



**HSS PM60**

# ONLY ONE COATED PM60 END MILLS

**Only One, beschichtete Pulvermetall PM60 Schaftfräser**

- Perfect Solution of Carbide Chipping under Vibrations
- Perfekte Lösung bei Zerspanung unter Vibrationen

**SELECTION GUIDE**

HSS



SERIES	GYG77 GYF97	GYG72 GYF99	GYG01
FLUTE	2	2	3
HELIX ANGLE	30°	30°	30°
CUTTING EDGE SHAPE	BALL NOSE	SQUARE	SQUARE
SIZE MIN	R0.5	D1.0	D1.0
SIZE MAX	R12.5	D25.0	D25.0
PAGE	618	619	620

CBN  
END MILLS

i-Xmill  
END MILLS

i-SMART  
MODULAR  
END MILLS

X5070  
END MILLS

4G MILL  
END MILLS

X-POWER  
PRO  
END MILLS

TitaNox-  
POWER  
END MILLS

JET-POWER  
END MILLS

V7 PLUS  
END MILLS

ALU-POWER  
HPC  
END MILLS

ALU-  
POWER  
END MILLS

D-POWER  
GRAPHITE  
END MILLS

D-POWER  
CFRP  
END MILLS

ROUTERS

CRX S  
END MILLS

K-2  
END MILLS

ONLY ONE  
COATED PM60  
END MILLS

TANK-  
POWER  
END MILLS

GENERAL  
HSS  
END MILLS

MILLING  
CUTTERS

TECHNICAL  
DATA

**COATED PM60**  
**ONLY ONE**  
**END MILLS**

Perfect solution to protect Carbide chipping problems under vibrations



Please visit  
[globalyg1.com/mat](http://globalyg1.com/mat)  
 for material search

◎ : Excellent ○ : Good

Recommended cutting conditions : P 628

SHORT LENGTH	SHORT LENGTH	SHORT LENGTH (Center Cut)
Y-Coating	Y-Coating	Y-Coating



ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	HRc				
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		Annealed	250	25				
	34		Ni or Co Based 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				

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**ONLY ONE**  
COATED PM60 END MILLS

PLAIN SHANK

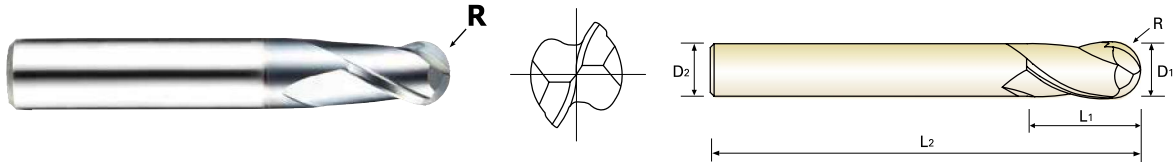
**GYG77** SERIES

FLAT SHANK

**GYF97** SERIES

**PM60, 2 FLUTE BALL NOSE SHORT LENGTH**

- 🇩🇪 **PM60, 2 Schneiden, Stirnradius kurz**
- 🇫🇷 **Revêtue YG-AlCrN - PM60, 2 dents, série courte, hémisphérique**
- 🇮🇹 **Rivestita PM60, 2 TAGLIENTE SERIE CORTA SEMISFERICA**



PM 60
2
30°
R ±0.02
PLAIN
FLAT
P.628

Unit : mm

EDP No.		Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
PLAIN	FLAT	R(±0.02)	D1	D2	L1	L2
GYG77010	GYF97010	R0.5	1.0	6	2.5	47
GYG77020	GYF97020	R1.0	2.0	6	4	48
GYG77030	GYF97030	R1.5	3.0	6	5	49
GYG77040	GYF97040	R2.0	4.0	6	7	51
GYG77050	GYF97050	R2.5	5.0	6	8	52
GYG77060	GYF97060	R3.0	6.0	6	8	52
GYG77070	GYF97070	R3.5	7.0	8	10	60
GYG77080	GYF97080	R4.0	8.0	8	11	61
GYG77090	GYF97090	R4.5	9.0	10	11	61
GYG77100	GYF97100	R5.0	10.0	10	13	63
GYG77120	GYF97120	R6.0	12.0	12	16	73
GYG77140	GYF97140	R7.0	14.0	12	16	73
GYG77160	GYF97160	R8.0	16.0	16	19	79
GYG77180	GYF97180	R9.0	18.0	16	19	79
GYG77200	GYF97200	R10.0	20.0	20	22	88
GYG77250	GYF97250	R12.5	25.0	25	26	102

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ -0.03	h6

◎ : Excellent ○ : Good

ISO Material Description	P											M					K						
	Non-alloy steel					Low alloy steel						High alloyed steel, and tool steel					Stainless steel			Grey cast iron		Nodular cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
HRc	13	25	28	32	30	10	29	32	38	15	35	15	23	10	10	26	3	25		21			
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230			
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	◎	◎	◎	◎	◎	◎	◎	◎			
ISO Material Description	N										S							H					
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron			
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41		
HRc											15	30	25	38	34			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						○	○	○												○			

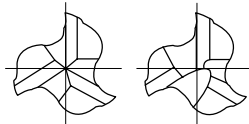
**YG** ONLY ONE  
 COATED PM60 END MILLS

FLAT SHANK

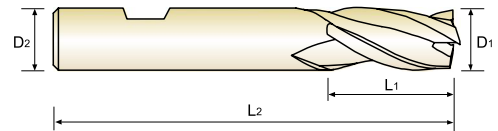
**GYG01** SERIES

**PM60, 3 FLUTE SHORT LENGTH (Center Cut)**

- PM60, 3 Schneiden, kurz, Zentrumschnitt**
- Revêtue YG-AlCrN - PM60, 3 dents, série courte (Coupe au centre)**
- Rivestita PM60, 3 TAGLIENTI SERIE CORTA (Tagliante al centro)**



up to  $\varnothing$  1mm    over  $\varnothing$  1mm



p.630-631

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
GYG01010	1.0	6	3	47
GYG01020	2.0	6	7	51
GYG01030	3.0	6	8	52
GYG01040	4.0	6	11	55
GYG01050	5.0	6	13	57
GYG01060	6.0	6	13	57
GYG01070	7.0	8	16	66
GYG01080	8.0	8	19	69
GYG01090	9.0	10	19	69
GYG01100	10.0	10	22	72
GYG01120	12.0	12	26	83
GYG01140	14.0	12	26	83
GYG01160	16.0	16	32	92
GYG01180	18.0	16	32	92
GYG01200	20.0	20	38	104
GYG01220	22.0	20	38	104
GYG01250	25.0	25	45	121

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ -0.03	h6

ONLY ONE  
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 END MILLS

TANK-  
 POWER  
 END MILLS

GENERAL  
 HSS  
 END MILLS

MILLING  
 CUTTERS

TECHNICAL  
 DATA

⊙ : Excellent ○ : Good

ISO Material Description	P										M					K					
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	25	28	32	36	10	29	32	38	42	15	23	26	30	10	10	3	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 Material Description	N										S							H			
	Aluminum- wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials			Heat Resistant Super Alloys				Titanium Alloys			Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	21	22	23	24	25	26	27	28	29	30	15	30	25	38	34	55	60	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	○	○	○	○	○	○	○	○													

HSS



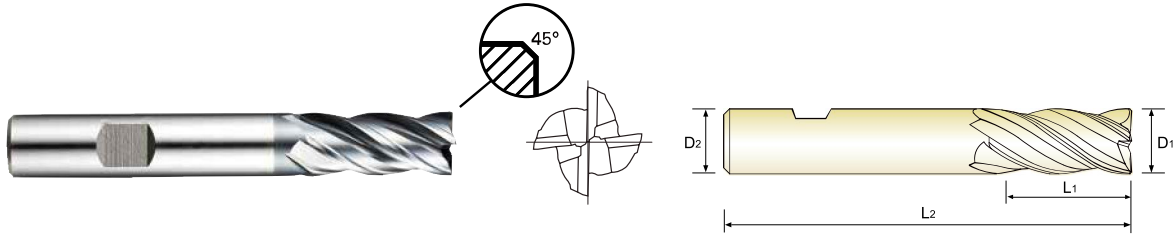
**ONLY ONE**  
 COATED PM60 END MILLS

FLAT SHANK

**GYG52** SERIES

**PM60, 4 FLUTE MULTIPLE HELIX SHORT LENGTH (Center Cut)**

- 🇩🇪 **PM60, 4 Schneiden, mit ungleichem Drall, kurz, Zentrumschnitt**
- 🇫🇷 **Revêtue YG-AlCrN - PM60, 4 dents, hélice multiple, série courte (Coupe au centre)**
- 🇮🇹 **Rivestita PM60, 4 TAGLIENTI elica variabile SERIE CORTA (Tagliante al centro)**

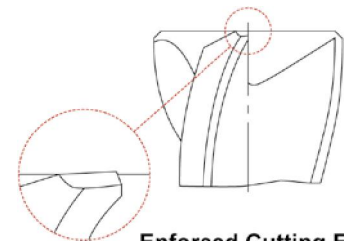


PM 60
4
35°/37°
FLAT
C x 45°
P.633

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	Chamfer
	D1	D2	L1	L2	
GYG52030	3.0	6	8	52	0.1
GYG52040	4.0	6	11	55	0.1
GYG52050	5.0	6	13	57	0.1
GYG52060	6.0	6	13	57	0.1
GYG52070	7.0	8	16	66	0.1
GYG52080	8.0	8	19	69	0.1
GYG52090	9.0	10	19	69	0.1
GYG52100	10.0	10	22	72	0.1
GYG52120	12.0	12	26	83	0.1
GYG52140	14.0	12	26	83	0.2
GYG52160	16.0	16	32	92	0.2
GYG52180	18.0	16	32	92	0.2
GYG52200	20.0	20	38	104	0.2
GYG52220	22.0	20	38	104	0.2
GYG52250	25.0	25	45	121	0.2

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ -0.03	h6



**Enforced Cutting Edge**

◎ : Excellent ○ : Good

ISO Material Description	P										M					K																									
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel					Stainless steel					Grey cast iron		Nodular cast iron		Malleable cast iron																
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	13	13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25	42	55	60	60	60	60	60	60	60	60	60	60	200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230	230
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎
ISO Material Description	N										S							H																							
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron																					
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41																				
HRc	60	100	75	90	130	110	90	100			15	30	25	38	34	200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550															
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550																				
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎															

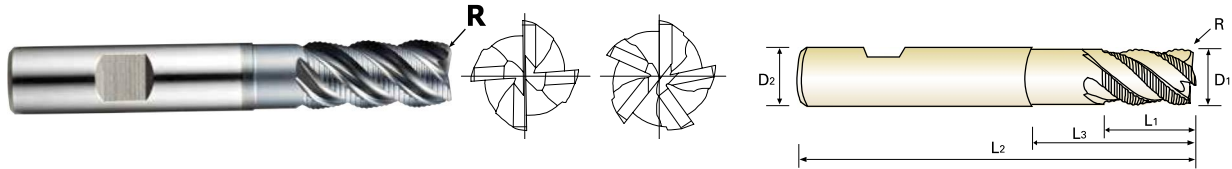
**YG** ONLY ONE  
 COATED PM60 END MILLS

FLAT SHANK

**GYF95** SERIES

**PM60, MULTI FLUTE MULTIPLE HELIX SHORT LENGTH CORNER RADIUS ROUGHING - FINE (Center Cut)**

- PM60, Mehrschneiden, mit ungleichem Drill, kurz, Eckenradius, Feinkordel-Schrupppfräser, Zentrumschnitt
- Revêtue YG-AlCrN - PM60, multi-dents, hélice multiple, série courte, rayonnée, ravageuse, pas fins (Coupe au centre)
- Rivestita PM60, MULTI TAGLIENTE ELICA VARIABILE SERIE CORTA TORICA PER SGROSSATURA - BOMBATO FINE (Tagliante al centro)



PM 60
4-5
44°/44.5°/45°
HR
FLAT
P.634

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank diameter	Length of Cut	Length Below Shank	Overall length	No. of Flute
	R	D1(js12)	D2(h6)	L1	L3	L2	
GYF95060	R0.5	6.0	6	13	-	57	4
GYF95070	R0.5	7.0	10	16	-	66	4
GYF95080	R0.5	8.0	10	19	-	69	4
GYF95090	R0.5	9.0	10	19	-	69	4
GYF95100	R0.5	10.0	10	22	31	72	4
GYF95120	R0.5	12.0	12	26	37	83	4
GYF95140	R1.0	14.0	12	26	-	83	5
GYF95160	R1.0	16.0	16	32	44	92	5
GYF95180	R1.0	18.0	16	32	-	92	5
GYF95200	R1.0	20.0	20	38	54	104	5
GYF95250	R1.0	25.0	25	45	63	121	5

**Tolerances according to DIN 7160 & 7161**

Tolerance range in $\mu\text{m}$			
Nominal-Diameter in mm			
	over 6 to 10	over 10 to 18	over 18 to 30
js12	$\pm 75$	$\pm 90$	$\pm 105$
h6	0 - 9	0 - 11	0 - 13

◎ : Excellent ○ : Good

ISO	P											M			K							
	Non-alloy steel					Low alloy steel						High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
VDI 3323																						
HRc	13	25	28	32	30	29	32	38	15	35	15	23	10	10	26	3	25					
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230		
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	◎	◎	◎	◎	◎	◎	◎	◎		
ISO	N										S					H						
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron		
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
VDI 3323																						
HRc											15	30	25	38	34			55	60	42	55	
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550	
Recommend						○	○	○													○	

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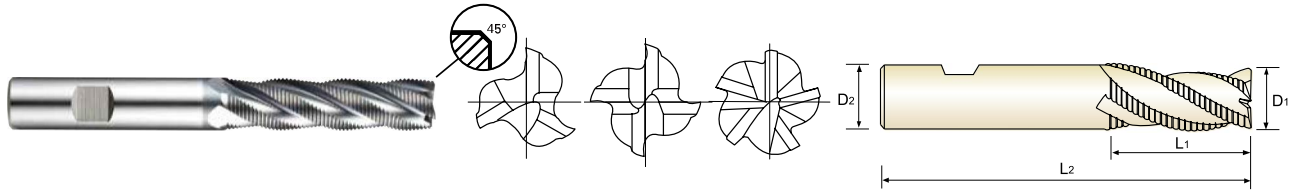
**ONLY ONE**  
 COATED PM60 END MILLS

FLAT SHANK

**GYF98** SERIES

**PM60, MULTI FLUTE LONG LENGTH ROUGHING - FINE (Center Cut)**

- 🇩🇪 **PM60, Mehrschneiden, lang, Feinkordel-Schruppfräser, Zentrumschnitt**
- 🇫🇷 **Revêtue YG-AlCrN - PM60, multi-dents, série longue, ravageuse, pas fins (Coupe au centre)**
- 🇮🇹 **Rivestita PM60, MULTI TAGLIENTE SERIE LUNGA PER SGROSSATURA - BOMBATO FINE (Tagliante al centro)**



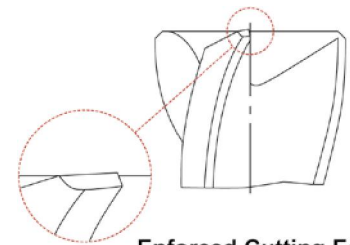
PM 60
3-5
30°
HR
FLAT
C x 45°
P.635

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer
	D1(js12)	D2(h6)	L1	L2		
GYF98060	6.0	6	24	68	3	0.18
GYF98070	7.0	10	30	80	3	0.18
GYF98080	8.0	10	38	88	3	0.18
GYF98090	9.0	10	38	88	3	0.18
GYF98100	10.0	10	45	95	4	0.18
GYF98120	12.0	12	53	110	4	0.18
GYF98140	14.0	12	53	110	4	0.25
GYF98160	16.0	16	63	123	4	0.25
GYF98180	18.0	16	63	123	4	0.25
GYF98200	20.0	20	75	141	4	0.25
GYF98250	25.0	25	90	166	5	0.36

**Tolerances according to DIN 7160 & 7161**

Tolerance range in $\mu\text{m}$			
Nominal-Diameter in mm			
	over 6 to 10	over 10 to 18	over 18 to 30
js12	$\pm 75$	$\pm 90$	$\pm 105$
h6	0 - 9	0 - 11	0 - 13



**Enforced Cutting Edge**

⊙ : Excellent ○ : Good

ISO Material Description	P										M					K										
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel					Stainless steel					Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
HRc	125	13	25	28	32	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	⊙	⊙	⊙	⊙	⊙	
Recommend	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	○	⊙	○	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	⊙	
ISO Material Description	N										S							H								
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron						
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
HRc	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550	○	○	○	○	○
Recommend						○	○	○																		

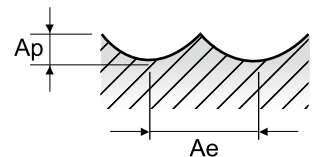
**YG** ONLY ONE  
 COATED PM60 END MILLS

**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**GYG77 , GYF97** 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	83	90	100	101	104	104	103	102	90	
					fz	0.023	0.036	0.054	0.079	0.109	0.115	0.141	0.156	0.162	
					RPM	8807	7162	5305	4019	3310	2759	2049	1623	1146	
					FEED	405	516	573	635	722	634	578	506	371	
	2		0.5D	0.2D	Vc	66	70	79	78	79	81	78	75	70	
					fz	0.020	0.032	0.046	0.067	0.095	0.097	0.123	0.140	0.140	
					RPM	7003	5570	4191	3104	2515	2149	1552	1194	891	
					FEED	280	357	386	416	478	417	382	334	250	
	3-4		0.5D	0.2D	Vc	44	45	52	54	53	54	54	52	44	
					fz	0.016	0.026	0.039	0.056	0.082	0.083	0.1	0.11	0.125	
					RPM	4669	3581	2759	2149	1687	1432	1074	828	560	
					FEED	149	186	215	241	277	238	215	182	140	
5	0.5D	0.2D	Vc	23	24	27	27	26	26	27	27	24			
			fz	0.014	0.023	0.035	0.047	0.073	0.071	0.090	0.099	0.100			
			RPM	2440	1910	1432	1074	828	690	537	430	306			
			FEED	68	88	100	101	121	98	97	85	61			
6	0.5D	0.2D	Vc	66	70	79	78	79	81	78	75	70			
			fz	0.020	0.032	0.046	0.067	0.095	0.097	0.123	0.140	0.140			
			RPM	7003	5570	4191	3104	2515	2149	1552	1194	891			
			FEED	280	357	386	416	478	417	382	334	250			
7	0.5D	0.2D	Vc	44	45	52	54	53	54	54	52	44			
			fz	0.016	0.026	0.039	0.056	0.082	0.083	0.1	0.11	0.125			
			RPM	4669	3581	2759	2149	1687	1432	1074	828	560			
			FEED	149	186	215	241	277	238	215	182	140			
8-9	0.5D	0.2D	Vc	23	24	27	27	26	26	27	27	24			
			fz	0.014	0.023	0.035	0.047	0.073	0.071	0.090	0.099	0.100			
			RPM	2440	1910	1432	1074	828	690	537	430	306			
			FEED	68	88	100	101	121	98	97	85	61			
10	0.5D	0.2D	Vc	66	70	79	78	79	81	78	75	70			
			fz	0.020	0.032	0.046	0.067	0.095	0.097	0.123	0.140	0.140			
			RPM	7003	5570	4191	3104	2515	2149	1552	1194	891			
			FEED	280	357	386	416	478	417	382	334	250			
11.1	0.5D	0.2D	Vc	23	24	27	27	26	26	27	27	24			
			fz	0.014	0.023	0.035	0.047	0.073	0.071	0.090	0.099	0.100			
			RPM	2440	1910	1432	1074	828	690	537	430	306			
			FEED	68	88	100	101	121	98	97	85	61			
11.2	0.3D	0.2D	Vc	16	17	19	19	18	18	19	19	16			
			fz	0.013	0.024	0.035	0.047	0.075	0.071	0.088	0.1	0.095			
			RPM	1698	1353	1008	756	573	477	378	302	204			
			FEED	44	65	71	71	86	68	67	60	39			
M	14.1	Stainless steel	0.5D	0.2D	Vc	25	27	30	30	28	29	30	30	26	
					fz	0.013	0.023	0.036	0.049	0.072	0.075	0.093	0.099	0.098	
					RPM	2653	2149	1592	1194	891	769	597	477	331	
					FEED	69	99	115	117	128	115	111	95	65	
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	0.2D	Vc	66	70	79	78	79	81	78	75	70	
					fz	0.02	0.032	0.046	0.067	0.095	0.097	0.123	0.14	0.14	
					RPM	7003	5570	4191	3104	2515	2149	1552	1194	891	
					FEED	280	357	386	416	478	417	382	334	250	
H	40	Chilled Cast Iron	0.3D	0.2D	Vc	16	17	19	19	18	18	19	19	16	
					fz	0.013	0.024	0.035	0.047	0.075	0.071	0.088	0.1	0.095	
					RPM	1698	1353	1008	756	573	477	378	302	204	
					FEED	44	65	71	71	86	68	67	60	39	





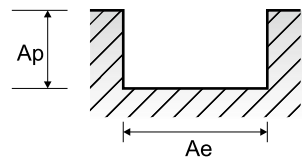
**YG** ONLY ONE  
 COATED PM60 END MILLS

**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**GYG01** 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	49	52	65	72	76	78	79	81	84	81	78	72	70	71		
					fz	0.004	0.007	0.011	0.014	0.023	0.031	0.04	0.051	0.052	0.06	0.07	0.08	0.091	0.107		
					RPM	7799	5517	5173	4584	4032	3104	289	2515	2149	1910	1611	1379	1146	1013	904	
	2		1.0D	0.5D	Vc	41	44	54	60	63	66	68	66	71	69	61	60	61	60		
					fz	0.003	0.007	0.011	0.013	0.023	0.032	0.039	0.053	0.055	0.06	0.072	0.081	0.089	0.11		
					RPM	6525	4669	4297	3820	3342	2626	2165	1751	1614	1373	1079	955	883	764		
	3-4		1.0D	0.5D	Vc	36	38	45	49	52	54	53	54	53	54	54	53	50	46		
					fz	0.003	0.005	0.009	0.012	0.021	0.028	0.038	0.047	0.053	0.056	0.063	0.067	0.083	0.107		
					RPM	5730	4032	3581	3119	2759	2149	1687	1432	1205	1074	955	844	723	586		
	5		1.0D	0.5D	Vc	23	25	29	32	33	35	34	34	35	34	34	33	33	34		
					fz	0.004	0.007	0.009	0.012	0.021	0.029	0.044	0.052	0.055	0.06	0.064	0.069	0.08	0.093		
					RPM	3661	2653	2308	2037	1751	1393	1082	902	796	676	601	525	477	433		
6	1.0D	0.5D	Vc	41	44	54	60	63	66	68	66	71	69	61	60	61	60				
			fz	0.003	0.007	0.011	0.013	0.023	0.032	0.039	0.053	0.055	0.06	0.072	0.081	0.089	0.11				
			RPM	6525	4669	4297	3820	3342	2626	2165	1751	1614	1373	1079	955	883	764				
7	1.0D	0.5D	Vc	36	38	45	49	52	54	53	54	53	54	54	53	50	46				
			fz	0.003	0.005	0.009	0.012	0.021	0.028	0.038	0.047	0.053	0.056	0.063	0.067	0.083	0.107				
			RPM	5730	4032	3581	3119	2759	2149	1687	1432	1205	1074	955	844	723	586				
8	1.0D	0.5D	Vc	23	25	29	32	33	35	34	34	35	34	34	33	33	34				
			fz	0.004	0.007	0.009	0.012	0.021	0.029	0.044	0.052	0.055	0.06	0.064	0.069	0.08	0.093				
			RPM	3661	2653	2308	2037	1751	1393	1082	902	796	676	601	525	477	433				
9	1.0D	0.3D	Vc	14	20	23	25	25	27	26	26	26	27	27	27	26	24				
			fz	0.005	0.008	0.012	0.014	0.023	0.031	0.045	0.052	0.056	0.063	0.066	0.074	0.088	0.111				
			RPM	2228	2122	1830	1592	1326	1074	828	690	591	537	477	430	376	306				
10	1.0D	0.5D	Vc	41	44	54	60	63	66	68	66	71	69	61	60	61	60				
			fz	0.003	0.007	0.011	0.013	0.023	0.032	0.039	0.053	0.055	0.06	0.072	0.081	0.089	0.11				
			RPM	6525	4669	4297	3820	3342	2626	2165	1751	1614	1373	1079	955	883	764				
11.1	1.0D	0.5D	Vc	23	25	29	32	33	35	34	34	35	34	34	33	33	34				
			fz	0.004	0.007	0.009	0.012	0.021	0.029	0.044	0.052	0.055	0.06	0.064	0.069	0.08	0.093				
			RPM	3661	2653	2308	2037	1751	1393	1082	902	796	676	601	525	477	433				
11.2	1.0D	0.3D	Vc	10	14	16	17	17	19	18	18	18	19	19	19	19	16				
			fz	0.005	0.009	0.012	0.014	0.024	0.031	0.044	0.051	0.056	0.063	0.064	0.072	0.086	0.111				
			RPM	1592	1485	1273	1082	902	756	573	477	409	378	336	302	275	204				
M	14.1	Stainless steel	1.0D	0.5D	Vc	41	44	54	60	63	66	68	66	71	69	61	60	61	60		
					fz	0.003	0.007	0.011	0.013	0.023	0.032	0.039	0.053	0.055	0.06	0.072	0.081	0.089	0.11		
					RPM	6525	4669	4297	3820	3342	2626	2165	1751	1614	1373	1079	955	883	764		
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	1.0D	0.5D	Vc	41	44	54	60	63	66	68	66	71	69	61	60	61	60		
					fz	0.003	0.007	0.011	0.013	0.023	0.032	0.039	0.053	0.055	0.06	0.072	0.081	0.089	0.11		
					RPM	6525	4669	4297	3820	3342	2626	2165	1751	1614	1373	1079	955	883	764		
H	40	Chilled Cast Iron	1.0D	0.3D	Vc	10	14	16	17	17	19	18	18	18	19	19	19	16			
					fz	0.005	0.009	0.012	0.014	0.024	0.031	0.044	0.051	0.056	0.063	0.064	0.072	0.086	0.111		
					RPM	1592	1485	1273	1082	902	756	573	477	409	378	336	302	275	204		





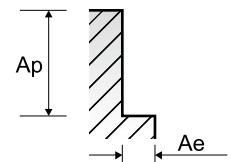
**ONLY ONE**  
COATED PM60 END MILLS

**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**GYG74 , GYF96 , GYG76 , GYG02 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	69	75	80	83	88	93	87	90	95	97	102	94	87	94		
					fz	0.008	0.015	0.023	0.029	0.035	0.046	0.068	0.071	0.076	0.079	0.076	0.088	0.097	0.093		
					RPM	10982	7958	6366	5284	4669	3700	2769	2387	2160	1930	1804	1496	1259	1197		
	FEED		351	477	586	613	654	681	753	678	657	610	548	527	488	445					
	2		0.1D	1.5D	Vc	63	68	71	75	81	78	79	81	84	84	85	79	79	79		
					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	0.09		
					RPM	10027	7215	5650	4775	4297	3104	2515	2149	1910	1671	1503	1257	1143	1006		
	FEED		281	433	475	497	533	571	634	576	550	515	481	443	384	362					
	3-4		0.1D	1.5D	Vc	46	50	54	55	59	60	60	63	58	60	61	59	57	60		
					fz	0.007	0.014	0.021	0.028	0.032	0.046	0.059	0.066	0.08	0.085	0.086	0.088	0.093	0.09		
RPM		7321			5305	4297	3501	3130	2387	1910	1671	1319	1194	1079	939	825	764				
FEED	205	297	361	392	401	439	451	441	422	406	371	331	307	275							
5	0.1D	1.5D	Vc	31	31	35	38	41	42	38	40	42	41	43	40	39	39				
			fz	0.008	0.017	0.022	0.028	0.032	0.043	0.067	0.068	0.072	0.081	0.077	0.082	0.085	0.09				
			RPM	4934	3289	2785	2419	2175	1671	1210	1061	955	816	760	637	564	497				
FEED	158	224	245	271	278	287	324	289	275	264	234	209	192	179							
6	0.1D	1.5D	Vc	63	68	71	75	81	78	79	81	84	84	85	79	79	79				
			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	0.09				
			RPM	10027	7215	5650	4775	4297	3104	2515	2149	1910	1671	1503	1257	1143	1006				
FEED	281	433	475	497	533	571	634	576	550	515	481	443	384	362							
7	0.1D	1.5D	Vc	46	50	54	55	59	60	60	63	58	60	61	59	57	60				
			fz	0.007	0.014	0.021	0.028	0.032	0.046	0.059	0.066	0.08	0.085	0.086	0.088	0.093	0.09				
			RPM	7321	5305	4297	3501	3130	2387	1910	1671	1319	1194	1079	939	825	764				
FEED	205	297	361	392	401	439	451	441	422	406	371	331	307	275							
8	0.1D	1.5D	Vc	31	31	35	38	41	42	38	40	42	41	43	40	39	39				
			fz	0.008	0.017	0.022	0.028	0.032	0.043	0.067	0.068	0.072	0.081	0.077	0.082	0.085	0.09				
			RPM	4934	3289	2785	2419	2175	1671	1210	1061	955	816	760	637	564	497				
FEED	158	224	245	271	278	287	324	289	275	264	234	209	192	179							
9	0.05D	1.5D	Vc	25	27	30	32	33	35	34	32	33	33	34	33	33	34				
			fz	0.006	0.013	0.019	0.023	0.031	0.04	0.056	0.064	0.067	0.076	0.075	0.08	0.081	0.087				
			RPM	3979	2865	2387	2037	1751	1393	1082	849	750	657	601	525	477	433				
FEED	95	149	181	187	217	223	242	217	201	200	180	168	155	151							
10	0.1D	1.5D	Vc	63	68	71	75	81	78	79	81	84	84	85	79	79	79				
			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	0.09				
			RPM	10027	7215	5650	4775	4297	3104	2515	2149	1910	1671	1503	1257	1143	1006				
FEED	281	433	475	497	533	571	634	576	550	515	481	443	384	362							
11.1	0.1D	1.5D	Vc	31	31	35	38	41	42	38	40	42	41	43	40	39	39				
			fz	0.008	0.017	0.022	0.028	0.032	0.043	0.067	0.068	0.072	0.081	0.077	0.082	0.085	0.09				
			RPM	4934	3289	2785	2419	2175	1671	1210	1061	955	816	760	637	564	497				
FEED	158	224	245	271	278	287	324	289	275	264	234	209	192	179							
11.2	0.05D	1.5D	Vc	17	19	21	22	23	24	24	23	23	23	24	23	23	24				
			fz	0.006	0.013	0.019	0.024	0.031	0.04	0.057	0.065	0.068	0.076	0.074	0.081	0.081	0.088				
			RPM	2706	2016	1671	1401	1220	955	764	610	523	458	424	366	333	306				
FEED	65	105	127	134	151	153	174	159	142	139	126	119	108	108							
M	14.1	Stainless steel	0.1D	1.5D	Vc	27	30	33	35	36	38	37	36	37	37	36	37	37			
fz	0.006	0.013	0.019	0.023	0.031	0.039	0.056	0.063	0.067	0.075	0.076	0.08	0.08	0.088							
RPM	4297	3183	2626	2228	1910	1512	1178	955	841	736	654	573	535	471							
FEED	103	166	200	205	237	236	264	241	225	221	199	183	171	166							
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.1D	1.5D	Vc	63	68	71	75	81	78	79	81	84	84	85	79	79	79		
					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	0.09		
					RPM	10027	7215	5650	4775	4297	3104	2515	2149	1910	1671	1503	1257	1143	1006		
FEED	281	433	475	497	533	571	634	576	550	515	481	443	384	362							
H	40	Chilled Cast Iron	0.05D	1.5D	Vc	17	19	21	22	23	24	24	23	23	24	23	23	24			
					fz	0.006	0.013	0.019	0.024	0.031	0.04	0.057	0.065	0.068	0.076	0.074	0.081	0.081	0.088		
					RPM	2706	2016	1671	1401	1220	955	764	610	523	458	424	366	333	306		
FEED	65	105	127	134	151	153	174	159	142	139	126	119	108	108							



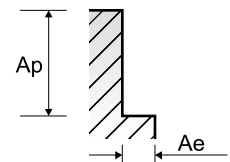
**YG** ONLY ONE  
 COATED PM60 END MILLS

**GYF95** 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										
						6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	25.0	
P	1	Non-alloy steel	0.5D	1.5D	Vc	76	87	86	87	89	87	85	87	90	
					fz	0.02	0.03	0.055	0.065	0.059	0.069	0.079	0.088	0.105	
					RPM	4032	3462	2737	2308	2024	1731	1503	1385	1146	
	2		Vc	60	69	68	65	66	69	72	68	68			
			fz	0.021	0.03	0.053	0.069	0.063	0.069	0.074	0.087	0.106			
			RPM	3183	2745	2165	1724	1501	1373	1273	1082	866			
	3		Vc	43	51	47	49	48	48	50	48	47			
			fz	0.018	0.028	0.046	0.063	0.061	0.069	0.075	0.086	0.107			
			RPM	2281	2029	1496	1300	1091	955	884	764	598			
	4		Vc	43	51	47	49	48	48	50	48	47			
			fz	0.018	0.028	0.046	0.063	0.061	0.069	0.075	0.086	0.107			
			RPM	2281	2029	1496	1300	1091	955	884	764	598			
5	Vc	35	38	40	40	40	40	40	40	41					
	fz	0.02	0.03	0.045	0.061	0.057	0.066	0.073	0.081	0.1					
	RPM	1857	1512	1273	1061	909	796	707	637	522					
6	Vc	60	69	68	65	66	69	72	68	68					
	fz	0.021	0.03	0.053	0.069	0.063	0.069	0.074	0.087	0.106					
	RPM	3183	2745	2165	1724	1501	1373	1273	1082	866					
7	Vc	43	51	47	49	48	48	50	48	47					
	fz	0.018	0.028	0.046	0.063	0.061	0.069	0.075	0.086	0.107					
	RPM	2281	2029	1496	1300	1091	955	884	764	598					
8-9	Vc	35	38	40	40	40	40	40	40	41					
	fz	0.02	0.03	0.045	0.061	0.057	0.066	0.073	0.081	0.1					
	RPM	1857	1512	1273	1061	909	796	707	637	522					
10	Vc	60	69	68	65	66	69	72	68	68					
	fz	0.021	0.03	0.053	0.069	0.063	0.069	0.074	0.087	0.106					
	RPM	3183	2745	2165	1724	1501	1373	1273	1082	866					
11.1	Vc	35	38	40	40	40	40	40	40	41					
	fz	0.02	0.03	0.045	0.061	0.057	0.066	0.073	0.081	0.1					
	RPM	1857	1512	1273	1061	909	796	707	637	522					
11.2	Vc	25	27	28	28	28	28	28	28	28					
	fz	0.02	0.029	0.044	0.06	0.056	0.065	0.072	0.08	0.1					
	RPM	1326	1074	891	743	637	557	495	446	357					
M	14.1	Stainless steel	0.5D	1.5D	Vc	39	43	43	43	44	43	45	44	44	
					fz	0.019	0.03	0.045	0.064	0.059	0.069	0.075	0.084	0.104	
					RPM	2069	1711	1369	1141	1000	855	796	700	560	
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	60	69	68	65	66	69	72	68	68	
					fz	0.021	0.03	0.053	0.069	0.063	0.069	0.074	0.087	0.106	
					RPM	3183	2745	2165	1724	1501	1373	1273	1082	866	
H	40	Chilled Cast Iron	0.3D	1.5D	Vc	25	27	28	28	28	28	28	28	28	
					fz	0.02	0.029	0.044	0.06	0.056	0.065	0.072	0.08	0.1	
					RPM	1326	1074	891	743	637	557	495	446	357	





Global Cutting Tool Leader **YG-1**



# MILLING



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

HSS



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	D1.0
SIZE MAX	R12.5	R12.5	D25.0	D25.0
PAGE	640	641	642	643

CBN  
END MILLS

i-Xmill  
END MILLS

i-SMART  
MODULAR  
END MILLS

X5070  
END MILLS

4G MILL  
END MILLS

X-POWER  
PRO  
END MILLS

TitaNox-  
POWER  
END MILLS

JET-POWER  
END MILLS

V7 PLUS  
END MILLS

ALU-POWER  
HPC  
END MILLS

ALU-  
POWER  
END MILLS

D-POWER  
GRAPHITE  
END MILLS

D-POWER  
CFRP  
END MILLS

ROUTERS

CRX S  
END MILLS

K-2  
END MILLS

ONLY ONE  
COATED PM60  
END MILLS

TANK-  
POWER  
END MILLS

GENERAL  
HSS  
END MILLS

MILLING  
CUTTERS

TECHNICAL  
DATA

## 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](http://globalyg1.com/mat)  
for material search

◎ : Excellent ○ : Good

Recommended cutting conditions : P 654

	SHORT LENGTH	LONG LENGTH	SHORT LENGTH	LONG LENGTH
	TiAIN	TiAIN	TiAIN	TiAIN
<b>P</b>	◎	◎	◎	◎
<b>M</b>	◎	◎	◎	◎
<b>K</b>	◎	◎	◎	◎
<b>N</b>	○	○	○	○
<b>S</b>	○	○	○	○
<b>H</b>	○	○	○	○

ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	HRc	
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		Annealed	250	25	
	34		Cured	350	38	
	35	Ni or Co Based 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	

HSS



**TANK-POWER**  
HSS-PM END MILLS

UNCOATED

**E9940** SERIES

TiAlN based COATED

**GA940** SERIES

**HSS-PM, 2 FLUTE SHORT LENGTH BALL NOSE**

- 🇩🇪 **HSS-PM, 2 SCHNEIDEN KURZ STIRNRADIUS**
- 🇫🇷 **FRAISES HSS-PM, 2 DENTS À BOUT HÉMISPHERIQUE, SÉRIE COURTE**
- 🇮🇹 **2 TAGLIENTI, SERIE CORTA, HSS-PM, SEMISFERICA**

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



HSS PM
DIN 327
2
30°
R ±0.02
DIN 1835B
P.654~655

Unit : mm

EDP No.	Radius of Ball Nose		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	
	UNCOATED	TiAlN based					R(±0.02)
E9940010		GA940010	R0.5	1.0	6	2.5	47
E9940020		GA940020	R1.0	2.0	6	4	48
E9940030		GA940030	R1.5	3.0	6	5	49
E9940040		GA940040	R2.0	4.0	6	7	51
E9940050		GA940050	R2.5	5.0	6	8	52
E9940060		GA940060	R3.0	6.0	6	8	52
E9940070		GA940070	R3.5	7.0	10	10	60
E9940080		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
E9940160		GA940160	R8.0	16.0	16	19	79
E9940180		GA940180	R9.0	18.0	16	19	79
E9940200		GA940200	R10.0	20.0	20	22	88
E9940220		GA940220	R11.0	22.0	20	22	88
E9940250		GA940250	R12.5	25.0	25	26	102

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.03	h6

◎ : Excellent ○ : Good

ISO Material Description	P										M					K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel					Stainless steel			Grey cast iron		Nodular cast iron	
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 Material Description	N										S							H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron		
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
HRc											15	30	25	38	34			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**  
HSS-PM END MILLS

UNCOATED

**E9936** SERIES

TiAlN based COATED

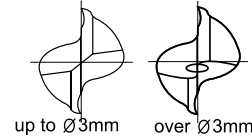
**GA936** SERIES

**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.



P.656-657

Unit : mm

EDP No.	Mill Diameter		Shank Diameter		Length of Cut	Overall Length
	UNCOATED	TiAlN based	e8	h6		
E9936010		GA936010	1.0	6	2.5	47
E9936020		GA936020	2.0	6	4	48
E9936030		GA936030	3.0	6	5	49
E9936040		GA936040	4.0	6	7	51
E9936050		GA936050	5.0	6	8	52
E9936060		GA936060	6.0	6	8	52
E9936070		GA936070	7.0	10	10	60
E9936080		GA936080	8.0	10	11	61
E9936090		GA936090	9.0	10	11	61
E9936100		GA936100	10.0	10	13	63
E9936120		GA936120	12.0	12	16	73
E9936140		GA936140	14.0	12	16	73
E9936160		GA936160	16.0	16	19	79
E9936180		GA936180	18.0	16	19	79
E9936200		GA936200	20.0	20	22	88
E9936220		GA936220	22.0	20	22	88
E9936250		GA936250	25.0	25	26	102

**Tolerances according to DIN 7160 & 7161**

Tolerance range in $\mu\text{m}$					
Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
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 Material Description	P										M					K					
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc		13	25	28	32	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 Material Description	N										S					H					
	Aluminum- wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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											○	○	○								



HSS



**TANK-POWER**  
HSS-PM END MILLS

UNCOATED

**E9942** SERIES

TiAlN based COATED

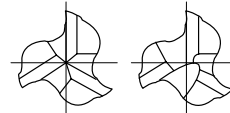
**GA942** SERIES

**HSS-PM, 3 FLUTE STUB LENGTH**

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

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

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



up to Ø1mm over Ø1mm



p.658 ~ 661

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
E9942010	1.0	6	2.5	47
E9942020	2.0	6	4	48
E9942030	3.0	6	5	49
E9942040	4.0	6	7	51
E9942050	5.0	6	8	52
E9942060	6.0	6	8	52
E9942070	7.0	10	10	60
E9942080	8.0	10	11	61
E9942090	9.0	10	11	61
E9942100	10.0	10	13	63
E9942120	12.0	12	16	73
E9942140	14.0	12	16	73
E9942160	16.0	16	19	79
E9942180	18.0	16	19	79
E9942200	20.0	20	22	88
E9942220	22.0	20	22	88
E9942250	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 Material Description	P										M					K					
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc		13	25	28	32	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 Material Description	N										S					H					
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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																					

HSS



UNCOATED

**E9938** SERIES

TiAlN based COATED

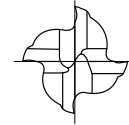
**GA938** SERIES

## 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.



P.662-663

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
E9938010	1.0	6	3	49
E9938020	2.0	6	7	51
E9938030	3.0	6	8	52
E9938040	4.0	6	11	55
E9938050	5.0	6	13	57
E9938060	6.0	6	13	57
E9938070	7.0	10	16	66
E9938080	8.0	10	19	69
E9938090	9.0	10	19	69
E9938100	10.0	10	22	72
E9938120	12.0	12	26	83
E9938140	14.0	12	26	83
E9938160	16.0	16	32	92
E9938180	18.0	16	32	92
E9938200	20.0	20	38	104
E9938220	22.0	20	38	104
E9938250	25.0	25	45	121

▶ Mill Diameter 1mm: Center match end teeth

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ -0.03	h6

◎ : Excellent ○ : Good

ISO Material Description	P										M					K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel					Stainless steel			Grey cast iron		Nodular cast iron	
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 Material Description	N										S							H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron		
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
HRc											15	30	25	38	34			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						○	○	○														

HSS



**TANK-POWER**  
HSS-PM END MILLS

UNCOATED

**E9941** SERIES

TiAlN based COATED

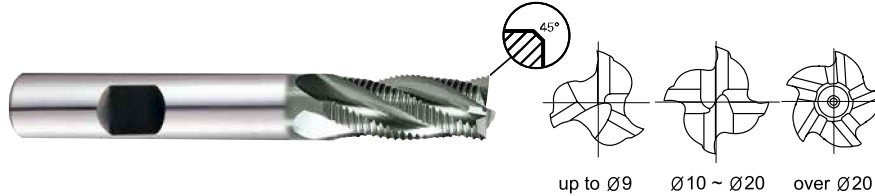
**GA941** SERIES

**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  $\varnothing 20$  : center cut, over  $\varnothing 20$  : non center cut

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

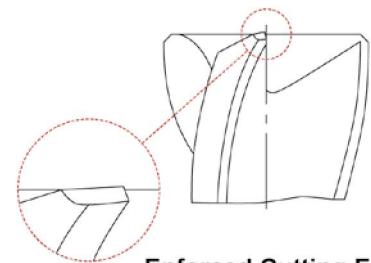


HSS PM
DIN 844
HR
3-5
30°
DIN 1835B
~Ø20
Ø22~
C x 45°
P.664~665

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer
UNCOATED	X-COATING	js12	h6				
E9941060	GA941060	6.0	6	13	57	3	0.18
E9941070	GA941070	7.0	10	16	66	3	0.18
E9941080	GA941080	8.0	10	19	69	3	0.18
E9941090	GA941090	9.0	10	19	69	3	0.18
E9941100	GA941100	10.0	10	22	72	4	0.18
E9941120	GA941120	12.0	12	26	83	4	0.18
E9941140	GA941140	14.0	12	26	83	4	0.25
E9941160	GA941160	16.0	16	32	92	4	0.25
E9941180	GA941180	18.0	16	32	92	4	0.25
E9941200	GA941200	20.0	20	38	104	4	0.25
E9941220	GA941220	22.0	20	38	104	5	0.36
E9941250	GA941250	25.0	25	45	121	5	0.36

**Tolerances according to DIN 7160 & 7161**

		Tolerance range in $\mu\text{m}$					
		Nominal-Diameter in mm					
		from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
js12		$\pm 50$	$\pm 60$	$\pm 75$	$\pm 90$	$\pm 105$	$\pm 125$
h6		0 -6	0 -8	0 -9	0 -11	0 -13	0 -16



**Enforced Cutting Edge**

◎ : Excellent ○ : Good

ISO	P											M					K						
	Non-alloy steel					Low alloy steel						High alloyed steel, and tool steel					Stainless steel			Grey cast iron		Nodular cast iron	
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
VDI 3323																							
HRc	13	25	28	32	36	38	40	42	45	48	50	52	54	56	58	60	62	64	66	68			
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230			
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎			

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



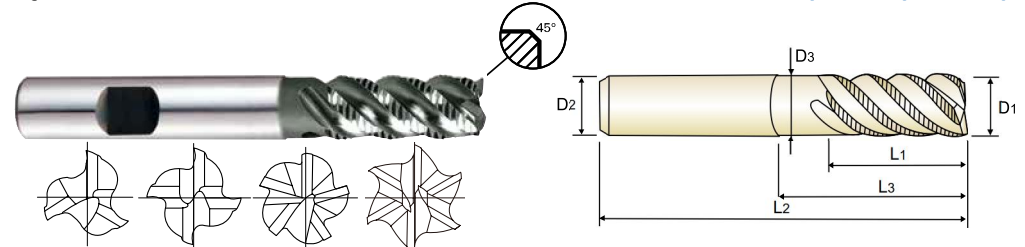
UNCOATED **E9A26** SERIES  
 TiAlN based COATED **GAA26** SERIES

**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.



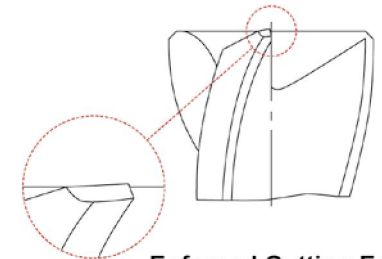
HSS PM
DIN 844
HR
3-6
45°
DIN 1835B
C x 45°
P.666-667

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	D1(js12)	D2(h6)	L1	L3	L2	D3		
E9A26040	GAA26040	4.0	6	11	-	57	-	3	0.1
E9A26050	GAA26050	5.0	6	13	-	57	-	4	0.13
E9A26060	GAA26060	6.0	6	13	-	57	-	4	0.15
E9A26070	GAA26070	7.0	10	16	-	66	-	4	0.15
E9A26080	GAA26080	8.0	10	19	-	69	-	4	0.18
E9A26090	GAA26090	9.0	10	19	-	69	-	4	0.18
E9A26100	GAA26100	10.0	10	22	31	72	9.5	4	0.20
E9A26120	GAA26120	12.0	12	26	37	83	11.5	4	0.20
E9A26140	GAA26140	14.0	12	26	-	83	-	5	0.20
E9A26160	GAA26160	16.0	16	32	44	92	15	5	0.20
E9A26180	GAA26180	18.0	16	32	-	92	-	6	0.20
E9A26200	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 $\mu\text{m}$						
Nominal-Diameter in mm						
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
js12	$\pm 50$	$\pm 60$	$\pm 75$	$\pm 90$	$\pm 105$	$\pm 125$
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16



**Enforced Cutting Edge**

◎ : Excellent ○ : Good

ISO Material Description	P										M				K								
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel				Stainless steel				Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
HRc	13	23	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25					
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230			
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○	◎	◎	◎	◎	◎	◎	◎	◎	◎			
ISO Material Description	N									S						H							
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)				Non Metallic Materials	Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron		
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41		
HRc											15	30	25	38	34			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						○	○	○															

HSS



**TANK-POWER**  
HSS-PM END MILLS

UNCOATED

**E9A34** SERIES

TiAlN based COATED

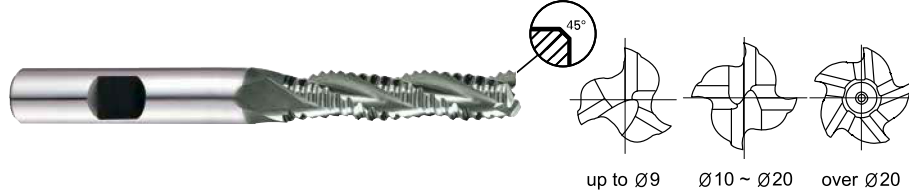
**GAA34** SERIES

**HSS-PM, MULTI FLUTE LONG LENGTH ROUGHING - COARSE**

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

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

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



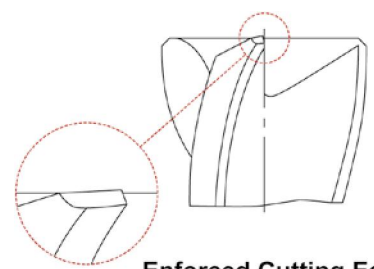
HSS PM
DIN 844
NR
3-5
30°
DIN 1835B
~Ø20
Ø22~
C x 45°
P.664~665

Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer
UNCOATED	X-COATING	js12	h6				
E9A34060	GAA34060	6.0	6	24	68	3	0.25
E9A34070	GAA34070	7.0	10	30	80	3	0.25
E9A34080	GAA34080	8.0	10	38	88	3	0.25
E9A34090	GAA34090	9.0	10	38	88	3	0.36
E9A34100	GAA34100	10.0	10	45	95	4	0.36
E9A34120	GAA34120	12.0	12	53	110	4	0.5
E9A34140	GAA34140	14.0	12	53	110	4	0.55
E9A34160	GAA34160	16.0	16	63	123	4	0.55
E9A34180	GAA34180	18.0	16	63	123	4	0.55
E9A34200	GAA34200	20.0	20	75	141	4	0.55
E9A34220	GAA34220	22.0	20	75	141	5	0.55
E9A34250	GAA34250	25.0	25	90	166	5	0.55

**Tolerances according to DIN 7160 & 7161**

Tolerance range in $\mu\text{m}$						
Nominal-Diameter in mm						
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
js12	$\pm 50$	$\pm 60$	$\pm 75$	$\pm 90$	$\pm 105$	$\pm 125$
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16



**Enforced Cutting Edge**

◎ : Excellent ○ : Good

ISO	P										M				K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel				Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323																					
HRc	13	23	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			
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323																					
HRc	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend						○	○	○													

**TANK-POWER**  
**HSS-PM END MILLS**

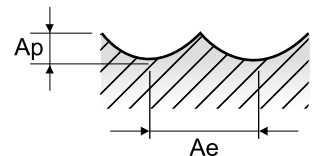
**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**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	85	75
					fz	0.023	0.036	0.055	0.079	0.109	0.115	0.141	0.156	0.163	
					RPM	7427	5968	4509	3382	2706	2255	1691	1353	955	
					FEED	342	430	496	534	590	519	477	422	311	
	2		Vc	55	60	65	65	65	70	65	65	60			
			fz	0.02	0.031	0.046	0.067	0.095	0.097	0.123	0.14	0.142			
			RPM	5836	4775	3448	2586	2069	1857	1293	1035	764			
	3-4		Vc	35	40	45	45	45	45	45	45	35			
			fz	0.016	0.027	0.039	0.056	0.082	0.083	0.101	0.11	0.122			
	5		Vc	20	20	25	20	20	20	20	25	20			
fz		0.014	0.023	0.035	0.048	0.075	0.073	0.091	0.097	0.104					
M	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		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			
	8-9		Vc	20	20	25	20	20	20	20	25	20			
			fz	0.014	0.023	0.035	0.048	0.075	0.073	0.091	0.097	0.104			
	K		10	High alloyed steel, and tool steel	0.5D	0.2D	Vc	55	60	65	65	65	70	65	65
fz		0.02					0.031	0.046	0.067	0.095	0.097	0.123	0.14	0.142	
RPM		5836					4775	3448	2586	2069	1857	1293	1035	764	
FEED		233					296	317	347	393	360	318	290	217	
11.1		Vc	20		20	25	20	20	20	20	25	20			
		fz	0.014		0.023	0.035	0.048	0.075	0.073	0.091	0.097	0.104			
14.1		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			
15-20		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			
15-20	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**  
**HSS-PM END MILLS**

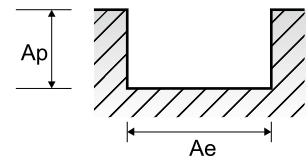
**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**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		
					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		
					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		
					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		
FEED		115			153	236	252	262	274	294	282	264	273	239	222	191	157				
6	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				
			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				
			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				
			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				
			FEED	89	136	172	197	210	241	259	242	210	203	200	169	153	141				
10	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				
			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				
			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			
					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**  
HSS-PM END MILLS

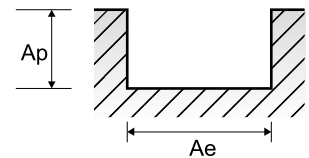
**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**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	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
	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
	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
6	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		
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		
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		
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		
10	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		
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		
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	1.0D	0.5D	Vc	35	35	45	50	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





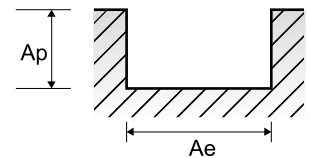
**TANK-POWER**  
HSS-PM END MILLS

**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	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	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	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		





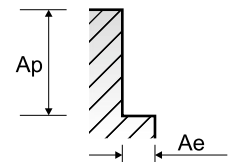
**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**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
	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
	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
6	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		
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		
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		
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		
10	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		
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		
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.1D	1.5D	Vc	55	55	60	65	70	65	65	70	70	70	65	65	65	
					fz	0.007	0.015	0.021	0.026	0.031	0.046	0.063	0.067	0.072	0.077	0.08	0.088	0.084	0.091
ROUTERS					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**  
HSS-PM END MILLS

**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

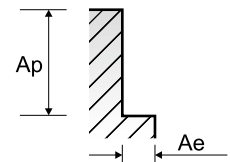
**GA941 , GAA35 , GAA33 , GAA34 SERIES**

**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		Vc	40	50	45	45	45	50	50	50	45	45		
			fz	0.027	0.04	0.053	0.069	0.079	0.087	0.093	0.109	0.102	0.105		
			RPM	2122	1989	1432	1194	1023	995	884	796	651	573		
	3-4		Vc	30	35	35	35	35	35	35	35	30	35		
			fz	0.024	0.038	0.046	0.064	0.076	0.087	0.094	0.108	0.098	0.105		
	5		Vc	25	25	30	30	30	30	30	30	30	30		
fz		0.027	0.04	0.045	0.061	0.071	0.082	0.092	0.102	0.09	0.1				
6	Vc	40	50	45	45	45	50	50	50	45	45				
	fz	0.027	0.04	0.053	0.069	0.079	0.087	0.093	0.109	0.102	0.105				
	RPM	2122	1989	1432	1194	1023	995	884	796	651	573				
7	Vc	30	35	35	35	35	35	35	35	30	35				
	fz	0.024	0.038	0.046	0.064	0.076	0.087	0.094	0.108	0.098	0.105				
	RPM	1592	1393	1114	928	796	696	619	557	434	446				
8-9	Vc	25	25	30	30	30	30	30	30	30	30				
	fz	0.027	0.04	0.045	0.061	0.071	0.082	0.092	0.102	0.09	0.1				
	RPM	1326	995	955	796	682	597	531	477	434	382				
10	Vc	40	50	45	45	45	50	50	50	45	45				
	fz	0.027	0.04	0.053	0.069	0.079	0.087	0.093	0.109	0.102	0.105				
	RPM	2122	1989	1432	1194	1023	995	884	796	651	573				
11.1	Vc	25	25	30	30	30	30	30	30	30	30				
	fz	0.027	0.04	0.045	0.061	0.071	0.082	0.092	0.102	0.09	0.1				
	RPM	1326	995	955	796	682	597	531	477	434	382				
M	14.1	Stainless steel	0.5D	1.5D	Vc	25	30	30	30	30	30	30	30	30	
					fz	0.025	0.039	0.045	0.064	0.074	0.085	0.093	0.107	0.095	0.103
					RPM	1326	1194	955	796	682	597	531	477	434	382
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	40	50	45	45	45	50	50	50	45	
					fz	0.027	0.04	0.053	0.069	0.079	0.087	0.093	0.109	0.102	0.105
					RPM	2122	1989	1432	1194	1023	995	884	796	651	573

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



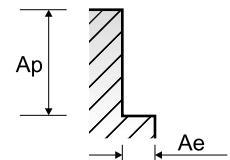


**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**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		Vc	40	50	45	45	45	50	50	50	45	45		
			fz	0.02	0.03	0.053	0.069	0.063	0.069	0.062	0.072	0.085	0.088		
			RPM	2122	1989	1432	1194	1023	995	884	796	651	573		
	3-4		Vc	30	35	35	35	35	35	35	35	30	35		
			fz	0.018	0.029	0.046	0.064	0.061	0.07	0.063	0.072	0.082	0.087		
			RPM	1592	1393	1114	928	796	619	557	434	446			
	5		Vc	25	25	30	30	30	30	30	30	30	30		
fz		0.02	0.03	0.045	0.061	0.057	0.065	0.061	0.068	0.075	0.083				
RPM		1326	995	955	796	682	597	531	477	434	382				
6	Vc	40	50	45	45	45	50	50	50	45	45				
	fz	0.02	0.03	0.053	0.069	0.063	0.069	0.062	0.072	0.085	0.088				
	RPM	2122	1989	1432	1194	1023	995	884	796	651	573				
7	Vc	30	35	35	35	35	35	35	35	30	35				
	fz	0.018	0.029	0.046	0.064	0.061	0.07	0.063	0.072	0.082	0.087				
	RPM	1592	1393	1114	928	796	619	557	434	446					
8-9	Vc	25	25	30	30	30	30	30	30	30	30				
	fz	0.02	0.03	0.045	0.061	0.057	0.065	0.061	0.068	0.075	0.083				
	RPM	1326	995	955	796	682	597	531	477	434	382				
10	Vc	40	50	45	45	45	50	50	50	45	45				
	fz	0.02	0.03	0.053	0.069	0.063	0.069	0.062	0.072	0.085	0.088				
	RPM	2122	1989	1432	1194	1023	995	884	796	651	573				
11.1	Vc	25	25	30	30	30	30	30	30	30	30				
	fz	0.02	0.03	0.045	0.061	0.057	0.065	0.061	0.068	0.075	0.083				
	RPM	1326	995	955	796	682	597	531	477	434	382				
M	14.1	Stainless steel	0.5D	1.5D	Vc	25	30	30	30	30	30	30	30	30	30
					fz	0.019	0.029	0.045	0.064	0.059	0.068	0.062	0.071	0.079	0.085
					RPM	1326	1194	955	796	682	597	531	477	434	382
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	40	50	45	45	45	50	50	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





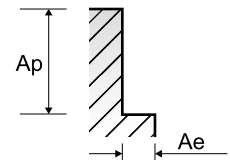
**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E9E43** 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	41	41	41	41	41	
					fz	0.042	0.05	0.067	0.085	0.081	
					RPM	1305	1088	816	653	522	
	FEED		219	218	219	222	211				
	2		0.5D	1.5D	Vc	32	32	32	32	32	
					fz	0.041	0.053	0.068	0.086	0.083	
					RPM	1019	849	637	509	407	
	FEED		167	180	173	175	169				
	3-4		0.5D	1.5D	Vc	23	23	23	23	23	
					fz	0.037	0.05	0.067	0.083	0.082	
					RPM	732	610	458	366	293	
FEED	108	122	123	122	120						
5	0.5D	1.5D	Vc	19	19	19	19	19			
			fz	0.035	0.048	0.064	0.079	0.079			
			RPM	605	504	378	302	242			
FEED	85	97	97	96	96						
6	0.5D	Low alloy steel	1.5D	Vc	32	32	32	32	32		
				fz	0.041	0.053	0.068	0.086	0.083		
				RPM	1019	849	637	509	407		
FEED	167		180	173	175	169					
7	0.5D		1.5D	Vc	23	23	23	23	23		
				fz	0.037	0.05	0.067	0.083	0.082		
				RPM	732	610	458	366	293		
FEED	108		122	123	122	120					
8	0.5D		1.5D	Vc	19	19	19	19	19		
				fz	0.035	0.048	0.064	0.079	0.079		
				RPM	605	504	378	302	242		
FEED	85	97	97	96	96						
9	0.5D	1.5D	Vc	19	19	19	19	19			
			fz	0.035	0.048	0.064	0.079	0.079			
			RPM	605	504	378	302	242			
FEED	64	97	97	119	96						
10	0.5D	High alloyed steel, and tool steel	1.5D	Vc	32	32	32	32	32		
				fz	0.041	0.053	0.068	0.086	0.083		
				RPM	1019	849	637	509	407		
FEED	167		180	173	175	169					
11.1	0.5D		1.5D	Vc	19	19	19	19	19		
				fz	0.035	0.048	0.064	0.079	0.079		
				RPM	605	504	378	302	242		
FEED	85		97	97	96	96					
M	14.1		Stainless steel	0.5D	1.5D	Vc	21	21	21	21	21
						fz	0.038	0.058	0.074	0.095	0.089
						RPM	668	557	418	334	267
		FEED				102	129	124	127	119	
K	15-20	Grey cast iron Nodular cast iron Malleable cast iron	0.5D	1.5D	Vc	32	32	32	32	32	
					fz	0.041	0.053	0.068	0.086	0.083	
					RPM	1019	849	637	509	407	
					FEED	167	180	173	175	169	





Global Cutting Tool Leader **YG-1**



# MILLING



Leading Through Innovation



**HSS**

# **GENERAL HSS END MILLS HSS SCHAFTFRÄSER**

- General Purpose / Coating Available
- Allgemeine Anwendung / Beschichtung verfügbar

**SELECTION GUIDE**



**MILLING TOOLS**

**HSS**

SERIES	E9410	E9720	E3570	E3574
FLUTE	2	Muti Flute	2	4
HELIX ANGLE	≈ 30°	30°	≈ 30°	≈ 30°
CUTTING EDGE SHAPE	SQUARE	SQUARE	SQUARE	SQUARE
SIZE MIN	D3.0	D6.0	D2.5	D2.0
SIZE MAX	D25.0	D30.0	D18.0	D18.0
PAGE	678	679	680	681

CBN  
END MILLS

i-Xmill  
END MILLS

i-SMART  
MODULAR  
END MILLS

X5070  
END MILLS

4G MILL  
END MILLS

X-POWER  
PRO  
END MILLS

TitaNox-  
POWER  
END MILLS

JET-POWER  
END MILLS

V7 PLUS  
END MILLS

ALU-POWER  
HPC  
END MILLS

ALU-  
POWER  
END MILLS

D-POWER  
GRAPHITE  
END MILLS

D-POWER  
CFRP  
END MILLS

ROUTERS

CRX S  
END MILLS

K-2  
END MILLS

ONLY ONE  
COATED PM60  
END MILLS

TANK-  
POWER  
END MILLS

GENERAL  
HSS  
END MILLS

MILLING  
CUTTERS

TECHNICAL  
DATA

**HSS**  
**GENERAL HSS**  
**END MILLS**

General Purpose, Non-coated, Any Coating Available



Please visit  
[globalyg1.com/mat](http://globalyg1.com/mat)  
 for material search

◎ : Excellent ○ : Good

Recommended cutting conditions : P 738

SHORT LENGTH	SHORT LENGTH ROUGHING	SHORT LENGTH	SHORT LENGTH
Uncoated / TiAIN	Uncoated / TiAIN	Uncoated / TiAIN	Uncoated
HSS-PM	HSS-PM	HSS-PM	HSS-PM



ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	HRc	E9410	E9720	E3570	E3574	
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		Ferritic	130						
20	Malleable cast iron	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		Cutting Alloys, PB>1%	110						
	27	Copper and Copper Alloys (Bronze / Brass)	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			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					



**SELECTION GUIDE**



**HSS**

SERIES	E2464	E2509	E2572	E2573	E2516	E2553	E2SET553
FLUTE	2	2	3	3	3	3	3
HELIX ANGLE	42°	42°	≈ 30°	≈ 30°	30°	30°	30°
	SQUARE	SQUARE	SQUARE	SQUARE	SQUARE	SQUARE	SQUARE
SIZE MIN	D1.0	D2.0	D1.5	D1.0	D2.0	D1.0	D2.0
SIZE MAX	D32.0	D20.0	D32.0	D40.0	D40.0	D20.0	D10.0
PAGE	696	698	699	700	702	704	705

**MILLING TOOLS**

**HSS**  
**GENERAL HSS**  
**END MILLS**

General Purpose, Non-coated,  
 Any Coating Available

◎ : Excellent ○ : Good

Recommended cutting conditions : P 738

Please visit  
[globalyg1.com/mat](http://globalyg1.com/mat)  
 for material search



SHORT LENGTH	LONG LENGTH	STUB LENGTH	SHORT LENGTH	LONG LENGTH	SHORT LENGTH THROW AWAY	THROW AWAY SET
Uncoated	Uncoated	Uncoated / TiAlN	Uncoated / TiAlN	Uncoated / TiAlN	Uncoated / TiAlN	Uncoated
HSS Co8	HSS Co8	HSS Co8	HSS Co8	HSS Co8	HSS Co8	HSS Co8



ISO	VDI 3323	Material Description	HB	HRc	E2464	E2509	E2572	E2573	E2516	E2553	E2SET553	
P	1	Non-alloy steel	125		○	○	◎	◎	◎	◎	◎	
	2		190	13	○	○	◎	◎	◎	◎	◎	
	3		250	25			◎	◎	◎	◎	◎	
	4		270	28			◎	◎	◎	◎	◎	
	5		300	32			◎	◎	◎	◎	◎	
	6	Low alloy steel	180	10	○	○	◎	◎	◎	◎	◎	
	7		275	29			◎	◎	◎	◎	◎	
	8		300	32			◎	◎	◎	◎	◎	
	9		350	38			○	○	○	○	○	
	10		High alloyed steel, and tool steel	200	15	○	○	◎	◎	◎	◎	◎
	11			325	35			○	○	○	○	○
M	12	Stainless steel	200	15								
	13		240	23								
	14		180	10								
K	15	Grey cast iron	180	10								
	16		260	26								
	17	Nodular cast iron	160	3								
	18		250	25								
	19	Malleable cast iron	130									
	20		230	21								
N	21	Aluminum-wrought alloy	60		◎	◎	○	○	○	○	○	
	22		100		◎	◎	○	○	○	○	○	
	23		75		◎	◎	○	○	○	○	○	
	24	Aluminum-cast, alloyed	90		◎	◎	○	○	○	○	○	
	25		130		○	○	○	○	○	○	○	
	26		110									
	27	Copper and Copper Alloys (Bronze / Brass)	90									
	28		100									
		29	Non Metallic Materials									
	30											
S	31	Heat Resistant Super Alloys	200	15								
	32		280	30								
	33		250	25								
	34		350	38								
	35		320	34								
	36	Titanium Alloys	400 Rm									
	37		1050 Rm									
H	38	Hardened steel	550	55								
	39		630	60								
	40	Chilled Cast Iron	400	42								
	41	Hardened Cast Iron	550	55								

**SELECTION GUIDE**



**HSS**

**MILLING TOOLS**

SERIES	E2524	E2753	E2762	E2757	E2764	E2765	E2755
FLUTE	3&4	Multi Flute	Multi Flute	3&4	3	3	3
HELIX ANGLE	30°	30°	30°	30°	30°	30°	37°
	SQUARE ROUGHING	SQUARE ROUGHING	SQUARE ROUGHING	BALL NOSE ROUGHING	SQUARE ROUGHING	SQUARE ROUGHING	SQUARE ROUGHING
SIZE MIN	D6.0	D6.0	D6.0	R4.0	D10.0	D10.0	D6.0
SIZE MAX	D20.0	D40.0	D40.0	R12.5	D40.0	D40.0	D30.0
PAGE	719	720	721	722	723	724	725

**HSS**  
**GENERAL HSS**  
**END MILLS**

General Purpose, Non-coated,  
 Any Coating Available

◎ : Excellent ○ : Good

Recommended cutting conditions : P 738

Please visit  
[globalyg1.com/mat](http://globalyg1.com/mat)  
 for material search



STUB LENGTH	SHORT LENGTH	LONG LENGTH	SHORT LENGTH	SHORT LENGTH	LONG LENGTH	SHORT LENGTH
Uncoated / TiAlN	Uncoated / TiAlN	Uncoated / TiAlN	Uncoated / TiAlN	Uncoated / TiAlN	Uncoated / TiAlN	Uncoated
HSS Co8	HSS Co8	HSS Co8	HSS Co8	HSS Co8	HSS Co8	HSS Co8



ISO	VDI 3323	Material Description	HB	HRc	E2524	E2753	E2762	E2757	E2764	E2765	E2755	
P	1	Non-alloy steel	125		◎	◎	◎	◎	◎	◎	◎	
	2		190	13	◎	◎	◎	◎	◎	◎	◎	
	3		250	25	◎	◎	◎	◎	◎	◎	○	
	4		270	28	◎	◎	◎	◎	◎	◎	○	
	5		300	32	◎	◎	◎	◎	◎	◎	○	
	6	Low alloy steel	180	10	◎	◎	◎	◎	◎	◎	◎	
	7		275	29	◎	◎	◎	◎	◎	◎	○	
	8		300	32	◎	◎	◎	◎	◎	◎	○	
	9		350	38	○	○	○	○	○	○	○	
	10		High alloyed steel, and tool steel	200	15	◎	◎	◎	◎	◎	◎	◎
	11			325	35	○	○	○	○	○	○	○
M	12	Stainless steel	200	15								
	13		240	23								
D-POWER GRAPHITE END MILLS	14		180	10								
	15	Grey cast iron	180	10								
16	260		26									
D-POWER CFRP END MILLS	17	Nodular cast iron	160	3								
	18		250	25								
	19	Malleable cast iron	130									
20	230		21									
ROUTERS	21	Aluminum-wrought alloy	60		○	○	○	○	○	○	◎	
	22		100		○	○	○	○	○	○	◎	
	23	Aluminum-cast, alloyed	75		○	○	○	○	○	○	◎	
	24		90		○	○	○	○	○	○	◎	
	25		130		○	○	○	○	○	○	○	
	26	Copper and Copper Alloys (Bronze / Brass)	110									
	27		90									
	28		100									
	29	Non Metallic Materials										
30												
ONLY ONE COATED PM60 END MILLS	31	Heat Resistant Super Alloys	200	15								
	32		280	30								
	33		250	25								
	34		350	38								
	35		320	34								
	36	Titanium Alloys	400 Rm									
37	1050 Rm											
GENERAL HSS END MILLS	38	Hardened steel	550	55								
	39		630	60								
	40	Chilled Cast Iron	400	42								
	41	Hardened Cast Iron	550	55								

HSS



FLAT SHANK **E9410** SERIES

FLAT SHANK **EP410** SERIES

### HSS-PM, 2 FLUTE SHORT LENGTH

- HSS-PM, 2 SCHNEIDEN KURZ
- Fraise HSS-PM, 2 dents, courte
- HSS-PM, 2 TAGLIENTI, SERIE CORTA



P.738

Unit : mm

EDP No.	Mill Diameter		Shank Diameter		Length of Cut	Overall Length
	UNCOATED	TiAIN	e8	h6		
▲ E9410030	▲ EP410030	3.0	6	5	49	
-	▲ EP410040	4.0	6	7	51	
-	▲ EP410050	5.0	6	8	52	
-	▲ EP410060	6.0	6	8	52	
-	▲ EP410080	8.0	10	11	61	
▲ E9410100	▲ EP410100	10.0	10	13	63	
▲ E9410120	-	12.0	12	16	73	
-	▲ EP410140	14.0	12	16	73	
▲ E9410160	▲ EP410160	16.0	16	19	79	
▲ E9410180	-	18.0	16	19	79	
▲ E9410250	-	25.0	25	26	102	

- ▲ : Only available till stock runs out
- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

#### Tolerances according to DIN 7160 & 7161

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
<b>e8</b>	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
<b>h6</b>	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO	P										M			K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc	13	25	28	32	30	10	29	32	38	15	35	15	23	10	10	26	3	25	42	55
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommend	◎	◎	◎	◎	○	◎	◎	○	○	◎	○									

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

HSS



FLAT SHANK

**E3570** SERIES

FLAT SHANK

**ER570** SERIES

### HSS-PM, 2 FLUTE SHORT LENGTH

- HSS-PM, 2 SCHNEIDEN KURZ
- Fraise HSS-PM, 2 dents, courte
- HSS-PM, 2 TAGLIENTI, SERIE CORTA



Unit : mm

EDP No.	Mill Diameter		Shank Diameter		Length of Cut	Overall Length
	UNCOATED	TiAIN	e8	h6		
▲ E3570025	-	-	2.5	6	5	49
-	▲ ER570030	-	3.0	6	5	49
▲ E3570040	-	-	4.0	6	7	51
▲ E3570050	▲ ER570050	-	5.0	6	8	52
▲ E3570060	▲ ER570060	-	6.0	6	8	52
▲ E3570070	-	-	7.0	10	10	60
▲ E3570080	▲ ER570080	-	8.0	10	11	61
▲ E3570090	-	-	9.0	10	11	61
▲ E3570100	-	-	10.0	10	13	63
▲ E3570110	-	-	11.0	12	13	70
▲ E3570120	▲ ER570120	-	12.0	12	16	73
▲ E3570130	-	-	13.0	12	16	73
▲ E3570140	-	-	14.0	12	16	73
▲ E3570150	-	-	15.0	12	16	73
▲ E3570160	▲ ER570160	-	16.0	16	19	79
-	▲ ER570170	-	17.0	16	19	79
-	▲ ER570180	-	18.0	16	19	79

▲ : Only available till stock runs out

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

#### Tolerances according to DIN 7160 & 7161

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO Material Description	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc		13	25	28	32	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 Material Description	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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	◎	◎	◎	◎	◎																

HSS



FLAT SHANK

**E3462** SERIES

**HSS-PM, 3 FLUTE 60° HELIX SHORT LENGTH**

- 🇩🇪 **HSS-PM, 3 SCHNEIDEN 60° RECHTSSPIRALE KURZ**
- 🇫🇷 **Fraise HSS-PM, 3 dents, hélice 60°, courte**
- 🇮🇹 **HSS-PM, 3 TAGLIENTI, ELICA 60°, SERIE CORTA**



1 Tooth over center cut type

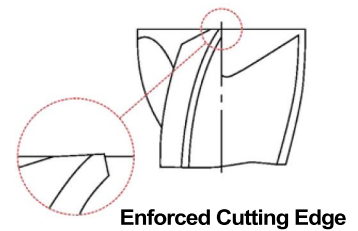
HSS PM
DIN 844
3
60°
DIN 1835B
P.741

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
UNCOATED				
▲ E3462070	7.0	10	16	66
▲ E3462080	8.0	10	19	69
▲ E3462090	9.0	10	19	69
▲ E3462100	10.0	10	22	72
▲ E3462120	12.0	12	26	83
▲ E3462140	14.0	12	26	83
▲ E3462150	15.0	12	26	83
▲ E3462160	16.0	16	32	92
▲ E3462180	18.0	16	32	92
▲ E3462200	20.0	20	38	104

- ▲ : Only available till stock runs out
- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
up to Ø6.5	h6
Ø7.0 ~ Ø10.0	
Ø10.5 ~ Ø18.0	
over Ø18.0	



◎ : Excellent ○ : Good

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

ISO	N					S										H					
	Aluminum-wrought alloy		Aluminum-cast, alloyed		Copper and Copper Alloys (Bronze / Brass)	Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys			Hardened steel	Chilled Cast Iron	Hardened Cast Iron			
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	○	○	○	○	○																

HSS



FLAT SHANK

**E2492** SERIES

FLAT SHANK

**EQ492** SERIES

### HSSCo8, 2 FLUTE LONG LENGTH BALL NOSE

- 🇩🇪 HSSCo8, 2 SCHNEIDEN LANG STIRNRADIUS
- 🇫🇷 Fraise HSSCo8, 2 dents, hémisphérique, longue
- 🇮🇹 2 TAGLIENTI, SEMISFERICA, SERIE LUNGA - HSSCo8



HSS Co8
DIN 1889
2
30°
R ±0.02
DIN 1835B
P.742~743

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
E2492020	EQ492020	R1.0	2.0	6	54
E2492030	EQ492030	R1.5	3.0	6	56
E2492040	EQ492040	R2.0	4.0	6	63
E2492050	EQ492050	R2.5	5.0	6	68
E2492060	EQ492060	R3.0	6.0	6	68
E2492070	EQ492070	R3.5	7.0	10	80
E2492080	EQ492080	R4.0	8.0	10	88
E2492090	EQ492090	R4.5	9.0	10	88
E2492100	EQ492100	R5.0	10.0	10	95
E2492110	EQ492110	R5.5	11.0	12	102
E2492120	EQ492120	R6.0	12.0	12	110
E2492130	EQ492130	R6.5	13.0	12	110
E2492140	EQ492140	R7.0	14.0	12	110
E2492150	EQ492150	R7.5	15.0	12	110
E2492160	EQ492160	R8.0	16.0	16	123
E2492170	EQ492170	R8.5	17.0	16	123
E2492180	EQ492180	R9.0	18.0	16	123
E2492190	EQ492190	R9.5	19.0	16	123
E2492200	EQ492200	R10.0	20.0	20	141
E2492220	EQ492220	R11.0	22.0	20	141
E2492240	EQ492240	R12.0	24.0	25	166
E2492250	EQ492250	R12.5	25.0	25	166
E2492260	EQ492260	R13.0	26.0	25	166
E2492280	EQ492280	R14.0	28.0	25	166
E2492300	EQ492300	R15.0	30.0	25	166

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.03	h6

◎ : Excellent ○ : Good

ISO Material Description	P										M			K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	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 Material Description	N					S					H										
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials			Heat Resistant Super Alloys			Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron			
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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	◎	◎	◎	◎	◎																

HSS



FLAT SHANK

**E2410** SERIES

FLAT SHANK

**EQ410** SERIES

### HSSCo8, 4&6 FLUTE SHORT LENGTH BALL NOSE

- 🇩🇪 HSSCo8, 4&6 SCHNEIDEN KURZ STIRNRADIUS
- 🇫🇷 Fraise HSSCo8, 4&6 dents, hémisphérique, courte
- 🇮🇹 4&6 TAGLIENTI, SEMISFERICA, SERIE CORTA - HSSCo8



HSS Co8
DIN 1889
4&6
30°
R ±0.02
DIN 1835B
P.744~745

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute
▲ E2410060	▲ EQ410060	R3.0	6.0	6	13	4
▲ E2410080	▲ EQ410080	R4.0	8.0	10	19	4
▲ E2410100	▲ EQ410100	R5.0	10.0	10	22	4
▲ E2410120	-	R6.0	12.0	12	26	4
▲ E2410160	▲ EQ410160	R8.0	16.0	16	32	4
▲ E2410200	-	R10.0	20.0	20	38	4
▲ E2410250	-	R12.5	25.0	25	45	6

▲ : Only available till stock runs out

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.03	h6

◎ : Excellent ○ : Good

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

ISO Material Description	N					S							H								
	Aluminum-wrought alloy		Aluminum-cast, alloyed		Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron			
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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	○	○	○	○	○																

HSS



PLAIN SHANK

EL623 SERIES

**HSS-E, 1 FLUTE**

- HSS-E, 1 SCHNEIDEN
- Fraise HSS-E, 1 dent
- 1 TAGLIENTE - HSS-E



Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
UNCOATED	js14	h6		
▲ EL623030	3.0	8	12	60
▲ EL623040	4.0	8	12	60
▲ EL623050	5.0	8	12	60
▲ EL623060	6.0	8	14	60
▲ EL623070	7.0	8	14	60
▲ EL623080	8.0	8	14	80
▲ EL623090	9.0	8	14	80
▲ EL623100	10.0	8	14	80

▲ : Only available till stock runs out

**Tolerances according to DIN 7160 & 7161**

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
js14	±125	±150	±180	±215	±260	±310
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO	P										M				K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel				Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	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			
	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	○	○	○	○	○																



HSS



FLAT SHANK

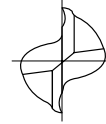
**E2570** SERIES

FLAT SHANK

**EQ570** SERIES

### HSSCo8, 2 FLUTE SHORT LENGTH

- HSSCo8, 2 SCHNEIDEN KURZ
- Fraise HSSCo8, 2 dents, courte
- 2 TAGLIENTI, SERIE CORTA - HSSCo8



P.746~749

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	
					UNCOATED
E2570010	EQ570010	1.0	6	2.5	47
E2570015	EQ570015	1.5	6	3	47
E2570020	EQ570020	2.0	6	4	48
E2570025	EQ570025	2.5	6	5	49
E2570028	EQ570028	2.8	6	5	49
E2570030	EQ570030	3.0	6	5	49
E2570035	EQ570035	3.5	6	6	50
E2570038	EQ570038	3.8	6	7	51
E2570040	EQ570040	4.0	6	7	51
E2570045	EQ570045	4.5	6	7	51
E2570048	EQ570048	4.8	6	8	52
E2570050	EQ570050	5.0	6	8	52
E2570055	EQ570055	5.5	6	8	52
E2570957	EQ570957	5.8	6	8	52
E2570060	EQ570060	6.0	6	8	52
E2570065	EQ570065	6.5	10	10	60
E2570967	EQ570967	6.8	10	10	60
E2570070	EQ570070	7.0	10	10	60
E2570075	EQ570075	7.5	10	10	60
E2570977	EQ570977	7.8	10	11	61
E2570080	EQ570080	8.0	10	11	61
E2570085	EQ570085	8.5	10	11	61
E2570087	EQ570087	8.7	10	11	61
E2570090	EQ570090	9.0	10	11	61

**Tolerances according to DIN 7160 & 7161**

▶ Other shank design on your request.

▶ NEXT PAGE

▶ TiN and TiCN Coatings are available on your request.

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
<b>e8</b>	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
<b>h6</b>	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO Material Description	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc		13	25	28	32	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 Material Description	N										S						H				
	Aluminum- wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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	◎	◎	◎	◎	◎																

HSS



FLAT SHANK

**E2570** SERIES

FLAT SHANK

**EQ570** SERIES

### HSSCo8, 2 FLUTE SHORT LENGTH

- HSSCo8, 2 SCHNEIDEN KURZ
- Fraise HSSCo8, 2 dents, courte
- 2 TAGLIENTI, SERIE CORTA - HSSCo8



P.746~749

Unit : mm

EDP No.	Mill Diameter		Shank Diameter		Length of Cut	Overall Length
	UNCOATED	TiAIN	e8	h6		
E2570197	EQ570197	19.7	20	22	88	
E2570920	EQ570920	20.0	16	22	82	
E2570200	EQ570200	20.0	20	22	88	
E2570210	EQ570210	21.0	20	22	88	
E2570220	EQ570220	22.0	20	22	88	
E2570922	EQ570922	22.0	25	22	98	
E2570240	EQ570240	24.0	25	26	102	
E2570250	EQ570250	25.0	25	26	102	
E2570260	EQ570260	26.0	25	26	102	
E2570270	EQ570270	27.0	25	26	102	
E2570280	EQ570280	28.0	25	26	102	
E2570290	EQ570290	29.0	25	26	102	
E2570300	EQ570300	30.0	25	26	102	
E2570320	EQ570320	32.0	32	32	112	
E2570340	EQ570340	34.0	32	32	112	
E2570350	EQ570350	35.0	32	32	112	
E2570360	EQ570360	36.0	32	32	112	
E2570380	EQ570380	38.0	32	38	118	
E2570938	EQ570938	38.0	40	38	130	
E2570400	EQ570400	40.0	32	38	118	
E2570903	EQ570903	40.0	40	38	130	

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

#### Tolerances according to DIN 7160 & 7161

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
<b>e8</b>	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
<b>h6</b>	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO Material Description	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25				
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
ISO Material Description	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	15	30	25	38	34						15	30	25	38	34						
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend	◎	◎	◎	◎	◎						◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

HSS



FLAT SHANK

**E2571** SERIES

FLAT SHANK

**EQ571** SERIES

### HSSCo8, 2 FLUTE LONG LENGTH

- HSSCo8, 2 SCHNEIDEN LANG**
- Fraise HSSCo8, 2 dents, longue**
- 2 TAGLIENTI, SERIE LUNGA - HSSCo8**



P.746~749

Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length
UNCOATED	TiAIN	e8	h6		
<b>E2571180</b>	<b>EQ571180</b>	<b>18.0</b>	<b>16</b>	<b>32</b>	<b>92</b>
<b>E2571200</b>	<b>EQ571200</b>	<b>20.0</b>	<b>20</b>	<b>38</b>	<b>104</b>
<b>E2571220</b>	<b>EQ571220</b>	<b>22.0</b>	<b>20</b>	<b>38</b>	<b>104</b>
<b>E2571240</b>	<b>EQ571240</b>	<b>24.0</b>	<b>25</b>	<b>45</b>	<b>121</b>
<b>E2571250</b>	<b>EQ571250</b>	<b>25.0</b>	<b>25</b>	<b>45</b>	<b>121</b>
<b>E2571260</b>	<b>EQ571260</b>	<b>26.0</b>	<b>25</b>	<b>45</b>	<b>121</b>
<b>E2571270</b>	<b>EQ571270</b>	<b>27.0</b>	<b>25</b>	<b>45</b>	<b>121</b>
<b>E2571280</b>	<b>EQ571280</b>	<b>28.0</b>	<b>25</b>	<b>45</b>	<b>121</b>
<b>E2571300</b>	<b>EQ571300</b>	<b>30.0</b>	<b>25</b>	<b>45</b>	<b>121</b>
<b>E2571320</b>	<b>EQ571320</b>	<b>32.0</b>	<b>32</b>	<b>53</b>	<b>133</b>
<b>E2571400</b>	<b>EQ571400</b>	<b>40.0</b>	<b>40</b>	<b>63</b>	<b>155</b>

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

#### Tolerances according to DIN 7160 & 7161

Tolerance range in $\mu\text{m}$						
Nominal-Diameter in mm						
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
<b>e8</b>	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
<b>h6</b>	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO Material Description	P											M			K						
	Non-alloy steel					Low alloy steel						High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRC		13	25	28	32	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 Material Description	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRC											15	30	25	38	34			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	○	○	○	○	○																

HSS



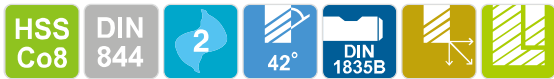
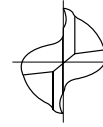
FLAT SHANK

**E2464** SERIES

**HSSCo8, 2 FLUTE 42° HELIX SHORT LENGTH for ALUMINIUM**

- 🇩🇪 HSSCo8, 2 SCHNEIDEN 42° RECHTSSPIRALE KURZ für ALUMINIUM
- 🇫🇷 Fraise HSSCo8, 2 dents, hélice 42°, pour aluminium, courte
- 🇮🇹 2 TAGLIENTI, ELICA 42°, SERIE CORTA - HSSCo8

for ALUMINIUM  
für ALUMINIUM



P.748~749

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
UNCOATED	e8	h6		
E2464010	1.0	6	3	49
E2464015	1.5	6	5	49
E2464020	2.0	6	7	51
E2464025	2.5	6	8	52
E2464030	3.0	6	8	52
E2464035	3.5	6	10	54
E2464040	4.0	6	11	55
E2464045	4.5	6	11	55
E2464050	5.0	6	13	57
E2464055	5.5	6	13	57
E2464060	6.0	6	13	57
E2464065	6.5	10	16	66
E2464070	7.0	10	16	66
E2464075	7.5	10	16	66
E2464080	8.0	10	19	69
E2464085	8.5	10	19	69
E2464090	9.0	10	19	69
E2464100	10.0	10	22	72
E2464110	11.0	12	22	79
E2464120	12.0	12	26	83
E2464130	13.0	12	26	83
E2464140	14.0	12	26	83
E2464150	15.0	12	26	83
E2464160	16.0	16	32	92

**Tolerances according to DIN 7160 & 7161**

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.
- ▶ NEXT PAGE

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
<b>e8</b>	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
<b>h6</b>	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO Material Description	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc		13	23	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 Material Description	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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	◎	◎	◎	◎	○																

HSS



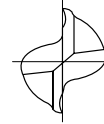
FLAT SHANK

**E2509** SERIES

### HSSCo8, 2 FLUTE 42° HELIX LONG LENGTH for ALUMINUM

- 🇩🇪 HSSCo8, 2 SCHNEIDEN 42° RECHTSSPIRALE KURZ für ALUMINIUM
- 🇫🇷 Fraise HSSCo8, 2 dents, hélice 42°, pour aluminium, longue
- 🇮🇹 2 TAGLIENTI, ELICA 42°, SERIE LUNGA - HSSCo8

for ALUMINUM  
für ALUMINIUM



P.748~749

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
UNCOATED	e8	h6		
E2509020	2.0	6	10	54
E2509030	3.0	6	12	56
E2509040	4.0	6	19	63
E2509050	5.0	6	24	68
E2509060	6.0	6	24	68
E2509070	7.0	10	30	80
E2509080	8.0	10	38	88
E2509090	9.0	10	38	88
E2509100	10.0	10	45	95
E2509110	11.0	12	45	102
E2509120	12.0	12	53	110
E2509130	13.0	12	53	110
E2509140	14.0	12	53	110
E2509150	15.0	12	53	110
E2509160	16.0	16	63	123
E2509180	18.0	16	63	123
E2509200	20.0	20	75	141

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

#### Tolerances according to DIN 7160 & 7161

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron	
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323																					
HRc																					
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	○	○				○				○											
ISO	N					S					H										
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys			Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron			
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323																					
HRc																					
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend	◎	◎	◎	◎	○																

HSS



FLAT SHANK

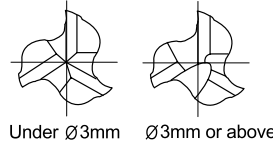
**E2573** SERIES

FLAT SHANK

**EQ573** SERIES

### HSSCo8, 3 FLUTE SHORT LENGTH

- HSSCo8, 3 SCHNEIDEN KURZ
- Fraise HSSCo8, 3 dents, courte
- 3 TAGLIENTI, SERIE CORTA - HSSCo8



HSS Co8
DIN 844
3
30°
DIN 1835B
P.750~757

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	
					UNCOATED
E2573010	EQ573010	1.0	6	3	47
E2573015	EQ573015	1.5	6	7	51
E2573020	EQ573020	2.0	6	7	51
E2573025	EQ573025	2.5	6	8	52
E2573030	EQ573030	3.0	6	8	52
E2573035	EQ573035	3.5	6	10	54
E2573040	EQ573040	4.0	6	11	55
E2573045	EQ573045	4.5	6	11	55
E2573050	EQ573050	5.0	6	13	57
E2573055	EQ573055	5.5	6	13	57
E2573060	EQ573060	6.0	6	13	57
E2573065	EQ573065	6.5	10	16	66
E2573070	EQ573070	7.0	10	16	66
E2573075	EQ573075	7.5	10	16	66
E2573080	EQ573080	8.0	10	19	69
E2573085	EQ573085	8.5	10	19	69
E2573090	EQ573090	9.0	10	19	69
E2573095	EQ573095	9.5	10	19	69
E2573100	EQ573100	10.0	10	22	72
E2573120	EQ573120	12.0	12	26	83
E2573140	EQ573140	14.0	12	26	83
E2573150	EQ573150	15.0	12	26	83
E2573160	EQ573160	16.0	16	32	92
E2573180	EQ573180	18.0	16	32	92

#### Tolerances according to DIN 7160 & 7161

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.
- ▶ NEXT PAGE

	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
<b>e8</b>	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
<b>h6</b>	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO Material Description	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc		13	25	28	32	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 Material Description	N										S					H					
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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	◎	◎	◎	◎	◎																

HSS



FLAT SHANK

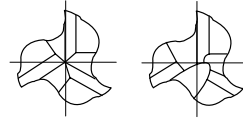
**E2516** SERIES

FLAT SHANK

**EQ516** SERIES

### HSSCo8, 3 FLUTE LONG LENGTH

- HSSCo8, 3 SCHNEIDEN LANG
- Fraise HSSCo8, 3 dents, longue
- 3 TAGLIENTI, SERIE LUNGA - HSSCo8



Up to Ø2.5mm Over Ø2.5mm



P.750~757

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	
					UNCOATED
E2516020	EQ516020	2.0	6	10	54
E2516025	EQ516025	2.5	6	12	56
E2516030	EQ516030	3.0	6	12	56
E2516035	EQ516035	3.5	6	15	59
E2516040	EQ516040	4.0	6	19	63
E2516045	EQ516045	4.5	6	19	63
E2516050	EQ516050	5.0	6	24	68
E2516055	EQ516055	5.5	6	24	68
E2516060	EQ516060	6.0	6	24	68
E2516070	EQ516070	7.0	10	30	80
E2516075	EQ516075	7.5	10	30	80
E2516080	EQ516080	8.0	10	38	88
E2516090	EQ516090	9.0	10	38	88
E2516100	EQ516100	10.0	10	45	95
E2516110	EQ516110	11.0	12	45	102
E2516120	EQ516120	12.0	12	53	110
E2516130	EQ516130	13.0	12	53	110
E2516140	EQ516140	14.0	12	53	110
E2516150	EQ516150	15.0	12	53	110
E2516160	EQ516160	16.0	16	63	123
E2516170	EQ516170	17.0	16	63	123
E2516180	EQ516180	18.0	16	63	123
E2516190	EQ516190	19.0	16	63	123
E2516901	EQ516901	20.0	16	75	135

#### Tolerances according to DIN 7160 & 7161

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.
- ▶ NEXT PAGE

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
<b>e8</b>	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
<b>h6</b>	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323																					
HRc	13	25	28	32	36	10	29	32	38	15	35	15	23	10	10	26	3	25	19	21	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
ISO	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323																					
HRc	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

HSS



FLAT SHANK

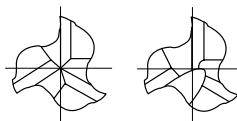
**E2553** SERIES

FLAT SHANK

**EQ553** SERIES

### HSSCo8, 3 FLUTE SHORT LENGTH THROW AWAY

- HSSCo8, 3 SCHNEIDEN KURZ EINWEGFRÄSER**
- Fraise HSSCo8, 3 dents à jeter, courte**
- 3 TAGLIENTI, SERIE CORTA NON RIAFFILABILE - HSSCo8**



Up to Ø10mm Over Ø10mm



P.750~757

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	
					UNCOATED
E2553010	EQ553010	1.0	6	2	34
E2553013	EQ553013	1.3	6	3	34
E2553015	EQ553015	1.5	6	3	34
E2553018	EQ553018	1.8	6	3	34
E2553020	EQ553020	2.0	6	4	35
E2553023	EQ553023	2.3	6	4	35
E2553025	EQ553025	2.5	6	5	36
E2553028	EQ553028	2.8	6	5	36
E2553030	EQ553030	3.0	6	5	36
E2553033	EQ553033	3.3	6	6	37
E2553035	EQ553035	3.5	6	6	37
E2553038	EQ553038	3.8	6	7	38
E2553040	EQ553040	4.0	6	7	38
E2553043	EQ553043	4.3	6	7	38
E2553045	EQ553045	4.5	6	7	38
E2553048	EQ553048	4.8	6	8	39
E2553050	EQ553050	5.0	6	8	39
E2553053	EQ553053	5.3	6	8	39
E2553055	EQ553055	5.5	6	8	39
E2553957	EQ553957	5.8	6	8	39
E2553060	EQ553060	6.0	6	8	39
E2553065	EQ553065	6.5	8	10	42
E2553070	EQ553070	7.0	8	10	42
E2553075	EQ553075	7.5	8	10	42

► TiN and TiCN Coatings are available on your request.

► NEXT PAGE

#### Tolerances according to DIN 7160 & 7161

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
<b>e8</b>	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89
<b>h6</b>	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO	P											M			K						
	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron			
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
ISO	N					S										H					
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323	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	◎	◎	◎	◎	◎																



HSS



FLAT SHANK

**E2554** SERIES

FLAT SHANK

**EQ554** SERIES

### HSSCo8, 3 FLUTE LONG LENGTH THROW AWAY

- HSSCo8, 3 SCHNEIDEN LANG EINWEGFRÄSER
- Fraise HSSCo8, 3 dents à jeter, longue
- 3 TAGLIENTI, SERIE LUNGA, NON RIAFFILABILE - HSSCo8



P.750~757

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	
					UNCOATED
E2554015	EQ554015	1.5	6	4	35
E2554020	EQ554020	2.0	6	7	38
E2554025	EQ554025	2.5	6	8	39
E2554030	EQ554030	3.0	6	8	39
E2554035	EQ554035	3.5	6	10	41
E2554040	EQ554040	4.0	6	11	42
E2554045	EQ554045	4.5	6	11	42
E2554050	EQ554050	5.0	6	13	44
E2554055	EQ554055	5.5	6	13	44
E2554060	EQ554060	6.0	6	13	44
E2554065	EQ554065	6.5	8	16	48
E2554070	EQ554070	7.0	8	16	48
E2554075	EQ554075	7.5	8	16	48
E2554080	EQ554080	8.0	8	19	51
E2554085	EQ554085	8.5	10	19	56
E2554090	EQ554090	9.0	10	19	56
E2554095	EQ554095	9.5	10	19	56
E2554100	EQ554100	10.0	10	22	59

► TiN and TiCN Coatings are available on your request.

#### Tolerances according to DIN 7160 & 7161

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
<b>e8</b>	-14	-20	-25	-32	-40	-50
	-28	-38	-47	-59	-73	-89
<b>h6</b>	0	0	0	0	0	0
	-6	-8	-9	-11	-13	-16

◎ : Excellent ○ : Good

ISO	P											M			K						
	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron			
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323																					
HRc																					
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
ISO	N										S							H			
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323																					
HRc																					
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend	○	○	○	○	○																

HSS



FLAT SHANK

**E2552** SERIES

FLAT SHANK

**EQ552** SERIES

### HSSCo8, 3 FLUTE LONG LENGTH THROW AWAY

- 🇩🇪 HSSCo8, 3 SCHNEIDEN LANG EINWEGFRÄSER
- 🇫🇷 Fraise HSSCo8, 3 dents à jeter, longue
- 🇮🇹 3 TAGLIENTI, SERIE CORTA NON RIAFFILABILE - HSSCo8



HSS Co8
YG STD
3
30°
FLAT
▶
▶
P.750~757

Unit : mm

	EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	UNCOATED	TiAIN	e8			
▲ E2552015	▲ EQ552015		1.5	6	4	28
▲ E2552020	-		2.0	6	4.5	29
▲ E2552025	-		2.5	6	6.5	32
▲ E2552030	-		3.0	6	7.5	34
▲ E2552035	▲ EQ552035		3.5	6	8.5	36.5
▲ E2552040	▲ EQ552040		4.0	6	9.5	39
▲ E2552045	▲ EQ552045		4.5	6	11	42
▲ E2552050	▲ EQ552050		5.0	6	12.5	44.5
▲ E2552055	▲ EQ552055		5.5	6	14.5	46
▲ E2552060	▲ EQ552060		6.0	6	16	44.5
▲ E2552080	▲ EQ552080		8.0	10	19	55.5
▲ E2552090	▲ EQ552090		9.0	10	22.5	61
▲ E2552100	▲ EQ552100		10.0	10	22.5	61

- ▲ : Only available till stock runs out
- ▶ TiN and TiCN Coatings are available on your request.

#### Tolerances according to DIN 7160 & 7161

	Tolerance range in $\mu\text{m}$						Shank Dia. Tolerance	
	Nominal-Diameter in mm						up to $\varnothing 6$	over $\varnothing 6$
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50	- 0.018 - 0.025	h6
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89		
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16		

◎ : Excellent ○ : Good

ISO	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323																					
HRc	13	25	28	32	35	38	42	45	48	52	55	58	60	62	64	66	68	70	72	74	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○										
ISO	N					S										H					
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel		Chilled Cast Iron	Hardened Cast Iron
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323																					
HRc	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend	○	○	○	○	○																

HSS



FLAT SHANK

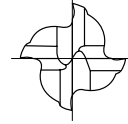
**E2595** SERIES

FLAT SHANK

**EQ595** SERIES

### HSSCo8, 4 FLUTE SHORT LENGTH - CENTER CUTTING

- 🇩🇪 HSSCo8, 4&6 SCHNEIDEN KURZ
- 🇫🇷 Fraise HSSCo8, 4&6 dents, coupe au centre, courte
- 🇮🇹 4 - 6 TAGLIENTI, SERIE CORTA, TAGLIENTE AL CENTRO - HSSCo8



P.772~775

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	
					UNCOATED
E2595020	EQ595020	2.0	6	7	51
E2595030	EQ595030	3.0	6	8	52
E2595040	EQ595040	4.0	6	11	55
E2595050	EQ595050	5.0	6	13	57
E2595060	EQ595060	6.0	6	13	57
E2595070	EQ595070	7.0	10	16	66
E2595080	EQ595080	8.0	10	19	69
E2595090	EQ595090	9.0	10	19	69
E2595100	EQ595100	10.0	10	22	72
E2595110	EQ595110	11.0	12	22	79
E2595120	EQ595120	12.0	12	26	83
E2595130	EQ595130	13.0	12	26	83
E2595140	EQ595140	14.0	12	26	83
E2595150	EQ595150	15.0	12	26	83
E2595160	EQ595160	16.0	16	32	92
E2595170	EQ595170	17.0	16	32	92
E2595180	EQ595180	18.0	16	32	92
E2595190	EQ595190	19.0	16	32	92
E2595200	EQ595200	20.0	16	38	98
E2595220	EQ595220	22.0	20	38	104
E2595250	EQ595250	25.0	25	45	121

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ + 0.04	h6

◎ : Excellent ○ : Good

ISO Material Description	P											M			K						
	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron		
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc		13	25	28	32	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 Material Description	N										S							H			
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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	○	○	○	○	○																



FLAT SHANK **E2576, EQ576** SERIES

FLAT SHANK **E2577, EQ577** SERIES

### HSSCo8, 4&6 FLUTE LONG LENGTH

- HSSCo8, 4&6 SCHNEIDEN LANG
- Fraise HSSCo8, 4&6 dents, longue
- HSSCo8, 4&6 TAGLIENTI, SERIE LUNGA



Under Ø3mm : Center cut type



P.758~761

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	
						UNCOATED
-	▲ EQ576020	2.0	6	10	54	4
▲ E2576030	-	3.0	6	12	56	4
▲ E2576040	-	4.0	6	19	63	4
▲ E2576045	-	4.5	6	19	63	4
▲ E2576050	▲ EQ576050	5.0	6	24	68	4
▲ E2576060	-	6.0	6	24	68	4
▲ E2576070	-	7.0	10	30	80	4
▲ E2576080	-	8.0	10	38	88	4
▲ E2576090	-	9.0	10	38	88	4
▲ E2576100	▲ EQ576100	10.0	10	45	95	4
▲ E2576110	-	11.0	12	45	102	4
▲ E2576120	-	12.0	12	53	110	4
▲ E2576130	-	13.0	12	53	110	4
▲ E2576140	-	14.0	12	53	110	4
▲ E2576160	-	16.0	16	63	123	4
▲ E2576180	▲ EQ576180	18.0	16	63	123	4
▲ E2576902	-	20.0	16	75	135	4
▲ E2576200	-	20.0	20	75	141	4
▲ E2577220	-	22.0	20	75	141	6
▲ E2577240	-	24.0	25	90	166	6
▲ E2577250	▲ EQ577250	25.0	25	90	166	6
▲ E2577320	-	32.0	32	106	186	6
▲ E2577400	▲ EQ577400	40.0	40	125	217	6

▲ : Only available till stock runs out

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
up to Ø6	0 ~ + 0.04
over Ø6	0 ~ + 0.05

h6

◎ : Excellent ○ : Good

ISO Material Description	P											M			K					
	Non-alloy steel					Low alloy steel						High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	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 Material Description	N					S					H										
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials			Heat Resistant Super Alloys			Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron			
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34	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	○	○	○	○	○																

HSS



FLAT SHANK **E2598** SERIES

FLAT SHANK **EQ598** SERIES

### HSSCo8, 6 FLUTE LONG LENGTH - CENTER CUTTING

- HSSCo8, 4&6 SCHNEIDEN LANG**
- Fraise HSSCo8, 4&6 dents, coupe au centre, longue**
- 4&6 TAGLIENTI, SERIE LUNGA, TAGLIENTE AL CENTRO - HSSCo8**



P.758~761

Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length
UNCOATED	TiAIN				
E2598220	EQ598220	22.0	20	75	141
E2598240	EQ598240	24.0	25	90	166
E2598250	EQ598250	25.0	25	90	166
E2598260	EQ598260	26.0	25	90	166
E2598280	EQ598280	28.0	25	90	166
E2598300	EQ598300	30.0	25	90	166
E2598320	EQ598320	32.0	32	106	186
E2598360	EQ598360	36.0	32	106	186
E2598400	EQ598400	40.0	40	125	217

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

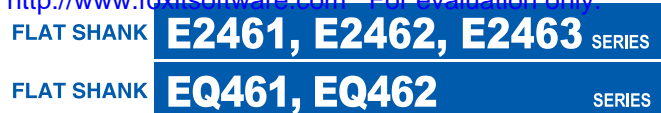
Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
0 ~ + 0.05	h6

◎ : Excellent ○ : Good

ISO Material Description	P										M			K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc	13	25	28	32	300	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 Material Description	N					S										H					
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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	○	○	○	○	○																



### HSSCo8, MULTI FLUTE 50° HELIX SHORT LENGTH

- 🇩🇪 HSSCo8, MULTI SCHNEIDEN 50° RECHTSSPIRALE KURZ
- 🇫🇷 Fraise HSSCo8, multi-dents, hélice 50°, courte
- 🇮🇹 MULTI TAGLIENTE, ELICA 50°, SERIE CORTA - HSSCo8



P.762-763

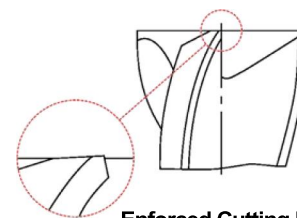
Unit : mm

	EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute
	UNCOATED	TiAIN					
▲ E2461020	-		2.0	6	7	51	2
▲ E2461030	▲ EQ461030		3.0	6	8	52	2
▲ E2461040	-		4.0	6	11	55	2
▲ E2461050	-		5.0	6	13	57	2
▲ E2462060	-		6.0	6	13	57	3
▲ E2462070	-		7.0	10	16	66	3
▲ E2462080	▲ EQ462080		8.0	10	19	69	3
▲ E2462090	-		9.0	10	19	69	3
▲ E2462100	-		10.0	10	22	72	3
▲ E2462110	▲ EQ462110		11.0	12	22	79	3
▲ E2462120	▲ EQ462120		12.0	12	26	83	3
▲ E2462130	-		13.0	12	26	83	3
▲ E2462140	▲ EQ462140		14.0	12	26	83	3
▲ E2462150	▲ EQ462150		15.0	12	26	83	3
▲ E2462160	-		16.0	16	32	92	3
▲ E2462180	-		18.0	16	32	92	3
▲ E2462200	-		20.0	20	38	104	3
▲ E2462230	-		23.0	20	38	104	3
▲ E2463220	-		22.0	25	45	121	4
▲ E2463250	-		25.0	25	45	121	4
▲ E2463300	-		30.0	25	45	121	4

▲ : Only available till stock runs out

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
up to Ø3.0	0 ~ + 0,04
Ø4.0 ~ Ø6.0	0 ~ + 0,048
Ø7.0 ~ Ø10.0	0 ~ + 0,058
Ø10.5 ~ Ø18.0	0 ~ + 0,07
over Ø18.0	0 ~ + 0,084



Enforced Cutting Edge

◎ : Excellent ○ : Good

ISO Material Description	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc		13	25	28	32	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 Material Description	N										S							H			
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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											◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

HSS



FLAT SHANK

**E2606** SERIES

FLAT SHANK

**EQ606** SERIES

**HSSCo8, 3&4 FLUTE SHORT LENGTH ROUGHING BALL NOSE - FINE**

- 🇩🇪 **HSSCo8, 3&4 SCHNEIDEN KURZ SCHRUPPFÄRER STIRNRADIUS - FEIN**
- 🇫🇷 **Fraise HSSCo8, 3&4 dents, ébauche, hémisphérique, pas fin, courte**
- 🇮🇹 **3&4 TAGLIENTI, SEMISFERICA, PER SGROSSATURA, SERIE CORTA, B. F. - HSSCo8**



P.768~769

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute
▲ E2606060	▲ EQ606060	R3.0	6.0	6	13	3
▲ E2606080	▲ EQ606080	R4.0	8.0	10	19	3
▲ E2606100	-	R5.0	10.0	10	22	3
▲ E2606120	-	R6.0	12.0	12	26	4
▲ E2606160	▲ EQ606160	R8.0	16.0	16	32	4
▲ E2606200	-	R10.0	20.0	20	38	4
▲ E2606250	▲ EQ606250	R12.5	25.0	25	45	4
▲ E2606320	▲ EQ606320	R16.0	32.0	32	53	4

▲ : Only available till stock runs out

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

**Tolerances according to DIN 7160 & 7161**

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	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						
	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				
	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	○	○	○	○	○																

HSS

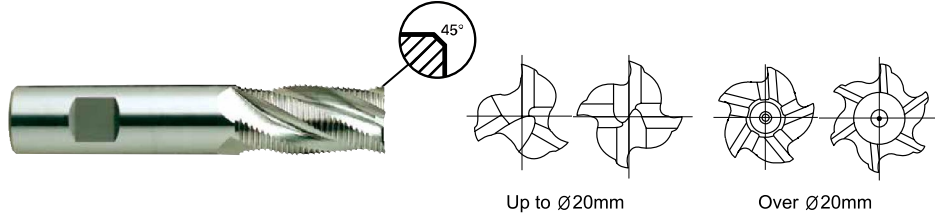


FLAT SHANK **E2753** SERIES

FLAT SHANK **EQ753** SERIES

### HSSCo8, MULTI FLUTE SHORT LENGTH ROUGHING - FINE

- 🇩🇪 HSSCo8, MULTI SCHNEIDEN KURZ SCHRUPPFRÄSER - FEIN
- 🇫🇷 Fraise HSSCo8, multi-dents ébauche, pas fin, courte
- 🇮🇹 MULTI TAGLIENTE, PER SGROSSATURA, SERIE CORTA, BOMBATO FINE - HSSCo8



HSS Co8
DIN 844
HR
3-6
30°
DIN 1835B
~Ø20
Ø25~
C x 45°
P.764~767

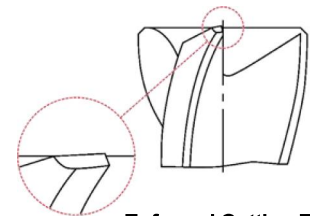
Unit : mm

	EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer
	UNCOATED	TiAIN	js12	h6				
	E2753060	EQ753060	6.0	6	13	57	3	0.18
	E2753070	EQ753070	7.0	10	16	66	3	0.18
	E2753080	EQ753080	8.0	10	19	69	3	0.18
	E2753090	EQ753090	9.0	10	19	69	3	0.18
	E2753100	EQ753100	10.0	10	22	72	4	0.18
	E2753110	EQ753110	11.0	12	22	79	4	0.18
	E2753120	EQ753120	12.0	12	26	83	4	0.18
	E2753130	EQ753130	13.0	12	26	83	4	0.18
	E2753140	EQ753140	14.0	12	26	83	4	0.25
	E2753150	EQ753150	15.0	12	26	83	4	0.25
	E2753160	EQ753160	16.0	16	32	92	4	0.25
	E2753180	EQ753180	18.0	16	32	92	4	0.25
	E2753200	EQ753200	20.0	20	38	104	4	0.25
	E2753250	EQ753250	25.0	25	45	121	5	0.36
	E2753280	EQ753280	28.0	25	45	121	6	0.36
	E2753300	EQ753300	30.0	25	45	121	6	0.36
	E2753320	EQ753320	32.0	32	53	133	6	0.51
	E2753350	EQ753350	35.0	32	53	133	6	0.51
	E2753400	EQ753400	40.0	32	63	155	6	0.56

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

#### Tolerances according to DIN 7160 & 7161

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
js12	±50	±60	±75	±90	±105	±125
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16



Enforced Cutting Edge

◎ : Excellent ○ : Good

ISO Material Description	P											M			K							
	Non-alloy steel					Low alloy steel						High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
HRc		13	25	28	32	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 Material Description	N										S							H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron		
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
HRc											15	30	25	38	34			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	○	○	○	○	○																	



HSS



FLAT SHANK **E2757** SERIES

FLAT SHANK **EQ757** SERIES

### HSSCo8, 3&4 FLUTE SHORT LENGTH ROUGHING BALL NOSE - COARSE

- 🇩🇪 HSSCo8, 3&4 SCHNEIDEN KURZ SCHRUPPFÄSER STIRNRADIUS - GROB
- 🇫🇷 Fraise HSSCo8, 3&4 dents, ébauche, hémisphérique, pas grossier, courte
- 🇮🇹 3&4 TAGLIENTI, SEMISFERICA, PER SGROSSATURA, SERIE CORTA, B. F. - HSSCo8



HSS Co8
DIN 1889
NR
3&4
30°
R ±0.02
DIN 1835B
P.768-769

Unit : mm

EDP No.	Radius of Ball Nose		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute
	UNCOATED	TiAIN					
▲ E2757080	▲ EQ757080	R4.0	8.0	10	19	69	3
▲ E2757100	-	R5.0	10.0	10	22	72	3
▲ E2757120	-	R6.0	12.0	12	26	83	4
▲ E2757160	▲ EQ757160	R8.0	16.0	16	32	92	4
▲ E2757200	-	R10.0	20.0	20	38	104	4
	▲ EQ757250	R12.5	25.0	25	45	121	4

- ▲ : Only available till stock runs out
- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

#### 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

◎ : Excellent ○ : Good

ISO	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron	
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323																					
HRc	13	25	28	32	30	29	32	38	15	35	15	23	10	10	26	3	25				
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○										
ISO	N					S					H										
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323																					
HRc	60	100	75	90	130	110	90	100			15	30	25	38	34	400 Rm	1050 Rm	550	630	400	550
HB											200	280	250	350	320						
Recommend	○	○	○	○	○																

HSS



FLAT SHANK **E2765** SERIES

FLAT SHANK **EQ765** SERIES

### HSSCo8, 3 FLUTE LONG LENGTH ROUGHING - COARSE

- 🇩🇪 HSSCo8, 3 SCHNEIDEN LANG SCHRUPPFRÄSER - GROB
- 🇫🇷 Fraise HSSCo8, 3 dents, ébauche, pas grossier, longue
- 🇮🇹 3 TAGLIENTI, PER SGROSSATURA, SERIE LUNGA, BOMBATO GROSSO - HSSCo8

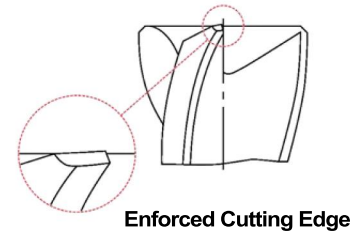


HSS Co8
DIN 844
NR
3
30°
DIN 1835B
C x 45°
P.764~767

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	Chamfer	
						UNCOATED
▲ E2765100	▲ EQ765100	10.0	10	45	95	0.34
▲ E2765120	▲ EQ765120	12.0	12	53	110	0.50
▲ E2765140	-	14.0	12	53	110	0.55
▲ E2765160	▲ EQ765160	16.0	16	63	123	0.55
▲ E2765180	▲ EQ765180	18.0	16	63	123	0.55
▲ E2765200	▲ EQ765200	20.0	20	75	141	0.55
-	▲ EQ765250	25.0	25	90	166	0.55
▲ E2765280	-	28.0	25	90	166	0.70
▲ E2765300	▲ EQ765300	30.0	25	90	166	0.70
-	▲ EQ765360	36.0	32	106	186	0.70
▲ E2765400	-	40.0	32	125	217	0.88

- ▲ : Only available till stock runs out
- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.



#### Tolerances according to DIN 7160 & 7161

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	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						
	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron			
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	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										
	Aluminum-wrought alloy		Aluminum-cast, alloyed		Copper and Copper Alloys (Bronze / Brass)		Non Metallic Materials			Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron		
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	60	100	75	90	130	110	90	100			15	30	25	38	34			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	○	○	○	○	○																

HSS



FLAT SHANK

**E2756** SERIES

**HSSCo8, 3 FLUTE 37° HELIX LONG LENGTH ROUGHING for ALUMINIUM**

**HSSCo8, 3 SCHNEIDEN 37° RECHTSSPIRALE LANG SCHRUPPFRÄSER für ALUMINIUM**  
**Fraise HSSCo8, 3 dents, ébauche pour aluminium, hélice 37°, longue**  
**3 TAGLIENTI, ELICA 37°, PER SGROSSATURA, SERIE LUNGA, B.G. - HSSCo8**

for ALUMINIUM  
für ALUMINIUM



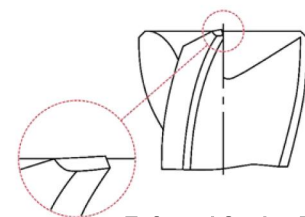
P.776~777

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	Chamfer
UNCOATED	js12	h6			
▲ E2756100	10.0	10	45	95	0.60
▲ E2756120	12.0	12	53	110	0.74
▲ E2756140	14.0	12	53	110	0.76
▲ E2756160	16.0	16	63	123	0.94
▲ E2756180	18.0	16	63	123	0.76
▲ E2756200	20.0	20	75	141	0.94
▲ E2756220	22.0	20	75	141	0.94
▲ E2756250	25.0	25	90	166	0.94
▲ E2756300	30.0	25	90	166	1.23

▲ : Only available till stock runs out

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.



Enforced Cutting Edge

**Tolerances according to DIN 7160 & 7161**

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	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 Material Description	P										M				K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel				Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	23	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 Material Description	N										S							H			
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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	◎	◎	◎	◎	○																

HSS

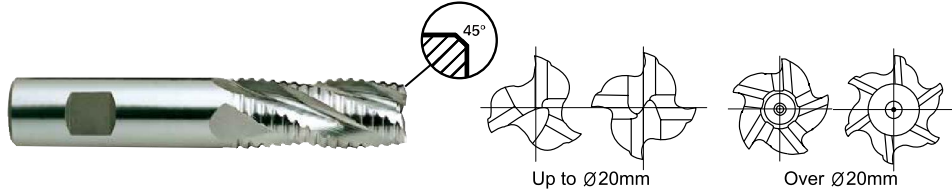


FLAT SHANK **E2751** SERIES

FLAT SHANK **EQ751** SERIES

### HSSCo8, MULTI FLUTE SHORT LENGTH ROUGHING - COARSE

- 🇩🇪 HSSCo8, MULTI SCHNEIDEN KURZ SCHRUPPFRÄSER - GROB
- 🇫🇷 Fraise HSSCo8, multi-dents ébauche, pas grossier, courte
- 🇮🇹 MULTI TAGLIENTE, PER SGROSSATURA, SERIE CORTA, BOMBATO GROSSO - HSSCo8

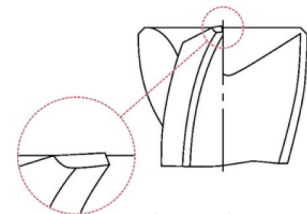


HSS Co8
DIN 844
NR
3-6
30°
DIN 1835B
~Ø20
Ø22~
C x 45°
P.764~767

Unit : mm

	EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer
	UNCOATED	TiAlN	js12	h6				
	<b>E2751240</b>	<b>EQ751240</b>	<b>24.0</b>	25	45	121	5	0.55
	<b>E2751250</b>	<b>EQ751250</b>	<b>25.0</b>	25	45	121	5	0.55
	<b>E2751260</b>	<b>EQ751260</b>	<b>26.0</b>	25	45	121	6	0.55
	<b>E2751280</b>	<b>EQ751280</b>	<b>28.0</b>	25	45	121	6	0.70
	<b>E2751300</b>	<b>EQ751300</b>	<b>30.0</b>	25	45	121	6	0.70
	<b>E2751320</b>	<b>EQ751320</b>	<b>32.0</b>	32	53	133	6	0.70
	<b>E2751340</b>	<b>EQ751340</b>	<b>34.0</b>	32	53	133	6	0.70
	<b>E2751350</b>	<b>EQ751350</b>	<b>35.0</b>	32	53	133	6	0.70
	<b>E2751360</b>	<b>EQ751360</b>	<b>36.0</b>	32	53	133	6	0.70
	<b>E2751380</b>	<b>EQ751380</b>	<b>38.0</b>	32	63	155	6	0.70
	<b>E2751938</b>	<b>EQ751938</b>	<b>38.0</b>	40	63	155	6	0.70
	<b>E2751400</b>	<b>EQ751400</b>	<b>40.0</b>	32	63	155	6	0.88
	<b>E2751940</b>	<b>EQ751940</b>	<b>40.0</b>	40	63	155	6	0.88
	<b>E2751450</b>	<b>EQ751450</b>	<b>45.0</b>	32	63	143	6	0.88
	<b>E2751500</b>	<b>EQ751500</b>	<b>50.0</b>	50	75	177	6	0.88

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.



Enforced Cutting Edge

#### Tolerances according to DIN 7160 & 7161

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
<b>js12</b>	$\pm 50$	$\pm 60$	$\pm 75$	$\pm 90$	$\pm 105$	$\pm 125$
<b>h6</b>	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO Material Description	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc		13	25	28	32	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 Material Description	N										S							H			
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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	◎	◎	◎	◎	◎																

HSS

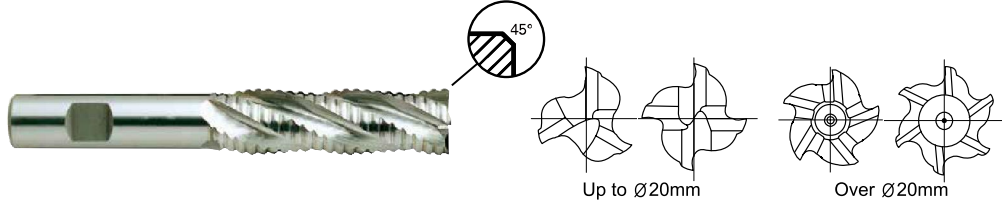


FLAT SHANK **E2752** SERIES

FLAT SHANK **EQ752** SERIES

### HSSCo8, MULTI FLUTE LONG LENGTH ROUGHING - COARSE

- 🇩🇪 HSSCo8, MULTI SCHNEIDEN LANG SCHRUPPFRÄSER - GROB
- 🇫🇷 Fraise HSSCo8, multi-dents ébauche, pas grossier, longue
- 🇮🇹 MULTI TAGLIENTE, PER SGROSSATURA, SERIE LUNGA, BOMBATO GROSSO - HSSCo8



HSS Co8
DIN 844
NR
3-6
30°
DIN 1835B
~Ø20
Ø22~
C x 45°
P.764~767

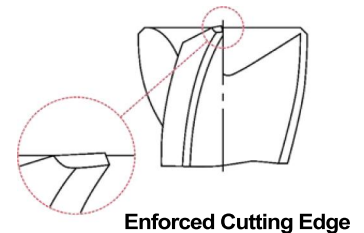
Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	Chamfer
UNCOATED	TiAlN	js12	h6				
E2752240	EQ752240	24.0	25	90	166	5	0.55
E2752250	EQ752250	25.0	25	90	166	5	0.55
E2752260	EQ752260	26.0	25	90	166	6	0.55
E2752280	EQ752280	28.0	25	90	166	6	0.70
E2752300	EQ752300	30.0	25	90	166	6	0.70
E2752320	EQ752320	32.0	32	106	186	6	0.70
E2752350	EQ752350	35.0	32	106	186	6	0.70
E2752360	EQ752360	36.0	32	106	186	6	0.70
E2752380	EQ752380	38.0	32	125	217	6	0.70
E2752938	EQ752938	38.0	40	125	217	6	0.70
E2752400	EQ752400	40.0	32	125	217	6	0.88
E2752940	EQ752940	40.0	40	125	217	6	0.88

- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

#### Tolerances according to DIN 7160 & 7161

Tolerance range in $\mu\text{m}$						
Nominal-Diameter in mm						
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	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							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25	41	21	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
ISO	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	60	100	75	90	130	110	90	100			15	30	25	38	34	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	○	○	○	○	○																

HSS



MORSE TAPER SHANK

**E2777** SERIES

MORSE TAPER SHANK

**EQ777** SERIES

### HSSCo8, MULTI FLUTE SHORT LENGTH ROUGHING - COARSE

- 🇩🇪 HSSCo8, MULTI SCHNEIDEN KURZ SCHRUPPFRÄSER - GROB
- 🇫🇷 Fraise HSSCo8, multi-dents ébauche, pas grossier, courte
- 🇮🇹 MULTI TAGLIENTE, SERIE CORTA, PER SGROSSATURA, B.G. - HSSCo8



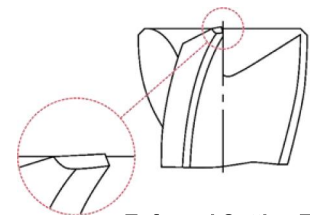
HSS Co8
DIN 845
NR
4-6
30°
DIN 228A
C x 45°
P.764-767

Unit : mm

EDP No.	Mill Diameter	Length of Cut	Overall Length	Morse Taper No.	No. of Flute	Chamfer	
							UNCOATED
-	▲ EQ777140	14.0	26	111	2	4	0.56
▲ E2777160	-	16.0	32	117	2	4	0.56
▲ E2777180	▲ EQ777180	18.0	32	117	2	4	0.56
▲ E2777200	-	20.0	38	123	2	4	0.56
▲ E2777220	-	22.0	38	123	2	5	0.56
▲ E2777240	-	24.0	45	147	3	5	0.56
▲ E2777250	-	25.0	45	147	3	5	0.56
▲ E2777280	-	28.0	45	147	3	6	0.70
▲ E2777300	-	30.0	45	147	3	6	0.70
▲ E2777320	▲ EQ777320	32.0	53	178	4	6	0.70
▲ E2777350	-	35.0	53	178	4	6	0.70
▲ E2777360	-	36.0	53	178	4	6	0.70
▲ E2777400	-	40.0	63	188	4	6	0.88
▲ E2777450	-	45.0	63	188	4	6	0.88

- ▲ : Only available till stock runs out
- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

Mill Dia.  
Tolerance(mm)  
± 0.120



Enforced Cutting Edge

◎ : Excellent ○ : Good

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

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

HSS



FLAT SHANK

**E2766** SERIES

FLAT SHANK

**EQ766** SERIES

### HSSCo8, 3 FLUTE SHORT LENGTH ROUGHING & FINISHING

- 🇩🇪 HSSCo8, 3 SCHNEIDEN KURZ SCHRUPPSCHLICHTFRÄSER
- 🇫🇷 Fraise HSSCo8, 3 dents ébauche et finition, courte
- 🇮🇹 HSSCo8, 3 TAGLIENTI, SERIE CORTA, PER SGROSSATURA & FINITURA



HSS Co8
DIN 844
NF
3
30°
DIN 1835B
P.780~783

Unit : mm

	EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	UNCOATED	TiAIN	k10	h6		
▲	E2766060	▲ EQ766060	6.0	6	13	57
▲	E2766080	▲ EQ766080	8.0	10	19	69
▲	E2766100	▲ EQ766100	10.0	10	22	72
▲	E2766120	▲ EQ766120	12.0	12	26	83
▲	E2766130	▲ EQ766130	13.0	12	26	83
▲	E2766140	▲ EQ766140	14.0	12	26	83
▲	E2766160	▲ EQ766160	16.0	16	32	92
▲	E2766180	▲ EQ766180	18.0	16	32	92
▲	E2766200	▲ EQ766200	20.0	20	38	104
▲	E2766220	▲ EQ766220	22.0	20	38	104
▲	E2766250	▲ EQ766250	25.0	25	45	121
▲	E2766280	▲ EQ766280	28.0	25	45	121
▲	E2766300	-	30.0	25	45	121
▲	E2766320	-	32.0	32	53	133
▲	E2766360	▲ EQ766360	36.0	32	53	133
▲	E2766400	▲ EQ766400	40.0	32	63	155

- ▲ : Only available till stock runs out
- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

#### Tolerances according to DIN 7160 & 7161

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
<b>k10</b>	+40 0	+48 0	+58 0	+70 0	+84 0	+100 0
<b>h6</b>	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO	P											M			K						
	Non-alloy steel					Low alloy steel			High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron			
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323																					
HRc																					
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	○	◎	◎	◎	◎	◎	◎	◎	◎	◎	
ISO	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323																					
HRc																					
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend	○	○	○	○	○																

HSS



FLAT SHANK **E2754** SERIES  
 FLAT SHANK **EQ754** SERIES

### HSSCo8, MULTI FLUTE SHORT LENGTH ROUGHING & FINISHING

- 🇩🇪 HSSCo8, MULTI SCHNEIDEN KURZ SCHRUPPSCHLICHTFRÄSER
- 🇫🇷 Fraise HSSCo8, multi-dents, ébauche et finition, courte
- 🇮🇹 MULTI TAGLIENTE, SERIE CORTA PER SEMIFINITURA - HSSCo8



HSS Co8
DIN 844
NF
3-6
30°
DIN 1835B
~Ø20
Ø22~
P.784~787

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute	
						UNCOATED
▲ E2754060	▲ EQ754060	6.0	6	13	57	3
▲ E2754070	▲ EQ754070	7.0	10	16	66	3
▲ E2754080	▲ EQ754080	8.0	10	19	69	4
▲ E2754090	▲ EQ754090	9.0	10	19	69	4
▲ E2754100	▲ EQ754100	10.0	10	22	72	4
▲ E2754110	▲ EQ754110	11.0	12	22	79	4
▲ E2754120	▲ EQ754120	12.0	12	26	83	4
▲ E2754130	▲ EQ754130	13.0	12	26	83	4
▲ E2754140	-	14.0	12	26	83	4
▲ E2754150	▲ EQ754150	15.0	12	26	83	4
▲ E2754160	▲ EQ754160	16.0	16	32	92	4
▲ E2754180	▲ EQ754180	18.0	16	32	92	4
▲ E2754200	▲ EQ754200	20.0	20	38	104	4
▲ E2754220	▲ EQ754220	22.0	20	38	104	5
▲ E2754250	▲ EQ754250	25.0	25	45	121	5
▲ E2754280	▲ EQ754280	28.0	25	45	121	5
-	▲ EQ754300	30.0	25	45	121	5
▲ E2754320	▲ EQ754320	32.0	32	53	133	5
▲ E2754360	-	36.0	32	53	133	6
▲ E2754400	-	40.0	32	63	155	6

- ▲ : Only available till stock runs out
- ▶ Other shank design on your request.
- ▶ TiN and TiCN Coatings are available on your request.

#### Tolerances according to DIN 7160 & 7161

	Tolerance range in $\mu\text{m}$					
	Nominal-Diameter in mm					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50
k10	+40 0	+48 0	+58 0	+70 0	+84 0	+100 0
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

ISO	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	Malleable cast iron	
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323																					
HRc	13	23	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25	42	55	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
ISO	N										S							H			
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323																					
HRc	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎



HSS

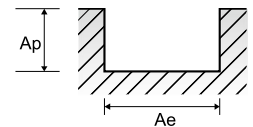


**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E9410 SERIES 2 FLUTE - SLOTTING**

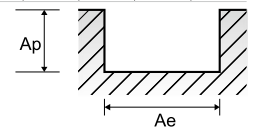
Vc = m/min.  
 fz = mm/tooth  
 RPM = rev./min.  
 FEED = mm/min.

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			
<b>P</b>	1-2	Non-alloy steel	1.0D	0.5D	Vc	35	40	35	35	40	35	35	40	40	35	35	40	40	35	40	40	
					fz	0.003	0.007	0.013	0.019	0.025	0.039	0.05	0.063	0.061	0.079	0.092	0.098	0.098	0.098	0.098	0.1	0.1
					RPM FEED	5570	4244	2785	2228	2122	1393	1114	1061	909	696	619	557	579	509	509	509	509
	3-4		1.0D	0.5D	Vc	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
					fz	0.004	0.008	0.013	0.019	0.025	0.039	0.05	0.063	0.071	0.076	0.085	0.085	0.094	0.094	0.094	0.094	0.094
					RPM FEED	4775	3183	2387	1910	1592	1194	955	796	682	597	531	477	434	382	382	382	382
	5	1.0D	0.5D	Vc	20	20	20	15	20	20	20	20	20	20	15	20	20	20	20	20	20	
				fz	0.004	0.006	0.013	0.02	0.025	0.039	0.049	0.06	0.067	0.079	0.092	0.098	0.098	0.098	0.098	0.1	0.1	
				RPM FEED	3183	2122	1592	955	1061	796	637	531	455	398	265	318	289	255	255	255	255	255
	6	1.0D	0.5D	Vc	35	40	35	35	40	35	35	40	40	35	35	40	40	35	40	40	40	
				fz	0.003	0.007	0.013	0.019	0.025	0.039	0.05	0.063	0.061	0.079	0.092	0.098	0.098	0.098	0.098	0.1	0.1	
RPM FEED				5570	4244	2785	2228	2122	1393	1114	1061	909	696	619	557	579	509	509	509	509	509	
7	1.0D	0.5D	Vc	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30		
			fz	0.004	0.008	0.013	0.019	0.025	0.039	0.05	0.063	0.071	0.076	0.085	0.085	0.094	0.094	0.094	0.094	0.094		
			RPM FEED	4775	3183	2387	1910	1592	1194	955	796	682	597	531	477	434	382	382	382	382	382	
8-9	1.0D	0.5D	Vc	20	20	20	15	20	20	20	20	20	20	15	20	20	20	20	20	20		
			fz	0.004	0.006	0.013	0.02	0.025	0.039	0.049	0.06	0.067	0.079	0.092	0.098	0.098	0.098	0.098	0.1	0.1		
			RPM FEED	3183	2122	1592	955	1061	796	637	531	455	398	265	318	289	255	255	255	255	255	
10	1.0D	0.5D	Vc	35	40	35	35	40	35	35	40	40	35	35	40	40	35	40	40	40		
			fz	0.003	0.007	0.013	0.019	0.025	0.039	0.05	0.063	0.061	0.079	0.092	0.098	0.098	0.098	0.098	0.1	0.1		
			RPM FEED	5570	4244	2785	2228	2122	1393	1114	1061	909	696	619	557	579	509	509	509	509	509	
11.1	1.0D	0.5D	Vc	20	20	20	15	20	20	20	20	20	20	15	20	20	20	20	20	20		
			fz	0.004	0.006	0.013	0.02	0.025	0.039	0.049	0.06	0.067	0.079	0.092	0.098	0.098	0.098	0.098	0.1	0.1		
			RPM FEED	3183	2122	1592	955	1061	796	637	531	455	398	265	318	289	255	255	255	255	255	



**EP410 SERIES 2 FLUTE TiAIN COATED - SLOTTING**

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			
<b>P</b>	1-2	Non-alloy steel	1.0D	0.5D	Vc	50	55	50	50	55	50	50	55	50	50	55	50	50	55	55	55	
					fz	0.003	0.007	0.013	0.019	0.025	0.04	0.05	0.063	0.062	0.078	0.092	0.099	0.099	0.1	0.1	0.1	0.1
					RPM FEED	7958	5836	3979	3183	2918	1989	1592	1459	1251	995	884	796	796	700	700	700	700
	3		1.0D	0.5D	Vc	45	40	40	45	40	40	45	40	45	40	45	40	45	40	45	40	45
					fz	0.004	0.008	0.012	0.019	0.025	0.039	0.054	0.068	0.075	0.086	0.086	0.1	0.095	0.095	0.1	0.095	0.095
					RPM FEED	7162	4244	3183	2865	2122	1592	1432	1061	1023	796	707	716	579	573	573	573	573
	4	1.0D	0.5D	Vc	45	40	40	45	40	40	45	40	45	40	45	40	45	40	45	40	45	
				fz	0.004	0.008	0.012	0.019	0.025	0.039	0.054	0.068	0.075	0.086	0.086	0.1	0.095	0.095	0.1	0.095	0.095	
				RPM FEED	7162	4244	3183	2865	2122	1592	1432	1061	1023	796	707	716	579	573	573	573	573	573
	5	1.0D	0.5D	Vc	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	
				fz	0.004	0.006	0.013	0.019	0.025	0.038	0.047	0.061	0.071	0.075	0.096	0.096	0.096	0.102	0.102	0.102	0.102	0.102
RPM FEED				3979	2653	1989	1592	1326	995	796	663	568	497	354	398	362	318	318	318	318	318	
6	1.0D	0.5D	Vc	50	55	50	50	55	50	50	55	50	50	55	50	50	55	55	55	55		
			fz	0.003	0.007	0.013	0.019	0.025	0.04	0.05	0.063	0.062	0.078	0.092	0.099	0.099	0.1	0.1	0.1	0.1		
			RPM FEED	7958	5836	3979	3183	2918	1989	1592	1459	1251	995	884	796	796	700	700	700	700	700	
7	1.0D	0.5D	Vc	45	40	40	45	40	40	45	40	45	40	45	40	45	40	45	40	45		
			fz	0.004	0.008	0.012	0.019	0.025	0.039	0.054	0.068	0.075	0.086	0.086	0.1	0.095	0.095	0.1	0.095	0.095		
			RPM FEED	7162	4244	3183	2865	2122	1592	1432	1061	1023	796	707	716	579	573	573	573	573	573	
8-9	1.0D	0.5D	Vc	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25		
			fz	0.004	0.006	0.013	0.019	0.025	0.038	0.047	0.061	0.071	0.075	0.096	0.096	0.096	0.102	0.102	0.102	0.102	0.102	
			RPM FEED	3979	2653	1989	1592	1326	995	796	663	568	497	354	398	362	318	318	318	318	318	
10	1.0D	0.5D	Vc	50	55	50	50	55	50	50	55	50	50	55	50	50	55	55	55	55		
			fz	0.003	0.007	0.013	0.019	0.025	0.04	0.05	0.063	0.062	0.078	0.092	0.099	0.099	0.1	0.1	0.1	0.1		
			RPM FEED	7958	5836	3979	3183	2918	1989	1592	1459	1251	995	884	796	796	700	700	700	700	700	
11.1	1.0D	0.5D	Vc	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25		
			fz	0.004	0.006	0.013	0.019	0.025	0.038	0.047	0.061	0.071	0.075	0.096	0.096	0.096	0.102	0.102	0.102	0.102	0.102	
			RPM FEED	3979	2653	1989	1592	1326	995	796	663	568	497	354	398	362	318	318	318	318	318	



HSS

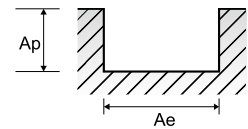


RECOMMENDED CUTTING CONDITIONS  
EMPFOHLENE SCHNEIDPARAMETER

E3570 SERIES 2 FLUTE - SLOTTING

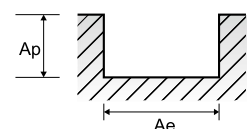
Vc = m/min.  
fz = mm/tooth  
RPM = rev./min.  
FEED = mm/min.

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	1-2	Non-alloy steel	1.0D	0.5D	Vc	30	35	30	30	35	30	30	35	30	30	35	30	30	35	35
					fz	0.004	0.007	0.012	0.019	0.025	0.042	0.05	0.061	0.063	0.083	0.091	0.1	0.1	0.1	0.1
	RPM		4775	3714	2387	1910	1857	1194	955	928	796	597	531	477	506	446				
	FEED		38	52	57	73	93	100	95	113	100	99	97	95	101	89				
	Vc		30	25	25	30	25	25	30	25	25	25	25	25	25	30	30	25	25	
	fz		0.004	0.008	0.013	0.018	0.025	0.038	0.05	0.064	0.075	0.075	0.083	0.083	0.094	0.093				
	RPM		4775	2653	1989	1910	1326	995	955	663	568	497	442	477	434	318				
	FEED		38	42	52	69	66	76	95	85	75	73	79	79	82	59				
	Vc		15	15	15	15	15	15	15	15	20	15	15	15	15	15	15	15	15	
	fz		0.003	0.006	0.015	0.02	0.025	0.042	0.05	0.061	0.069	0.083	0.089	0.1	0.1	0.1	0.1	0.1	0.1	
RPM	2387	1592	1194	955	796	597	477	398	455	298	265	239	217	191						
FEED	14	19	36	38	40	50	48	49	63	50	47	48	43	38						
Vc	30	35	30	30	35	30	30	35	30	35	30	30	30	35	35					
fz	0.004	0.007	0.012	0.019	0.025	0.042	0.05	0.061	0.063	0.083	0.091	0.1	0.1	0.1	0.1	0.1	0.1			
RPM	4775	3714	2387	1910	1857	1194	955	928	796	597	531	477	506	446						
FEED	38	52	57	73	93	100	95	113	100	99	97	95	101	89						
Vc	30	25	25	30	25	25	30	25	25	25	25	30	30	25						
fz	0.004	0.008	0.013	0.018	0.025	0.038	0.05	0.064	0.075	0.075	0.083	0.083	0.094	0.093						
RPM	4775	2653	1989	1910	1326	995	955	663	568	497	442	477	434	318						
FEED	38	42	52	69	66	76	95	85	75	73	79	79	82	59						
Vc	15	15	15	15	15	15	15	15	20	15	15	15	15	15	15	15	15			
fz	0.003	0.006	0.015	0.02	0.025	0.042	0.05	0.061	0.069	0.083	0.089	0.1	0.1	0.1	0.1	0.1	0.1			
RPM	2387	1592	1194	955	796	597	477	398	455	298	265	239	217	191						
FEED	14	19	36	38	40	50	48	49	63	50	47	48	43	38						
Vc	30	35	30	30	35	30	30	35	30	35	30	30	30	35	35					
fz	0.004	0.007	0.012	0.019	0.025	0.042	0.05	0.061	0.063	0.083	0.091	0.1	0.1	0.1	0.1	0.1	0.1			
RPM	4775	3714	2387	1910	1857	1194	955	928	796	597	531	477	506	446						
FEED	38	52	57	73	93	100	95	113	100	99	97	95	101	89						
Vc	30	25	25	30	25	25	30	25	25	25	25	30	30	25						
fz	0.004	0.008	0.013	0.018	0.025	0.038	0.05	0.064	0.075	0.075	0.083	0.083	0.094	0.093						
RPM	4775	2653	1989	1910	1326	995	955	663	568	497	442	477	434	318						
FEED	38	42	52	69	66	76	95	85	75	73	79	79	82	59						
Vc	15	15	15	15	15	15	15	15	20	15	15	15	15	15	15	15	15			
fz	0.003	0.006	0.015	0.02	0.025	0.042	0.05	0.061	0.069	0.083	0.089	0.1	0.1	0.1	0.1	0.1	0.1			
RPM	2387	1592	1194	955	796	597	477	398	455	298	265	239	217	191						
FEED	14	19	36	38	40	50	48	49	63	50	47	48	43	38						
Vc	15	15	15	15	15	15	15	15	20	15	15	15	15	15	15	15	15			
fz	0.003	0.006	0.015	0.02	0.025	0.042	0.05	0.061	0.069	0.083	0.089	0.1	0.1	0.1	0.1	0.1	0.1			
RPM	2387	1592	1194	955	796	597	477	398	455	298	265	239	217	191						
FEED	14	19	36	38	40	50	48	49	63	50	47	48	43	38						



ER570 SERIES 2 FLUTE TiAlN COATED - SLOTTING

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	1-2	Non-alloy steel	1.0D	0.5D	Vc	45	45	45	45	45	45	45	45	50	45	40	45	50	50	
					fz	0.004	0.007	0.012	0.019	0.025	0.041	0.05	0.062	0.064	0.082	0.093	0.1	0.1	0.1	0.099
	RPM		7162	4775	3581	2865	2387	1790	1432	1194	1137	895	707	716	723	637				
	FEED		57	67	86	109	119	147	143	148	146	147	132	143	145	126				
	Vc		40	35	35	40	35	35	40	35	35	35	35	35	40	40	40	40	40	
	fz		0.004	0.008	0.013	0.018	0.025	0.038	0.05	0.064	0.074	0.075	0.083	0.083	0.094	0.092				
	RPM		6366	3714	2785	2546	1857	1393	1273	928	796	696	619	637	579	509				
	FEED		51	59	72	92	93	106	127	119	118	104	103	106	109	94				
	Vc		20	25	20	20	25	20	20	25	20	25	20	20	20	25	20	25	20	
	fz		0.003	0.006	0.015	0.02	0.024	0.041	0.05	0.063	0.068	0.088	0.09	0.1	0.1	0.1	0.098			
RPM	3183	2653	1592	1273	1326	796	637	663	568	398	354	318	362	255						
FEED	19	32	48	51	64	65	64	84	77	70	64	64	72	50						
Vc	45	45	45	45	45	45	45	45	50	45	40	45	50	50						
fz	0.004	0.007	0.012	0.019	0.025	0.041	0.05	0.062	0.064	0.082	0.093	0.1	0.1	0.1	0.099					
RPM	7162	4775	3581	2865	2387	1790	1432	1194	1137	895	707	716	723	637						
FEED	57	67	86	109	119	147	143	148	146	147	132	143	145	126						
Vc	40	35	35	40	35	35	40	35	35	35	35	35	40	40	40	40	40			
fz	0.004	0.008	0.013	0.018	0.025	0.038	0.05	0.064	0.074	0.075	0.083	0.083	0.094	0.092						
RPM	6366	3714	2785	2546	1857	1393	1273	928	796	696	619	637	579	509						
FEED	51	59	72	92	93	106	127	119	118	104	103	106	109	94						
Vc	20	25	20	20	25	20	20	25	20	25	20	20	20	25	20	25	20			
fz	0.003	0.006	0.015	0.02	0.024	0.041	0.05	0.063	0.068	0.088	0.09	0.1	0.1	0.1	0.098					
RPM	3183	2653	1592	1273	1326	796	637	663	568	398	354	318	362	255						
FEED	19	32	48	51	64	65	64	84	77	70	64	64	72	50						
Vc	45	45	45	45	45	45	45	45	50	45	40	45	50	50						
fz	0.004	0.007	0.012	0.019	0.025	0.041	0.05	0.062	0.064	0.082	0.093	0.1	0.1	0.1	0.099					
RPM	7162	4775	3581	2865	2387	1790	1432	1194	1137	895	707	716	723	637						
FEED	57	67	86	109	119	147	143	148	146	147	132	143	145	126						
Vc	20	25	20	20	25	20	20	25	20	25	20	20	20	25	20	25	20			
fz	0.003	0.006	0.015	0.02	0.024	0.041	0.05	0.063	0.068	0.088	0.09	0.1	0.1	0.1	0.098					
RPM	3183	2653	1592	1273	1326	796	637	663	568	398	354	318	362	255						
FEED	19	32	48	51	64	65	64	84	77	70	64	64	72	50						
Vc	20	25	20	20	25	20	20	25	20	25	20	20	20	25	20	25	20			
fz	0.003	0.006	0.015	0.02	0.024	0.041	0.05	0.063	0.068	0.088	0.09	0.1	0.1	0.1	0.098					
RPM	3183	2653	1592	1273	1326	796	637	663	568	398	354	318	362	255						
FEED	19	32	48	51	64	65	64	84	77	70	64	64	72	50						





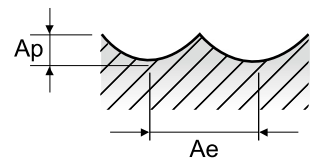
**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2535, E2492 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	0.7D	0.3D	Vc	40	40	40	40	40	40	40	40	40	40
					fz	0.011	0.018	0.031	0.05	0.069	0.085	0.094	0.117	0.13	
					RPM	4244	3183	2122	1592	1273	1061	796	637	509	
	2		0.7D	0.3D	Vc	30	30	30	30	30	30	30	30	30	30
					fz	0.01	0.017	0.026	0.044	0.06	0.066	0.083	0.085	0.088	
					RPM	3183	2387	1592	1194	955	796	597	477	382	
	3-4		0.7D	0.3D	Vc	20	20	20	20	20	15	20	20	15	
					fz	0.008	0.013	0.023	0.036	0.054	0.061	0.079	0.083	0.091	
					RPM	2122	1592	1061	796	637	398	398	318	191	
	5		0.7D	0.3D	Vc	15	15	15	15	15	10	15	15	15	
					fz	0.007	0.013	0.018	0.03	0.044	0.055	0.07	0.088	0.094	
RPM		1592			1194	796	597	477	265	298	239	191			
6	0.7D	0.3D	Vc	30	30	30	30	30	30	30	30	30			
			fz	0.01	0.017	0.026	0.044	0.06	0.066	0.083	0.085	0.088			
			RPM	3183	2387	1592	1194	955	796	597	477	382			
7	0.7D	0.3D	Vc	20	20	20	20	20	15	20	20	15			
			fz	0.008	0.013	0.023	0.036	0.054	0.061	0.079	0.083	0.091			
			RPM	2122	1592	1061	796	637	398	398	318	191			
8-9	0.7D	0.3D	Vc	15	15	15	15	15	10	15	15	15			
			fz	0.007	0.013	0.018	0.03	0.044	0.055	0.07	0.088	0.094			
			RPM	1592	1194	796	597	477	265	298	239	191			
10	0.7D	0.3D	Vc	30	30	30	30	30	30	30	30	30			
			fz	0.01	0.017	0.026	0.044	0.06	0.066	0.083	0.085	0.088			
			RPM	3183	2387	1592	1194	955	796	597	477	382			
11.1	0.7D	0.3D	Vc	15	15	15	15	15	10	15	15	15			
			fz	0.007	0.013	0.018	0.03	0.044	0.055	0.07	0.088	0.094			
			RPM	1592	1194	796	597	477	265	298	239	191			
N	21-22	Aluminum-wrought alloy	0.7D	0.3D	Vc	105	100	105	100	100	95	100	100	100	
					fz	0.01	0.016	0.025	0.044	0.056	0.068	0.075	0.088	0.096	
					RPM	11141	7958	5570	3979	3183	2520	1989	1592	1273	
N	23-24	Aluminum-cast, alloyed	0.7D	0.3D	Vc	68	65	68	65	65	62	65	65	65	
					fz	0.01	0.016	0.025	0.044	0.056	0.068	0.075	0.088	0.096	
					RPM	7215	5173	3608	2586	2069	1645	1293	1035	828	

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



HSS



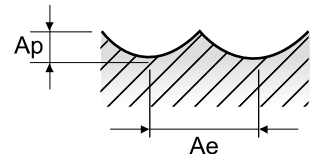
**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2410, E2429, E2512 SERIES MULTI 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)						
						6.0	8.0	10.0	12.0	16.0	20.0	25.0
P	1	Non-alloy steel	0.7D	0.3D	Vc	40	40	40	40	40	40	40
					fz	0.03	0.05	0.069	0.087	0.096	0.117	0.133
					RPM	2122	1592	1273	1061	796	637	509
	2		Vc	30	30	30	30	30	30	30		
			fz	0.026	0.044	0.06	0.067	0.083	0.087	0.088		
			RPM	1592	1194	955	796	597	477	382		
	3-4		Vc	166	210	229	213	198	166	202		
			fz	20	20	20	15	20	20	15		
			RPM	0.023	0.036	0.054	0.059	0.076	0.083	0.091		
	5		Vc	1061	796	637	398	398	318	191		
fz		98	115	138	94	121	106	104				
RPM		15	15	15	15	15	15	15				
6	Vc	0.019	0.03	0.042	0.052	0.067	0.083	0.094				
	fz	796	597	477	398	298	239	191				
	RPM	60	72	80	83	80	79	108				
7	Vc	30	30	30	30	30	30	30				
	fz	0.026	0.044	0.06	0.067	0.083	0.087	0.088				
	RPM	1592	1194	955	796	597	477	382				
8-9	Vc	166	210	229	213	198	166	202				
	fz	20	20	20	15	20	20	15				
	RPM	0.023	0.036	0.054	0.059	0.076	0.083	0.091				
10	Vc	1061	796	637	398	398	318	191				
	fz	98	115	138	94	121	106	104				
	RPM	15	15	15	15	15	15	15				
11.1	Vc	0.019	0.03	0.042	0.052	0.067	0.083	0.094				
	fz	796	597	477	398	298	239	191				
	RPM	60	72	80	83	80	79	108				
N	21-22	Aluminum-wrought alloy	0.7D	0.3D	Vc	105	100	100	95	100	100	100
					fz	0.025	0.044	0.056	0.068	0.075	0.088	0.097
					RPM	5570	3979	3183	2520	1989	1592	1273
23-24	Aluminum-cast, alloyed	0.7D	0.3D	Vc	557	700	713	685	597	560	741	
				fz	68	65	65	62	65	65	65	
				RPM	0.025	0.044	0.056	0.068	0.075	0.088	0.097	
					Vc	3608	2586	2069	1645	1293	1035	828
					fz	361	455	463	447	388	364	482
					RPM							

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





**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOLGENE SCHNEIDPARAMETER**

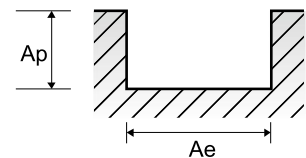
**E2570, E2571, E2510 SERIES 2 FLUTE - SLOTTING**

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
P	1	Non-alloy steel	1.0D	0.5D	Vc	35	35	35	35	35	35	35	35
					fz	0.004	0.008	0.013	0.02	0.025	0.036	0.045	0.061
					RPM	5570	3714	2785	2228	1857	1393	1114	928
	2		1.0D	0.5D	Vc	30	30	30	30	30	30	30	30
					fz	0.003	0.007	0.013	0.019	0.025	0.041	0.05	0.063
					RPM	4775	3183	2387	1910	1592	1194	955	796
	3-4		1.0D	0.5D	Vc	29	45	62	73	80	98	95	100
					fz	0.004	0.008	0.013	0.019	0.025	0.039	0.05	0.063
					RPM	3979	2653	1989	1592	1326	995	796	663
	5		1.0D	0.5D	Vc	32	42	52	60	66	78	80	84
fz		0.003			0.006	0.014	0.019	0.025	0.04	0.05	0.063		
RPM		2387			1592	1194	955	796	597	477	398		
6	1.0D	0.5D	Vc	15	15	15	15	15	15	15	15		
			fz	0.003	0.006	0.014	0.019	0.025	0.04	0.05	0.063		
			RPM	2387	1592	1194	955	796	597	477	398		
7	1.0D	0.5D	Vc	14	19	33	36	40	48	48	50		
			fz	0.003	0.007	0.013	0.019	0.025	0.041	0.05	0.063		
			RPM	4775	3183	2387	1910	1592	1194	955	796		
8-9	1.0D	0.5D	Vc	29	45	62	73	80	98	95	100		
			fz	0.004	0.008	0.013	0.019	0.025	0.039	0.05	0.063		
			RPM	3979	2653	1989	1592	1326	995	796	663		
10	1.0D	0.5D	Vc	32	42	52	60	66	78	80	84		
			fz	0.003	0.006	0.014	0.019	0.025	0.04	0.05	0.063		
			RPM	2387	1592	1194	955	796	597	477	398		
11.1	1.0D	0.5D	Vc	15	15	15	15	15	15	15	15		
			fz	0.003	0.006	0.014	0.019	0.025	0.04	0.05	0.063		
			RPM	2387	1592	1194	955	796	597	477	398		
N	21-22	Aluminum-wrought alloy	Vc	14	19	33	36	40	48	48	50		
			fz	0.007	0.011	0.018	0.025	0.028	0.049	0.065	0.076		
			RPM	11937	11141	7958	6366	5570	3979	3024	2520		
23-24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	167	245	286	318	312	390	393	383	
				fz	0.007	0.011	0.018	0.025	0.028	0.049	0.065	0.076	
				RPM	7799	7215	5173	4138	3608	2586	1974	1645	
						109	159	186	207	202	253	257	250

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

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**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

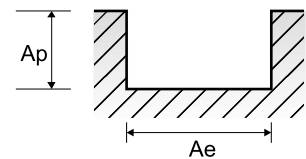
**EQ570, EQ571, EQ510 SERIES 2 FLUTE TiAlN COATED - SLOTTING**

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
P	1	Non-alloy steel	1.0D	0.5D	Vc	50	45	50	50	45	50	50	45
					fz	0.004	0.008	0.013	0.02	0.025	0.036	0.045	0.062
					RPM	7958	4775	3979	3183	2387	1989	1592	1194
	2		1.0D	0.5D	Vc	40	40	40	40	40	40	40	40
					fz	0.003	0.007	0.012	0.02	0.024	0.04	0.05	0.064
					RPM	6366	4244	3183	2546	2122	1592	1273	1061
	3-4		1.0D	0.5D	Vc	35	35	30	35	30	30	35	35
					fz	0.004	0.008	0.013	0.019	0.025	0.04	0.05	0.061
					RPM	5570	3714	2387	2228	1592	1194	1114	928
	5		1.0D	0.5D	Vc	20	20	20	20	20	20	20	20
					fz	0.003	0.007	0.013	0.02	0.025	0.041	0.05	0.064
RPM		3183			2122	1592	1273	1061	796	637	531		
6	1.0D	0.5D	Vc	40	40	40	40	40	40	40	40		
			fz	0.003	0.007	0.012	0.02	0.024	0.04	0.05	0.064		
			RPM	6366	4244	3183	2546	2122	1592	1273	1061		
7	1.0D	0.5D	Vc	35	35	30	35	30	30	35	35		
			fz	0.004	0.008	0.013	0.019	0.025	0.04	0.05	0.061		
			RPM	5570	3714	2387	2228	1592	1194	1114	928		
8-9	1.0D	0.5D	Vc	20	20	20	20	20	20	20	20		
			fz	0.003	0.007	0.013	0.02	0.025	0.041	0.05	0.064		
			RPM	3183	2122	1592	1273	1061	796	637	531		
10	1.0D	0.5D	Vc	40	40	40	40	40	40	40	40		
			fz	0.003	0.007	0.012	0.02	0.024	0.04	0.05	0.064		
			RPM	6366	4244	3183	2546	2122	1592	1273	1061		
11.1	1.0D	0.5D	Vc	20	20	20	20	20	20	20	20		
			fz	0.003	0.007	0.013	0.02	0.025	0.041	0.05	0.064		
			RPM	3183	2122	1592	1273	1061	796	637	531		
N	21-22	Aluminum-wrought alloy	1.0D	0.5D	Vc	105	145	140	140	150	140	135	130
					fz	0.007	0.011	0.018	0.025	0.028	0.049	0.064	0.076
					RPM	16711	15385	11141	8913	7958	5570	4297	3448
N	23-24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	68	94	91	91	98	91	88	85
					fz	0.007	0.011	0.018	0.025	0.028	0.049	0.064	0.076
					RPM	10823	9974	7242	5793	5199	3621	2801	2255

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

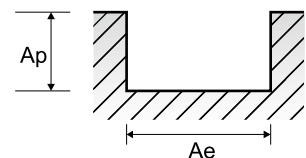
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**E2464, E2509 SERIES 2 FLUTE - SLOTTING**

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)								
						3.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0
N	21-22	Aluminum-wrought alloy	1.0D	0.5D	Vc	75	130	150	155	190	155	175	130	145
					fz	0.035	0.05	0.071	0.12	0.12	0.177	0.177	0.283	0.283
					RPM	7958	6897	5968	4934	5040	3524	3482	2299	2308
	23-24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	49	85	98	101	124	101	114	85	94
					fz	0.035	0.05	0.071	0.12	0.12	0.177	0.177	0.283	0.283
					RPM	5199	4509	3899	3215	3289	2296	2268	1503	1496
					FEED	364	451	554	772	789	813	803	851	847

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**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2572, E2573, E2516, E2553, E2554, E2551, E2552 SERIES**

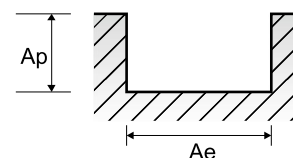
Vc = m/min.  
 fz = mm/tooth  
 RPM = rev./min.  
 FEED = mm/min.

**3 FLUTE - SLOTTING**

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
P	1	Non-alloy steel	1.0D	0.5D	Vc	35	35	35	35	35	35	35	35
					fz	0.002	0.005	0.007	0.012	0.015	0.021	0.027	0.037
					RPM	5570	3714	2785	2228	1857	1393	1114	928
	FEED		33	56	58	80	84	88	90	103			
	2		1.0D	0.5D	Vc	30	30	30	30	30	30	30	30
					fz	0.002	0.004	0.007	0.01	0.014	0.021	0.026	0.033
					RPM	4775	3183	2387	1910	1592	1194	955	796
	FEED		29	38	50	57	67	75	74	79			
	3-4		1.0D	0.5D	Vc	25	25	25	25	25	25	25	25
					fz	0.002	0.003	0.006	0.008	0.011	0.019	0.023	0.029
RPM		3979			2653	1989	1592	1326	995	796	663		
FEED	24	24	36	38	44	57	55	58					
5	1.0D	0.5D	Vc	15	15	15	15	15	15	15	15		
			fz	0.002	0.003	0.006	0.007	0.01	0.018	0.022	0.029		
			RPM	2387	1592	1194	955	796	597	477	398		
FEED	14	14	21	20	24	32	32	35					
6	1.0D	0.5D	Vc	30	30	30	30	30	30	30	30		
			fz	0.002	0.004	0.007	0.01	0.014	0.021	0.026	0.033		
			RPM	4775	3183	2387	1910	1592	1194	955	796		
FEED	29	38	50	57	67	75	74	79					
7	1.0D	0.5D	Vc	25	25	25	25	25	25	25	25		
			fz	0.002	0.003	0.006	0.008	0.011	0.019	0.023	0.029		
			RPM	3979	2653	1989	1592	1326	995	796	663		
FEED	24	24	36	38	44	57	55	58					
8-9	1.0D	0.5D	Vc	15	15	15	15	15	15	15	15		
			fz	0.002	0.003	0.006	0.007	0.01	0.018	0.022	0.029		
			RPM	2387	1592	1194	955	796	597	477	398		
FEED	14	14	21	20	24	32	32	35					
10	1.0D	0.5D	Vc	30	30	30	30	30	30	30	30		
			fz	0.002	0.004	0.007	0.01	0.014	0.021	0.026	0.033		
			RPM	4775	3183	2387	1910	1592	1194	955	796		
FEED	29	38	50	57	67	75	74	79					
11.1	1.0D	0.5D	Vc	15	15	15	15	15	15	15	15		
			fz	0.002	0.003	0.006	0.007	0.01	0.018	0.022	0.029		
			RPM	2387	1592	1194	955	796	597	477	398		
FEED	14	14	21	20	24	32	32	35					
N	21-22	Aluminum-wrought alloy	1.0D	0.5D	Vc	75	105	100	100	105	100	95	95
					fz	0.003	0.005	0.008	0.011	0.013	0.022	0.029	0.035
					RPM	11937	11141	7958	6366	5570	3979	3024	2520
					FEED	107	167	191	210	217	263	263	265
23-24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	49	68	65	65	68	65	62	62	
				fz	0.003	0.005	0.008	0.011	0.013	0.022	0.029	0.035	
				RPM	7799	7215	5173	4138	3608	2586	1974	1645	
				FEED	70	108	124	137	141	171	172	173	

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

▶ NEXT PAGE





**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2572, E2573, E2516, E2553, E2554, E2551, E2552 SERIES**

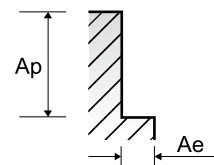
Vc = m/min.  
 fz = mm/tooth  
 RPM = rev./min.  
 FEED = mm/min.

**3 FLUTE - SIDE CUTTING**

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
P	1	Non-alloy steel	0.1D	1.5D	Vc	35	35	35	35	35	35	35	35
					fz	0.004	0.008	0.013	0.02	0.025	0.036	0.045	0.061
					RPM	5570	3714	2785	2228	1857	1393	1114	928
					FEED	67	89	109	134	139	150	150	170
	2		0.1D	1.5D	Vc	30	30	30	30	30	30	30	30
					fz	0.003	0.006	0.011	0.018	0.023	0.036	0.044	0.056
					RPM	4775	3183	2387	1910	1592	1194	955	796
	3-4		0.1D	1.5D	Vc	25	25	25	25	25	25	25	25
					fz	0.003	0.006	0.009	0.014	0.018	0.03	0.038	0.048
					RPM	3979	2653	1989	1592	1326	995	796	663
5	0.1D	1.5D	Vc	15	15	15	15	15	15	15	15		
			fz	0.002	0.004	0.009	0.013	0.019	0.03	0.037	0.046		
			RPM	2387	1592	1194	955	796	597	477	398		
6	0.1D	1.5D	Vc	30	30	30	30	30	30	30	30		
			fz	0.003	0.006	0.011	0.018	0.023	0.036	0.044	0.056		
			RPM	4775	3183	2387	1910	1592	1194	955	796		
7	0.1D	1.5D	Vc	25	25	25	25	25	25	25	25		
			fz	0.003	0.006	0.009	0.014	0.018	0.03	0.038	0.048		
			RPM	3979	2653	1989	1592	1326	995	796	663		
8-9	0.1D	1.5D	Vc	15	15	15	15	15	15	15	15		
			fz	0.002	0.004	0.009	0.013	0.019	0.03	0.037	0.046		
			RPM	2387	1592	1194	955	796	597	477	398		
10	0.1D	1.5D	Vc	30	30	30	30	30	30	30	30		
			fz	0.003	0.006	0.011	0.018	0.023	0.036	0.044	0.056		
			RPM	4775	3183	2387	1910	1592	1194	955	796		
11.1	0.1D	1.5D	Vc	15	15	15	15	15	15	15	15		
			fz	0.002	0.004	0.009	0.013	0.019	0.03	0.037	0.046		
			RPM	2387	1592	1194	955	796	597	477	398		
N	21-22	Aluminum-wrought alloy	0.1D	1.5D	Vc	75	105	100	100	105	100	95	95
					fz	0.005	0.008	0.014	0.019	0.021	0.037	0.048	0.057
					RPM	11937	11141	7958	6366	5570	3979	3024	2520
					FEED	179	267	334	363	351	442	435	431
23-24	Aluminum-cast, alloyed	0.1D	1.5D	Vc	49	68	65	65	68	65	62	62	
				fz	0.005	0.008	0.014	0.019	0.021	0.037	0.048	0.057	
				RPM	7799	7215	5173	4138	3608	2586	1974	1645	
				FEED	117	173	217	236	227	287	284	281	

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

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**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**EQ572, EQ573, EQ516, EQ553, EQ554, EQ551, EQ552 SERIES**

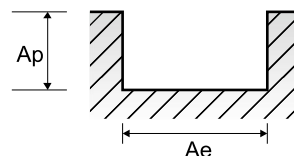
Vc = m/min.  
 fz = mm/tooth  
 RPM = rev./min.  
 FEED = mm/min.

**3 FLUTE TiAIN COATED - SLOTTING**

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
P	1	Non-alloy steel	1.0D	0.5D	Vc	50	45	50	50	45	50	45	50
					fz	0.002	0.005	0.007	0.012	0.015	0.021	0.028	0.036
					RPM	7958	4775	3979	3183	2387	1989	1432	1326
	FEED		48	72	84	115	107	125	120	143			
	2		1.0D	0.5D	Vc	40	40	40	40	40	40	40	40
					fz	0.002	0.004	0.006	0.01	0.014	0.022	0.028	0.033
					RPM	6366	4244	3183	2546	2122	1592	1273	1061
	FEED		38	51	57	76	89	105	107	105			
	3-4		1.0D	0.5D	Vc	35	35	30	35	30	35	35	35
					fz	0.002	0.003	0.005	0.008	0.011	0.018	0.023	0.028
					RPM	5570	3714	2387	2228	1592	1393	1114	928
FEED	33	33	36	53	53	75	77	78					
5	1.0D	0.5D	Vc	20	20	20	20	20	20	20	20		
			fz	0.002	0.003	0.007	0.008	0.011	0.017	0.021	0.03		
			RPM	3183	2122	1592	1273	1061	796	637	531		
FEED	19	19	33	31	35	41	40	48					
6	1.0D	0.5D	Vc	40	40	40	40	40	40	40	40		
			fz	0.002	0.004	0.006	0.01	0.014	0.022	0.028	0.033		
			RPM	6366	4244	3183	2546	2122	1592	1273	1061		
FEED	38	51	57	76	89	105	107	105					
7	1.0D	0.5D	Vc	35	35	30	35	30	35	35	35		
			fz	0.002	0.003	0.005	0.008	0.011	0.018	0.023	0.028		
			RPM	5570	3714	2387	2228	1592	1393	1114	928		
FEED	33	33	36	53	53	75	77	78					
8-9	1.0D	0.5D	Vc	20	20	20	20	20	20	20	20		
			fz	0.002	0.003	0.007	0.008	0.011	0.017	0.021	0.03		
			RPM	3183	2122	1592	1273	1061	796	637	531		
FEED	19	19	33	31	35	41	40	48					
10	1.0D	0.5D	Vc	40	40	40	40	40	40	40	40		
			fz	0.002	0.004	0.006	0.01	0.014	0.022	0.028	0.033		
			RPM	6366	4244	3183	2546	2122	1592	1273	1061		
FEED	38	51	57	76	89	105	107	105					
11.1	1.0D	0.5D	Vc	20	20	20	20	20	20	20	20		
			fz	0.002	0.003	0.007	0.008	0.011	0.017	0.021	0.03		
			RPM	3183	2122	1592	1273	1061	796	637	531		
FEED	19	19	33	31	35	41	40	48					
N	21-22	Aluminum-wrought alloy	1.0D	0.5D	Vc	105	145	140	140	145	140	135	130
					fz	0.003	0.005	0.008	0.011	0.012	0.021	0.029	0.034
					RPM	16711	15385	11141	8913	7692	5570	4297	3448
					FEED	150	231	267	294	277	351	374	352
23-24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	68	94	91	91	94	91	88	85	
				fz	0.003	0.005	0.008	0.011	0.012	0.021	0.029	0.034	
				RPM	10823	9974	7242	5793	4987	3621	2801	2255	
				FEED	97	150	174	191	180	228	244	230	

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

▶ NEXT PAGE





**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**EQ572, EQ573, EQ516, EQ553, EQ554, EQ551, EQ552 SERIES**

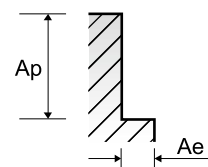
Vc = m/min.  
 fz = mm/tooth  
 RPM = rev./min.  
 FEED = mm/min.

**3 FLUTE TiAIN COATED - SIDE CUTTING**

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
P	1	Non-alloy steel	0.1D	1.5D	Vc	50	45	50	50	45	50	45	50
					fz	0.004	0.007	0.012	0.02	0.025	0.035	0.047	0.059
					RPM	7958	4775	3979	3183	2387	1989	1432	1326
	FEED		95	100	143	191	179	209	202	235			
	2		Vc	40	40	40	40	40	40	40	40		
			fz	0.003	0.006	0.011	0.017	0.023	0.038	0.044	0.058		
			RPM	6366	4244	3183	2546	2122	1592	1273	1061		
	FEED		57	76	105	130	146	181	168	185			
	3-4		Vc	35	35	30	35	30	35	35	35		
			fz	0.003	0.006	0.009	0.014	0.018	0.028	0.038	0.047		
			RPM	5570	3714	2387	2228	1592	1393	1114	928		
FEED	50	67	64	94	86	117	127	131					
5	Vc	20	20	20	20	20	20	20	20				
	fz	0.002	0.005	0.009	0.013	0.018	0.03	0.037	0.045				
	RPM	3183	2122	1592	1273	1061	796	637	531				
FEED	19	32	43	50	57	72	71	72					
6	Vc	40	40	40	40	40	40	40	40				
	fz	0.003	0.006	0.011	0.017	0.023	0.038	0.044	0.058				
	RPM	6366	4244	3183	2546	2122	1592	1273	1061				
FEED	57	76	105	130	146	181	168	185					
7	Vc	35	35	30	35	30	35	35	35				
	fz	0.003	0.006	0.009	0.014	0.018	0.028	0.038	0.047				
	RPM	5570	3714	2387	2228	1592	1393	1114	928				
FEED	50	67	64	94	86	117	127	131					
8-9	Vc	20	20	20	20	20	20	20	20				
	fz	0.002	0.005	0.009	0.013	0.018	0.03	0.037	0.045				
	RPM	3183	2122	1592	1273	1061	796	637	531				
FEED	19	32	43	50	57	72	71	72					
10	Vc	40	40	40	40	40	40	40	40				
	fz	0.003	0.006	0.011	0.017	0.023	0.038	0.044	0.058				
	RPM	6366	4244	3183	2546	2122	1592	1273	1061				
FEED	57	76	105	130	146	181	168	185					
11.1	Vc	20	20	20	20	20	20	20	20				
	fz	0.002	0.005	0.009	0.013	0.018	0.03	0.037	0.045				
	RPM	3183	2122	1592	1273	1061	796	637	531				
FEED	19	32	43	50	57	72	71	72					
N	21-22	Aluminum-wrought alloy	0.1D	1.5D	Vc	105	145	140	140	145	140	135	130
					fz	0.005	0.008	0.014	0.019	0.021	0.037	0.049	0.057
	RPM		16711	15385	11141	8913	7692	5570	4297	3448			
	FEED		251	369	468	508	485	618	632	590			
23-24	Aluminum-cast, alloyed	0.1D	1.5D	Vc	68	94	91	91	94	91	88	85	
				fz	0.005	0.008	0.014	0.019	0.021	0.037	0.049	0.057	
RPM		10823	9974	7242	5793	4987	3621	2801	2255				
FEED		162	239	304	330	314	402	412	386				

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

▶ NEXT PAGE





**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2574, E2575, E2576, E2577, E2597, E2598, E2776 SERIES**

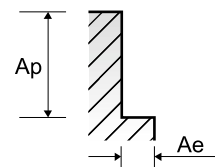
Vc = m/min.  
 fz = mm/tooth  
 RPM = rev./min.  
 FEED = mm/min.

**MULTI FLUTE - SIDE CUTTING**

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)						
						2.0	3.0	4.0	5.0	6.0	8.0	10.0
P	1	Non-alloy steel	0.1D	1.5D	Vc	35	35	35	35	35	35	35
					fz	0.004	0.008	0.013	0.02	0.025	0.036	0.045
					RPM	5570	3714	2785	2228	1857	1393	1114
	2		0.1D	1.5D	Vc	30	30	30	30	30	30	30
					fz	0.003	0.006	0.011	0.017	0.023	0.036	0.044
					RPM	4775	3183	2387	1910	1592	1194	955
	3-4		0.1D	1.5D	Vc	25	25	25	25	25	25	25
					fz	0.003	0.006	0.009	0.014	0.019	0.029	0.038
					RPM	3979	2653	1989	1592	1326	995	796
	5		0.1D	1.5D	Vc	15	15	15	15	15	15	15
					fz	0.002	0.005	0.01	0.014	0.019	0.029	0.036
RPM		2387			1592	1194	955	796	597	477		
6	0.1D	1.5D	Vc	30	30	30	30	30	30	30		
			fz	0.003	0.006	0.011	0.017	0.023	0.036	0.044		
			RPM	4775	3183	2387	1910	1592	1194	955		
7	0.1D	1.5D	Vc	25	25	25	25	25	25	25		
			fz	0.003	0.006	0.009	0.014	0.019	0.029	0.038		
			RPM	3979	2653	1989	1592	1326	995	796		
8-9	0.1D	1.5D	Vc	15	15	15	15	15	15	15		
			fz	0.002	0.005	0.01	0.014	0.019	0.029	0.036		
			RPM	2387	1592	1194	955	796	597	477		
10	0.1D	1.5D	Vc	30	30	30	30	30	30	30		
			fz	0.003	0.006	0.011	0.017	0.023	0.036	0.044		
			RPM	4775	3183	2387	1910	1592	1194	955		
11.1	0.1D	1.5D	Vc	15	15	15	15	15	15	15		
			fz	0.002	0.005	0.01	0.014	0.019	0.029	0.036		
			RPM	2387	1592	1194	955	796	597	477		
N	21-22	Aluminum-wrought alloy	0.1D	1.5D	Vc	75	105	100	100	105	100	95
					fz	0.005	0.009	0.014	0.019	0.021	0.036	0.048
					RPM	11937	11141	7958	6366	5570	3979	3024
					FEED	239	401	446	484	468	573	581
23-24	Aluminum-cast, alloyed	0.1D	1.5D	Vc	49	68	65	65	68	65	62	
				fz	0.005	0.009	0.014	0.019	0.021	0.036	0.048	
				RPM	7799	7215	5173	4138	3608	2586	1974	
				FEED	156	260	290	314	303	372	379	

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

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**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**EQ574, EQ575, EQ576, EQ577, EQ597, EQ598, EQ776** SERIES

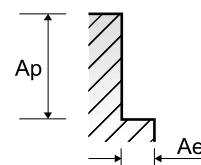
Vc = m/min.  
 fz = mm/tooth  
 RPM = rev./min.  
 FEED = mm/min.

**MULTI FLUTE TiAIN COATED - SIDE CUTTING**

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
P	1	Non-alloy steel	0.1D	1.5D	Vc	50	45	50	50	45	50	50	45
					fz	0.004	0.008	0.013	0.02	0.025	0.036	0.045	0.062
					RPM	7958	4775	3979	3183	2387	1989	1592	1194
					FEED	127	153	207	255	239	286	286	296
	2		Vc	40	40	40	40	40	40	40	40		
			fz	0.003	0.006	0.011	0.018	0.023	0.036	0.045	0.057		
			RPM	6366	4244	3183	2546	2122	1592	1273	1061		
	3-4		Vc	35	35	30	35	30	30	35	35		
			fz	0.003	0.006	0.009	0.014	0.018	0.029	0.039	0.047		
			RPM	5570	3714	2387	2228	1592	1194	1114	928		
	5		Vc	20	20	20	20	20	20	20	20		
fz		0.002	0.004	0.01	0.014	0.019	0.028	0.035	0.048				
RPM		3183	2122	1592	1273	1061	796	637	531				
6	Vc	40	40	40	40	40	40	40	40				
	fz	0.003	0.006	0.011	0.018	0.023	0.036	0.045	0.057				
	RPM	6366	4244	3183	2546	2122	1592	1273	1061				
7	Vc	35	35	30	35	30	30	35	35				
	fz	0.003	0.006	0.009	0.014	0.018	0.029	0.039	0.047				
	RPM	5570	3714	2387	2228	1592	1194	1114	928				
8-9	Vc	20	20	20	20	20	20	20	20				
	fz	0.002	0.004	0.01	0.014	0.019	0.028	0.035	0.048				
	RPM	3183	2122	1592	1273	1061	796	637	531				
10	Vc	40	40	40	40	40	40	40	40				
	fz	0.003	0.006	0.011	0.018	0.023	0.036	0.045	0.057				
	RPM	6366	4244	3183	2546	2122	1592	1273	1061				
11.1	Vc	20	20	20	20	20	20	20	20				
	fz	0.002	0.004	0.01	0.014	0.019	0.028	0.035	0.048				
	RPM	3183	2122	1592	1273	1061	796	637	531				
N	21-22	Aluminum-wrought alloy	0.1D	1.5D	Vc	105	145	140	140	150	140	135	130
					fz	0.005	0.009	0.014	0.019	0.021	0.036	0.048	0.057
					RPM	16711	15385	11141	8913	7958	5570	4297	3448
					FEED	334	554	624	677	668	802	825	786
23-24	Aluminum-cast, alloyed	0.1D	1.5D	Vc	68	94	91	91	98	91	88	85	
				fz	0.005	0.009	0.014	0.019	0.021	0.036	0.048	0.057	
				RPM	10823	9974	7242	5793	5199	3621	2801	2255	
				FEED	216	359	406	440	437	521	538	514	

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

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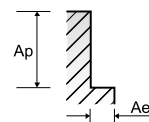
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**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2461, E2462, E2463** SERIES

**MULTI FLUTE - SIDE CUTTING**



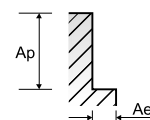
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 fz = mm/tooth  
 RPM = rev./min.  
 FEED = mm/min.

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)					
						2.0	3.0	4.0	5.0	6.0	8.0
P	1-2	Non-alloy steel	0.3D	1.5D	Vc	30	35	30	30	35	30
					fz	0.004	0.007	0.012	0.019	0.016	0.026
	RPM		4775	3714	2387	1910	1857	1194			
	FEED		38	52	57	73	89	93			
	3-4		0.3D	1.5D	Vc	30	30	25	30	25	25
					fz	0.003	0.006	0.01	0.015	0.014	0.022
	5		0.3D	1.5D	Vc	15	15	15	15	15	15
					fz	0.002	0.006	0.01	0.015	0.013	0.022
	6		0.3D	1.5D	Vc	30	35	30	30	35	30
					fz	0.004	0.007	0.012	0.019	0.016	0.026
	7		0.3D	1.5D	Vc	30	30	25	30	25	25
fz		0.003			0.006	0.01	0.015	0.014	0.022		
8-9	0.3D	1.5D	Vc	30	30	25	30	25	25		
			fz	0.003	0.006	0.01	0.015	0.014	0.022		
10	0.3D	1.5D	Vc	15	15	15	15	15	15		
			fz	0.002	0.006	0.01	0.015	0.013	0.022		
11.1	0.3D	1.5D	Vc	30	35	30	30	35	30		
			fz	0.004	0.007	0.012	0.019	0.016	0.026		

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**EQ461, EQ462, EQ463** SERIES

**MULTI FLUTE TiAIN COATED - SIDE CUTTING**



ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)					
						2.0	3.0	4.0	5.0	6.0	8.0
P	1-2	Non-alloy steel	0.3D	1.5D	Vc	45	45	45	45	50	40
					fz	0.004	0.007	0.012	0.019	0.016	0.027
	RPM		7162	4775	3581	2865	2653	1592			
	FEED		57	67	86	109	127	129			
	3-4		0.3D	1.5D	Vc	40	35	35	40	35	35
					fz	0.003	0.006	0.01	0.015	0.014	0.021
	5		0.3D	1.5D	Vc	20	25	20	20	25	20
					fz	0.002	0.006	0.01	0.014	0.013	0.022
	6		0.3D	1.5D	Vc	3183	2653	1592	1273	1326	796
					fz	13	32	32	36	52	53
	7		0.3D	1.5D	Vc	45	45	45	45	50	40
fz		0.004			0.007	0.012	0.019	0.016	0.027		
8-9	0.3D	1.5D	Vc	7162	4775	3581	2865	2653	1592		
			fz	57	67	86	109	127	129		
10	0.3D	1.5D	Vc	40	35	35	40	35	35		
			fz	0.003	0.006	0.01	0.015	0.014	0.021		
11.1	0.3D	1.5D	Vc	6366	3714	2785	2546	1857	1393		
			fz	38	45	56	76	78	88		
11.1	0.3D	1.5D	Vc	20	25	20	20	25	20		
			fz	0.002	0.006	0.01	0.014	0.013	0.022		

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**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2761, E2753, E2762, E2751, E2764, E2752, E2765, E2778, E2777 SERIES**

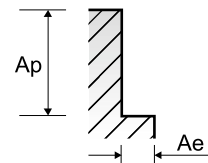
Vc = m/min.  
 fz = mm/tooth  
 RPM = rev./min.  
 FEED = mm/min.

**MULTI FLUTE ROUGHING - SIDE CUTTING**

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)					
						6.0	8.0	10.0	12.0	14.0	16.0
P	1	Non-alloy steel	0.5D	1.5D	Vc	35	35	35	35	35	35
					fz	0.015	0.025	0.034	0.05	0.056	0.064
					RPM	1857	1393	1114	928	796	696
	2		0.5D	1.5D	Vc	30	30	30	30	30	30
					fz	0.013	0.023	0.033	0.044	0.05	0.063
					RPM	1592	1194	955	796	682	597
	3-4		0.5D	1.5D	Vc	25	25	25	25	25	25
					fz	0.015	0.024	0.034	0.044	0.049	0.061
					RPM	1326	995	796	663	568	497
	5		0.5D	1.5D	Vc	15	15	15	15	15	15
					fz	0.013	0.021	0.033	0.044	0.05	0.063
RPM		796			597	477	398	341	298		
6	0.5D	1.5D	Vc	30	30	30	30	30	30		
			fz	0.013	0.023	0.033	0.044	0.05	0.063		
			RPM	1592	1194	955	796	682	597		
7	0.5D	1.5D	Vc	25	25	25	25	25	25		
			fz	0.015	0.024	0.034	0.044	0.049	0.061		
			RPM	1326	995	796	663	568	497		
8-9	0.5D	1.5D	Vc	15	15	15	15	15	15		
			fz	0.013	0.021	0.033	0.044	0.05	0.063		
			RPM	796	597	477	398	341	298		
10	0.5D	1.5D	Vc	30	30	30	30	30	30		
			fz	0.013	0.023	0.033	0.044	0.05	0.063		
			RPM	1592	1194	955	796	682	597		
11.1	0.5D	1.5D	Vc	15	15	15	15	15	15		
			fz	0.013	0.021	0.033	0.044	0.05	0.063		
			RPM	796	597	477	398	341	298		
21-22	0.5D	1.5D	Vc	85	80	80	75	80	80		
			fz	0.015	0.025	0.035	0.05	0.058	0.07		
			RPM	4509	3183	2546	1989	1819	1592		
23-24	0.5D	1.5D	Vc	55	52	52	49	52	52		
			fz	0.015	0.025	0.035	0.05	0.058	0.07		
			RPM	2918	2069	1655	1300	1182	1035		

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

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**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**EQ761, EQ753, EQ762, EQ751 EQ764, EQ752 EQ765, EQ778, EQ777 SERIES**

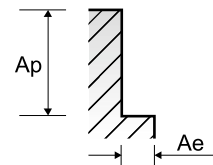
Vc = m/min.  
 fz = mm/tooth  
 RPM = rev./min.  
 FEED = mm/min.

**MULTI FLUTE ROUGHING TiAIN COATED - SIDE CUTTING**

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)					
						6.0	8.0	10.0	12.0	14.0	16.0
P	1	Non-alloy steel	0.5D	1.5D	Vc	45	50	50	45	50	50
					fz	0.015	0.025	0.034	0.05	0.057	0.063
					RPM	2387	1989	1592	1194	1137	995
	2		0.5D	1.5D	Vc	40	40	40	40	45	40
					fz	0.013	0.023	0.034	0.044	0.049	0.061
					RPM	2122	1592	1273	1061	1023	796
	3-4		0.5D	1.5D	Vc	30	30	35	35	35	35
					fz	0.015	0.024	0.035	0.043	0.048	0.06
					RPM	1592	1194	1114	928	796	696
	5		0.5D	1.5D	Vc	20	20	20	20	20	20
					fz	0.012	0.021	0.033	0.045	0.05	0.063
RPM		1061			796	637	531	455	398		
6	0.5D	1.5D	Vc	40	40	40	40	45	40		
			fz	0.013	0.023	0.034	0.044	0.049	0.061		
			RPM	2122	1592	1273	1061	1023	796		
7	0.5D	1.5D	Vc	30	30	35	35	35	35		
			fz	0.015	0.024	0.035	0.043	0.048	0.06		
			RPM	1592	1194	1114	928	796	696		
8-9	0.5D	1.5D	Vc	20	20	20	20	20	20		
			fz	0.012	0.021	0.033	0.045	0.05	0.063		
			RPM	1061	796	637	531	455	398		
10	0.5D	1.5D	Vc	40	40	40	40	45	40		
			fz	0.013	0.023	0.034	0.044	0.049	0.061		
			RPM	2122	1592	1273	1061	1023	796		
11.1	0.5D	1.5D	Vc	20	20	20	20	20	20		
			fz	0.012	0.021	0.033	0.045	0.05	0.063		
			RPM	1061	796	637	531	455	398		
N	21-22	Aluminum-wrought alloy	0.5D	1.5D	Vc	120	110	110	105	110	115
					fz	0.015	0.025	0.035	0.05	0.059	0.07
					RPM	6366	4377	3501	2785	2501	2288
					FEED	286	328	490	557	590	641
N	23-24	Aluminum-cast, alloyed	0.5D	1.5D	Vc	78	72	72	68	72	75
					fz	0.015	0.025	0.035	0.05	0.059	0.07
					RPM	4138	2865	2292	1804	1637	1492
					FEED	186	215	321	361	386	418

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

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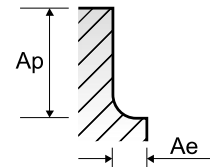
**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOLGENE SCHNEIDPARAMETER**

**E2606, E2757** SERIES

**MULTI FLUTE BALL NOSE ROUGHING - SIDE CUTTING**

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)							
						8.0	10.0	12.0	16.0	20.0	25.0	32.0	40.0
P	1	Non-alloy steel	0.5D	1.5D	Vc	35	35	35	35	35	35	35	35
					fz	0.025	0.045	0.05	0.064	0.08	0.122	0.15	0.179
					RPM	1393	1114	928	696	557	446	348	279
	2		Vc	30	30	30	30	30	30	30	30		
			fz	0.023	0.044	0.044	0.063	0.078	0.106	0.143	0.17		
			RPM	1194	955	796	597	477	382	298	239		
	3-4		Vc	25	25	25	25	25	25	25	25		
			fz	0.024	0.046	0.044	0.061	0.069	0.113	0.148	0.167		
			RPM	995	796	663	497	398	318	199	199		
	5		Vc	15	15	15	15	15	15	15	15		
			fz	0.021	0.044	0.044	0.063	0.08	0.118	0.152	0.182		
RPM		597	477	398	298	239	191	149	119				
6	Vc	30	30	30	30	30	30	30	30				
	fz	0.023	0.044	0.044	0.063	0.078	0.106	0.143	0.17				
	RPM	1194	955	796	597	477	382	298	239				
7	Vc	25	25	25	25	25	25	25	25				
	fz	0.024	0.046	0.044	0.061	0.069	0.113	0.148	0.167				
	RPM	995	796	663	497	398	318	199	199				
8-9	Vc	15	15	15	15	15	15	15	15				
	fz	0.021	0.044	0.044	0.063	0.08	0.118	0.152	0.182				
	RPM	597	477	398	298	239	191	149	119				
10	Vc	30	30	30	30	30	30	30	30				
	fz	0.023	0.044	0.044	0.063	0.078	0.106	0.143	0.17				
	RPM	1194	955	796	597	477	382	298	239				
11.1	Vc	15	15	15	15	15	15	15	15				
	fz	0.021	0.044	0.044	0.063	0.08	0.118	0.152	0.182				
	RPM	597	477	398	298	239	191	149	119				
N	21-22	Aluminum-wrought alloy	0.5D	1.5D	Vc	80	80	75	80	75	80	80	80
					fz	0.025	0.033	0.05	0.07	0.104	0.113	0.156	0.179
					RPM	3183	2546	1989	1592	1194	1019	796	637
					FEED	239	252	398	446	497	460	497	456
23-24	Aluminum-cast, alloyed	0.5D	1.5D	Vc	52	52	49	52	49	52	52	52	
				fz	0.025	0.033	0.05	0.07	0.104	0.113	0.156	0.179	
				RPM	2069	1655	1300	1035	780	662	517	414	
				FEED	155	164	260	290	324	299	323	296	

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







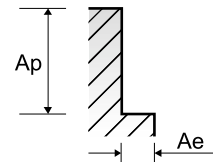
**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2524** SERIES

**MULTI FLUTE ROUGHING - SIDE CUTTING**

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)								
						6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	
P	1	Non-alloy steel	0.5D	1.5D	Vc	35	35	35	35	35	35	35	35	35
					fz	0.015	0.019	0.034	0.05	0.056	0.064	0.071	0.08	
					RPM	1857	1393	1114	928	796	696	619	557	
					FEED	84	106	152	186	178	178	176	178	
					Vc	30	30	30	30	30	30	30	30	
	2		fz	0.013	0.017	0.033	0.044	0.05	0.063	0.07	0.078			
			RPM	1592	1194	955	796	682	597	531	477			
	3-4		FEED	62	81	126	140	136	150	149	149			
			Vc	25	25	25	25	25	25	25	25			
	5		fz	0.015	0.018	0.034	0.044	0.049	0.061	0.069	0.069			
			RPM	1326	995	796	663	568	497	442	398			
6	FEED	60	72	108	117	111	121	122	110					
	Vc	15	15	15	15	15	15	15	15					
7	fz	0.013	0.016	0.033	0.044	0.05	0.063	0.07	0.08					
	RPM	796	597	477	398	341	298	265	239					
8-9	FEED	31	38	63	70	68	75	74	76					
	Vc	30	30	30	30	30	30	30	30					
10	fz	0.013	0.017	0.033	0.044	0.05	0.063	0.07	0.078					
	RPM	1592	1194	955	796	682	597	531	477					
11.1	FEED	62	81	126	140	136	150	149	149					
	Vc	15	15	15	15	15	15	15	15					
N	21-22	Aluminum-wrought alloy	0.5D	1.5D	fz	0.015	0.019	0.035	0.05	0.058	0.07	0.084	0.104	
					RPM	4509	3183	2546	1989	1819	1592	1415	1194	
23-24	Aluminum-cast, alloyed	0.5D	1.5D	FEED	62	81	126	140	136	150	149	149		
				Vc	55	52	52	49	52	52	52	49		
					fz	0.015	0.019	0.035	0.05	0.058	0.07	0.084	0.104	
					RPM	2918	2069	1655	1300	1182	1035	920	780	
					FEED	62	81	126	140	136	150	149	149	

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





**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2595, E2596** SERIES

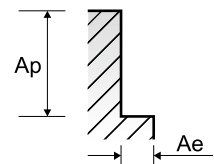
**MULTI FLUTE - SIDE CUTTING**

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
P	1	Non-alloy steel	0.1D	1.5D	Vc	35	35	35	35	35	35	35
					fz	0.004	0.008	0.013	0.02	0.025	0.036	0.045
					RPM	5570	3714	2785	2228	1857	1393	1114
	2		Vc	30	30	30	30	30	30	30		
			fz	0.003	0.006	0.011	0.017	0.023	0.036	0.044		
			RPM	4775	3183	2387	1910	1592	1194	955		
	3-4		Vc	25	25	25	25	25	25	25		
			fz	0.003	0.006	0.009	0.014	0.019	0.029	0.038		
			RPM	3979	2653	1989	1592	1326	995	796		
	5		Vc	15	15	15	15	15	15	15		
fz		0.002	0.005	0.01	0.014	0.019	0.029	0.036				
RPM		2387	1592	1194	955	796	597	477				
6	Vc	30	30	30	30	30	30	30				
	fz	0.003	0.006	0.011	0.017	0.023	0.036	0.044				
	RPM	4775	3183	2387	1910	1592	1194	955				
7	Vc	25	25	25	25	25	25	25				
	fz	0.003	0.006	0.009	0.014	0.019	0.029	0.038				
	RPM	3979	2653	1989	1592	1326	995	796				
8-9	Vc	15	15	15	15	15	15	15				
	fz	0.002	0.005	0.01	0.014	0.019	0.029	0.036				
	RPM	2387	1592	1194	955	796	597	477				
10	Vc	30	30	30	30	30	30	30				
	fz	0.003	0.006	0.011	0.017	0.023	0.036	0.044				
	RPM	4775	3183	2387	1910	1592	1194	955				
11.1	Vc	15	15	15	15	15	15	15				
	fz	0.002	0.005	0.01	0.014	0.019	0.029	0.036				
	RPM	2387	1592	1194	955	796	597	477				
N	21-22	Aluminum-wrought alloy	0.1D	1.5D	Vc	75	105	100	100	105	100	95
					fz	0.005	0.009	0.014	0.019	0.021	0.036	0.048
					RPM	11937	11141	7958	6366	5570	3979	3024
23-24	Aluminum-cast, alloyed	0.1D	1.5D	Vc	49	68	65	65	68	65	62	
				fz	0.005	0.009	0.014	0.019	0.021	0.036	0.048	
				RPM	7799	7215	5173	4138	3608	2586	1974	

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

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**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**EQ595, EQ596 SERIES**

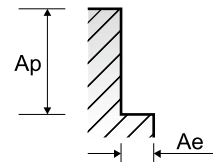
**MULTI FLUTE TiAlN COATED - SIDE CUTTING**

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
P	1	Non-alloy steel	0.1D	1.5D	Vc	50	45	50	50	45	50	50
					fz	0.004	0.008	0.013	0.02	0.025	0.036	0.045
					RPM	7958	4775	3979	3183	2387	1989	1592
	2		Vc	40	40	40	40	40	40	40		
			fz	0.003	0.006	0.011	0.018	0.023	0.036	0.045		
			RPM	6366	4244	3183	2546	2122	1592	1273		
	3-4		Vc	35	35	30	35	30	30	35		
			fz	0.003	0.006	0.009	0.014	0.018	0.029	0.039		
			RPM	5570	3714	2387	2228	1592	1194	1114		
	5		Vc	20	20	20	20	20	20	20		
fz		0.002	0.004	0.01	0.014	0.019	0.028	0.035				
RPM		3183	2122	1592	1273	1061	796	637				
6	Vc	40	40	40	40	40	40	40				
	fz	0.003	0.006	0.011	0.018	0.023	0.036	0.045				
	RPM	6366	4244	3183	2546	2122	1592	1273				
7	Vc	35	35	30	35	30	30	35				
	fz	0.003	0.006	0.009	0.014	0.018	0.029	0.039				
	RPM	5570	3714	2387	2228	1592	1194	1114				
8-9	Vc	20	20	20	20	20	20	20				
	fz	0.002	0.004	0.01	0.014	0.019	0.028	0.035				
	RPM	3183	2122	1592	1273	1061	796	637				
10	Vc	40	40	40	40	40	40	40				
	fz	0.003	0.006	0.011	0.018	0.023	0.036	0.045				
	RPM	6366	4244	3183	2546	2122	1592	1273				
11.1	Vc	20	20	20	20	20	20	20				
	fz	0.002	0.004	0.01	0.014	0.019	0.028	0.035				
	RPM	3183	2122	1592	1273	1061	796	637				
N	21-22	Aluminum-wrought alloy	0.1D	1.5D	Vc	105	145	140	140	150	140	135
					fz	0.005	0.009	0.014	0.019	0.021	0.036	0.048
					RPM	16711	15385	11141	8913	7958	5570	4297
					FEED	334	554	624	677	668	802	825
23-24	Aluminum-cast, alloyed	0.1D	1.5D	Vc	68	94	91	91	98	91	88	
				fz	0.005	0.009	0.014	0.019	0.021	0.036	0.048	
				RPM	10823	9974	7242	5793	5199	3621	2801	
				FEED	216	359	406	440	437	521	538	

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

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**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2755, E2756** SERIES

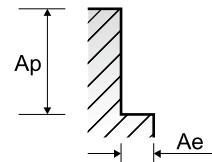
**3 FLUTE ROUGHING - SIDE CUTTING**

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
P	1	Non-alloy steel	0.5D	1.5D	Vc	35	35	35	35
					fz	0.015	0.025	0.045	0.067
					RPM	1857	1393	1114	928
	FEED		84	104	150	187			
	2		Vc	30	30	30	30		
			fz	0.013	0.023	0.044	0.058		
			RPM	1592	1194	955	796		
	FEED		62	82	126	138			
	3-4		Vc	25	25	25	25		
			fz	0.015	0.024	0.046	0.058		
RPM		1326	995	796	663				
FEED	60	72	110	115					
5	Vc	15	15	15	15				
	fz	0.013	0.021	0.044	0.058				
	RPM	796	597	477	398				
FEED	31	38	63	69					
6	Vc	30	30	30	30				
	fz	0.013	0.023	0.044	0.058				
	RPM	1592	1194	955	796				
FEED	62	82	126	138					
7	Vc	25	25	25	25				
	fz	0.015	0.024	0.046	0.058				
	RPM	1326	995	796	663				
FEED	60	72	110	115					
8-9	Vc	15	15	15	15				
	fz	0.013	0.021	0.044	0.058				
	RPM	796	597	477	398				
FEED	31	38	63	69					
10	Vc	30	30	30	30				
	fz	0.013	0.023	0.044	0.058				
	RPM	1592	1194	955	796				
FEED	62	82	126	138					
11.1	Vc	15	15	15	15				
	fz	0.013	0.021	0.044	0.058				
	RPM	796	597	477	398				
FEED	31	38	63	69					
N	21-22	Aluminum-wrought alloy	0.5D	1.5D	Vc	85	80	80	75
					fz	0.015	0.025	0.047	0.067
	RPM		4509	3183	2546	1989			
	FEED		203	239	359	400			
23-24	Aluminum-cast, alloyed	0.5D	1.5D	Vc	55	52	52	49	
				fz	0.015	0.025	0.047	0.067	
RPM		2918	2069	1655	1300				
FEED		131	155	233	261				

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

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**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

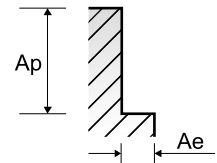
**E2779** SERIES

**MULTI FLUTE ROUGHING & FINISHING - SIDE CUTTING**

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

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)												
						16.0	18.0	20.0	22.0	25.0	28.0	30.0	32.0	36.0	40.0	45.0	50.0	
P	1	Non-alloy steel	0.5D	1.5D	Vc	35	35	35	35	35	35	35	35	35	35	35	35	35
					fz	0.052	0.058	0.065	0.07	0.078	0.071	0.081	0.081	0.091	0.095	0.099	0.11	
					RPM	696	619	557	506	446	398	371	348	309	279	248	223	
	2		Vc	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
			fz	0.049	0.055	0.061	0.06	0.068	0.062	0.07	0.077	0.087	0.091	0.099	0.106			
			RPM	597	531	477	434	382	341	318	298	265	239	212	191			
	3-4		Vc	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
			fz	0.05	0.056	0.056	0.063	0.071	0.063	0.07	0.08	0.088	0.088	0.088	0.088	0.094		
			RPM	497	442	398	362	318	284	265	249	221	199	177	159			
	5		Vc	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
fz		0.049	0.055	0.063	0.064	0.078	0.073	0.073	0.083	0.097	0.098	0.099	0.1					
RPM		298	265	239	217	191	171	159	149	133	119	106	95					
6	Vc	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30		
	fz	0.049	0.055	0.061	0.06	0.068	0.062	0.07	0.077	0.087	0.091	0.099	0.106					
	RPM	597	531	477	434	382	341	318	298	265	239	212	191					
7	Vc	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25		
	fz	0.05	0.056	0.056	0.063	0.071	0.063	0.07	0.08	0.088	0.088	0.088	0.088	0.094				
	RPM	497	442	398	362	318	284	265	249	221	199	177	159					
8-9	Vc	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15		
	fz	0.049	0.055	0.063	0.064	0.078	0.073	0.073	0.083	0.097	0.098	0.099	0.1					
	RPM	298	265	239	217	191	171	159	149	133	119	106	95					
10	Vc	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30		
	fz	0.049	0.055	0.061	0.06	0.068	0.062	0.07	0.077	0.087	0.091	0.099	0.106					
	RPM	597	531	477	434	382	341	318	298	265	239	212	191					
11.1	Vc	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15		
	fz	0.049	0.055	0.063	0.064	0.078	0.073	0.073	0.083	0.097	0.098	0.099	0.1					
	RPM	298	265	239	217	191	171	159	149	133	119	106	95					
N	21-22	Aluminum-wrought alloy	0.5D	1.5D	Vc	80	80	80	80	80	80	85	80	80	80	80	80	
					fz	0.056	0.068	0.083	0.069	0.072	0.076	0.078	0.083	0.09	0.095	0.1	0.11	
					RPM	1592	1415	1273	1157	1019	909	902	796	707	637	566	509	
23-24	Aluminum-cast, alloyed	0.5D	1.5D	Vc	52	52	52	52	52	52	55	52	52	52	52	52		
				fz	0.056	0.068	0.083	0.069	0.072	0.076	0.078	0.083	0.09	0.095	0.1	0.11		
				RPM	1035	920	828	752	662	591	584	517	460	414	368	331		

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





**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2766, E2767 SERIES**

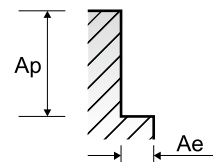
**3 FLUTE ROUGHING & FINISHING - SIDE CUTTING**

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
P	1	Non-alloy steel	0.5D	1.5D	Vc	35	35	35	35	35	35
					fz	0.012	0.02	0.036	0.054	0.06	0.069
					RPM	1857	1393	1114	928	796	696
	FEED		67	84	120	150	143	144			
	2		Vc	30	30	30	30	30	30		
			fz	0.01	0.018	0.035	0.046	0.052	0.065		
			RPM	1592	1194	955	796	682	597		
	FEED		48	64	100	110	106	116			
	3-4		Vc	25	25	25	25	25	25		
			fz	0.013	0.019	0.038	0.048	0.054	0.067		
RPM		1326	995	796	663	568	497				
FEED	52	57	91	95	92	100					
5	Vc	15	15	15	15	15	15				
	fz	0.01	0.018	0.037	0.046	0.052	0.065				
	RPM	796	597	477	398	341	298				
FEED	24	32	53	55	53	58					
6	Vc	30	30	30	30	30	30				
	fz	0.01	0.018	0.035	0.046	0.052	0.065				
	RPM	1592	1194	955	796	682	597				
FEED	48	64	100	110	106	116					
7	Vc	25	25	25	25	25	25				
	fz	0.013	0.019	0.038	0.048	0.054	0.067				
	RPM	1326	995	796	663	568	497				
FEED	52	57	91	95	92	100					
8-9	Vc	15	15	15	15	15	15				
	fz	0.01	0.018	0.037	0.046	0.052	0.065				
	RPM	796	597	477	398	341	298				
FEED	24	32	53	55	53	58					
10	Vc	30	30	30	30	30	30				
	fz	0.01	0.018	0.035	0.046	0.052	0.065				
	RPM	1592	1194	955	796	682	597				
FEED	48	64	100	110	106	116					
11.1	Vc	15	15	15	15	15	15				
	fz	0.01	0.018	0.037	0.046	0.052	0.065				
	RPM	796	597	477	398	341	298				
FEED	24	32	53	55	53	58					
N	21-22	Aluminum-wrought alloy	0.5D	1.5D	Vc	85	80	80	80	80	80
					fz	0.012	0.02	0.037	0.053	0.063	0.075
	RPM		4509	3183	2546	2122	1819	1592			
	FEED		162	191	283	337	344	358			
23-24	Aluminum-cast, alloyed	0.5D	1.5D	Vc	55	52	52	52	52	52	
				fz	0.012	0.02	0.037	0.053	0.063	0.075	
RPM	2918	2069	1655	1379	1182	1035					
FEED	105	124	184	219	223	233					

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

▶ NEXT PAGE





**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**EQ766, EQ767 SERIES**

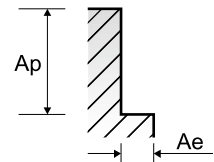
**3 FLUTE ROUGHING & FINISHING TIAN COATED - SIDE CUTTING**

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
P	1	Non-alloy steel	0.5D	1.5D	Vc	50	50	50	50	50	50
					fz	0.012	0.021	0.037	0.055	0.062	0.068
					RPM	2653	1989	1592	1326	1137	995
	2		0.5D	1.5D	Vc	40	40	40	40	45	40
					fz	0.01	0.018	0.036	0.047	0.052	0.065
					RPM	2122	1592	1273	1061	1023	796
	3-4		0.5D	1.5D	Vc	30	30	35	35	35	35
					fz	0.013	0.019	0.038	0.046	0.052	0.064
					RPM	1592	1194	1114	928	796	696
	5		0.5D	1.5D	Vc	20	20	20	20	20	20
					fz	0.011	0.017	0.036	0.045	0.05	0.063
RPM		1061			796	637	531	455	398		
6	0.5D	1.5D	Vc	40	40	40	40	45	40		
			fz	0.01	0.018	0.036	0.047	0.052	0.065		
			RPM	2122	1592	1273	1061	1023	796		
7	0.5D	1.5D	Vc	30	30	35	35	35	35		
			fz	0.013	0.019	0.038	0.046	0.052	0.064		
			RPM	1592	1194	1114	928	796	696		
8-9	0.5D	1.5D	Vc	20	20	20	20	20	20		
			fz	0.011	0.017	0.036	0.045	0.05	0.063		
			RPM	1061	796	637	531	455	398		
10	0.5D	1.5D	Vc	40	40	40	40	45	40		
			fz	0.01	0.018	0.036	0.047	0.052	0.065		
			RPM	2122	1592	1273	1061	1023	796		
11.1	0.5D	1.5D	Vc	20	20	20	20	20	20		
			fz	0.011	0.017	0.036	0.045	0.05	0.063		
			RPM	1061	796	637	531	455	398		
N	21-22	Aluminum-wrought alloy	0.5D	1.5D	Vc	120	110	110	105	110	115
					fz	0.012	0.02	0.037	0.054	0.063	0.075
					RPM	6366	4377	3501	2785	2501	2288
					FEED	229	263	389	451	473	515
23-24	Aluminum-cast, alloyed	0.5D	1.5D	Vc	78	72	72	68	72	75	
				fz	0.012	0.02	0.037	0.054	0.063	0.075	
				RPM	4138	2865	2292	1804	1637	1492	
				FEED	149	172	254	292	309	336	

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

▶ NEXT PAGE





**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2754, E2768** SERIES

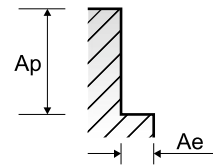
**MULTI FLUTE ROUGHING & FINISHING - SIDE CUTTING**

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
P	1	Non-alloy steel	0.5D	1.5D	Vc	35	35	35	35	35	35
					fz	0.012	0.015	0.027	0.04	0.045	0.052
					RPM	1857	1393	1114	928	796	696
	2		0.5D	1.5D	Vc	30	30	30	30	30	30
					fz	0.01	0.014	0.026	0.034	0.039	0.049
					RPM	1592	1194	955	796	682	597
	3-4		0.5D	1.5D	Vc	25	25	25	25	25	25
					fz	0.013	0.014	0.028	0.036	0.04	0.05
					RPM	1326	995	796	663	568	497
	5		0.5D	1.5D	Vc	15	15	15	15	15	15
					fz	0.01	0.013	0.028	0.034	0.039	0.049
RPM		796			597	477	398	341	298		
6	0.5D	1.5D	Vc	24	31	53	54	53	58		
			fz	0.01	0.014	0.026	0.034	0.039	0.049		
			RPM	1592	1194	955	796	682	597		
7	0.5D	1.5D	Vc	48	67	99	108	106	117		
			fz	25	25	25	25	25	25		
			RPM	1326	995	796	663	568	497		
8-9	0.5D	1.5D	Vc	52	56	89	95	91	99		
			fz	15	15	15	15	15	15		
			RPM	796	597	477	398	341	298		
10	0.5D	1.5D	Vc	24	31	53	54	53	58		
			fz	0.01	0.014	0.026	0.034	0.039	0.049		
			RPM	1592	1194	955	796	682	597		
11.1	0.5D	1.5D	Vc	48	67	99	108	106	117		
			fz	15	15	15	15	15	15		
			RPM	796	597	477	398	341	298		
21-22	0.5D	1.5D	Vc	24	31	53	54	53	58		
			fz	0.01	0.013	0.028	0.034	0.039	0.049		
			RPM	796	597	477	398	341	298		
23-24	0.5D	1.5D	Vc	85	80	80	80	80	80		
			fz	0.012	0.015	0.028	0.04	0.047	0.056		
			RPM	4509	3183	2546	2122	1819	1592		
23-24	0.5D	1.5D	Vc	162	191	285	340	342	357		
			fz	55	52	52	52	52	52		
			RPM	2918	2069	1655	1379	1182	1035		
23-24	0.5D	1.5D	Vc	105	124	185	221	222	232		
			fz	0.012	0.015	0.028	0.04	0.047	0.056		
			RPM	2918	2069	1655	1379	1182	1035		

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

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**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**EQ754, EQ768 SERIES**

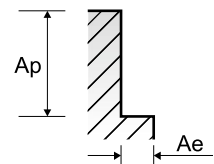
**MULTI FLUTE ROUGHING & FINISHING TiAIN COATED - SIDE CUTTING**

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
P	1	Non-alloy steel	0.5D	1.5D	Vc	50	50	50	50	50	50
					fz	0.012	0.015	0.027	0.041	0.047	0.051
					RPM	2653	1989	1592	1326	1137	995
	2		0.5D	1.5D	Vc	40	40	40	40	45	40
					fz	0.01	0.014	0.027	0.035	0.039	0.048
					RPM	2122	1592	1273	1061	1023	796
	3-4		0.5D	1.5D	Vc	64	89	138	149	160	153
					fz	30	30	35	35	35	35
					RPM	1592	1194	1114	928	796	696
	5		0.5D	1.5D	Vc	62	67	125	130	124	134
					fz	20	20	20	20	20	20
RPM		1061			796	637	531	455	398		
6	0.5D	1.5D	Vc	35	41	69	72	69	75		
			fz	40	40	40	40	45	40		
			RPM	2122	1592	1273	1061	1023	796		
7	0.5D	1.5D	Vc	64	89	138	149	160	153		
			fz	30	30	35	35	35	35		
			RPM	1592	1194	1114	928	796	696		
8-9	0.5D	1.5D	Vc	62	67	125	130	124	134		
			fz	20	20	20	20	20	20		
			RPM	1061	796	637	531	455	398		
10	0.5D	1.5D	Vc	35	41	69	72	69	75		
			fz	40	40	40	40	45	40		
			RPM	2122	1592	1273	1061	1023	796		
11.1	0.5D	1.5D	Vc	64	89	138	149	160	153		
			fz	20	20	20	20	20	20		
			RPM	1061	796	637	531	455	398		
N	21-22	Aluminum-wrought alloy	0.5D	1.5D	Vc	35	41	69	72	69	75
					fz	120	110	110	105	110	115
					RPM	6366	4377	3501	2785	2501	2288
23-24	0.5D	1.5D	Vc	229	263	392	446	480	512		
			fz	78	72	72	68	72	75		
			RPM	4138	2865	2292	1804	1637	1492		
		Aluminum-cast, alloyed	0.5D	1.5D	Vc	149	172	257	289	314	334
					fz	0.012	0.015	0.028	0.04	0.048	0.056
					RPM	4138	2865	2292	1804	1637	1492

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

▶ NEXT PAGE





Global Cutting Tool Leader **YG-1**



# MILLING



**HSS**

# MILLING CUTTERS

## HSS Fräser

- General Works. Available Dovetail, Woodruff Keyseat, T-slot, Side Milling Cutters and HSS (8% cobalt) Corner Rounding, Shell End Mills
- Allgemeine Arbeiten. Verfügbare Schwalbenschwanz, Passfedernut, T-Nut, Scheibenfräser, Scheibenfräser und HSS (8% Kobalt) Eckenverrundung, Walzenstirnfräser

**SELECTION GUIDE**

HSS



**MILLING TOOLS**

SERIES	ML012, ML022	ML032, ML042	ML062
	ML112, ML122	ML132, ML142	ML162
	ML212, ML222	ML232, ML242	ML262
DOVETAIL CUTTERS	DOVETAIL CUTTERS	WOODRUFF KEYSEAT CUTTERS	
FLUTE	-	-	-
HELIX ANGLE	0°	0°	10°-20°
SIZE MIN	D16.0	D16.0	D10.5
SIZE MAX	D50.0	D38.0	D45.5
PAGE	<b>792</b>	<b>793</b>	<b>794</b>

**HSS MILLING CUTTERS**

General Works. Available Dovetail, Woodruff Keyseat, T-slot, Side Milling Cutters and HSS (8% cobalt) Corner Rounding, Shell End Mills



Please visit [globalyg1.com/mat](http://globalyg1.com/mat) for material search

◎ : Excellent ○ : Good

Recommended cutting conditions : P 811



ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	HRc
<b>P</b>	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
	11	Quenched & Tempered		325	35
<b>M</b>	12	Stainless steel	Ferritic / Martensitic Annealed	200	15
	13		Martensitic Quenched & Tempered	240	23
	14		Austenitic	180	10
<b>K</b>	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		Ferritic	130	
20	Malleable cast iron	Pearlitic	230	21	
<b>N</b>	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	Cutting Alloys, PB>1%	110
	27	(Bronze / Brass)	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.		
<b>S</b>	31	Heat Resistant Super Alloys	Fe Based Annealed	200	15
	32		Cured	280	30
	33		Annealed	250	25
	34		Ni or Co Based Cured	350	38
	35		Cast	320	34
	36	Titanium Alloys	Pure Titanium	400 Rm	
	37		Alpha + Beta Alloys Hardened	1050 Rm	
<b>H</b>	38	Hardened steel	Hardened	550	55
	39		Hardened	630	60
	40	Chilled Cast Iron	Cast	400	42
	41	Hardened Cast Iron	Hardened	550	55



HSS

PLAIN SHANK

ML012, ML022 SERIES

FLAT SHANK

ML112, ML122 SERIES

THREAD SHANK

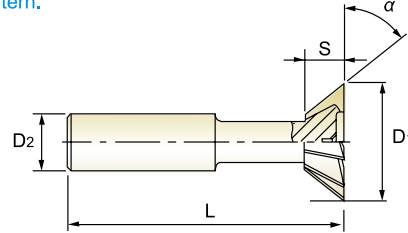
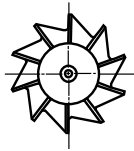
ML212, ML222 SERIES

### HSS-E, DOVETAIL CUTTERS TYPE "A", "C", "E"

- 🇩🇪 HSS-E, WINKELFRÄSER FORM "A", "C", "E"
- 🇫🇷 Fraise HSS-E pour queue d'aronde Type "A", "C", "E"
- 🇮🇹 FRESE AD ANGOLO DIVERGENTE TIPO "A", "C", "E"

▶ Recommended for use in place of arbor and threaded hole type cutters to reduce set time and facilitate handling.

▶ Empfohlen zur Nutzung anstelle von Arbor und threaded hole type Cutters um Montierzeit zu verkürzen und Handhabung zu erleichtern.



HSS-E
DIN 1833
N
0°
DIN 1835A
DIN 1835B
DIN 1835D
P.812

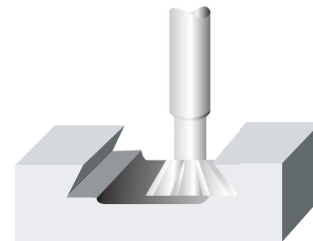
EDP No.			Cutter Diameter	Width of Face	Divergent Taper Angle	Shank Diameter	Overall Length	No. of Teeth
PLAIN	FLAT	THREAD	D1(js16)	S(js14)	α(± 15°)	D2(h6)	L(js18)	Z
ML01201601	ML11201601	-	16.0	4	45°	12	60	6
ML01202001	ML11202001	▲ ML21202001	20.0	5	45°	12	63	6
ML01202201	ML11202201	-	22.0	6	45°	12	67	6
ML01202501	ML11202501	▲ ML21202501	25.0	6.3	45°	16	67	8
ML01202801	ML11202801	-	28.0	7.5	45°	16	67	8
ML01203201	ML11203201	-	32.0	8	45°	16	71	10
ML01203801	ML11203801	-	38.0	10	45°	16	80	12
ML02201601	ML12201601	▲ ML22201601	16.0	6.3	60°	12	60	6
ML02202001	ML12202001	-	20.0	8	60°	12	63	6
ML02202201	ML12202201	-	22.0	9	60°	12	67	6
ML02202501	ML12202501	-	25.0	10	60°	16	67	8
ML02202801	ML12202801	-	28.0	11	60°	16	67	8
ML02203201	ML12203201	-	32.0	12.5	60°	16	71	10
ML02203801	ML12203801	-	38.0	16	60°	16	80	12
ML02204001	ML12204001	▲ ML22204001	40.0	13	60°	25	85	12
ML02205001	ML12205001	-	50.0	16	60°	25	100	16

Unit : mm

▲ : Only available till stock runs out

#### Tolerances according to DIN 7160 & 7161

	Nominal-Diameter in mm						
	over3to6	over6to10	over10to18	over18to30	over30to50	over50to80	over80to120
Tolerance range in mm							
js16	± 0.375	± 0.45	± 0.55	± 0.65	± 0.80	± 0.95	± 1.10
js14	± 0.15	± 0.18	± 0.215	± 0.26	± 0.31	± 0.37	± 0.435
js18	± 0.90	± 1.10	± 1.35	± 1.65	± 1.95	± 2.30	± 2.70
Tolerance range in µm							
h6	0 - 8	0 - 9	0 - 11	0 - 13	0 - 16	0 - 19	0 - 22



◎ : Excellent ○ : Good

ISO Material Description	P											M			K							
	Non-alloy steel					Low alloy steel						High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
HRc		13	25	28	32	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		
Recommended	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		
ISO Material Description	N										S							H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron		
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
HRc											15	30	25	38	34			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	
Recommended	◎	◎	◎	◎	◎																	

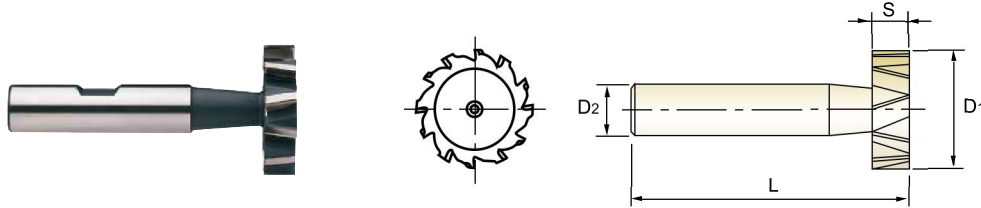


PLAIN SHANK	<b>ML062</b> SERIES
FLAT SHANK	<b>ML162</b> SERIES
THREAD SHANK	<b>ML262</b> SERIES

HSS

**HSS-E, WOODRUFF KEYSEAT CUTTERS TYPE "B", "D", "F"**

- 🇩🇪 HSS-E, SCHLITZFRÄSER FORM "B", "D", "F"
- 🇫🇷 Fraise HSS-E WOODRUFF Type "B", "D", "F"
- 🇮🇹 FRESE PER CHIAVETTE WOODRUFF TIPO "B", "D", "F"



HSS-E
DIN 850
N
10~12°
DIN 1835A
DIN 1835B
DIN 1835D
P.814

Unit : mm

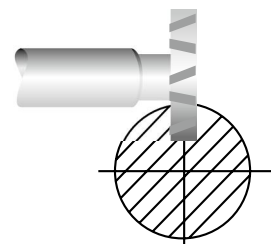
EDP No.	Cutter Diameter			Width of Face	Shank Diameter	Overall Length	No. of Teeth
	PLAIN	FLAT	THREAD				
ML06210E01	ML16210E01	-	10.5	2	6	50	8
ML06210E02	ML16210E02	-	10.5	2.5	6	50	8
ML06210E03	ML16210E03	-	10.5	3	6	50	8
ML06213E01	ML16213E01	-	13.5	2	10	56	8
ML06213E02	ML16213E02	-	13.5	2.5	10	56	8
ML06213E03	ML16213E03	-	13.5	3	10	56	8
ML06213E04	ML16213E04	-	13.5	4	10	56	8
ML06216E01	ML16216E01	-	16.5	2.5	10	56	8
ML06216E02	ML16216E02	-	16.5	3	10	56	8
ML06216E03	ML16216E03	-	16.5	4	10	56	8
ML06216E04	ML16216E04	-	16.5	5	10	56	8
ML06219E01	ML16219E01	-	19.5	3	10	56	8
ML06219E02	ML16219E02	-	19.5	4	10	63	8
ML06219E03	ML16219E03	-	19.5	5	10	63	8
ML06219E04	ML16219E04	-	19.5	6	10	63	8
ML06222E01	ML16222E01	-	22.5	4	10	63	10
ML06222E02	ML16222E02	▲ ML26222E02	22.5	5	10	63	10
ML06222E03	ML16222E03	-	22.5	6	10	63	10
ML06222E04	ML16222E04	-	22.5	8	10	63	10
ML06225E01	ML16225E01	-	25.5	5	10	63	10

**Tolerances according to DIN 7160 & 7161**

▲ : Only available till stock runs out

▶ NEXT PAGE

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	over 50 to 80
Tolerance range in mm							
js18	± 0.90	± 1.10	± 1.35	± 1.65	± 1.95	± 2.30	± 2.70
Tolerance range in µm							
h11	0 -60	0 -75	0 -90	0 -110	0 -130	0 -160	0 -190
e8	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73	-50 -89	-60 -106
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16	0 -19



◎ : Excellent ○ : Good

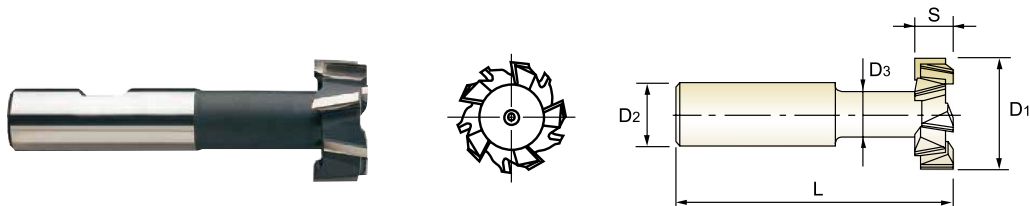
ISO Material Description	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc		13	25	28	32	10	29	32	38	15	35	15	23	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	
Recommended	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	○	◎	◎	◎	◎	◎	◎	◎	◎	◎	
ISO Material Description	N										S					H					
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel		Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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
Recommended	○	○	○	○	○																



PLAIN SHANK	<b>ML072</b> SERIES
FLAT SHANK	<b>ML172</b> SERIES
THREAD SHANK	<b>ML272</b> SERIES

### HSS-E, T-SLOT CUTTERS TYPE "AA", "AB", "AD"

- 🇩🇪 HSS-E, SCHAFTERFRÄSER FÜR T-NUTEN FORM "AA", "AB", "AD"
- 🇫🇷 Fraise HSS-E pour rainure en "T" Type "AA", "AB", "AD"
- 🇮🇹 FRESE PER SCANALATURE A T - DENTI ALTERNATI



HSS-E
DIN 851
N
10°
DIN 1835A
DIN 1835B
DIN 1835D
P.815

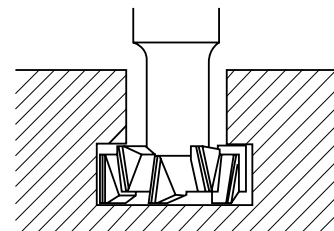
Unit : mm

EDP No.	Cutter Diameter			Width of Face	Shank Diameter	Neck Diameter	Overall Length	No. of Teeth
	PLAIN	FLAT	THREAD					
ML07212E01	ML17212E01	-	12.5	6	10	5	57	6
ML07201601	ML17201601	-	16.0	8	10	6.5	62	6
ML07201801	ML17201801	-	18.0	8	12	8	70	6
ML07201901	ML17201901	-	19.0	9	12	8	71	6
ML07202101	ML17202101	-	21.0	9	12	10	74	6
ML07202201	ML17202201	-	22.0	10	12	10	75	6
ML07202501	ML17202501	-	25.0	11	16	12	82	6
ML07202801	ML17202801	▲ ML27202801	28.0	12	16	13	83	6
ML07203201	ML17203201	-	32.0	14	16	15	90	8
ML07203601	ML17203601	▲ ML27203601	36.0	16	25	17	103	8
ML07204001	ML17204001	▲ ML27204001	40.0	18	25	19	108	8

▲ : Only available till stock runs out

#### Tolerances according to DIN 7160 & 7161

	Nominal-Diameter in mm						
	over3 to6	over6 to10	over10 to18	over18 to30	over30 to50	over50 to80	over80 to120
Tolerance range in mm							
<b>h12</b>	0	0	0	0	0	0	0
	-0.12	-0.15	-0.18	-0.21	-0.25	-0.30	-0.35
<b>js18</b>	± 0.90	± 1.10	± 1.35	± 1.65	± 1.95	± 2.30	± 2.70
Tolerance range in µm							
<b>d11</b>	-30	-40	-50	-65	-80	-100	-120
	-105	-130	-160	-195	-240	-290	-340
<b>h6</b>	0	0	0	0	0	0	0
	-8	-9	-11	-13	-16	-19	-22



◎ : Excellent ○ : Good

ISO	P											M			K							
	Non-alloy steel					Low alloy steel						High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
HRc	13	25	28	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32		
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230		
Recommended	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎		
ISO	N										S							H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron		
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
HRc	60	100	75	90	130	110	90	100			15	30	25	38	34			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	
Recommended	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

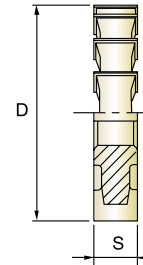
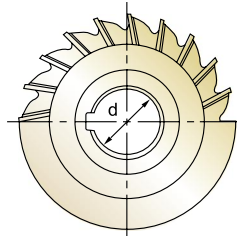


### HSS-E, SIDE AND FACE MILLING CUTTERS with STRAIGHT TEETH

- 🇩🇪 HSS-E, SCHEIBENFRÄSER mit GERADEVERZAHNT
- 🇫🇷 Fraise HSS-E 3 Tailles, denture droite
- 🇮🇹 FRESE A DISCO A TRE TAGLI - DENTI DRITTI

▶ The tools are used for general purpose side and straddle milling where deep cut is not required.

▶ Diese Werkzeuge werden bei allgemeinen Seiten- und Breitfräsen eingesetzt, wo Tiefschnitte nicht vorkommen.



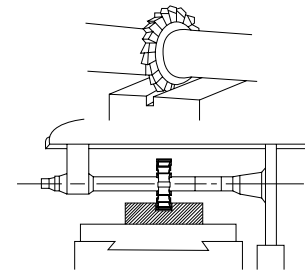
HSS-E
DIN 885-B
H
P.816

Unit : mm

EDP No.	Cutter Diameter	Width of Face	Internal Diameter	No. of Teeth
	D1(js14)	S(k11)	d(H7)	Z
ML09210003	100.0	10	27	22
ML09210004	100.0	6	32	26
ML09210005	100.0	8	32	26
ML09210006	100.0	10	32	22
ML09210007	100.0	12	32	22
ML09212501	125.0	8	32	30
ML09212502	125.0	10	32	30
ML09212503	125.0	12	32	24

#### Tolerances according to DIN 7160 & 7161

Nominal-Diameter in mm								
	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50	over 50 to 80	over 80 to 120	over 120 to 180
Tolerance range in mm								
js14	± 0.15	± 0.18	± 0.215	± 0.26	± 0.31	± 0.37	± 0.435	± 0.50
Tolerance range in µm								
k11	+75 0	+90 0	+110 0	+130 0	+160 0	+190 0	+220 0	+250 0
H7	+12 0	+15 0	+18 0	+21 0	+25 0	+30 0	+35 0	+40 0



◎ : Excellent ○ : Good

ISO	P										M				K								
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel				Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron		
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
HRc	13	25	28	32	30	29	32	38	15	35	15	23	10	10	26	3	25	42	55				
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230			
Recommended	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○												
ISO	N										S						H						
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel		Chilled Cast Iron		Hardened Cast Iron
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41		
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41		
HRc	60	100	75	90	130	110	90	100			15	30	25	38	34	400 Rm	1050 Rm	550	630	400	550		
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550		
Recommended	○	○	○	○	○																		



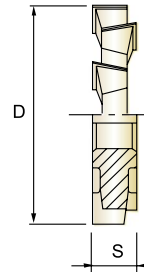
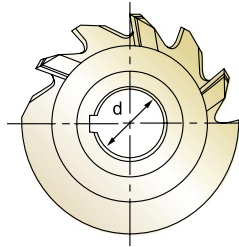


### HSS-E, SIDE AND FACE MILLING CUTTERS with STAGGERED TEETH

- 🇩🇪 HSS-E, SCHEIBENFRÄSER mit KREUZVERZAHNT
- 🇫🇷 Fraise HSS-E 3 Tailles, denture alternée
- 🇮🇹 FRESE A DISCO A TRE TAGLI - DENTI ALTERNATI

▶ The type of cutter is recommended for slotting operations.  
 The alternate spiral effectively counteracts all tendency to chatter.

▶ Dieser Typ ist zum Schlitzfräsen geeignet. Das alternierende Spiral wirkt allen Schnatterbewegungen entgegen.

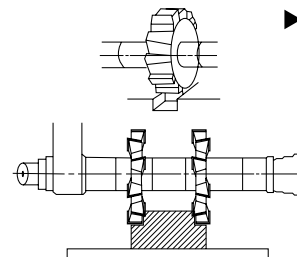


Unit : mm

EDP No.	Cutter Diameter	Width of Face	Internal Diameter	No. of Teeth
	D(js14)	S(k11)	d(H7)	Z
ML10208001	80.0	3	22	18
ML10208002	80.0	4	22	18
ML10208003	80.0	5	22	18
ML10208004	80.0	6	22	18
ML10208005	80.0	7	22	18
ML10208006	80.0	8	22	18
ML10208007	80.0	9	22	18
ML10208008	80.0	10	22	18
ML10208009	80.0	12	22	18
ML10208010	80.0	14	22	18
ML10208011	80.0	16	22	18
ML10208012	80.0	18	22	18
ML10208013	80.0	20	22	18
ML10208014	80.0	4	27	18
ML10208015	80.0	5	27	18
ML10208016	80.0	6	27	18
ML10208017	80.0	7	27	18
ML10208018	80.0	8	27	18
ML10208019	80.0	9	27	18
ML10208020	80.0	10	27	18

#### Tolerances according to DIN 7160 & 7161

	Nominal-Diameter in mm								
	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50	over 50 to 80	over 80 to 120	over 120 to 180	over 180 to 250
Tolerance range in mm									
js14	± 0.15	± 0.18	± 0.215	± 0.26	± 0.31	± 0.37	± 0.435	± 0.50	± 0.575
Tolerance range in µm									
k11	+ 75 0	+ 90 0	+ 110 0	+ 130 0	+ 160 0	+ 190 0	+ 220 0	+ 250 0	+ 290 0
H7	+ 12 0	+ 15 0	+ 18 0	+ 21 0	+ 25 0	+ 30 0	+ 35 0	+ 40 0	+ 46 0



▶ NEXT PAGE

◎ : Excellent ○ : Good

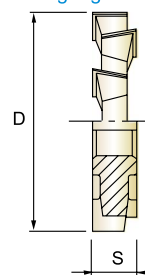
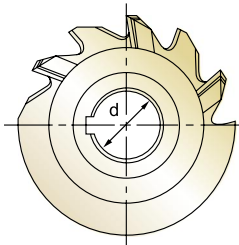
ISO	P											M			K						
	Non-alloy steel					Low alloy steel						High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron	
Material Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323																					
HRc		13	25	28	32	10	29	32	38	15	35	12	23	10	10	26	3	25	42	21	
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230	
Recommended	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
ISO	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)					Non Metallic Materials		Heat Resistant Super Alloys				Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
Material Description	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
VDI 3323																					
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommended	○	○	○	○	○																



### HSS-E, SIDE AND FACE MILLING CUTTERS with STAGGERED TEETH

- 🇩🇪 HSS-E, SCHEIBENFRÄSER mit KREUZVERZAHNT
- 🇫🇷 Fraise HSS-E 3 Tailles, denture alternée
- 🇮🇹 FRESE A DISCO A TRE TAGLI - DENTI ALTERNATI

▶ The type of cutter is recommended for slotting operations. The alternate spiral effectively counteracts all tendency to chatter.  
 ▶ Dieser Typ ist zum Schlitzfräsen geeignet. Das alternierende Spiral wirkt allen Schnatterbewegungen entgegen.



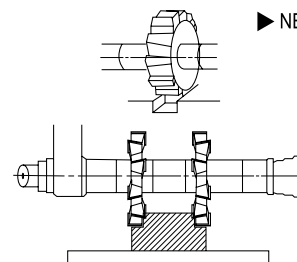
HSS-E
DIN 885-A
H
P.817

Unit : mm

EDP No.	Cutter Diameter	Width of Face	Internal Diameter	No. of Teeth
	D(js14)	S(k11)	d(H7)	Z
ML10210016	100.0	5	32	20
ML10210017	100.0	6	32	20
ML10210018	100.0	7	32	20
ML10210019	100.0	8	32	20
ML10210020	100.0	9	32	20
ML10210021	100.0	10	32	20
ML10210022	100.0	12	32	20
ML10210023	100.0	14	32	20
ML10210024	100.0	15	32	20
ML10210025	100.0	16	32	20
ML10210026	100.0	18	32	20
ML10210027	100.0	20	32	20
ML10212501	125.0	5	32	22
ML10212502	125.0	6	32	22
ML10212503	125.0	8	32	22
ML10212504	125.0	10	32	22
ML10212505	125.0	12	32	22
ML10212506	125.0	14	32	22
ML10212507	125.0	16	32	22
ML10212508	125.0	18	32	22

#### Tolerances according to DIN 7160 & 7161

	Nominal-Diameter in mm								
	over3 to6	over6 to10	over10 to18	over18 to30	over30 to50	over50 to80	over80 to120	over120 to180	over180 to250
Tolerance range in mm									
js14	± 0.15	± 0.18	± 0.215	± 0.26	± 0.31	± 0.37	± 0.435	± 0.50	± 0.575
Tolerance range in µm									
k11	+75 0	+90 0	+110 0	+130 0	+160 0	+190 0	+220 0	+250 0	+290 0
H7	+12 0	+15 0	+18 0	+21 0	+25 0	+30 0	+35 0	+40 0	+46 0



▶ NEXT PAGE

◎ : Excellent ○ : Good

ISO Material Description	P											M			K					
	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	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
Recommended	◎	◎	◎	◎	◎	◎	◎	◎	◎	○	○	◎	○	○	○	○	○	○	○	○

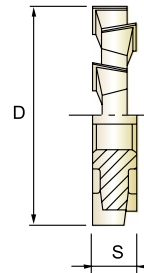
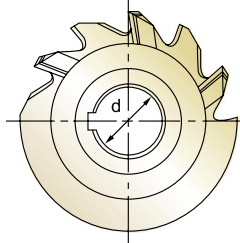
ISO Material Description	N										S					H					
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron	
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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
Recommended	○	○	○	○	○																



**HSS-E, SIDE AND FACE MILLING CUTTERS with STAGGERED TEETH**

- 🇩🇪 **HSS-E, SCHEIBENFRÄSER mit KREUZVERZAHNT**
- 🇫🇷 **Fraise HSS-E 3 Tailles, denture alternée**
- 🇮🇹 **FRESE A DISCO A TRE TAGLI - DENTI ALTERNATI**

▶ The type of cutter is recommended for slotting operations. The alternate spiral effectively counteracts all tendency to chatter.  
 ▶ Dieser Typ ist zum Schlitzfräsen geeignet. Das alternierende Spiral wirkt allen Schnatterbewegungen entgegen.



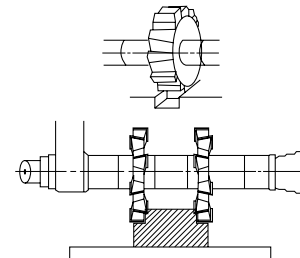
**HSS-E** **DIN 885-A** **H** P.817

Unit : mm

EDP No.	Cutter Diameter	Width of Face	Internal Diameter	No. of Teeth
	D(js14)	S(k11)	d(H7)	Z
<b>ML10220004</b>	<b>200.0</b>	16	40	30
<b>ML10220005</b>	<b>200.0</b>	18	40	30
<b>ML10220006</b>	<b>200.0</b>	20	40	30
<b>ML10220007</b>	<b>200.0</b>	22	40	30
<b>ML10220008</b>	<b>200.0</b>	25	40	30

**Tolerances according to DIN 7160 & 7161**

		Nominal-Diameter in mm								
		over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30	over 30 to 50	over 50 to 80	over 80 to 120	over 120 to 180	over 180 to 250
		Tolerance range in mm								
<b>js14</b>		± 0.15	± 0.18	± 0.215	± 0.26	± 0.31	± 0.37	± 0.435	± 0.50	± 0.575
		Tolerance range in µm								
<b>k11</b>		+75 0	+90 0	+110 0	+130 0	+160 0	+190 0	+220 0	+250 0	+290 0
<b>H7</b>		+12 0	+15 0	+18 0	+21 0	+25 0	+30 0	+35 0	+40 0	+46 0



◎ : Excellent ○ : Good

ISO	P										M				K						
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel				Stainless steel		Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc		13	25	28	32	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	
Recommended	◎	◎	◎	◎	◎	◎	◎	◎	○	◎	○										
ISO	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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
Recommended	○	○	○	○	○																

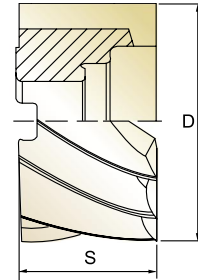
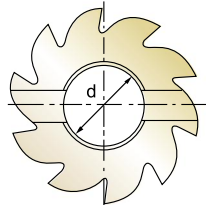
HSS



**E2676** SERIES

### HSSCo8, MULTI FLUTE SHELL END MILL for ALUMINUM

- HSSCo8, MULTI SCHNEIDEN WALZENSTIRNFRÄSER für ALUMINIUM
- Fraise HSSCo8, multi-dents trou lisse pour aluminium
- FRESA CILINDRICA FRONTALE MULTI TAGLIENTE, PER ALLUMINIO



HSS Co8
DIN 841
W
4&6
42°



P.818

Unit : mm

EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
	D	S	d	Z
E2676300	30.0	30	● 13	4
E2676400	40.0	20	● 16	4
E2676402	40.0	40	● 16	4
E2676500	50.0	25	22	6
E2676502	50.0	50	22	6
E2676600	60.0	30	27	6
E2676601	60.0	60	27	6
E2676750	75.0	75	27	6

- Tolerance of Internal Diameter = +0,018 ~ 0
- ▶ TIN-COATING, TiCN-COATING & TiAIN-COATING is available on your request.

HSS Co8
DIN 1880
W
4&6
42°



P.818

Unit : mm

EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
	D	S	d	Z
E2676401	40.0	32	● 16	4
E2676501	50.0	36	22	6
E2676630	63.0	40	27	6
E2676800	80.0	45	27	6
E2676901	100.0	50	32	6

- Tolerance of Internal Diameter = +0,018 ~ 0
- ▶ TIN-COATING, TiCN-COATING & TiAIN-COATING is available on your request.

Mill Dia. Tolerance(mm)	Width of Face Tolerance(mm)	Internal Dia. Tolerance(mm)
+ 0.25	+ 0.5	+ 0.02
- 0.15	- 0	- 0

◎ : Excellent ○ : Good

ISO Material Description	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	23	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	
Recommended	○	○	○	○	○	○	○			○											
ISO Material Description	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			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
Recommended	◎	◎	◎	◎	◎																

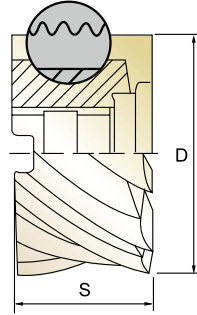
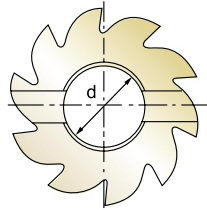
HSS



**E2678** SERIES

**HSSCo8, MULTI FLUTE ROUGHING SHELL END MILL - FINE**

- HSSCo8, MULTI SCHNEIDEN WALZENSTIRN-SCHRUPPFÄSER - FEINES
- Fraise HSSCo8, multi-dents trou lisse, ébauche, pas fin
- FRESA CILINDRICA FRONTALE MULTI TAGLIENTE, PER SGROSSATURA



HSS Co8
DIN 841
HR
6-12
30°



P.819

Unit : mm

EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
	D	S	d	Z
E2678401	40.0	40	● 16	6
E2678501	50.0	50	22	8
E2678600	60.0	30	27	8
E2678601	60.0	60	27	8
E2678750	75.0	35	27	10
E2678751	75.0	75	27	10
E2678900	90.0	35	27	10
E2678902	110.0	35	32	12

- Tolerance of Internal Diameter = +0.018 ~ 0
- ▶ TIN-COATING, TiCN-COATING & TiAIN-COATING is available on your request.

HSS Co8
DIN 1880
HR
6-12
30°



P.819

Unit : mm

EDP No.	Mill Diameter	Width of Face	Internal Diameter	No. of Teeth
	D	S	d	Z
E2678400	40.0	32	● 16	6
E2678500	50.0	36	22	8
E2678630	63.0	40	27	8
E2678800	80.0	45	27	10
E2678901	100.0	50	32	10
E2678903	125.0	56	40	12
E2678904	160.0	63	50	12

- Tolerance of Internal Diameter = +0.018 ~ 0
- ▶ TIN-COATING, TiCN-COATING & TiAIN-COATING is available on your request.

Mill Dia. Tolerance(mm)	Width of Face Tolerance(mm)	Internal Dia. Tolerance(mm)
+ 0.25 - 0.15	+ 0.5 - 0	+ 0.02 - 0

◎ : Excellent ○ : Good

ISO Material Description	P										M			K							
	Non-alloy steel					Low alloy steel					High alloyed steel, and tool steel			Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
HRc	13	23	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	
Recommended	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
ISO Material Description	N										S						H				
	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys						Titanium Alloys		Hardened steel	Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc	15	30	25	38	34	15	30	25	38	34	15	30	25	38	34	15	30	25	38	34	
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommended	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

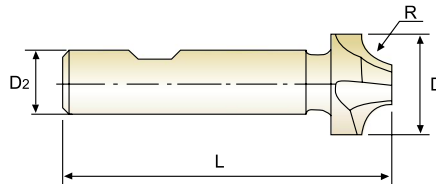


## HSSCo8, 4 FLUTE CORNER ROUNDING CUTTERS

- 🇩🇪 **HSSCo8, 4 SCHNEIDEN VIERTELKREISFRÄSER**
- 🇫🇷 **Fraise HSSCo8, 1/4 de cercle, 4 dents**
- 🇮🇹 **4 TAGLIENTI PER RAGGIATURA DI SPIGOLI**

▶ These tools can be adapted for many screw machine applications as end forming tools to form a specific radius.

▶ Dieses Werkzeug kann an vielen Screw maschine als Finishingtool für spezielle Radien montiert werden.



HSS Co8
DIN 6518
N
4
0°
DIN 1835B
P.820

Unit : mm

EDP No.	Radius	Outside Diameter	Shank Diameter	Overall Length
	R(H11)	D	D2(h6)	L
E2498010	R1.0	8.0	10	60
E2498015	R1.5	9.0	10	60
E2498020	R2.0	10.0	10	60
E2498025	R2.5	11.0	10	60
E2498030	R3.0	12.0	12	60
E2498035	R3.5	13.0	12	60
E2498040	R4.0	14.0	12	60
E2498045	R4.5	15.0	12	60
E2498050	R5.0	16.0	12	60
E2498055	R5.5	19.0	16	67
E2498060	R6.0	20.0	16	67
E2498065	R6.5	21.0	16	71
E2498070	R7.0	22.0	16	71
E2498075	R7.5	23.0	16	71
E2498080	R8.0	24.0	16	71
E2498085	R8.5	25.0	25	85
E2498090	R9.0	26.0	25	85
E2498095	R9.5	27.0	25	85

▶ TIN-COATING, TiCN-COATING & TiAIN-COATING is available on your request.

▶ NEXT PAGE

### Tolerances according to DIN 7160 & 7161

	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
	Tolerance range in $\mu\text{m}$					
H11	+60 0	+75 0	+90 0	+110 0	+130 0	+160 0
h6	0 -6	0 -8	0 -9	0 -11	0 -13	0 -16

◎ : Excellent ○ : Good

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

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



**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**ML012, ML112, ML022, ML122, ML212, ML222** SERIES

**MULTI FLUTE DOVETAIL CUTTERS**  
**TYPE 'A', 'C', 'E'**

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

ISO	VDI 3323	Material Description	Parameter	Diameter (Ø)						
				16.0	20.0	25.0	32.0	40.0	50.0	63.0
P	1	Non-alloy steel	Vc	30	30	30	30	30	30	30
			fz	0.03	0.037	0.026	0.042	0.043	0.03	0.031
			RPM	597	477	382	298	239	191	152
			FEED	107	106	79	125	123	92	75
	2		Vc	15	15	15	15	15	15	15
			fz	0.031	0.036	0.031	0.041	0.043	0.026	0.031
			RPM	298	239	191	149	119	95	76
			FEED	56	52	47	61	62	40	38
	3-4		Vc	10	10	10	10	10	10	10
			fz	0.031	0.035	0.028	0.04	0.042	0.03	0.033
			RPM	199	159	127	99	80	64	51
FEED		37	33	29	40	40	31	27		
5	Vc	10	10	10	10	10	10	10		
	fz	0.021	0.02	0.02	0.02	0.022	0.02	0.023		
	RPM	199	159	127	99	80	64	51		
	FEED	25	19	20	20	21	20	19		
6	Vc	15	15	15	15	15	15	15		
	fz	0.031	0.036	0.031	0.041	0.043	0.026	0.031		
	RPM	298	239	191	149	119	95	76		
	FEED	56	52	47	61	62	40	38		
7	Vc	10	10	10	10	10	10	10		
	fz	0.031	0.035	0.028	0.04	0.042	0.03	0.033		
	RPM	199	159	127	99	80	64	51		
	FEED	37	33	29	40	40	31	27		
8-9	Vc	10	10	10	10	10	10	10		
	fz	0.021	0.02	0.02	0.02	0.022	0.02	0.023		
	RPM	199	159	127	99	80	64	51		
	FEED	25	19	20	20	21	20	19		
10	Vc	15	15	15	15	15	15	15		
	fz	0.031	0.036	0.031	0.041	0.043	0.026	0.031		
	RPM	298	239	191	149	119	95	76		
	FEED	56	52	47	61	62	40	38		
11.1	Vc	10	10	10	10	10	10	10		
	fz	0.021	0.02	0.02	0.02	0.022	0.02	0.023		
	RPM	199	159	127	99	80	64	51		
	FEED	25	19	20	20	21	20	19		
N	21~25	Aluminum-wrought alloy, Aluminum-cast, alloyed	Vc	95	85	90	90	95	85	90
			fz	0.03	0.04	0.029	0.041	0.042	0.03	0.033
			RPM	1890	1353	1146	895	756	541	455
			FEED	340	325	266	367	381	260	240



**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**ML062, ML162, ML262 SERIES**

**MULTI FLUTES WOODRUFF KEYSEAT CUTTERS**  
**TYPE 'B', 'D', 'F'**

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

ISO	VDI 3323	Material Description	Parameter	Diameter (Ø)								
				10.5	13.5	16.5	19.5	22.5	28.5	32.5	45.5	
P	1	Non-alloy steel	Vc	30	30	30	30	30	30	30	30	30
			fz	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07	
			RPM	909	707	579	490	424	335	294	210	
	FEED		73	57	116	137	170	168	212	206		
	2		Vc	20	20	20	20	20	20	20	20	
			fz	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07	
			RPM	606	472	386	326	283	223	196	140	
	FEED		49	38	77	91	113	112	141	137		
	3-4		Vc	15	15	15	15	15	15	15	15	
			fz	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07	
			RPM	455	354	289	245	212	168	147	105	
	FEED		36	28	58	69	85	84	106	103		
5	Vc	10	10	10	10	10	10	10	10			
	fz	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07			
	RPM	303	236	193	163	141	112	98	70			
FEED	24	19	39	46	57	56	71	69				
6	Vc	20	20	20	20	20	20	20	20			
	fz	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07			
	RPM	606	472	386	326	283	223	196	140			
FEED	49	38	77	91	113	112	141	137				
7	Vc	15	15	15	15	15	15	15	15			
	fz	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07			
	RPM	455	354	289	245	212	168	147	105			
FEED	36	28	58	69	85	84	106	103				
8-9	Vc	10	10	10	10	10	10	10	10			
	fz	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07			
	RPM	303	236	193	163	141	112	98	70			
FEED	24	19	39	46	57	56	71	69				
10	Vc	20	20	20	20	20	20	20	20			
	fz	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07			
	RPM	606	472	386	326	283	223	196	140			
FEED	49	38	77	91	113	112	141	137				
11.1	Vc	10	10	10	10	10	10	10	10			
	fz	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07			
	RPM	303	236	193	163	141	112	98	70			
FEED	24	19	39	46	57	56	71	69				
N	21~25	Aluminum-wrought alloy, Aluminum-cast, alloyed	Vc	100	100	100	100	100	100	90	100	
			fz	0.01	0.01	0.025	0.035	0.04	0.05	0.06	0.07	
			RPM	3032	2358	1929	1632	1415	1117	881	700	
			FEED	243	189	386	457	566	558	635	686	





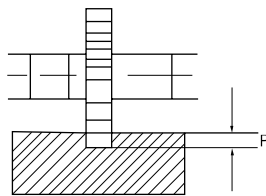
**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**ML092 SERIES**

**MULTI FLUTES SIDE AND FACE MILLING CUTTERS WITH STRAIGHT TEETH**

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

ISO	VDI 3323	Material Description	Parameter	Diameter (Ø)				
				50.0	63.0	80.0	100.0	125.0
P	1	Non-alloy steel	Vc	25	25	25	25	25
			fz	0.045	0.058	0.06	0.063	0.066
			RPM	159	126	99	80	64
	FEED		129	161	143	130	126	
	2		Vc	20	20	20	20	20
			fz	0.04	0.036	0.041	0.038	0.05
			RPM	127	101	80	64	51
	FEED		92	80	78	63	76	
	3-4		Vc	15	15	15	15	15
			fz	0.034	0.031	0.033	0.034	0.042
RPM		95	76	60	48	38		
FEED	58	52	47	42	48			
5	Vc	10	10	10	10	10		
	fz	0.031	0.029	0.03	0.03	0.036		
	RPM	64	51	40	32	25		
FEED	36	32	29	25	28			
6	Vc	20	20	20	20	20		
	fz	0.04	0.036	0.041	0.038	0.05		
	RPM	127	101	80	64	51		
FEED	92	80	78	63	76			
7	Vc	15	15	15	15	15		
	fz	0.034	0.031	0.033	0.034	0.042		
	RPM	95	76	60	48	38		
FEED	58	52	47	42	48			
8-9	Vc	10	10	10	10	10		
	fz	0.031	0.029	0.03	0.03	0.036		
	RPM	64	51	40	32	25		
FEED	36	32	29	25	28			
10	Vc	20	20	20	20	20		
	fz	0.04	0.036	0.041	0.038	0.05		
	RPM	127	101	80	64	51		
FEED	92	80	78	63	76			
11.1	Vc	10	10	10	10	10		
	fz	0.031	0.029	0.03	0.03	0.036		
	RPM	64	51	40	32	25		
FEED	36	32	29	25	28			
N	21~25	Aluminum-wrought alloy, Aluminum-cast, alloyed	Vc	100	100	100	100	100
			fz	0.018	0.023	0.026	0.024	0.033
			RPM	637	505	398	318	255
FEED	206	256	248	199	252			



MILLING DEPTH P = WIDTH OF FACES



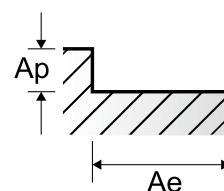
**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2675** SERIES

**MULTI FLUTE SHELL END MILL**

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

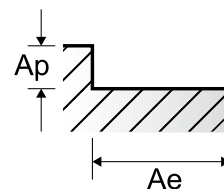
ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)						
						40.0	50.0	63.0	80.0	100.0	125.0	160.0
P	1-2	Non-alloy steel	0.75D	0.25D	Vc	30	30	30	30	30	30	30
					fz	0.07	0.078	0.092	0.1	0.115	0.12	0.131
					RPM	239	191	152	119	95	76	60
	FEED		134	119	112	119	110	110	109			
	3-4		0.75D	0.25D	Vc	25	25	25	25	25	25	30
					fz	0.075	0.077	0.091	0.1	0.119	0.113	0.119
					RPM	199	159	126	99	80	64	60
	FEED		119	98	92	99	95	86	99			
	5		0.75D	0.25D	Vc	20	20	20	20	20	20	20
					fz	0.071	0.078	0.09	0.094	0.117	0.108	0.116
					RPM	159	127	101	80	64	51	40
FEED	90	79	73	75	74	66	65					
6	0.75D	0.25D	Vc	30	30	30	30	30	30	30		
			fz	0.07	0.078	0.092	0.1	0.115	0.12	0.131		
			RPM	239	191	152	119	95	76	60		
FEED	134	119	112	119	110	110	109					
7	0.75D	0.25D	Vc	25	25	25	25	25	25	30		
			fz	0.075	0.077	0.091	0.1	0.119	0.113	0.119		
			RPM	199	159	126	99	80	64	60		
FEED	119	98	92	99	95	86	99					
8	0.75D	0.25D	Vc	20	20	20	20	20	20	20		
			fz	0.071	0.078	0.09	0.094	0.117	0.108	0.116		
			RPM	159	127	101	80	64	51	40		
FEED	90	79	73	75	74	66	65					
9	0.75D	0.25D	Vc	10	10	10	10	10	10	10		
			fz	0.078	0.08	0.1	0.1	0.117	0.146	0.125		
			RPM	80	64	51	40	32	25	20		
FEED	50	41	40	40	37	45	35					
10	0.75D	0.25D	Vc	30	30	30	30	30	30	30		
			fz	0.07	0.078	0.092	0.1	0.115	0.12	0.131		
			RPM	239	191	152	119	95	76	60		
FEED	134	119	112	119	110	110	109					
11.1	0.75D	0.25D	Vc	20	20	20	20	20	20	20		
			fz	0.071	0.078	0.09	0.094	0.117	0.108	0.116		
			RPM	159	127	101	80	64	51	40		
FEED	90	79	73	75	74	66	65					



**E2676** SERIES

**MULTI FLUTE SHELL END MILL for ALUMINUM**

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)							
						30.0	40.0	50.0	60.0	63.0	75.0	80.0	100.0
N	21~25	Aluminum-wrought alloy, Aluminum-cast, alloyed	0.75D	0.25D	Vc	100	105	95	95	95	105	100	100
					fz	0.05	0.06	0.069	0.1	0.115	0.13	0.128	0.151
					RPM	1061	836	605	504	480	446	398	318
					FEED	212	201	250	302	331	348	306	288





**RECOMMENDED CUTTING CONDITIONS**  
**EMPFOHLENE SCHNEIDPARAMETER**

**E2498** SERIES

**4 FLUTE CORNER ROUNDING CUTTERS**

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

ISO	VDI 3323	Material Description	Parameter	Diameter (Ø)												
				8.0	9.0	10.0	11.0	12.0	14.0	16.0	20.0	24.0	28.0	34.0	48.0	
P	1	Non-alloy steel	Vc	20	20	20	20	20	20	20	20	20	20	20	20	20
			fz	0.017	0.022	0.02	0.021	0.021	0.025	0.029	0.032	0.038	0.042	0.049	0.058	
			RPM	796	707	637	579	531	455	398	318	265	227	187	133	
	FEED		54	62	51	49	45	45	46	41	40	38	37	31		
	Vc		15	15	15	15	15	15	15	15	15	15	15	15	15	
	fz		0.015	0.016	0.016	0.019	0.019	0.023	0.029	0.033	0.039	0.04	0.048	0.053		
	RPM	597	531	477	434	398	341	298	239	199	171	140	99			
	FEED	36	34	31	33	30	31	35	32	31	27	27	21			
	2	3-4	Vc	10	10	10	10	10	10	10	10	10	10	10	10	
			fz	0.018	0.023	0.02	0.024	0.024	0.023	0.03	0.034	0.04	0.05	0.048	0.05	
			RPM	398	354	318	289	265	227	199	159	133	114	94	66	
	FEED		29	33	25	28	25	21	24	22	21	23	18	13		
6	Low alloy steel		Vc	15	15	15	15	15	15	15	15	15	15	15	15	
			fz	0.015	0.016	0.016	0.019	0.019	0.023	0.029	0.033	0.039	0.04	0.048	0.053	
		RPM	597	531	477	434	398	341	298	239	199	171	140	99		
FEED		36	34	31	33	30	31	35	32	31	27	27	21			
7-8		High alloyed steel, and tool steel	Vc	10	10	10	10	10	10	10	10	10	10	10	10	
			fz	0.018	0.023	0.02	0.024	0.024	0.023	0.03	0.034	0.04	0.05	0.048	0.05	
	RPM		398	354	318	289	265	227	199	159	133	114	94	66		
FEED	29		33	25	28	25	21	24	22	21	23	18	13			
10	Aluminum-wrought alloy, Aluminum-cast, alloyed		Vc	15	15	15	15	15	15	15	15	15	15	15	15	
			fz	0.015	0.016	0.016	0.019	0.019	0.023	0.029	0.033	0.039	0.04	0.048	0.053	
		RPM	597	531	477	434	398	341	298	239	199	171	140	99		
FEED		36	34	31	33	30	31	35	32	31	27	27	21			
11.1			Vc	10	10	10	10	10	10	10	10	10	10	10	10	
			fz	0.018	0.023	0.02	0.024	0.024	0.023	0.03	0.034	0.04	0.05	0.048	0.05	
	RPM		398	354	318	289	265	227	199	159	133	114	94	66		
FEED	29		33	25	28	25	21	24	22	21	23	18	13			
N	21~25		Vc	90	80	90	85	90	90	80	90	90	85	85	90	
			fz	0.018	0.021	0.02	0.023	0.022	0.025	0.031	0.034	0.038	0.045	0.05	0.058	
		RPM	3581	2829	2865	2460	2387	2046	1592	1432	1194	966	796	597		
		FEED	258	238	229	226	210	205	197	195	181	174	159	138		



Leading Through Innovation



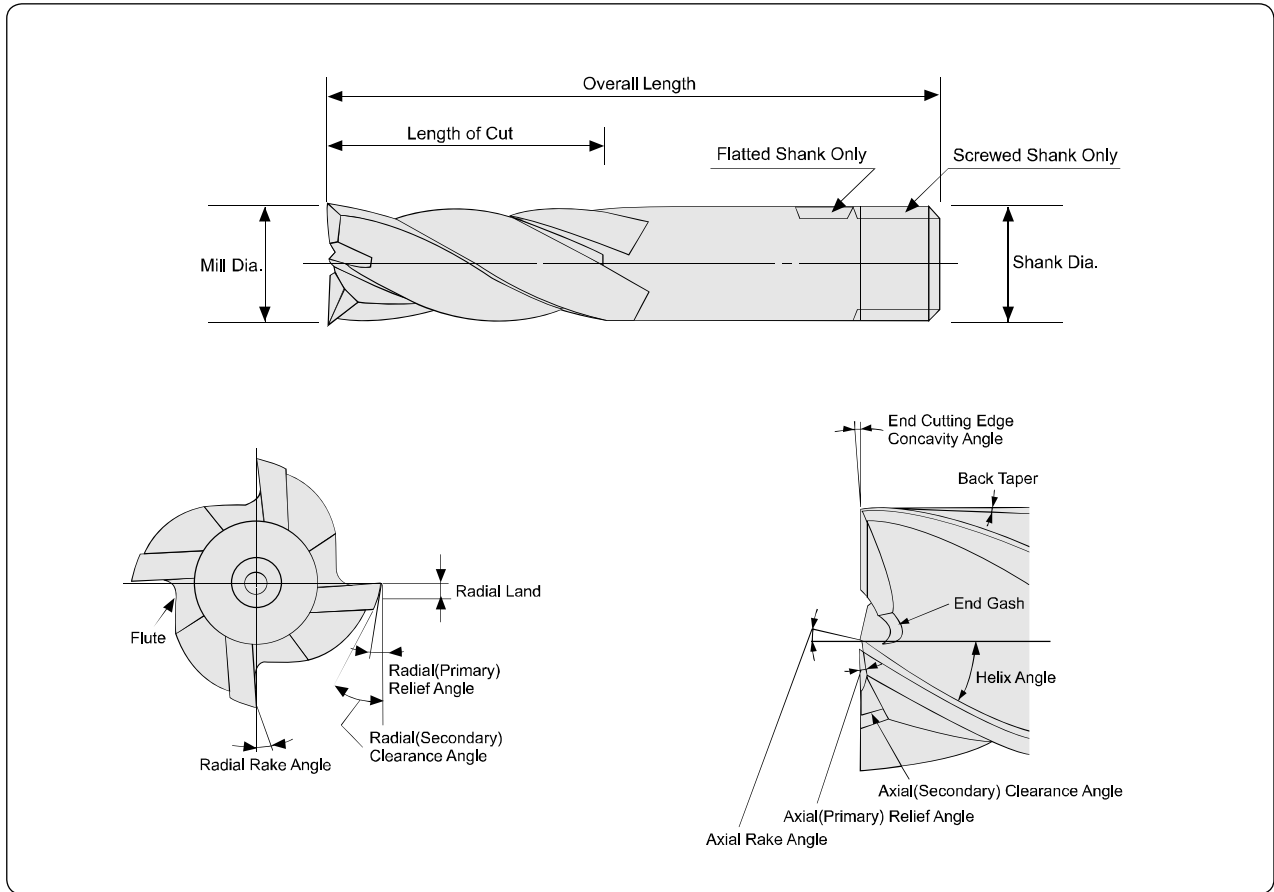
# TECHNICAL DATA

## TECHNISCHE DATEN

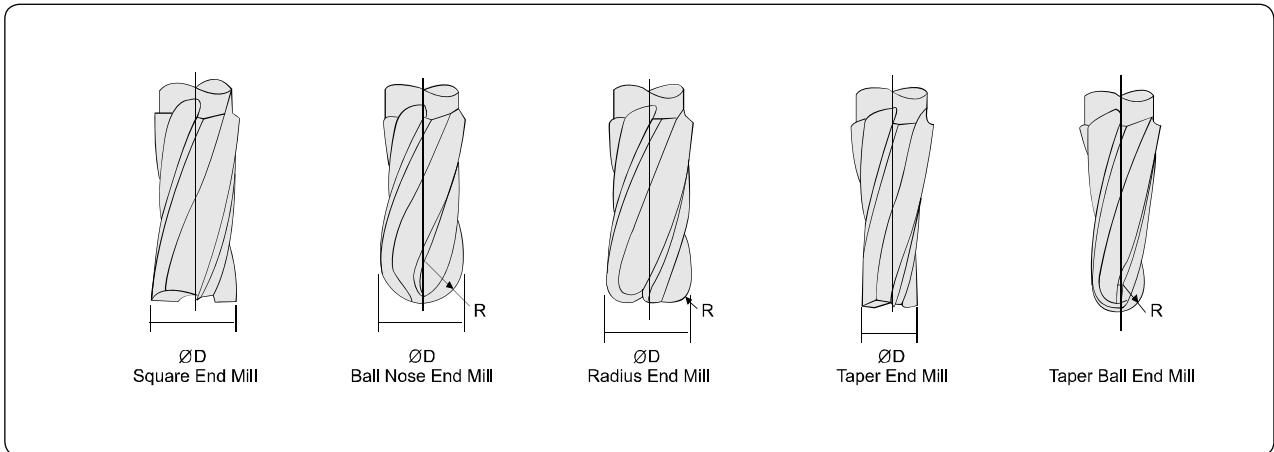


**SUPER CUTTING END MILLS**  
**HOCHLEISTUNGS FRÄSER**

**1 NAMES OF END MILL PARTS**  
**ERLÄUTERUNG DER FRÄSERTEILE**



**2 TYPES OF END MILL**  
**FRÄSERTYPEN**





Feed in millimeters per Minute / *Vorschub in Milimeter pro Minute*

$$F.M = F.R. \times R.P.M$$

F.R. : Feed per Revolutions in millimeters / *Vorschub pro Umdrehungen pro Minute*

R.P.M. : Revolutions per Minutes / *Umdrehungen pro Minute*

The following factors should be kept in mind when using the recommended stating feed per tooth.

*Die folgenden Faktoren sind beim Einsatz der Vorschübe pro Zahn zu berücksichtigen.*

Use Higher Feeds For <i>Höherer Vorschub für</i>
Heavy, roughing cuts / <i>Heavy cut, Schruppfräsen</i>
Rigid set-ups / <i>Robustes Werkstück</i>
Easy-to-machine work materials / <i>Leicht fräsbares Material</i>
Rugged cutters / <i>Robuster Fräser</i>
Slab milling cuts / <i>Scheibenfräsen</i>
Low tensile strength materials / <i>Material von niedriger Zugfestigkeit</i>
Coarse tooth cutters / <i>Grobgewinde-Fräser</i>
Abrasive materials / <i>Abrasives Material</i>

Use Lower Feeds For <i>Niedrigerer Vorschub für</i>
Light, and finishing cuts / <i>Light cut, Finishing cut</i>
Frail set-ups / <i>Zerbrechliches Material</i>
Hard to machine work materials / <i>Schwer fräsbares Material</i>
Frail and small cutters / <i>Dünne, kleine Fräser</i>
Deep slots / <i>Tiefnuten</i>
High tensile strength materials / <i>Material von hoher Zugfestigkeit</i>
Fine tooth cutters / <i>Feingewinde-Fräser</i>

**SPEED AND FEED CALCULATIONS FOR MILLING CUTTERS AND OTHER ROTATING TOOLS**

TO FIND	HAVING	FORMULA
Surface(or Periphery) Speed in meter per Minute=S.P.M.	Diameter of Tool in millimeters =D Revolutions per Minute =R.P.M.	$V = \frac{D \times 3.1416 \times R.P.M.}{1000}$
Revolutions per Minute=R.P.M.	Surface Speed in meter per Minute =S.P.M Diameter of Tool in millimeters =D	$R.P.M. = \frac{V \times 1000}{D \times 3.1416}$
Feed per Revolution in millimeters-F.R.	Feed in millimeters per Minute =F.M. Revolution per Minute =R.P.M.	$F.R. = \frac{F.M.}{R.P.M.}$
Feed in millimeters per Minute-F.M.	Feed per Revolution in millimeters =F.R. Revolution per Minute =R.P.M.	$F.M. = F.R. \times R.P.M.$
Number of Cutting Teeth per Minute=T.M.	Number of Teeth in Tool =T Revolution per Minute =R.P.M.	$T.M = T \times R.P.M.$
Feed per tooth=F.T.	Number of Teeth in Tool =T Feed per Revolution in millimeters =R.P.M.	$F.T. = \frac{F.R.}{T}$
Feed per Tooth=F.T.	Number of Teeth in Tool =T Feed in millimeters per Minute =F.M. Speed in Revolution per Minute =R.P.M.	$F.T. = \frac{F.M.}{T \times R.P.M.}$

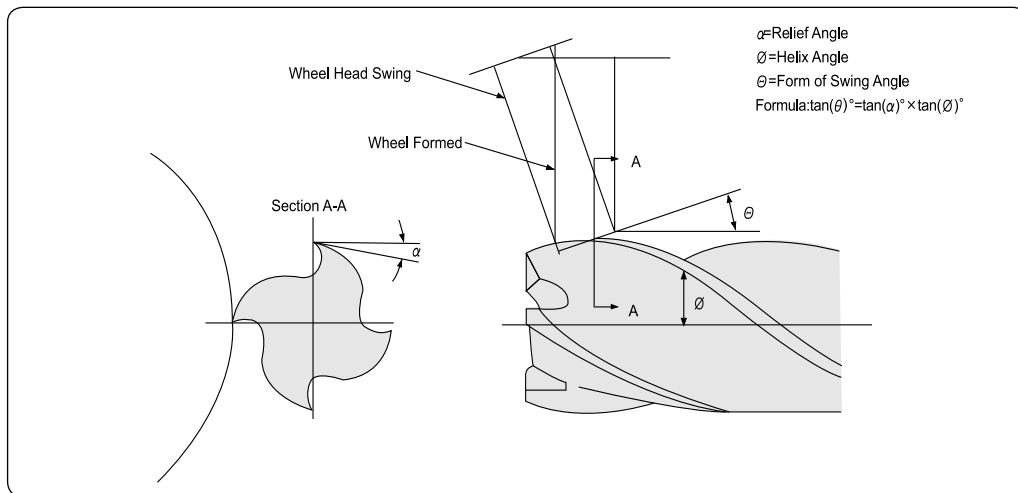


Fig. 4. Tothing of Eccentric Relief Angle

**2 ANGLE OF WHEEL INCLINATION**

**Winkel der Radneigung.**

Eccentric relief is produced with a plain wheel positioned with its axis parallel or at a slight angle with the cutter axis. The degree of relief is varied by changing the angle of wheel inclination.

Exzentrischer Hinterschliff wird mit einer, mit der eigenen Achse zur Fräsachse parallelen oder nur geringfügig geneigten Schleifscheibe produziert. Das Grad des Hinterschliffs variiert mit dem Einstellwinkel der Schleifscheiben Einstellung.

**Table 1. RECOMMENDED RELIEF ON END MILLS**

Mill Diameter (mm)	Eccentric relief indicator drop for relief Angles shown		Checking Distance	Wheel Angles(Deg.) $\theta$			Radial Relief Angles( $\alpha$ 1)	Clearance Angles( $\alpha$ 2)
	Min	Max.		15° Helix	30° Helix	60° Helix		
-	Min	Max.	-	*Angle	*Angle	*Angle	*Angle	*Angle
3.0	0.100	0.130	0.40	4° 24'	9° 25'	26° 28'	16° 02'	25°
6.0	0.090	0.125	0.50	3° 18'	7° 05'	20° 25'	12° 08'	25°
12.0	0.100	0.135	0.65	2° 46'	5° 46'	17° 23'	10° 15'	25°
25.0	0.095	0.140	0.80	2° 15'	4° 15'	14° 16'	8° 21'	25°
40.0	0.085	0.125	0.80	2° 01'	4° 33'	12° 48'	7° 29'	25°
50.0	0.085	0.125	0.80	2° 01'	4° 33'	12° 48'	7° 29'	25°

The actual at the radial relief angle is normally kept within the range shown but may be varied to suit the cutter material, the work material and the operating conditions.

Die Freiwinkel sind normalerweise in den angegebenen Maßen, sie schwanken je nach Werkzeug, Werkstück und den Einsatzbedingungen

\* Angle is calculated from the basic mean at the radical angle.

Der Winkel wird von der Hauptschneide zum Radialwinkel gemessen.

TROUBLE SHOOTING IN MILLING  
PROBLEMLÖSUNG BEI FRÄSEN

Trouble Problem	Occurrences of trouble Auftreten des Problems	Countermeasures Gegenmaßnahmen
CBN END MILLS  i-Xmill END MILLS  i-SMART MODULAR END MILLS  X5070 END MILLS  4G MILL END MILLS  X-POWER PRO END MILLS  TitaNox- POWER END MILLS  JET-POWER END MILLS  V7 PLUS END MILLS  ALU-POWER HPC END MILLS  ALU- POWER END MILLS  D-POWER GRAPHITE END MILLS  D-POWER CFRP END MILLS  ROUTERS  CRX S END MILLS  K-2 END MILLS  ONLY ONE COATED PM60 END MILLS  TANK- POWER END MILLS  GENERAL HSS END MILLS  MILLING CUTTERS	<ul style="list-style-type: none"> <li>At time of engaging with work material Beim Eintritt in das Werkstück</li> <li>When ending cut Beim Austritt aus dem Werkstück</li> </ul>	<ol style="list-style-type: none"> <li>Decrease feed rate. / Vermindern von Vorschub</li> <li>Decrease projection amount / Schnitttiefe verringern</li> <li>Shorten cutting edge length to required minimum limit Eingriffslänge reduzieren</li> </ol>
	<ul style="list-style-type: none"> <li>During normal cutting Während des Fräsens</li> </ul>	<ol style="list-style-type: none"> <li>Decrease feed rate / Vorschub mindern</li> <li>Control wear → replace tool early Abnutzung kontrollieren - Werkzeug frühzeitig ersetzen</li> <li>Replace chuck or collet / Chuck oder Collet ersetzen</li> <li>Decrease projection amount / Schnitttiefe verringern</li> <li>Carry out honing / Nachschleifen</li> <li>If 4 flute, reduce to 2 flute(clogging of chipping) Wenn 4 Schneiden, zu 2 Schneiden verkleinern</li> <li>If dry cutting change to wet cutting utilize cutting fluid. In case of wet cutting flow oil supplied from the front, change to from rear angle of side top. Use ample with rate. Wenn Trockenfräsen, zu Naßfräsen wechseln. Wenn Naßfräsen mit Kühlflüssigkeitsversorgung von Vorne, zu einer Ölversorgung aus hinterem oder seitlich-oberem Winkel ändern. Ölversorgung reichlich gestalten</li> </ol>
	<ul style="list-style-type: none"> <li>When changing direction of feed Wenn Vorschubrichtung geändert wird</li> </ul>	<ol style="list-style-type: none"> <li>Utilize circular interpolation(in case of NC machine) or temporarily stop feed(Dowelling) Circular interpolation benutzen(bei NC-Maschinen) oder Vorschub vorübergehend stoppen.</li> <li>Reduce feed rate before and after change of directions Vor und nach dem Richtungswechsel den Vorschub mindern</li> <li>Replace chuck or collect / Chuck oder Collet ersetzen,</li> </ol>
Fracture of cutting edge Beschädigung der Schneidkante	<ul style="list-style-type: none"> <li>Fracture of corners Eckenbruch</li> </ul>	<ol style="list-style-type: none"> <li>Carry out chamfering or nose with hand lapper. Mit Handlapper eine Abschrägung durchführen.</li> <li>Down cut → Up cut / Down cut → Up cut</li> </ol>
	<ul style="list-style-type: none"> <li>Fracture at boundary of depth of cut Beschädigung an der Schneidtiefgrenze</li> </ul>	<ol style="list-style-type: none"> <li>Down cut → Up cut / Down cut → Up cut</li> <li>Reduce cutting speed / Schneidgeschwindigkeit mindern</li> </ol>
	<ul style="list-style-type: none"> <li>Chipping at center part or overall Abbröckelung an der Hauptschneide oder überall</li> </ul>	<ol style="list-style-type: none"> <li>Carry out honing. Or enlarge. / Nachschleifen oder erweitern</li> <li>Change number of rotation(in case machine vibrates) Drehzahl ändern(wenn Maschine vibriert).</li> <li>Increase cutting speed / Fräsgeschwindigkeit erhöhen.</li> <li>In ease of squeaking noise during cutting, increase feed. Wenn quitschendes Fräsgeräusch zu vernehmen, Vorschub erhöhen.</li> <li>If dry cutting use cutting fluid or blow air. Wenn Trockenfräsen, Kühlflüssigkeit oder Luft zuführen</li> <li>Replace chuck or collet / Chuck oder Collet auswechseln.</li> <li>Reduce cutting speed / Fräsgeschwindigkeit reduzieren.</li> </ol>
	<ul style="list-style-type: none"> <li>Large fracturing of cutting edge Größere Beschädigung an Schneidkanten</li> </ul>	<ol style="list-style-type: none"> <li>Decrease feed rate / Vorschub mindern.</li> <li>If 4 flute reduce to 2 flute Wenn 4 Schneiden, zu 2 Schneiden wechseln.</li> <li>Carry out honing. Or enlarge / Nachschleifen oder erweitern.</li> <li>Replace chuck or collet / Chuck oder Collet auswechseln.</li> <li>Reduce cutting speed / Fräsgeschwindigkeit mindern.</li> <li>If dry cutting, change to wet cutting. In case oil supply in wet cutting is from the front, change to rear at an angle or from side top. Use ample supply. Wenn Trockenfräsen, zu Naßfräsen wechseln. Wenn Naßfräsen mit Kühlflüssigkeitsversorgung von Vorne, zu einer Ölversorgung aus hinterem oder seitlich-oberem Winkel ändern. Ölversorgung reichlich gestalten.</li> </ol>



**COMPARISON CHART SCALE FOR HARDNESS  
VERGLEICHSTABELLE FÜR HÄRTESKALEN**

	Rockwell Hardness C Scale 150kg Brale (HRC)	Diamond Pyramid Hardness Number. Vickers (HV)	Brinell Hardness Standard 10mm Ball 29.42kN (HB)	Rockwell Hardness A Scale 60kg Brale (HRA)	Shore Scleroscope Hardness Number (HS)	Approx. Tensile Strength N/mm <sup>2</sup>
CBN END MILLS	68	940	-	85.6	97	-
i-Xmill END MILLS	67	900	-	85.5	95	-
i-SMART MODULAR END MILLS	66	865	-	84.5	92	-
X5070 END MILLS	65	832	-	83.9	91	-
4G MILL END MILLS	64	800	-	83.4	88	-
	63	772	-	82.8	87	-
	62	746	-	82.3	85	-
	61	720	-	81.8	83	-
	60	697	-	81.2	81	-
X-POWER PRO END MILLS	59	674	-	80.7	80	-
	58	653	-	80.1	78	-
	57	633	-	79.6	76	-
TitaNox- POWER END MILLS	56	613	-	79.0	75	-
	55	595	-	78.5	74	2079
	54	577	-	78.0	72	2010
	53	560	-	77.4	71	1952
JET-POWER END MILLS	52	544	500	76.8	69	1883
	51	528	487	76.3	68	1824
	50	513	475	75.9	67	1755
V7 PLUS END MILLS	49	498	464	75.2	66	1687
	48	484	451	74.7	64	1639
	47	471	442	74.1	63	1578
ALU-POWER HPC END MILLS	46	458	432	73.6	62	1530
	45	446	421	73.1	60	1481
	44	434	409	72.5	58	1432
ALU- POWER END MILLS	43	423	400	72.0	57	1383
	42	412	390	71.5	56	1334
	41	402	381	70.9	55	1294
	40	392	371	70.4	54	1245
D-POWER GRAPHITE END MILLS	39	382	362	69.9	52	1216
	38	372	353	69.4	51	1177
	37	363	344	68.9	50	1157
D-POWER CFRP END MILLS	36	354	336	68.4	49	1118
	35	345	327	67.9	48	1079
	34	336	319	67.4	47	1059
	33	327	311	66.8	46	1030
ROUTERS	32	318	301	66.3	44	1000
	31	310	294	65.8	43	981
	30	302	286	65.3	42	952
CRX S END MILLS	29	294	279	64.7	41	932
	28	285	271	64.3	41	912
	27	279	264	63.8	40	883
K-2 END MILLS	26	272	258	63.3	38	863
	25	266	253	62.8	38	843
	24	260	247	62.4	37	824
ONLY ONE COATED PM60 END MILLS	23	254	243	62.0	36	804
	22	248	237	61.5	35	785
	21	243	231	61.0	35	775
TANK- POWER END MILLS	20	238	226	60.5	34	755
	(18)	230	219	-	33	736
	(16)	222	212	-	32	706
GENERAL HSS END MILLS	(14)	213	203	-	31	677
	(12)	204	194	-	29	647
	(10)	196	187	-	28	618
	(8)	188	179	-	27	598
MILLING CUTTERS	(6)	180	171	-	26	579
	(4)	173	165	-	25	549
	(2)	166	158	-	24	530
	(0)	160	152	-	24	520

P	VDI 3323 1		Material Description Non-alloyed steel			Composition / Structure / Heat Treatment About 0.15% C, Annealed					HB 125	HRC	
	Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.0037	STKM 12 C	St 37-2	-	4360 40 B	S235JR	E24-2	1311	Fe 360 B				16D	
1.0038	STKM 12 A	St 37-3	A570.36	4360 40 C	S275J2G3	E28-3	1312	Fe 360 D FF				ST14KP	
1.0045	SM 490 YA	S 355 JR	-	-	S 1207	E36-2	-	Fe 510 BFN					
1.0050	SS 50	St 50-2	A570 Gr. 50	4360 50 B	E 295	A50-2	2172	Fe 490				ST5PS	
1.0060	SM 58	St 60-2	A572 Gr. 65	4360 55 E	-	A60-2	1650	Fe 60-2				ST6PS	
1.0114		S 235 J0	-	En 40C	S 235 J0	E24-3		Fe 360 CFN					
1.0143		S 275 J0	-	-	S 275 J0	E28-3	1414	Fe 430 C					
1.0144	SM41C, SM400	St 44-3 N	A573 Gr. 81	4360 43C	S 275 J2 G3	E28-3	1412	Fe 430 D FF				ST14KP	
1.0149		Ro St 44-2	-	43C	S 275 J0 H	-	1412	Fe430C					
1.0301	S10C	C10	1010	045M10	C10	34C10, XC10		C10	F.1511	G10100		10	
1.0330	SPCC	St 12	-	DC 01	Fe P01	DC 01/Fe P01	1142	Fe P01				15KP	
1.0335	SPHE	DD 13 (StW 24)	A622(1008)	HS 3	DD 13	3C		FeP13				08KP	
1.0338	SPCE	St 4	A620(1008)	14491CR	Fe P04	Fe 14	1147	DC04/FeP04				08JU	
1.0345	SPV 50	P235 GH	A516 Gr. 65	P 235 GH	P 235 GH	A 37 CP	1330	Fe E 235		K02503			
1.0401	S15C	C15	1015	080M15	-	C18RR, XC18	1350	C15, C16	F.1110	G10170		15	
1.0402	S20C	C22	1020	050 A 20	1 C 22	C20	1450	C 20	F.1120	G10200		20	
1.0425	SPV315	P265GH/HII				A42CP	1430	Fe4101KW		K02801		16K	
1.0443	SC 450	GS-45	A2765-35	A1		E23-45M	1305						
1.0539		S355NH				TSE355-4	2134	Fe510B					
1.0545		S355N		4360-50E		E355R	2334	FeE355KG					
1.0546		S355NL		4360-50EE		E355FP	2135	FeE355KT					
1.0547		S355J0H		4360-50C		TSE355-3	2172	Fe510C					
1.0549		S355NLH					2135	Fe510D					
1.0553	SM 520 M	St52-3U	A14880-40	4360-50C		320-560M	1606	Fe510C					
1.0562	SM490A	St E 355	A633 Gr. C	P 355 N		FeE355KGN	2132	Fe E 355 KG		K12000		15GF	
1.0565		W St E 355		P 355 NH		P 355 NH	2106	Fe E 355 KW		K01600			
1.0566	SLA 37	T St E 355		P 355 NL1		P 355 NL1	2107	Fe E 355 KT					
1.0570	SM 50 YA	St 52-3	1	4360-50 C	S355JR	E36-3	2172	Fe 510 B				17G1S	
1.0715	SUM22	9SMn28	1213	230M07		S250	1912	CF5Mn28	F.2111	G12130			
1.0718	SUM22L	9SMnPb28	12L13			S250Pb	1914	CF95MnPb28	F.2112	G12134			
1.0721		10S20	1108	10S20		10S20		CF10S20	F.2121	G11080			
1.0722		10SPb20	11L08			10PbF2		CF10SPb20		G11084			
1.0736	SUM25	9SMn36	1215			S300		CF9Mn36	F.2113	G12150			
1.0737		9SMnPb36	12L14			S300Pb	1926	CF95MnPb36	F.2114	G12144			
1.0972		S315MC		1501-40F30		E315D							
1.0976		S355MC		1501-43F35		E355D	2642	FeE355TM					
1.0982		S460MC		1501-50F45									
1.0984		S500MC				E490D	2662	FeE490TM					
1.0986		S500MC		1501-60F55		E560D		FeE560TM					
1.1121	S10C	Ck10	1010	040A10		XC10	1265	C10	F.1510	G10100		10	
1.1141	S15	Ck15	1015	040A15	32C	XC15	1370	C15	F.1110	G10150		15	
1.1151	S20C	C22E	1020	055M15		2C22	1450	C20	F.1120	G10230		20	
1.8900	S25C	StE380	A572-60	436055E			2145	FeE390KG					
		St44-2	A36	436043A		NFA35-501E28	1411						
		StE320-3Z		1501160			1421						

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRC
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
			Non-alloyed steel			About 0.75% C, Annealed					270	28
1.0603	S 70 C-CSP	C67	107	080A67		XC65		C67		G10700		
1.0605		C75	1075	144980HS				C75		G10740	75	
1.1203	S55C	Ck55	1055	060A57		2C55	1655	C55	F.1150	G10550	55	
1.1209		C55R	1055	070M55		3C55		C55	F.1155	G10550		
1.1221	S58C	Ck60	1060	060A62	43D	2C60	1678	C60	F.1150	G10640	60	
1.1231	S 70 C-CSP	C67E	1070	060A67		XC68	1770	C70	F.5103	G10700	65GA	
1.1248	C 75	C75E	1074	060A78		XC75	1774	C75	F.5107	G10800	75(A)	
1.1269	SK 5-CSP	C85E	1086			XC90		C90		G10900	85(A)	
1.1274	SUP4	Ck 101	1095	060 A 96	C 100S	XC100	1870	C100	F.5117	G10950		
1.1545	SK 3	C 105W1	W1	BW 2	C 105U	Y1 105	1880	C 100 KU	F.5118		U10A	
1.1663	SK 2	C125W	W112			Y2120					U13	

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRC
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
			Non-alloyed steel			About 0.75% C, Quenched & Tempered					300	32
1.0070		St 70-2	1055	Fe690-2FN	-	A70-2	1655	Fe 690	F.1150		55	
1.0535	S55C	C55	1055	070M55		1C55	1655	C55		J05000	55	
1.0601	S58C	C60	1060	060A62	43D	1C60		C60		G10600	60(G)	
1.1203	S55C	Ck55	1055	060A57		2C55	1655	C55	F.1150	G10550	55	
1.1221	S58C	Ck60	1060	060A62	43D	2C60	1678	C60	F.1150	G10640	60	
1.1274	SUP4	Ck 101	1095	060 A 96	C 100S	XC100	1870	C100	F.5117	G10950		
1.1545	SK 3	C 105W1	W1	BW 2	C 105U	Y1 105	1880	C 100 KU	F.5118		U10A	
1.1663	SK 2	C125W	W112			Y2120					U13	
1.5120		38MnSi4										
1.5710	SNC236	36NiCr6	3135	640A35	111A	35NC6						
1.7701		51CrMoV4						51CrMoV4				

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRC
			AISI/ASTM/SAE	BS	EN	Annealed					180	10
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.7715		14MoV6-3		1503-660-440				13MoCrV6				
1.8159	SUP 10	50CrV4	6150	735A50	47	50CrV4	2230	50CrV4		G61500	50C GFA	
1.8161		58CrV4										
1.8509	SACM 645	41CrAlMo7	A355A	905M39	41B	40CAD6-12	2940	41CrAlMo7				
1.8523		39CrMoV13-9		897M39	40C			36CrMoV12				

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRC
			AISI/ASTM/SAE	BS	EN	Quenched & Tempered					275	29
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.5415	STFA 12	15Mo3	A204GrA	1503-243B		15D3	2912	16Mo3(KG)	F.2601	K11820		
1.5423	SB450M	16Mo5	4520	1503-245-420				16Mo5(KG)	F.2602	K11522		
1.5622		14Ni6	A350-LF5			16N6		14Ni6(KG)	F.2641			
1.5732	SNC415(H)	14NiCr10	3415			14NC11		16NiCr11				
1.5752	SNC815(H)	14NiCr14	3310	655M13	36A	12NC15					20X2H4A	
1.5755	SNC236	31NiCr14		653M31		18NC13	2534		F.1270			
1.6565	SNCM447	40NiCrMo6	4340	817M40	24	35NCD6	2541	35NiCrMo6(KB)			38C2N2MA	
1.6587		17CrNiMo6		820A16		18NCD6		14NiCrMo13				
1.6657		10NiCrMo13-4						14NiCrMo131				
1.6957		26NiCrMoV14-5										
1.7015	SCr415(H)	10Cr3	5015	523M15		12C3				G50150	15C	
1.7262	SCM415(H)	15CrMo5				12CD4	2216	12CrMo4				
1.7335	SCM415(H)	13CrMo4-4	A182-F11	1501-620		15CD4-5	2216	14CrMo45			12CM	
1.7380		10CrMo9-10	A182F22	1501-622		12CD9-10	2218	12CrMo9			12KH8	
1.7715		14MoV6-3		1503-660-440				13MoCrV6				
1.7733		24CrMoV55				20CDV6		21CrMoV511				
1.7755		G5-45CrMoV10-4										
1.8070		21CrMoV511						35NiCr9				

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRC
			AISI/ASTM/SAE	BS	EN	Quenched & tempered					300	32
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.1730		C45W3	C45W			XC48						
1.2332	SCM(440)	47CrMo4	4142	708M40	19A	42CD4	2244	42CrMo4				
1.5736	SNC 631 (H)	36NiCr10	3435			30NC11						
1.6523	SNCM220(H)	21NiCrMo2	8620	805M20	362	20NCD2	2506	20NiCrMo2			20C GNM	
1.7033	SCr430(H)	34Cr4	5132	530A32	18B	32C4		34Cr4(KB)		G51300	35C	
1.7218	SCM420	25CrMo4	4130	CDS110		25CD4	2225	25CrMo4(KB)			20C M	
1.8515		32CrMo12		722M24	40B	30CD12	2240	32CrMo12	F.124A			

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRC
			AISI/ASTM/SAE	BS	EN	Annealed					200	15
						AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.2510	SKS3	100MnCrW4	O1	BO1		90 MWCV 5	2140	95 MnWCr 5 KU	F.5220		9KHVG	
1.2581	SKD5	X30WCrV9-3	H21	BH21		Z30WCV9		X30WCrV93KU	F.526	T20821	3C2W8F	
1.2601		X165CrMoV12					2310	X160CrMoV12			KH12MF	
1.2606	SKD 62	X37CrMoW51	H12	BH12		Z35CWDV5		X35CrMoW05KU	F.537	T20812	5C NM	
1.2764		X19NiCrMo4										
1.2767		X45NiCrMo4				45NCD16		40NiCrMoV8KU				
1.2842		90MnCrV8	O2	B02		90MV8		90MnVCr8KU		T31502	9G2F	
1.3243	SKH55	S6-5-2-5	T15			KCV06-05-05-04-02	2723	HS6-5-2-5			R6M5K5	
1.3249	SKH 3	S18-1-2-5	T4	BT4		Z80WKCV18-05-04					R18K5F2	
1.3343	SKH51,SKH9	S6-5-2	M2	BM2		Z85WDCV	2722	HS652	F.5604		R6M5	
1.3348	SKH 58	S2-9-2	M7			Z100DCWV09-04-02	2782	HS292	F.5607			
1.3355	SKH 2	S18-0-1	T1	BT1		Z80WCV18-4-01					R18	
1.4718	SUH1	X45CrSi9-3	HNV3	401S45	52	Z45CS9		X45CrSi8	F.322		40C 9S2	
1.5662	SL9N60(53)	X8Ni9	ASMA353	502-650		9Ni		X10Ni9	F.2645			
1.5680		12Ni19	2515	12Ni19		Z18N5						

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRC
			AISI/ASTM/SAE	BS	EN	Quenched & Tempered					325	35
						AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands
1.2080	SKD1	X210Cr12	D3	BD3	X210Cr12	Z200C12		X205Cr12KU		T30403	KH12	
1.2344	SKD61	X40CrMoV5-1	H13	BH13		Z40CDV5	2242	X40CrMoV511KU	F.5318	T20813	4C5MF15	
1.2363	SKD12	X100CrMoV5-1	A2	BA2		Z100CDV5	2260	X100CrMoV51KU	F.5227		9KH5VF	
1.2436	SKD 2	X210CrW12	D4(D6)	BD6		Z200CD12	2312	X215CrW121KU	F.5213		KH12	
1.2581	SKD5	X30WCrV9-3	H21	BH21		Z30WCV9		X30WCrV93KU	F.526	T20821	3C2W8F	
1.2601		X165CrMoV12					2310	X160CrMoV12			KH12MF	
1.2714	SKT 4	55NiCrMoV7	6F3/L6			55NiCrMoV7			F.520S		5KHNV	
1.3202		S12-1-4-5		BT15				HS12-1-5-5				
1.3207		S10-4-3-10		BT42		Z130WKCDV						
1.3243	SKH55	S6-5-2-5	T15			KCV06-05-05-04-02	2723	HS6-5-2-5			R6M5K5	
1.3246		S7-4-2-5	M35			Z110WKCDV07-05-04		HS7-4-2-5				
1.3247	SKH 51	S2-10-1-8	M42	BM42		Z110DKCWV09-08-04		HS2-9-1-8			R2AM9K5	
1.3255	SKH 3	S18-1-2-5	T4	BT4		Z80WKCV18-05-04					R18K5F2	
1.3343	SKH51,SKH9	S6-5-2	M2	BM2		Z85WDCV	2722	HS652	F.5604		R6M5	
1.3348	SKH 58	S2-9-2	M7			Z100DCWV09-04-02	2782	HS292	F.5607			
1.3355	SKH 2	S18-0-1	T1	BT1		Z80WCV18-4-01					R18	
1.4718	SUH1	X45CrSi9-3	HNV3	401S45	52	Z45CS9		X45CrSi8	F.322		40C 9S2	
1.4935	SUH 616	X20CrMoWV121	422							S42200		
1.5680		12Ni19	2515	12Ni19		Z18N5						

M		VDI 3323 14	Material Description				Composition / Structure / Heat Treatment					HB	HRc
			Stainless steel				Austenitic					180	10
Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	
1.4301	SUS 304	X5CrNi18-10	304	304S15		Z5CN18-09	2332		F.3551	S30409	08C 18N10		
1.4305	SUS303	X10CrNiS18-10	303	303S21	58M	Z8CNF18-09	2346	X10CrNiS18.09	F.3508	S30300	30C 18N11	ATI 303	
1.4306	SCS19	X2CrNi1911	304L	304C12	X3CrNi1810KD	Z2CN18-09	2352	GX2CrNi1910	F.3503	S30403	03KH18N11	ATI 304L	
1.4308	SUS304L	GX6CrNi18-9	CF-8	304C15	58E	Z6CN18-10M	2333					CF-8	
1.4310	SUS 301	X10CrNi18-8	301	301S21		Z12CN17-07	2331	X2CrNi1807	F.3517	S30100	07KH16N6	ATI 301	
1.4311	SUS304LN	X2CrNiN18 10	304LN	304S62		Z2CN18-10	2371	X2CrNiN1810	F.3541	S30453	03KH18N11		
1.4312	SCS12	GX10CrNi188	305	302C25		Z10CN18-9M					10C 18N9L	ATI 305	
1.4350	SUS304	X5CrNi18-9	304	304S15	58E	Z6CN18-09	2332	X5CrNi1810	F.3551	S30400		ATI 304	
1.4362		X2CrNiN234	S32304			Z2CN23-04AZ	2327			S32304		ATI 2304TM	
1.4371		X3CrMnNiN18887	202	284S16		Z8CMN18-08-05							
1.4401	SUS316	X5CrNiMo17-12-2	316	316S13		Z3CND17-11-01	2347	X5CrNiMo17 12 2	F.3534	S31600	08KH17H13M2T	ATI 316	
1.4404	SUS316L	X2CrNiMo17-13-2	316L	316S11		Z2CND17-12	2348	X2CrNiMo1712	F.3533	S31603		ATI 316L	
1.4406	SUS316LN	X2CrNiMoN17122	316LN	316S61		Z2CND17-12AZ		X2CrNiMoN1712	F.3542	S31653	07C 18N	ATI 316LN	
1.4408	SCS14	GX6CrNiMo18-10	CF-8M	316C16			2343	X7CrNiMo2010	F.8414	J92900	10G2S2MSL		
1.4410	SCS 14 A	GX10CrNiMo18-9				Z5CND20-12M	2328				S32750		
1.4429	SUS316LN	X2CrNiMoN17-13-3	316Ln	316S62		Z2CND17-13AZ	2375	X2CrNiMoN17133	F.3543		03KH16N15M3		
1.4435	SUS316L	X2CrNiMo18143	316L	316S11		Z3CND17-12-03	2375	X2CrNiMo17 13 2	F.3533	S31603	O3C 17N14M3		
1.4436	SUS316	X3CrNiMo17-13-3	316	316S19		Z6CND18-12-03	2343	X5CrNiMo17 12 2	F.3543	S31600			
1.4438	SUS317L	X2CrNiMo18164	317L	317S12		Z2CND19-15-04	2367	X2CrNiMo18 16 4	F.3539	S31703		ATI 317L	
1.4439		X2CrNiMoN17135	(s31726)			Z3CND18-14-06AZ							
1.4440		X2CrNiMo18-16											
1.4449	SUS317	X5CrNiMo17133	317	317S16				X5CrNiMo1815		S31700		ATI 317	
1.4460	SUS 329 J1	X8CrNiMo275	329				2324			S32900		10RE51	
1.4462	SUS329J3L	X2CrNiMoN2253		318S13		Z3CND22-05Az	2377			S31803		ATI 2205TM	
1.4500		X7NiCrMoCuNb2520				Z3NCDU25-20M				J95150			
1.4521	SUS444	X2CrMoTi18-2	443444				2326	X2CrMoTiNb18 2	F.3123				
1.4539		X1NiCrMoCuN25205				Z2NCDU25-20	2562			N08904		ATI 904L	
1.4541	SUS321	X14CrNiTi18-10	321	321S31		Z6CNT18-10	2337	X6CrNiTi18 11	F.3523	S32100	06C 18N10T	ATI 321	
1.4542	SUS630	X5CrNiCuNb174	630			Z7CNU15-05						UGIMA 4542	
1.4545		Z7CNU15.05	15-5PH							S15500		ATI 15-5	
1.4547		X1CrNiMoN20187	S31254				2378			S31254		Uranus B25 6Mo	
1.4550	SUS347	X6CrNiNb18-10	347	347S17	58F	Z6CENNb18-10	2338	X6CrNiNb18 11	F.3552	S34700	08C 18N12B	ATI 347	
1.4552	SCS 21	GX7CrNiNb18-9				Z4CENNb19-10M				J92710			
1.4568	SUS 631	X7 CrNiAl 177		316S111		Z9 CAN 17-7	2388	Z8CNA17-07		S17700	09C 17NJU1	17-7PH	
1.4571	SUS 316Ti	X6CrNiMoTi17-12-2	316Ti	320S31	58J	Z6NDT17-12	2350	X6CrNiMoTi17 12	F.3535		10C 17N13M2T	ATI 316Ti	
1.4581	SCS 22	GX5CrNiMoNb18		318C17		Z4CNDNb18-12M							
1.4583		X6CrNiMoNb18-12	318	303S21		Z15CNS20-12		X15CrNiSi2 12					
1.4585		GX7CrNiMoCuNb1818						X6CrNiMoTi17 12		J94651			
1.4821		X20CrNiSi254				Z20CNS25-04				S44635			
1.4823		GX40CrNiSi274								J92605			
1.4828	SCS17	X15CrNiSi20-12	309	309S24	58C	Z15CNS20-12			F.8414	S30900	20C 20N14S2	ATI 309	
1.4833	SUS 309 S	X6CrNi2213	309S	309S13		Z15CN24-13				J93400			
1.4845	SUH310	X12CrNi25-21	310S	310S24		Z12CN25-20	2361	X6CrNi2520	F.331	S31008	20C 23N18	ATI 310S	
1.4878	SUS321	X12CrNiTi18-9	321	321S20	58B	Z6CNT18-12(B)	2337	X6CrNiTi1811	F.3553	S32100		ACX315	
1.4891		X5CrNiNb18-10	Ss30415				2372						
1.4893		X8CrNiNb11	S30815				2368						
1.4948		X6CrNi1811	304H	304S51		Z5CN18-09	2333			S30480			
1.4980		X5NiCrTi2515	660				2570			S66286		Incoloy A 286	
		X5NiCrN3525											
		X2CrNiMoN18134	S31753										
		X2CrNiMoN25227											

Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	K	VDI 3323 19	Material Description Malleable cast iron	Composition / Structure / Heat Treatment Ferritic	HB 130	HRc

Mat'l No.	JIS	DIN	AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	K	VDI 3323 20	Material Description Malleable cast iron	Composition / Structure / Heat Treatment Pearlitic	HB 230	HRc 21
0.8155	FCMP490	GTS-55	50005	P 510-4	GJMB-550-4	MP 50-5	0854	GMN 55			Kc 60-3							
0.8165	FCMP590	GTS-65	70003	P 570-3	GJMB-650-2	MN 650-3	0856	GMN 65										
0.8170	FCMP690	GTS-70	90001	P 690-2	GJMB-700-2	MN 700-2	0862	GMN 70			Kc 70-2							

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	
		<b>N</b>	<b>VDI 3323</b>	Aluminum-cast, alloyed			≤ 12% Si, Curable, Hardened					90	
			<b>24</b>										
2.1871		G-AlCu4TiMg											
3.1754		G-AlCu5Ni1,5											
3.2371		G-AlSi7Mg	4218B									AK8	
3.2373	C4BS	G-AlSi9MgWA	SC64D			A-S7G	4251					AK9	
3.2381		G-AlSi10Mg										AK12	
3.5106		G-MgAg3SE2Zr1	QE22	mag12									
		G-ALMG5	GD-AISI12	LM5		A-SU12	4252						

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	
		<b>N</b>	<b>VDI 3323</b>	Copper and Copper Alloys (Bronze / Brass)			Cutting alloys, PB>1%					110	
			<b>26</b>										
2.0375		CuZn36Pb3										LS60-2	
2.1090		G-CuSn75pb	C93200			U-E7Z5pb4							
2.1096		G-CuSn5ZnPB	c83600	LG2									
2.1098		G-CuSn2Znpb	C83600										
2.1182		G-CuPb15Sn	C23000	LB1		U-pb15E8							

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	
		<b>N</b>	<b>VDI 3323</b>	Copper and copper alloys (Bronze / Brass)			CuZn, CuSnZn (Brass)					90	
			<b>27</b>										
2.0240	C2300	CuZn15										L90	
2.0321		CuZn37	C27200	cz108		CuZn36,CuZn37		C2700				L63	
2.0590		G-CuZn40Fe											
2.0592		G-CuZn35Al1	C86500	U-Z36N3		HTB1							
2.0596		G-CuZn34Al2	C86200	HTB1		U-Z36N3						LTS23AD	
2.1293		CuCrZr	C18200	CC102		U-Cr0-8Zr							

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	
		<b>N</b>	<b>VDI 3323</b>	Copper and copper alloys (Bronze / Brass)			CuSn, lead-free copper and electrolytic copper					100	
			<b>28</b>										
2.0060		E-Cu57											
2.0966		CuAl10Ni5Fe4	C63000	Ca104		U-A10N						BrAD	
2.0975		G-CuAl10Ni	B-148-52										
2.1050		G-CuSn10	c90700	CT1									
2.1052		G-CuSn12	C90800	pb2		UE12P							
2.1292		G-CuCrF35	C81500	CC1-FF									



Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	
		<b>S</b>	<b>VDI 3323</b>	Heat resistant super alloys			Ni or Co Based, Cast					320	34
2.4669		NiCr15Fe7TiAl				NC15TNbA					N07750	Inconel X750	
2.4685		G-NiMo28									N10665	Hastelloy B	
2.4810		G-NiMo30										Hastelloy C	
2.4973		NiCr19Co11MoTi	AMS 5399			NC19KDT					VT5-1		
3.7115		TiAl5Sn2									R54520	VT1-00 ATI Grade 6	

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	
		<b>S</b>	<b>VDI 3323</b>	Titanium alloys			Pure Titanium					400 Rm	
2.4674		NiCo15Cr10MoAlTi	AMS 5397								N13100	IN 100	
3.7025		Ti1	R50250	2TA1							R50250	ATI30 CP Gr. 1	
3.7225		Ti1pd	R52250	TP1							R52250		

Mat'l No.	JIS	DIN	Material Description			Composition / Structure / Heat Treatment					HB	HRc	
			AISI/ASTM/SAE	BS	EN	AFNOR	SS	UNI	UNE / IHA	UNS	GOST	Brands	
		<b>S</b>	<b>VDI 3323</b>	Titanium alloys			Alpha + Beta Alloys, Hardened					1050 Rm	
3.7124		TiCu2		2TA21-24									
3.7145		TiAl6Sn2Zr4Mo2Si	R54620								R54620		
3.7165		TiAl6V4	AMS R56400	TA10-13		T-A6V					VT6		
3.7185		TiAl4Mo4Sn2		TA45-51									
3.7195		TiAl3V2.5									R56320	ATI3-2.5	
		TiAl4Mo4Sn4Si0.5											
		TiAl5Sn2.5	AMS R54520	TA14/17		T-A5E							
		Ti6Al4VELI	AMS R56401	TA11									

# EDP No. INDEX

EDP No.	Page
E2410	686
E2429	687
E2461	716
E2462	716
E2463	716
E2464	696~697
E2492	684
E2498	810~811
E2509	698
E2510	695
E2512	685
E2516	702~703
E2524	719
E2535	683
E2551	707
E2552	708
E2553	704~705
E2554	706
E2570	690~692
E2571	693~694
E2572	699
E2573	700~701
E2574	709
E2575	709
E2576	712
E2577	712
E2595	710
E2596	711
E2597	713
E2598	714
E2606	718
E2675	805
E2676	806
E2677	807
E2678	808
E2679	809
E2751	727~728
E2752	729~730
E2753	720
E2754	736
E2755	725
E2756	726
E2757	722
E2761	717
E2762	721
E2764	723
E2765	724
E2766	734
E2767	735
E2768	737
E2776	715
E2777	732
E2778	731
E2779	733
E2SET553	705
E3462	682
E3570	680
E3574	681
E5521	487
E5522	487
E5711	490
E5742	490

EDP No.	Page
E5908	481
E5909	482
E5910	480
E5930	483
E5E39	491
E5E40	491
E5E47	485
E5E48	486
E5E49	488
E5E50	489
E5E51	484
E5H22	472
E5H23	473
E5H24	466~468
E5H25	469~471
E9410	678
E9720	679
E9936	642
E9938	646
E9940	640
E9941	648
E9942	644
E9A26	650
E9A29	643
E9A30	645
E9A31	647
E9A32	641
E9A33	651
E9A34	652
E9A35	649
E9E43	653
EE515	420
EH830	418
EH831	422
EH840	418
EH841	422
EH852	421
EH862	421
EH911	414~415
EH912	414~415
EH913	416~417
EH914	416~417
EH915	419
EH916	419
EH917	423
EH918	423
EH919	424
EH920	424
EH921	425
EH942	425
EHE54	405
EHE55	405
EI450	507
EI451	506
EI880	505
EI881	509
EI996	510~511
EI997	502~503
EIA13	513
EIA14	514
EIB04	516
EIB86	512

EDP No.	Page
EIB87	508
EIB88	515
EIB93	504
EL612	689
EL623	688
EMB72	457
EMB73	457
EP922	492
EP923	492
EP924	493
EP925	493
ESB94	51
ESD02	52
G8A01	135
G8A02	136
G8A28	112~113
G8A36	123~124
G8A37	128
G8A38	114
G8A39	130
G8A45	131~134
G8A46	107~110
G8A47	127
G8A50	126
G8A52	125
G8A53	115
G8A54	111
G8A59	116
G8A60	118~122
G8B08	129
G8B54	106
G8B59	105
G8D62	117
G8D63	137
G8D64	138
G9400	596
G9410	575~576
G9424	563
G9425	578
G9432	586
G9433	582
G9437	550
G9438	551
G9439	580
G9444	566
G9445	568~569
G9447	584
G9448	589
G9449	591
G9452	571
G9453	593
G9454	552
G9455	553
G9527	567
G9528	581
G9540	590
G9553	575~576
G9624	548
G9634	556
G9A42	595
G9A68	565
G9A69	588



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 BRAZIL	 CANADA	 COLOMBIA	 MEXICO	 UNITED STATES
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