Material Description	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	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		
Material Description	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			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						○	○	○													

TANK-POWER END MILLS

UNCOATED **E9A32 SERIES**
TiAlN COATED **GAA32 SERIES**

HSS-PM, 2 FLUTE LONG LENGTH BALL NOSE

HSS-PM, 2 SCHNEIDEN LANG STIRNRADIUS
FRAISES HSS-PM, 2 DENTS À BOUT HÉMISPHÉRIQUE, SÉRIE LONGUE
2 TAGLIENTI, SERIE LUNGA, HSS-PM, SEMISFERICA

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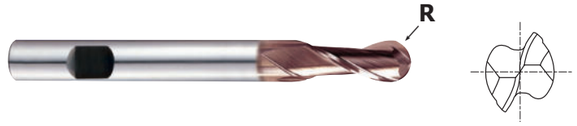
- Entworfen zum Fräsen von Nuten mit Radien, Rippen und speziellen Konturen.
- Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.



HSS PM | DIN 1889 | 2 | 30° | R ±0.02 | DIN 1835B | UNCOATED | TiAlN

p.C670~C671

Unit : mm

EDP No.		Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
UNCOATED	TiAlN	R(±0.02)				
-	**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	P											M			K					
Material Description	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	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		
Material Description	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			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						○	○	○													

TANK-POWER END MILLS

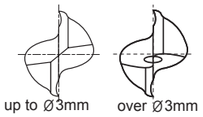
UNCOATED **E9936** SERIES
TiAlN COATED **GA936** SERIES

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° | DIN 1835B | UNCOATED | TiAlN

p.C672~C673

Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length
UNCOATED	TiAlN	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

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					
Material Description	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	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		
Material Description	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			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						○	○	○													

TANK-POWER END MILLS

UNCOATED **E9A29** SERIES
TiAlN 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.
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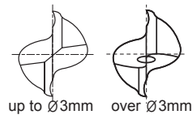


HSS PM | DIN 844 | 2 | 30° | DIN 1835B | UNCOATED | TiAlN

p.C672~C673

Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length
UNCOATED	TiAlN	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

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					
Material Description	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	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		
Material Description	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			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						○	○	○													

TANK-POWER END MILLS

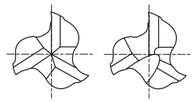
UNCOATED **E9942** SERIES
TiAlN COATED **GA942** SERIES

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 Fräsern.
▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.



HSS PM | DIN 327 | 3 | 30° | DIN 1835B | UNCOATED | TiAlN

p.C674~C677

Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length
UNCOATED	TiAlN	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					
Material Description	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	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		
Material Description	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			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						○	○	○													

TANK-POWER END MILLS

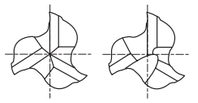
UNCOATED **E9A30** SERIES
TiAlN COATED **GAA30** SERIES

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 Fräsern.
▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.



HSS PM | DIN 844 | 3 | 30° | DIN 1835B | UNCOATED | TiAlN

p.C674~C677

Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length
UNCOATED	TiAlN	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					
Material Description	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	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		
Material Description	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			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						○	○	○													

TANK-POWER END MILLS

UNCOATED **E9938** SERIES
TiAlN 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 | TiAlN

p.C678~C679

Unit : mm

EDP No. UNCOATED	EDP No. TiAlN	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
-	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	P											M			K					
Material Description	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	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		
Material Description	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			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						○	○	○													

TANK-POWER END MILLS

UNCOATED **E9A31** SERIES
TiAlN 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 | TiAlN

p.C678~C679

Unit : mm

EDP No. UNCOATED	EDP No. TiAlN	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
-	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	P											M			K					
Material Description	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	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		
Material Description	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			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						○	○	○													

TANK-POWER END MILLS

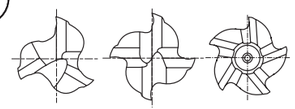
UNCOATED **E9941** SERIES
X-COATING **GA941** SERIES

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 exzellent 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
~Ø20 | Ø22~ | C x 45° | UNCOATED | X Coating

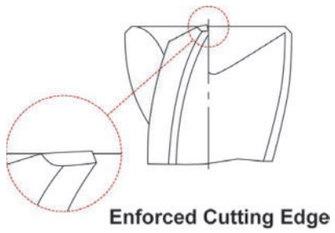
p.C680~C681

Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer
UNCOATED	X-COATING	js12	h6				
-	GA941060	6.0	6	13	57	3	0.18
E9941070	GA941070	7.0	10	16	66	3	0.18
-	GA941080	8.0	10	19	69	3	0.18
-	GA941090	9.0	10	19	69	3	0.18
-	GA941100	10.0	10	22	72	4	0.18
-	GA941120	12.0	12	26	83	4	0.18
-	GA941140	14.0	12	26	83	4	0.25
-	GA941160	16.0	16	32	92	4	0.25
-	GA941180	18.0	16	32	92	4	0.25
-	GA941200	20.0	20	38	104	4	0.25
-	GA941220	22.0	20	38	104	5	0.36
-	GA941250	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					
Material Description	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	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		
Material Description	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			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						○	○	○													

TANK-POWER END MILLS

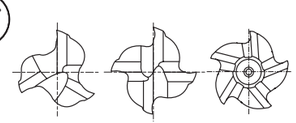
UNCOATED **E9A35** SERIES
X-COATING **GAA35** SERIES

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 exzellent 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
~Ø20 | Ø22~ | C x 45° | UNCOATED | X Coating

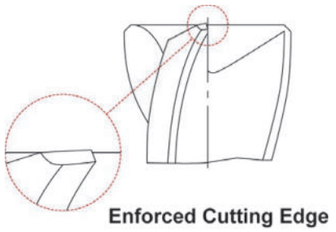
p.C680~C681

Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer
UNCOATED	X-COATING	js12	h6				
-	GAA35060	6.0	6	24	68	3	0.18
-	GAA35070	7.0	10	30	80	3	0.18
-	GAA35080	8.0	10	38	88	3	0.18
-	GAA35090	9.0	10	38	88	3	0.18
-	GAA35100	10.0	10	45	95	4	0.18
-	GAA35120	12.0	12	53	110	4	0.18
-	GAA35140	14.0	12	53	110	4	0.25
-	GAA35160	16.0	16	63	123	4	0.25
-	GAA35180	18.0	16	63	123	4	0.25
-	GAA35200	20.0	20	75	141	4	0.25
-	GAA35220	22.0	20	75	141	5	0.36
E9A35250	GAA35250	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					
Material Description	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	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		
Material Description	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			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						○	○	○													

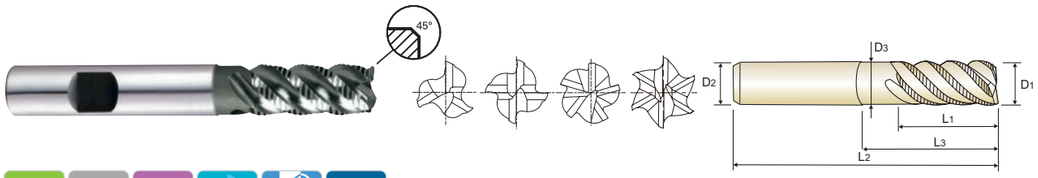
TANK-POWER END MILLS

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 | C x 45° | UNCOATED | X Coating

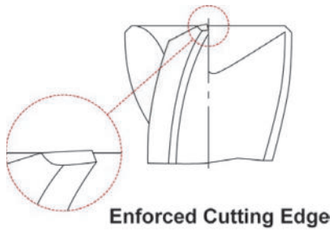
p.C682~C683

Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	No. of Flute	Chamfer
UNCOATED	X-COATING	D_1(js12)	D_2(h6)	L_1	L_3	L_2	D_3		
-	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 ㎛ / Nominal-Diameter in ㎜	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



◎ : Excellent ○ : Good

ISO	P											M			K					
Material Description	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	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		
Material Description	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			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						○	○	○													

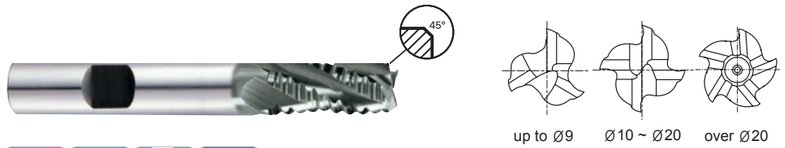
TANK-POWER END MILLS

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 Ø20 : center cut, over Ø20 : non center cut
- ▶ Geeignet zum HSC - Schrupp - Fräsen.
- ▶ Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- ▶ Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.
- ▶ Bis D<=20mm : mit Zentrumschnitt, über D<=20mm : Ohne Zentrumschnitt.



HSS PM | DIN 844 | NR | 3-5 | 30° | DIN 1835B | ~Ø20 | Ø22~ | C x 45° | UNCOATED | X Coating

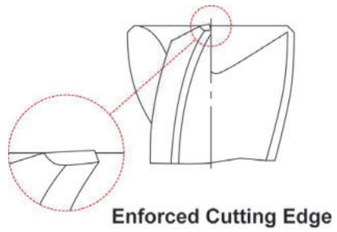
p.C680~C681

Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer
UNCOATED	X-COATING	js12	h6				
-	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 ㎛ / Nominal-Diameter in ㎜	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



◎ : Excellent ○ : Good

ISO	P											M			K					
Material Description	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	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		
Material Description	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			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						○	○	○													

TANK-POWER END MILLS

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 Ø20 : center cut, over Ø20 : non center cut

- Geeignet zum HSC - Schrupp - Fräsen.
- Geeignet zum Fräsen von Stahl, legiertem Stahl und rostfreier Stahl.
- Neuentwickelte Beschichtung für Hochgeschwindigkeitsfräsen.
- Bis D<=20mm : mit Zentrumschnitt, über D<=20mm : Ohne Zentrumschnitt.

up to Ø9 Ø10 ~ Ø20 over Ø20

HSS PM | DIN 844 | NR | 3-5 | 30° | DIN 1835B
~Ø20 | Ø22~ | C x 45° | UNCOATED | X Coating

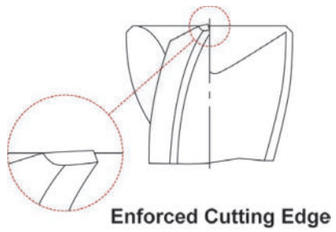
p.C680~C681

Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer
UNCOATED	X-COATING	js12	h6				
-	**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	P											M			K					
Material Description	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	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		
Material Description	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			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						○	○	○													

TANK-POWER END MILLS

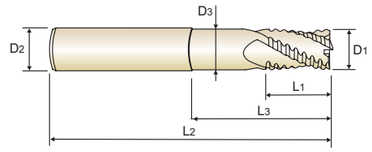
X-COATING **GAE43** SERIES

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.



HSS PM | NR | 4&5 | 30° | DIN 1835B
C x 45° | UNCOATED | X Coating

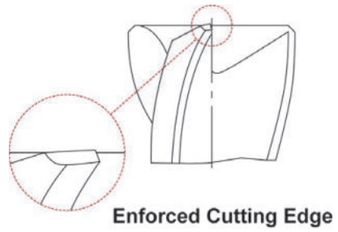
p.C684

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	No. of Flute	Chamfer
X-COATING	D_1(js12)	D_2(h6)	L_1	L_3	L_2	D_3		
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	P											M			K					
Material Description	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	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		
Material Description	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			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						○	○	○													

TANK-POWER END MILLS

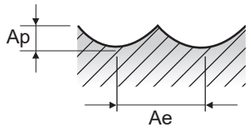
RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

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	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		0.5D	0.2D	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		0.5D	0.2D	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		0.5D	0.2D	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	Low alloy steel	0.5D	0.2D	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		0.5D	0.2D	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		0.5D	0.2D	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	High alloyed steel, and tool steel	0.5D	0.2D	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		0.5D	0.2D	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
					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
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	0.2D	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

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



TANK-POWER END MILLS

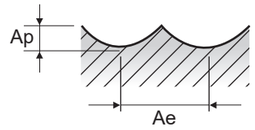
RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

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		0.5D	0.2D	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		0.5D	0.2D	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		0.5D	0.2D	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	Low alloy steel	0.5D	0.2D	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		0.5D	0.2D	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		0.5D	0.2D	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	High alloyed steel, and tool steel	0.5D	0.2D	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		0.5D	0.2D	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
					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
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	0.2D	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

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



TANK-POWER END MILLS

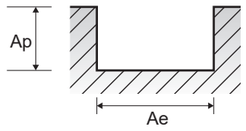
RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

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
					FEED	115	153	236	252	262	274	294	282	264	273	239	222	191	157
	2		1.0D	0.5D	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
					FEED	89	136	172	197	210	241	259	242	210	203	200	169	153	141
	3-4		1.0D	0.5D	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
					FEED	76	108	159	183	196	201	226	217	201	181	161	153	120	119
	5		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
					FEED	115	153	236	252	262	274	294	282	264	273	239	222	191	157
	6	Low alloy steel	1.0D	0.5D	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
					FEED	89	136	172	197	210	241	259	242	210	203	200	169	153	141
	7		1.0D	0.5D	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
					FEED	76	108	159	183	196	201	226	217	201	181	161	153	120	119
	8		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
					FEED	115	153	236	252	262	274	294	282	264	273	239	222	191	157
	9		1.0D	0.5D	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
					FEED	89	136	172	197	210	241	259	242	210	203	200	169	153	141
	10	High alloyed steel, and tool steel	1.0D	0.5D	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
					FEED	89	136	172	197	210	241	259	242	210	203	200	169	153	141
	11.1		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
					FEED	115	153	236	252	262	274	294	282	264	273	239	222	191	157
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	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
					FEED	89	136	172	197	210	241	259	242	210	203	200	169	153	141

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



TANK-POWER END MILLS

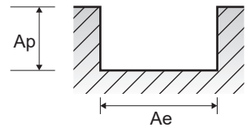
RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

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	50	45	45	40	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	895	796	637	579	509
					FEED	67	95	134	158	167	168	183	170	166	159	150	130	111	95
	2		1.0D	0.5D	Vc	25	25	30	35	40	40	40	35	40	35	35	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	796	619	557	506	446
					FEED	56	80	110	125	144	159	176	159	131	143	116	104	95	88
	3-4		1.0D	0.5D	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	682	597	531	477	434	318
					FEED	51	72	95	122	121	124	134	129	120	110	100	95	82	66
	5		1.0D	0.5D	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
					FEED	48	51	55	57	70	75	85	74	69	68	57	59	54	48
	6	Low alloy steel	1.0D	0.5D	Vc	25	25	30	35	40	40	40	40	35	40	35	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	796	619	557	506	446
					FEED	56	80	110	125	144	159	176	159	131	143	116	104	95	88
	7		1.0D	0.5D	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	682	597	531	477	434	318
					FEED	51	72	95	122	121	124	134	129	120	110	100	95	82	66
	8		1.0D	0.5D	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
					FEED	48	51	55	57	70	75	85	74	69	68	57	59	54	48
	9		1.0D	0.5D	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
					FEED	32	36	50	48	59	55	65	55	50	50	44	40	36	33
	10	High alloyed steel, and tool steel	1.0D	0.5D	Vc	25	25	30	35	40	40	40	40	35	40	35	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	796	619	557	506	446
					FEED	56	80	110	125	144	159	176	159	131	143	116	104	95	88
	11.1		1.0D	0.5D	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
					FEED	48	51	55	57	70	75	85	74	69	68	57	59	54	48
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	35	40	35	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	796	619	557	506	446
					FEED	56	80	110	125	144	159	176	159	131	143	116	104	95	88

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



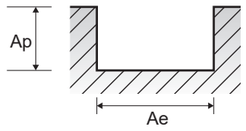
TANK-POWER END MILLS

RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

GA942 , GAA30 SERIES — 3 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	40	45	55	60	65	65	65	70	70	70	65	60	60	60
					fz	0.004	0.007	0.011	0.014	0.023	0.031	0.033	0.051	0.052	0.059	0.07	0.081	0.091	0.107
					RPM	6366	4775	4377	3820	3448	2586	2069	1857	1592	1393	1149	955	868	764
					FEED	76	100	144	160	238	241	205	284	248	246	241	232	237	245
	2		1.0D	0.5D	Vc	35	35	45	50	55	55	55	55	60	60	50	50	50	50
					fz	0.003	0.007	0.011	0.014	0.023	0.032	0.039	0.053	0.054	0.061	0.071	0.08	0.089	0.111
					RPM	5570	3714	3581	3183	2918	2188	1751	1459	1364	1194	884	796	723	637
					FEED	50	78	118	134	201	210	205	232	221	218	188	191	193	212
	3-4		1.0D	0.5D	Vc	30	30	40	40	45	45	45	45	45	45	45	45	40	40
					fz	0.003	0.005	0.009	0.012	0.02	0.028	0.038	0.047	0.053	0.056	0.063	0.067	0.083	0.109
					RPM	4775	3183	3183	2546	2387	1790	1432	1194	1023	895	796	716	579	509
					FEED	43	48	86	92	143	150	163	168	163	150	150	144	144	167
	5		1.0D	0.5D	Vc	20	20	25	25	25	30	30	30	30	30	30	30	30	30
					fz	0.004	0.007	0.009	0.012	0.021	0.03	0.043	0.052	0.056	0.061	0.063	0.07	0.079	0.094
					RPM	3183	2122	1989	1592	1326	1194	955	796	682	597	531	477	434	382
					FEED	38	45	54	57	84	107	123	124	115	109	100	100	103	108
	6	Low alloy steel	1.0D	0.5D	Vc	35	35	45	50	55	55	55	55	60	60	50	50	50	50
					fz	0.003	0.007	0.011	0.014	0.023	0.032	0.039	0.053	0.054	0.061	0.071	0.08	0.089	0.111
					RPM	5570	3714	3581	3183	2918	2188	1751	1459	1364	1194	884	796	723	637
					FEED	50	78	118	134	201	210	205	232	221	218	188	191	193	212
	7		1.0D	0.5D	Vc	30	30	40	40	45	45	45	45	45	45	45	45	40	40
					fz	0.003	0.005	0.009	0.012	0.02	0.028	0.038	0.047	0.053	0.056	0.063	0.067	0.083	0.109
					RPM	4775	3183	3183	2546	2387	1790	1432	1194	1023	895	796	716	579	509
					FEED	43	48	86	92	143	150	163	168	163	150	150	144	144	167
	8		1.0D	0.5D	Vc	20	20	25	25	25	30	30	30	30	30	30	30	30	30
					fz	0.004	0.007	0.009	0.012	0.021	0.03	0.043	0.052	0.056	0.061	0.063	0.07	0.079	0.094
					RPM	3183	2122	1989	1592	1326	1194	955	796	682	597	531	477	434	382
					FEED	38	45	54	57	84	107	123	124	115	109	100	100	103	108
	9		1.0D	0.5D	Vc	10	15	20	20	20	20	20	20	20	20	25	25	20	20
					fz	0.005	0.008	0.012	0.014	0.023	0.032	0.045	0.053	0.057	0.064	0.067	0.074	0.09	0.113
					RPM	1592	1592	1592	1273	1061	796	637	531	455	398	442	398	289	255
					FEED	24	38	57	53	73	76	86	84	78	76	89	88	78	86
	10	High alloyed steel, and tool steel	1.0D	0.5D	Vc	35	35	45	50	55	55	55	55	60	60	50	50	50	50
					fz	0.003	0.007	0.011	0.014	0.023	0.032	0.039	0.053	0.054	0.061	0.071	0.08	0.089	0.111
					RPM	5570	3714	3581	3183	2918	2188	1751	1459	1364	1194	884	796	723	637
					FEED	50	78	118	134	201	210	205	232	221	218	188	191	193	212
	11.1		1.0D	0.5D	Vc	20	20	25	25	25	30	30	30	30	30	30	30	30	30
					fz	0.004	0.007	0.009	0.012	0.021	0.03	0.043	0.052	0.056	0.061	0.063	0.07	0.079	0.094
					RPM	3183	2122	1989	1592	1326	1194	955	796	682	597	531	477	434	382
					FEED	38	45	54	57	84	107	123	124	115	109	100	100	103	108
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	1.0D	0.5D	Vc	35	35	45	50	55	55	55	55	60	60	50	50	50	50
					fz	0.003	0.007	0.011	0.014	0.023	0.032	0.039	0.053	0.054	0.061	0.071	0.08	0.089	0.111
					RPM	5570	3714	3581	3183	2918	2188	1751	1459	1364	1194	884	796	723	637
					FEED	50	78	118	134	201	210	205	232	221	218	188	191	193	212



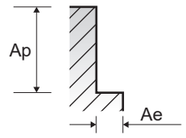
TANK-POWER END MILLS

RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

GA942 , GAA30 SERIES — 3 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	50	55	65	75	80	80	80	80	80	80	75	80	80	80
					fz	0.004	0.008	0.012	0.015	0.024	0.034	0.047	0.056	0.065	0.069	0.077	0.08	0.09	0.11
					RPM	7958	5836	5173	4775	4244	3183	2546	2122	1819	1592	1326	1273	1157	1019
					FEED	95	140	186	215	306	325	359	357	355	329	306	306	313	336
	2		0.1D	1.5D	Vc	45	45	55	65	70	65	65	65	65	65	65	65	65	65
					fz	0.004	0.008	0.012	0.015	0.023	0.035	0.046	0.056	0.063	0.071	0.077	0.081	0.093	0.109
					RPM	7162	4775	4377	4138	3714	2586	2069	1857	1478	1293	1149	1035	940	828
					FEED	86	115	158	186	256	272	286	312	279	275	266	251	262	271
	3-4		0.1D	1.5D	Vc	35	35	45	45	50	50	50	55	50	50	50	50	50	50
					fz	0.004	0.007	0.01	0.014	0.024	0.033	0.044	0.055	0.061	0.067	0.073	0.081	0.088	0.111
					RPM	5570	3714	3581	2865	2653	1989	1592	1459	1137	995	884	796	723	637
					FEED	67	78	107	120	191	197	210	241	208	200	194	193	191	212
	5		0.1D	1.5D	Vc	25	25	30	30	35	35	30	35	35	35	35	35	30	35
					fz	0.004	0.008	0.011	0.014	0.023	0.036	0.05	0.056	0.06	0.071	0.075	0.08	0.092	0.107
					RPM	3979	2653	2387	1910	1857	1393	955	928	796	696	619	557	434	446
					FEED	48	64	79	80	128	150	143	156	143	148	139	134	120	143
	6	Low alloy steel	0.1D	1.5D	Vc	45	45	55	65	70	65	65	70	65	65	65	65	65	65
					fz	0.004	0.008	0.012	0.015	0.023	0.035	0.046	0.056	0.063	0.071	0.077	0.081	0.093	0.109
					RPM	7162	4775	4377	4138	3714	2586	2069	1857	1478	1293	1149	1035	940	828
					FEED	86	115	158	186	256	272	286	312	279	275	266	251	262	271
	7		0.1D	1.5D	Vc	35	35	45	45	50	50	50	55	50	50	50	50	50	50
					fz	0.004	0.007	0.01	0.014	0.024	0.033	0.044	0.055	0.061	0.067	0.073	0.081	0.088	0.111
					RPM	5570	3714	3581	2865	2653	1989	1592	1459	1137	995	884	796	723	637
					FEED	67	78	107	120	191	197	210	241	208	200	194	193	191	212
	8		0.1D	1.5D	Vc	25	25	30	30	35	35	30	35	35	35	35	35	30	35
					fz	0.004	0.008	0.011	0.014	0.023	0.036	0.05	0.056	0.06	0.071	0.075	0.08	0.092	0.107
					RPM	3979	2653	2387	1910	1857	1393	955	928	796	696	619	557	434	446
					FEED	48	64	79	80	128	150	143	156	143	148	139	134	120	143
	9		0.1D	1.5D	Vc	15	20	25	25	30	30	30	30	30	30	30	30	30	30
					fz	0.006	0.01	0.013	0.015	0.022	0.035	0.047	0.056	0.063	0.07	0.073	0.083	0.092	0.111
					RPM	2387	2122	1989	1592	1592	1194	955	796	682	597	531	477	434	382
					FEED	43	64	78	72	105	125	135	134	129	125	116	119	120	127
	10	High alloyed steel, and tool steel	0.1D	1.5D	Vc	45	45	55	65	70	65	65	70	65	65	65	65	65	65
					fz	0.004	0.008	0.012	0.015	0.023	0.035	0.046	0.056	0.063	0.071	0.077	0.081	0.093	0.109
					RPM	7162	4775	4377	4138	3714	2586	2069	1857	1478	1293	1149	1035	940	828
					FEED	86	115	158	186	256	272	286	312	279	275	266	251	262	271
	11.1		0.1D	1.5D	Vc	25	25	30	30	35	35	30	35	35	35	35	35	30	35
					fz	0.004	0.008	0.011	0.014	0.023	0.036	0.05	0.056	0.06	0.071	0.075	0.08	0.092	0.107
					RPM	3979	2653	2387	1910	1857	1393	955	928	796	696	619	557	434	446
					FEED	48	64	79	80	128	150	143	156	143	148	139	134	120	143
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.1D	1.5D	Vc	45	45	55	65	70	65	65	70	65	65	65	65	65	65
					fz	0.004	0.008	0.012	0.015	0.023	0.035	0.046	0.056	0.063	0.071	0.077	0.081	0.093	0.109
					RPM	7162	4775	4377	4138	3714	2586	2069	1857	1478	1293	1149	1035	940	828
					FEED	86	115	158	186	256	272	286	312	279	275	266	251	262	271



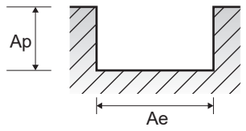
TANK-POWER END MILLS

RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

E9942 , E9A30 SERIES — 3 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	40
					fz	0.003	0.007	0.01	0.013	0.021	0.028	0.037	0.047	0.048	0.054	0.064	0.076	0.085	0.096
					RPM	4775	3183	2785	2546	2387	1790	1432	1194	1023	895	796	637	579	509
					FEED	43	67	84	99	150	150	159	168	147	145	153	145	148	147
	2		1.0D	0.5D	Vc	25	25	30	35	35	40	40	40	40	40	35	35	35	35
					fz	0.003	0.007	0.01	0.012	0.021	0.029	0.036	0.048	0.048	0.056	0.066	0.075	0.08	0.101
					RPM	3979	2653	2387	2228	1857	1592	1273	1061	909	796	619	557	506	446
					FEED	36	56	72	80	117	138	138	153	131	134	123	125	122	135
	3-4		1.0D	0.5D	Vc	20	30	25	30	30	30	30	30	30	30	30	30	30	25
					fz	0.003	0.003	0.008	0.01	0.018	0.026	0.035	0.043	0.049	0.052	0.06	0.059	0.077	0.098
					RPM	3183	3183	1989	1910	1592	1194	955	796	682	597	531	477	434	318
					FEED	29	29	48	57	86	93	100	103	100	93	95	85	100	94
	5		1.0D	0.5D	Vc	15	15	15	15	20	20	20	20	20	20	20	20	20	20
					fz	0.003	0.007	0.009	0.012	0.018	0.028	0.038	0.047	0.048	0.057	0.057	0.061	0.074	0.09
					RPM	2387	1592	1194	955	1061	796	637	531	455	398	354	318	289	255
					FEED	21	33	32	34	57	67	73	75	65	68	60	58	64	69
	6	Low alloy steel	1.0D	0.5D	Vc	25	25	30	35	35	40	40	40	40	40	35	35	35	35
					fz	0.003	0.007	0.01	0.012	0.021	0.029	0.036	0.048	0.048	0.056	0.066	0.075	0.08	0.101
					RPM	3979	2653	2387	2228	1857	1592	1273	1061	909	796	619	557	506	446
					FEED	36	56	72	80	117	138	138	153	131	134	123	125	122	135
	7		1.0D	0.5D	Vc	20	30	25	30	30	30	30	30	30	30	30	30	30	25
					fz	0.003	0.003	0.008	0.01	0.018	0.026	0.035	0.043	0.049	0.052	0.06	0.059	0.077	0.098
					RPM	3183	3183	1989	1910	1592	1194	955	796	682	597	531	477	434	318
					FEED	29	29	48	57	86	93	100	103	100	93	95	85	100	94
	8		1.0D	0.5D	Vc	15	15	15	15	20	20	20	20	20	20	20	20	20	20
					fz	0.003	0.007	0.009	0.012	0.018	0.028	0.038	0.047	0.048	0.057	0.057	0.061	0.074	0.09
					RPM	2387	1592	1194	955	1061	796	637	531	455	398	354	318	289	255
					FEED	21	33	32	34	57	67	73	75	65	68	60	58	64	69
	9		1.0D	0.5D	Vc	10	10	15	15	15	15	15	15	15	15	15	15	15	15
					fz	0.005	0.008	0.012	0.013	0.02	0.03	0.042	0.049	0.053	0.061	0.062	0.068	0.085	0.108
					RPM	1592	1061	1194	955	796	597	477	398	341	298	265	239	217	191
					FEED	24	25	43	37	48	54	60	58	54	55	49	49	55	62
	10	High alloyed steel, and tool steel	1.0D	0.5D	Vc	25	25	30	35	35	40	40	40	40	40	35	35	35	35
					fz	0.003	0.007	0.01	0.012	0.021	0.029	0.036	0.048	0.048	0.056	0.066	0.075	0.08	0.101
					RPM	3979	2653	2387	2228	1857	1592	1273	1061	909	796	619	557	506	446
					FEED	36	56	72	80	117	138	138	153	131	134	123	125	122	135
	11.1		1.0D	0.5D	Vc	15	15	15	15	20	20	20	20	20	20	20	20	20	20
					fz	0.003	0.007	0.009	0.012	0.018	0.028	0.038	0.047	0.048	0.057	0.057	0.061	0.074	0.09
					RPM	2387	1592	1194	955	1061	796	637	531	455	398	354	318	289	255
					FEED	21	33	32	34	57	67	73	75	65	68	60	58	64	69
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	1.0D	0.5D	Vc	25	25	30	35	35	40	40	40	40	40	35	35	35	35
					fz	0.003	0.007	0.01	0.012	0.021	0.029	0.036	0.048	0.048	0.056	0.066	0.075	0.08	0.101
					RPM	3979	2653	2387	2228	1857	1592	1273	1061	909	796	619	557	506	446
					FEED	36	56	72	80	117	138	138	153	131	134	123	125	122	135



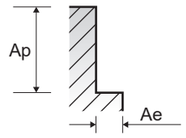
TANK-POWER END MILLS

RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

E9942 , E9A30 SERIES — 3 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	50	55	65	75	80	80	80	80	80	80	75	80	80	80
					fz	0.004	0.008	0.012	0.015	0.024	0.034	0.047	0.056	0.065	0.069	0.077	0.08	0.09	0.11
					RPM	7958	5836	5173	4775	4244	3183	2546	2122	1819	1592	1326	1273	1157	1019
					FEED	95	140	186	215	306	325	359	357	355	329	306	306	313	336
	2		0.1D	1.5D	Vc	45	45	55	65	70	65	65	65	65	65	65	65	65	65
					fz	0.004	0.008	0.012	0.015	0.023	0.035	0.046	0.056	0.063	0.071	0.077	0.081	0.093	0.109
					RPM	7162	4775	4377	4138	3714	2586	2069	1857	1478	1293	1149	1035	940	828
					FEED	86	115	158	186	256	272	286	312	279	275	266	251	262	271
	3-4		0.1D	1.5D	Vc	35	35	45	45	50	50	50	55	50	50	50	50	50	50
					fz	0.004	0.007	0.01	0.014	0.024	0.033	0.044	0.055	0.061	0.067	0.073	0.081	0.088	0.111
					RPM	5570	3714	3581	2865	2653	1989	1592	1459	1137	995	884	796	723	637
					FEED	67	78	107	120	191	197	210	241	208	200	194	193	191	212
	5		0.1D	1.5D	Vc	25	25	30	30	35	35	30	35	35	35	35	35	30	35
					fz	0.004	0.008	0.011	0.014	0.023	0.036	0.05	0.056	0.06	0.071	0.075	0.08	0.092	0.107
					RPM	3979	2653	2387	1910	1857	1393	955	928	796	696	619	557	434	446
					FEED	48	64	79	80	128	150	143	156	143	148	139	134	120	143
	6	Low alloy steel	0.1D	1.5D	Vc	45	45	55	65	70	65	65	70	65	65	65	65	65	65
					fz	0.004	0.008	0.012	0.015	0.023	0.035	0.046	0.056	0.063	0.071	0.077	0.081	0.093	0.109
					RPM	7162	4775	4377	4138	3714	2586	2069	1857	1478	1293	1149	1035	940	828
					FEED	86	115	158	186	256	272	286	312	279	275	266	251	262	271
	7		0.1D	1.5D	Vc	35	35	45	45	50	50	50	55	50	50	50	50	50	50
					fz	0.004	0.007	0.01	0.014	0.024	0.033	0.044	0.055	0.061	0.067	0.073	0.081	0.088	0.111
					RPM	5570	3714	3581	2865	2653	1989	1592	1459	1137	995	884	796	723	637
					FEED	67	78	107	120	191	197	210	241	208	200	194	193	191	212
	8		0.1D	1.5D	Vc	25	25	30	30	35	35	30	35	35	35	35	35	30	35
					fz	0.004	0.008	0.011	0.014	0.023	0.036	0.05	0.056	0.06	0.071	0.075	0.08	0.092	0.107
					RPM	3979	2653	2387	1910	1857	1393	955	928	796	696	619	557	434	446
					FEED	48	64	79	80	128	150	143	156	143	148	139	134	120	143
	9		0.1D	1.5D	Vc	15	20	25	25	30	30	30	30	30	30	30	30	30	30
					fz	0.006	0.01	0.013	0.015	0.022	0.035	0.047	0.056	0.063	0.07	0.073	0.083	0.092	0.111
					RPM	2387	2122	1989	1592	1592	1194	955	796	682	597	531	477	434	382
					FEED	43	64	78	72	105	125	135	134	129	125	116	119	120	127
	10	High alloyed steel, and tool steel	0.1D	1.5D	Vc	45	45	55	65	70	65	65	70	65	65	65	65	65	65
					fz	0.004	0.008	0.012	0.015	0.023	0.035	0.046	0.056	0.063	0.071	0.077	0.081	0.093	0.109
					RPM	7162	4775	4377	4138	3714	2586	2069	1857	1478	1293	1149	1035	940	828
					FEED	86	115	158	186	256	272	286	312	279	275	266	251	262	271
	11.1		0.1D	1.5D	Vc	25	25	30	30	35	35	30	35	35	35	35	35	30	35
					fz	0.004	0.008	0.011	0.014	0.023	0.036	0.05	0.056	0.06	0.071	0.075	0.08	0.092	0.107
					RPM	3979	2653	2387	1910	1857	1393	955	928	796	696	619	557	434	446
					FEED	48	64	79	80	128	150	143	156	143	148	139	134	120	143
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.1D	1.5D	Vc	45	45	55	65	70	65	65	70	65	65	65	65	65	65
					fz	0.004	0.008	0.012	0.015	0.023	0.035	0.046	0.056	0.063	0.071	0.077	0.081	0.093	0.109
					RPM	7162	4775	4377	4138	3714	2586	2069	1857	1478	1293	1149	1035	940	828
					FEED	86	115	158	186	256	272	286	312	279	275	266	251	262	271



TANK-POWER END MILLS

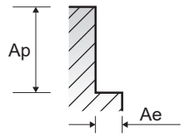
RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

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
					FEED	306	407	476	517	557	586	606	565	553	509	463	448	425	379
	2		0.1D	1.5D	Vc	55	55	60	65	70	65	65	70	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
	3-4		0.1D	1.5D	Vc	40	40	45	45	50	50	50	55	50	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
					FEED	178	238	301	321	340	366	376	385	364	338	308	280	245	232
	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
					FEED	127	180	210	214	238	240	252	249	232	226	191	185	148	159
	6	Low alloy steel	0.1D	1.5D	Vc	55	55	60	65	70	65	65	70	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
	7		0.1D	1.5D	Vc	40	40	45	45	50	50	50	55	50	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
					FEED	178	238	301	321	340	366	376	385	364	338	308	280	245	232
	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
					FEED	127	180	210	214	238	240	252	249	232	226	191	185	148	159
	9		0.1D	1.5D	Vc	20	25	25	25	25	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
					FEED	76	138	151	153	164	191	214	170	183	179	159	153	141	133
	10	High alloyed steel, and tool steel	0.1D	1.5D	Vc	55	55	60	65	70	65	65	70	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
	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
					FEED	127	180	210	214	238	240	252	249	232	226	191	185	148	159
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	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%



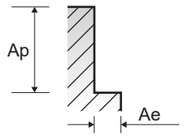
TANK-POWER END MILLS
RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

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	55	55	55	50	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
					FEED	178	238	301	298	340	376	388	366	355	306	272	277	266	238
	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
					FEED	156	221	255	255	277	301	338	301	296	265	262	232	203	190
	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
					FEED	111	166	191	183	208	228	236	238	220	209	196	180	151	144
	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
					FEED	89	119	127	122	154	167	148	167	150	149	124	121	90	87
	6	Low alloy steel	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
					FEED	156	221	255	255	277	301	338	301	296	265	262	232	203	190
	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
					FEED	111	166	191	183	208	228	236	238	220	209	196	180	151	144
	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
					FEED	89	119	127	122	154	167	148	167	150	149	124	121	90	87
	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
					FEED	57	76	86	112	119	121	132	123	111	107	99	90	86	85
	10	High alloyed steel, and tool steel	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
					FEED	156	221	255	255	277	301	338	301	296	265	262	232	203	190
	11.1		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
					FEED	89	119	127	122	154	167	148	167	150	149	124	121	90	87
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	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%



TANK-POWER END MILLS

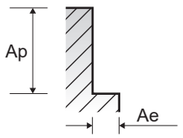
RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

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
					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
					FEED	236	286	420	414	404	411	420	424	417	401
	2		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
					FEED	172	239	304	329	323	346	329	347	332	301
	3-4		0.5D	1.5D	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
					FEED	115	159	205	238	242	242	233	241	213	234
	5		0.5D	1.5D	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
					FEED	107	119	172	194	194	196	195	195	195	191
	6	Low alloy steel	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
					FEED	172	239	304	329	323	346	329	347	332	301
	7		0.5D	1.5D	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
					FEED	115	159	205	238	242	242	233	241	213	234
	8-9		0.5D	1.5D	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
					FEED	107	119	172	194	194	196	195	195	195	191
	10	High alloyed steel, and tool steel	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
					FEED	172	239	304	329	323	346	329	347	332	301
	11.1		0.5D	1.5D	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
					FEED	107	119	172	194	194	196	195	195	195	191
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
					FEED	99	140	172	204	202	203	197	204	206	197
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
					FEED	172	239	304	329	323	346	329	347	332	301

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



TANK-POWER END MILLS

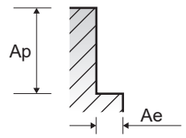
RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

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
					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
					FEED	100	134	255	250	204	201	173	171	208	204
	2		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
					FEED	86	113	187	201	158	153	139	128	169	155
	3-4		0.5D	1.5D	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
					FEED	54	84	112	154	100	123	101	103	106	102
	5		0.5D	1.5D	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
					FEED	43	64	107	117	93	94	79	78	98	97
	6	Low alloy steel	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
					FEED	86	113	187	201	158	153	139	128	169	155
	7		0.5D	1.5D	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
					FEED	54	84	112	154	100	123	101	103	106	102
	8-9		0.5D	1.5D	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
					FEED	43	64	107	117	93	94	79	78	98	97
	10	High alloyed steel, and tool steel	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
					FEED	86	113	187	201	158	153	139	128	169	155
	11.1		0.5D	1.5D	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
					FEED	43	64	107	117	93	94	79	78	98	97
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
					FEED	64	72	115	138	109	110	91	93	117	109
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
					FEED	86	113	187	201	158	153	139	128	169	155

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



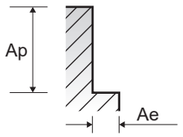
TANK-POWER END MILLS

RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

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
					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
					FEED	245	286	420	414	402	412	420	424	417	403
	2		0.5D	1.5D	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
					FEED	170	239	304	329	322	343	329	344	332	303
	3-4		0.5D	1.5D	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
					FEED	115	162	205	238	243	244	234	241	214	233
	5		0.5D	1.5D	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
					FEED	106	119	172	194	194	194	194	195	195	190
	6	Low alloy steel	0.5D	1.5D	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
					FEED	170	239	304	329	322	343	329	344	332	303
	7		0.5D	1.5D	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
					FEED	115	162	205	238	243	244	234	241	214	233
	8-9		0.5D	1.5D	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
					FEED	106	119	172	194	194	194	194	195	195	190
	10	High alloyed steel, and tool steel	0.5D	1.5D	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
					FEED	170	239	304	329	322	343	329	344	332	303
	11.1		0.5D	1.5D	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
					FEED	106	119	172	194	194	194	194	195	195	190
M	14.1	Stainless steel	0.5D	1.5D	Vc	25	30	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
					FEED	101	138	172	204	201	203	197	203	206	195
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	0.02	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
					FEED	170	239	304	329	322	343	329	344	332	303



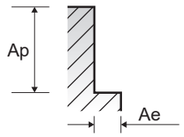
TANK-POWER END MILLS

RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

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
					FEED	134	178	255	250	255	251	259	256	250	244
	2		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
					FEED	115	150	187	201	198	191	208	192	203	186
	3-4		0.5D	1.5D	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
					FEED	72	111	112	154	125	154	151	155	127	122
	5		0.5D	1.5D	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
					FEED	57	86	107	117	116	117	119	117	118	116
	6	Low alloy steel	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
					FEED	115	150	187	201	198	191	208	192	203	186
	7		0.5D	1.5D	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
					FEED	72	111	112	154	125	154	151	155	127	122
	8-9		0.5D	1.5D	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
					FEED	57	86	107	117	116	117	119	117	118	116
	10	High alloyed steel, and tool steel	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
					FEED	115	150	187	201	198	191	208	192	203	186
	11.1		0.5D	1.5D	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
					FEED	57	86	107	117	116	117	119	117	118	116
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
					FEED	85	95	115	138	136	137	136	139	141	131
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
					FEED	115	150	187	201	198	191	208	192	203	186



TANK-POWER END MILLS

RECOMMENDED CUTTING CONDITIONS
EMPFOHLENE SCHNEIDPARAMETER

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
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		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
	3-4		0.5D	1.5D	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		0.5D	1.5D	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	Low alloy steel	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
	7		0.5D	1.5D	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		0.5D	1.5D	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	High alloyed steel, and tool steel	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
	11.1		0.5D	1.5D	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