



Leading Through Innovation



**SOLID CARBIDE**

**CRX S END MILLS**

**CRX S FRÄSER**

- DLC Coated Carbide End Mills for Copper
- DLC beschichtete VHM Fräser für die Kuper - und Kupferlegierungen zu bearbeiten

SELECTION GUIDE



MILLING  
TOOLS

SERIES	SGED28	SGED27	SGED29	SGED31	SGED30
	2	2	2	2	2
FLUTE	30°	30°	30°	30°	30°
HELIX ANGLE	BALL NOSE	BALL NOSE	CORNER RADIUS	SQUARE	SQUARE
CUTTING EDGE SHAPE	R0.5	R0.25	D1.0	D1.0	D0.5
SIZE MIN	R6.0	R6.0	D12.0	D12.0	D12.0
SIZE MAX	531	532	534	536	537
PAGE	EXTENDED NECK		EXTENDED NECK		EXTENDED NECK
	DLC	DLC	DLC	DLC	DLC

SOLID CARBIDE  
**CRX S**  
END MILLS

DLC Coated Carbide End Mills for Copper



①: Excellent ○: Good  
Recommended cutting conditions : P 539

ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment	HB	Hrc
P	1	Non-alloy steel	About 0.15% C Annealed	125	13
	2	Non-alloy steel	About 0.45% C Annealed	190	25
	3	Non-alloy steel	About 0.45% C Quenched & Tempered	250	25
	4	Non-alloy steel	About 0.75% C Annealed	270	28
	5	Low alloy steel	About 0.75% C Annealed	300	32
	6	Low alloy steel	About 0.75% C Quenched & Tempered	300	32
	7	Low alloy steel	Quenched & Tempered	180	10
	8	Low alloy steel	Quenched & Tempered	275	29
	9	Low alloy steel	Quenched & Tempered	300	32
	10	High alloyed steel, and tool steel	Quenched & Tempered	350	38
	11	High alloyed steel, and tool steel	Quenched & Tempered	200	15
M	12	Ferritic / Martensitic	Quenched & Tempered	325	35
	13	Stainless steel	Annealed	200	15
	14	Stainless steel	Quenched & Tempered	240	23
	15	Stainless steel	Quenched & Tempered	180	10
K	16	Grey cast iron	Pearlitic / ferritic	180	10
	17	Grey cast iron	Pearlitic (Martensitic)	260	26
	18	Nodular cast iron	Ferritic	160	3
	19	Nodular cast iron	Pearlitic	250	25
N	20	Malleable cast iron	Pearlitic	130	21
	21	Aluminum-wrought alloy	Not Curable	60	0
	22	Aluminum-wrought alloy	Curable	100	0
	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable	75	0
	24	Aluminum-cast, alloyed	≤ 12% Si, Curable	90	0
	25	Copper and Copper Alloys (Bronze / Brass)	> 12% Si, Not Curable	130	0
	26	Copper and Copper Alloys (Bronze / Brass)	Cutting Alloys, Pb>1%	110	0
	27	Copper and Copper Alloys (Bronze / Brass)	CuZn, CuSnZn (Brass)	90	0
	28	Non Metallic Materials	CuSn lead-free copper and electrolytic copper	100	0
	29	Non Metallic Materials	Diureplastic, Fiber Reinforced Plastic Rubber, Wood, etc.	100	0
S	30	Heat Resistant Super Alloys	Annealed	200	15
	31	Heat Resistant Super Alloys	Curable	280	30
	32	Heat Resistant Super Alloys	Annealed	250	25
	33	Heat Resistant Super Alloys	Curable	350	38
	34	Heat Resistant Super Alloys	Cast	320	34
H	35	Titanium Alloys	Pure Titanium	400 Rm	0
	36	Titanium Alloys	Alpha + Beta Alloys	1050 Rm	0
	37	Hardened steel	Hardened	550	55
	38	Hardened steel	Hardened	630	60
H	39	Chilled Cast Iron	Cast	400	42
	40	Hardened Cast Iron	Cast	400	42
	41	Hardened Cast Iron	Hardened	550	55



PLAIN SHANK **SGED28** SERIES

CARBIDE, 2 FLUTE BALL NOSE DLC COATING  
VOLLHARTMETALL, 2 SCHNEIDEN STIRNRADIUS DLC BESCHICHTUNG  
Fraise carbure, 2 dents, hémisphérique, revêtuë DLC  
2 TAGLIANTI, SEMISFERICA, RIVESTIMENTO DLC

- Designed for copper, copper alloys, soft graphite, reinforced plastics and materials affiliated with non-ferrous metals.
- Tight radius tolerance is applied (±0.005mm tolerance under R3).
- Excellent surface roughness from Mirror Face of cutting edges
- Entwickelt für die Bearbeitung von Kupfer, Kupferlegierungen, sowie faserverstärkten Kunststoffen, NE-Metallen
- Hochgenaue Radiusoleranz (±0.005mm Toleranz unter R3mm)
- Sehr gute Oberflächenrauigkeit wird durch die besonders behandelte Schneide erreicht



EDP No.	Radius of Ball Nose R(±0.005)	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
SGED28010	R0.5	1.0	6	2.5	50
SGED28015	R0.75	1.5	6	4	50
SGED28020	R1.0	2.0	6	5	50
SGED28030	R1.5	3.0	6	8	60
SGED28040	R2.0	4.0	6	8	70
SGED28050	R2.5	5.0	6	12	90
SGED28060	R3.0	6.0	6	12	90
SGED28080	R4.0	8.0	8	16	100
SGED28100	R5.0	10.0	10	20	100
SGED28120	R6.0	12.0	12	25	110

Size	Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R3	± 0.005	0 ~ -0.012	h5
over R3	± 0.015	0 ~ -0.015	h5

ISO Material	P Non-alloy steel			Low alloy steel			High alloyed steel			M Stainless steel			K Grey cast iron			S Titanium Alloys					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
VDI 3323	13	25	28	32	36	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	
HB	125	190	250	270	300	180	275	300	350	400	325	200	240	180	160	250	190	230	230	230	
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
ISO Material	Aluminum wrought alloy			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials			Heat Resistant Super Alloys			Titanium Alloys			Hardened 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
HB	60	100	75	90	130	110	60	100	100	200	280	250	350	320	350	350	550	630	400	400	550
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

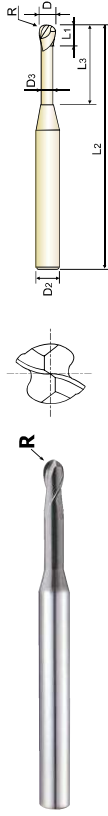


PLAIN SHANK SGED27 SERIES

**CARBIDE, 2 FLUTE BALL NOSE DLC COATING with EXTENDED NECK**

- VOLLHARTMETALL, 2 SCHNEIDEN STIRNRADIUS DLC BESCHICHTUNG mit ABGESETZTEM SCHAFTTETEL
- Fraise carbure, 2 dents, hémisphérique, détaillée, revêtuë DLC
- 2 TAGLIANTI, SEMISFERICA CON SCARICO ESTESO, RIV. DLC

- Designed for copper, copper alloys soft graphite, reinforced plastics and the materials affiliated with non-ferrous metals.
- Tight radius tolerance is applied (±0.005mm tolerance under R3).
- Excellent surface roughness thanks to Mirror Faces of cutting edges
- High strength and minimized vibration are available due to two step taper neck(under R0.5).
- Entwickelt für die Bearbeitung von Kupfer, Kupferlegierungen, sowie faserverstärkten Kunststoffen, NE-, Metallen
- Hohegenauere Radustoleranz (±0.005mm Toleranz unter R3mm)
- Sehr gute Oberflächenrauhigkeit wird durch die besonders behandelte Schmelde erreicht.
- Hohe Zähigkeit und verminderte Vibrationen werden durch den besonderen kegelförmigen Hals erreicht, (unter R 0.5mm)



R0.25-R3 R4-R6 P.540

EDP No.	Radius of Ball Nose		Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
	D1	D2						
SGED2700502	R0.25	4	0.5	4	0.5	2	45	0.45
SGED2700504	R0.25	4	0.5	4	0.5	4	45	0.45
SGED2700506	R0.25	4	0.5	4	0.5	6	45	0.45
SGED2700508	R0.25	4	0.5	4	0.5	8	45	0.45
SGED2700510	R0.25	4	0.5	4	0.5	10	45	0.45
SGED2700602	R0.3	4	0.6	4	0.6	2	45	0.55
SGED2700604	R0.3	4	0.6	4	0.6	4	45	0.55
SGED2700606	R0.3	4	0.6	4	0.6	6	45	0.55
SGED2700608	R0.3	4	0.6	4	0.6	8	45	0.55
SGED2700610	R0.3	4	0.6	4	0.6	10	45	0.55
SGED2700804	R0.4	4	0.8	4	0.8	4	45	0.75
SGED2700806	R0.4	4	0.8	4	0.8	6	45	0.75
SGED2700808	R0.4	4	0.8	4	0.8	8	45	0.75
SGED2700810	R0.4	4	0.8	4	0.8	10	45	0.75
SGED2700812	R0.4	4	0.8	4	0.8	12	45	0.75
SGED2701004	R0.5	4	1.0	4	1.0	4	45	0.95
SGED2701006	R0.5	4	1.0	4	1.0	6	45	0.95
SGED2701008	R0.5	4	1.0	4	1.0	8	45	0.95
SGED2701010	R0.5	4	1.0	4	1.0	10	45	0.95
SGED2701012	R0.5	4	1.0	4	1.0	12	45	0.95
SGED2701506	R0.75	4	1.5	4	1.5	6	45	1.45
SGED2701508	R0.75	4	1.5	4	1.5	8	45	1.45
SGED2701510	R0.75	4	1.5	4	1.5	10	45	1.45
SGED2701512	R0.75	4	1.5	4	1.5	12	45	1.45

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Size	Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R3	±0.005	0 ~ -0.012	h5
over R3	±0.010	0 ~ -0.015	h5

◎: Excellent ○: Good

ISO Material	P			M			K														
	Non-alloy steel	Low alloy steel	High alloyed steel	Stainless steel	Grey cast iron	Nickel cast iron	Malleable cast iron	Cast iron	Hardened Cast Iron												
VM3 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	26	3	25	3	25	3	21	21
HRc	125	190	250	270	300	180	275	300	350	200	240	180	180	180	180	250	160	250	130	230	230
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



PLAIN SHANK SGED27 SERIES

**CARBIDE, 2 FLUTE BALL NOSE DLC COATING with EXTENDED NECK**

- VOLLHARTMETALL, 2 SCHNEIDEN STIRNRADIUS DLC BESCHICHTUNG mit ABGESETZTEM SCHAFTTETEL
- Fraise carbure, 2 dents, hémisphérique, détaillée, revêtuë DLC
- 2 TAGLIANTI, SEMISFERICA CON SCARICO ESTESO, RIV. DLC

- Designed for copper, copper alloys soft graphite, reinforced plastics and the materials affiliated with non-ferrous metals.
- Tight radius tolerance is applied (±0.005mm tolerance under R3).
- Excellent surface roughness thanks to Mirror Faces of cutting edges
- High strength and minimized vibration are available due to two step taper neck(under R0.5).
- Entwickelt für die Bearbeitung von Kupfer, Kupferlegierungen, sowie faserverstärkten Kunststoffen, NE-, Metallen
- Hohegenauere Radustoleranz (±0.005mm Toleranz unter R3mm)
- Sehr gute Oberflächenrauhigkeit wird durch die besonders behandelte Schmelde erreicht.
- Hohe Zähigkeit und verminderte Vibrationen werden durch den besonderen kegelförmigen Hals erreicht, (unter R 0.5mm)



R0.25-R3 R4-R6 P.540

EDP No.	Radius of Ball Nose		Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
	D1	D2						
SGED2701516	R0.75	4	1.5	4	1.5	16	50	1.45
SGED2702006	R1.0	4	2.0	4	3	6	45	1.95
SGED2702008	R1.0	4	2.0	4	3	8	45	1.95
SGED2702010	R1.0	4	2.0	4	3	10	45	1.95
SGED2702012	R1.0	4	2.0	4	3	12	45	1.95
SGED2702016	R1.0	4	2.0	4	3	16	50	1.95
SGED2703010	R1.5	6	3.0	4	4	10	50	2.85
SGED2703012	R1.5	6	3.0	4	4	12	50	2.85
SGED2703016	R1.5	6	3.0	4	4	16	60	2.85
SGED2703020	R1.5	6	3.0	4	4	20	60	2.85
SGED2704010	R2.0	6	4.0	6	5	10	50	3.85
SGED2704012	R2.0	6	4.0	6	5	12	50	3.85
SGED2704016	R2.0	6	4.0	6	5	16	60	3.85
SGED2704020	R2.0	6	4.0	6	5	20	60	3.85
SGED2706020	R3.0	6	6.0	6	8	20	60	5.85
SGED2706030	R3.0	6	6.0	6	8	30	90	5.85
SGED2708020	R4.0	8	8.0	8	10	20	70	7.70
SGED2710025	R5.0	10	10.0	10	12	25	80	9.70
SGED2712025	R6.0	12	12.0	12	14	25	80	11.70

Size	Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to R3	±0.005	0 ~ -0.012	h5
over R3	±0.010	0 ~ -0.015	h5

◎: Excellent ○: Good

ISO Material	P			M			K														
	Non-alloy steel	Low alloy steel	High alloyed steel	Stainless steel	Grey cast iron	Nickel cast iron	Malleable cast iron	Cast iron	Hardened Cast Iron												
VM3 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	26	3	25	3	25	3	21	21
HRc	125	190	250	270	300	180	275	300	350	200	240	180	180	180	250	160	250	130	230	230	
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



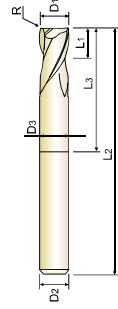
CRX S  
END MILLS

PLAIN SHANK  
SGED29 SERIES

CARBIDE, 2 FLUTE CORNER RADIUS DLC COATING with EXTENDED NECK

- VOLLHARTMETALL, 2 SCHNEIDEN ECKENRADIUS DLC Beschichtung mit ABGESETZTEM SCHAFTTIEL
- Fraise carbure, 2 dents, torique, détaillonnée, revêtué DLC
- 2 TAGLIANTI, TORICA CON SCARICO ESTESO, RIVESTIMENTO DLC

- Designed for copper, copper alloys, soft graphite, reinforced plastics and materials affilated with non-ferrous metals
- Excellent surface roughness from Mirror Face of cutting edges
- Entwickelt für die Bearbeitung von Kupfer, Kupferlegierungen, sowie faserverstärkten Kunststoffen, NE-, Metallen
- Ausgelegt für verschiedene Anwendungen, z.B. schruppen, schruppschichten und zur schlicht Bearbeitung, aufgrund der neuartigen Geometrie



30°  
CARBIDE  
PLAIN  
P.539

EDP No.	Corner Radius R	Mill Diameter D1	Shank Diameter D2	Length of Cut L1	Length Below Shank L3	Overall Length L2	Neck Diameter D3	Unit: mm	
SGED290100104	R0.1	1.0	4	1.5	4	45	0.95		
SGED290100106	R0.1	1.0	4	1.5	6	45	0.95		
SGED290100108	R0.1	1.0	4	1.5	8	45	0.95		
SGED290100204	R0.2	1.0	4	1.5	4	45	0.95		
SGED290100206	R0.2	1.0	4	1.5	6	45	0.95		
SGED290100208	R0.2	1.0	4	1.5	8	45	0.95		
SGED290150106	R0.1	1.5	4	2.3	6	45	1.45		
SGED290150108	R0.1	1.5	4	2.3	8	45	1.45		
SGED290150110	R0.1	1.5	4	2.3	10	45	1.45		
SGED290150206	R0.2	1.5	4	2.3	6	45	1.45		
SGED290150208	R0.2	1.5	4	2.3	8	45	1.45		
SGED290150210	R0.2	1.5	4	2.3	10	45	1.45		
SGED290200208	R0.2	2.0	4	3	8	45	1.95		
SGED290200210	R0.2	2.0	4	3	10	45	1.95		
SGED290200212	R0.2	2.0	4	3	12	45	1.95		
SGED290200508	R0.5	2.0	4	3	8	45	2.85		
SGED290200510	R0.5	2.0	4	3	10	45	2.85		
SGED290200512	R0.5	2.0	4	3	12	45	2.85		
SGED290300210	R0.2	3.0	6	4.5	10	50	2.85		
SGED290300212	R0.2	3.0	6	4.5	12	50	2.85		
SGED290300216	R0.2	3.0	6	4.5	16	60	2.85		
SGED290300310	R0.3	3.0	6	4.5	10	50	2.85		
SGED290300312	R0.3	3.0	6	4.5	12	50	2.85		
SGED290300316	R0.3	3.0	6	4.5	16	60	2.85		

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Size	Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	±0.010	0 ~ -0.012	h5
over Ø6	±0.015	0 ~ -0.015	h5

ISO Material Designation: VDI 3323, HRc, HB, Recommend

ISO Material Designation	P			M			K												
	Non-alloy steel	Low alloy steel	High alloyed steel (Austenitic)	Stainless steel	Grey cast iron	Nodular cast iron	Malleable cast iron	Malleable cast iron	Malleable cast iron										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25	3	25	21
125	190	250	270	300	180	275	300	350	200	240	180	180	250	160	250	130	230		

ISO Material Designation: VDI 3323, HRc, HB, Recommend

ISO Material Designation	N			S			H													
	Aluminum alloy	Aluminum-cast alloy	Copper and Copper Alloys (Brass and Bronze)	Heat Resistant Super Alloys	Titanium Alloys	Hardened Cast Iron	Hardened Cast Iron	Hardened Cast Iron	Hardened Cast Iron											
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
15	30	25	38	34	55	60	42	55												
60	100	75	90	130	110	90	100	100	200	250	350	300	400	400	1050	650	650	650	400	550

ISO Material Designation: VDI 3323, HRc, HB, Recommend

① : Excellent ○ : Good



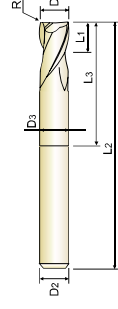
CRX S  
END MILLS

PLAIN SHANK  
SGED29 SERIES

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30°  
CARBIDE  
PLAIN  
P.539

EDP No.	Corner Radius R	Mill Diameter D1	Shank Diameter D2	Length of Cut L1	Length Below Shank L3	Overall Length L2	Neck Diameter D3	Unit: mm	
SGED290400212	R0.2	4.0	6	6	12	50	3.85		
SGED290400216	R0.2	4.0	6	6	16	60	3.85		
SGED290400220	R0.2	4.0	6	6	20	60	3.85		
SGED290400512	R0.5	4.0	6	6	12	50	3.85		
SGED290400516	R0.5	4.0	6	6	16	60	3.85		
SGED290400520	R0.5	4.0	6	6	20	60	3.85		
SGED290600320	R0.3	6.0	9	9	20	60	5.85		
SGED290601020	R1.0	6.0	9	9	20	60	5.85		
SGED290800325	R0.3	8.0	12	12	25	65	7.70		
SGED290800525	R0.5	8.0	12	12	25	65	7.70		
SGED290801025	R1.0	8.0	12	12	25	65	7.70		
SGED291000530	R1.0	10.0	15	15	30	70	9.70		
SGED291001030	R1.0	10.0	15	15	30	70	9.70		
SGED291200532	R0.5	12.0	18	18	32	80	11.70		
SGED291201032	R1.0	12.0	18	18	32	80	11.70		

Size	Corner Radius Tolerance (mm)	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	±0.010	0 ~ -0.012	h5
over Ø6	±0.015	0 ~ -0.015	h5

ISO Material Designation: VDI 3323, HRc, HB, Recommend

ISO Material Designation	P			M			K												
	Non-alloy steel	Low alloy steel	High alloyed steel (Austenitic)	Stainless steel	Grey cast iron	Nodular cast iron	Malleable cast iron	Malleable cast iron	Malleable cast iron										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25	3	25	21
125	190	250	270	300	180	275	300	350	200	240	180	180	250	160	250	130	230		

ISO Material Designation: VDI 3323, HRc, HB, Recommend

ISO Material Designation	N			S			H													
	Aluminum alloy	Aluminum-cast alloy	Copper and Copper Alloys (Brass and Bronze)	Heat Resistant Super Alloys	Titanium Alloys	Hardened Cast Iron	Hardened Cast Iron	Hardened Cast Iron	Hardened Cast Iron											
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
15	30	25	38	34	55	60	42	55												
60	100	75	90	130	110	90	100	100	200	250	350	300	400	400	1050	650	650	650	400	550

ISO Material Designation: VDI 3323, HRc, HB, Recommend

① : Excellent ○ : Good



PLAIN SHANK **SGED31** SERIES

**CARBIDE, 2 FLUTE DLC COATING**

● VOLLHARTMETALL, 2 SCHNEIDEN DLC BESCHICHTUNG  
● Fraise carbure, 2 dents, revêtue DLC  
● 2 TAGLIANTI, RIVESTIMENTO DLC

- Designed for copper, copper alloys, soft graphite, reinforced plastics and materials affiliated with non-ferrous metals.
- Excellent surface roughness from special flute geometry for removing burrs

- Entwickelt für die Bearbeitung von Kupfer, Kupferlegierungen, sowie faserverstärkten Kunststoffen, NE-Metallen
- Hervorragende Oberflächenrauhheit durch speziell behandelte Nulengeometrie was zur verminderten Gratbildung führt



EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
SGED31010	1.0	6	2.5	50
SGED31015	1.5	4	4	50
SGED31020	2.0	6	6	50
SGED31025	2.5	6	8	50
SGED31030	3.0	6	10	50
SGED31040	4.0	6	12	50
SGED31050	5.0	6	15	60
SGED31060	6.0	6	15	60
SGED31080	8.0	8	20	65
SGED31100	10.0	10	25	70
SGED31120	12.0	12	30	80

Unit: mm

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	0 ~ -0.012	h6
over Ø6	0 ~ -0.015	

◎: Excellent ○: Good

ISO Material	P			M			S			K										
	Non-alloy steel	Low alloy steel	High alloyed steel	Stainless steel	Grey cast iron	Nodular cast iron	Heat Resistant Super Alloys	Aluminum-cast alloy	Copper and Copper Alloys	Non-Metallic Materials	Titanium Alloys	Heat Resistant Super Alloys	Hardened steel							
VM3 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	3	25
HRc	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	250	160	250	130	230
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



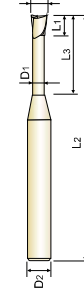
PLAIN SHANK **SGED30** SERIES

**CARBIDE, 2 FLUTE DLC COATING with EXTENDED NECK**

● VOLLHARTMETALL, 2 SCHNEIDEN DLC BESCHICHTUNG mit ABGESETZTEM SCHAFTTITEL  
● Fraise carbure, 2 dents, détalonnée, revêtue DLC  
● 2 TAGLIANTI, SCARICO ESTESO, RIVESTIMENTO DLC

- Designed for copper, copper alloys, soft graphite, reinforced plastics and materials affiliated with non-ferrous metals.
- High toughness and minimized vibration applied from two step taper neck (under dia. 1.0mm)
- Excellent surface roughness from special flute geometry for removing burrs

- Entwickelt für die Bearbeitung von Kupfer, Kupferlegierungen, sowie faserverstärkten Kunststoffen, NE-Metallen
- Hohe Zähigkeit und verminderte Vibrationen werden durch den besonderen kegel förmigen Hals erreicht. (unterer Ø 1mm)
- Hervorragende Oberflächenrauhheit durch speziell behandelte Nulengeometrie



EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
SGED3000502	0.5	4	0.7	2	45	D3
SGED3000504	0.5	4	0.7	4	45	0.45
SGED3000506	0.5	4	0.7	6	45	0.45
SGED3000508	0.5	4	0.7	8	45	0.45
SGED3000510	0.5	4	0.7	10	45	0.45
SGED3000602	0.6	4	0.9	2	45	0.55
SGED3000604	0.6	4	0.9	4	45	0.55
SGED3000606	0.6	4	0.9	6	45	0.55
SGED3000608	0.6	4	0.9	8	45	0.55
SGED3000610	0.6	4	0.9	10	45	0.55
SGED3000804	0.8	4	1.2	4	45	0.75
SGED3000806	0.8	4	1.2	6	45	0.75
SGED3000808	0.8	4	1.2	8	45	0.75
SGED3000810	0.8	4	1.2	10	45	0.75
SGED3000812	0.8	4	1.2	12	45	0.75
SGED3001004	1.0	4	1.5	4	45	0.95
SGED3001006	1.0	4	1.5	6	45	0.95
SGED3001008	1.0	4	1.5	8	45	0.95
SGED3001010	1.0	4	1.5	10	45	0.95
SGED3001012	1.0	4	1.5	12	45	0.95
SGED3001506	1.5	4	2.3	6	45	1.45
SGED3001508	1.5	4	2.3	8	45	1.45
SGED3001510	1.5	4	2.3	10	45	1.45
SGED3001512	1.5	4	2.3	12	45	1.45

Unit: mm

► NEXT PAGE

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	0 ~ -0.012	h6
over Ø6	0 ~ -0.015	

◎: Excellent ○: Good

ISO Material	P			M			S			K										
	Non-alloy steel	Low alloy steel	High alloyed steel	Stainless steel	Grey cast iron	Nodular cast iron	Heat Resistant Super Alloys	Aluminum-cast alloy	Copper and Copper Alloys	Non-Metallic Materials	Titanium Alloys	Heat Resistant Super Alloys	Hardened steel							
VM3 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	3	25
HRc	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	250	160	250	130	230
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○



PLAIN SHANK **SGED30** SERIES

**CARBIDE, 2 FLUTE DLC COATING with EXTENDED NECK**

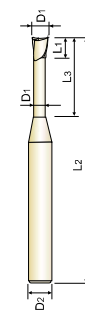
VOLLHARTMETALL, 2 SCHNEIDEN DLC BESCHICHTUNG mit ABGESETZTEM SCHAFTTITEL

Fraise carbure, 2 dents, détalonnée, revêtue DLC

2 TAGLIANTI, SCARICO ESTESO, RIVESTIMENTO DLC

- Designed for copper, copper alloys, soft graphite, reinforced plastics and materials affilized with non-ferrous metals.
- High toughness and minimized vibration applied from two step taper neck (under dia. 1.0mm).
- Excellent surface roughness from special flute geometry for removing burrs

- Entwickelt für die Bearbeitung von Kupfer, Kupferlegierungen, sowie faserverstärkten Kunststoffen, NE-Metallen
- Hohe Zähigkeit und verminderte Vibrationen werden durch den besonderen kegelförmigen Hals erreicht. (unter Ø 1mm)
- Hervorragende Oberflächenrauhheit durch speziell behandelte Nulterungsgeometrie



EDP No.	Mill Diameter		Shank Diameter D <sub>2</sub>	Length of Cut L <sub>1</sub>	Length Below Shank L <sub>3</sub>	Overall Length L <sub>2</sub>	Neck Diameter D <sub>3</sub>
	D <sub>1</sub>	D <sub>2</sub>					
SGED3001516	1.5	4	4	2.3	16	50	1.45
SGED3002008	2.0	4	4	3	8	45	1.95
SGED3002010	2.0	4	4	3	10	45	1.95
SGED3002012	2.0	4	4	3	12	45	1.95
SGED3002016	2.0	4	4	3	16	50	1.95
SGED3003008	3.0	6	6	4.5	8	50	2.85
SGED3003010	3.0	6	6	4.5	10	50	2.85
SGED3003012	3.0	6	6	4.5	12	50	2.85
SGED3003016	3.0	6	6	4.5	16	60	2.85
SGED3003020	3.0	6	6	4.5	20	60	2.85
SGED3004010	4.0	6	6	6	10	50	3.85
SGED3004012	4.0	6	6	6	12	50	3.85
SGED3004016	4.0	6	6	6	16	60	3.85
SGED3004020	4.0	6	6	6	20	60	3.85
SGED3006030	6.0	6	6	8	20	60	5.85
SGED3008020	8.0	8	8	12	20	70	7.70
SGED3010025	10.0	10	10	15	25	80	9.70
SGED3012025	12.0	12	12	18	25	80	11.70

Size	Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
up to Ø6	0 ~ -0.012	h5
over Ø6	0 ~ -0.015	

ISO Material	P			M			K													
	Non-alloy steel	Low alloy steel	High alloyed steel	Stainless steel	Grey cast iron	Nodular cast iron	Malleable cast iron	Heat Resistant Super Alloys	Titanium Alloys	Heat Resistant Cast Iron	High Speed Steel									
VM1 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	26	3	25	3	25	21
HRc	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	250	160	250	130	230
Recommend	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

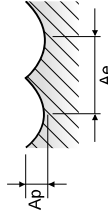
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PLAIN SHANK **SGED28** SERIES

**2 FLUTE BALL**

ISO 3323	Material Description	Ap	Ae	Diameter (Ø)									
				1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	
21-22	Aluminum-wrought alloy	Vc	0.05D	155	300	295	285	290	295	300	300	300	300
		Fz	0.02D	0.01	0.022	0.031	0.042	0.052	0.061	0.079	0.101	0.12	0.12
N 26-28	Copper and Copper Alloys (Bronze / Brass)	Vc	0.05D	49338	47746	31300	22680	18462	15650	11937	9549	7958	7958
		Fz	0.02D	987	2101	1941	1905	1920	1909	1886	1929	1910	1910
29.1	Duroplastic	Vc	0.05D	130	150	150	145	145	145	150	150	150	150
		Fz	0.02D	0.011	0.02	0.028	0.038	0.047	0.055	0.072	0.092	0.109	0.109
29.1	Duroplastic	Vc	0.05D	41380	23873	15915	9231	7692	5968	4775	3979	3979	3979
		Fz	0.02D	910	855	891	868	846	859	879	867	859	859
29.1	Duroplastic	Vc	0.05D	155	315	315	445	445	445	445	450	450	450
		Fz	0.02D	0.008	0.015	0.019	0.026	0.033	0.038	0.035	0.063	0.076	0.076
29.1	Duroplastic	Vc	0.05D	49338	50134	47216	34616	28011	23608	17905	14483	11937	11937
		Fz	0.02D	789	1504	1794	1800	1849	1794	1794	1790	1825	1814

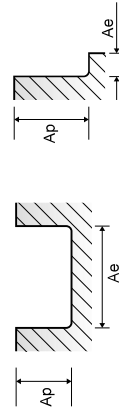


**2 FLUTE CORNER RADIUS - SLOTTING**

ISO 3323	Material Description	Ap	Ae	Diameter (Ø)									
				1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	
21-22	Aluminum-wrought alloy	Vc	1.0D	155	315	470	630	785	840	840	840	840	840
		Fz	0.5D	0.01	0.018	0.026	0.037	0.043	0.052	0.068	0.089	0.105	0.105
N 26-28	Copper and Copper Alloys (Bronze / Brass)	Vc	1.0D	49338	50134	49869	50134	49975	49563	45633	42638	26738	22149
		Fz	0.5D	987	1805	2593	3710	4238	4635	4545	4759	4651	4651
29.1	Duroplastic	Vc	1.0D	155	315	420	420	420	420	420	420	420	420
		Fz	0.5D	0.01	0.017	0.026	0.031	0.039	0.042	0.063	0.079	0.095	0.095
29.1	Duroplastic	Vc	1.0D	49338	50134	44563	33423	27056	22482	16711	13369	11141	11141
		Fz	0.5D	987	1705	2317	2072	2110	2094	2112	2112	2117	2117
29.1	Duroplastic	Vc	1.0D	155	315	470	630	785	940	1255	1255	1265	1265
		Fz	0.5D	0.007	0.014	0.021	0.026	0.034	0.042	0.054	0.069	0.084	0.084
29.1	Duroplastic	Vc	1.0D	49338	50134	49869	50134	49975	49869	49935	39948	33555	33555
		Fz	0.5D	691	1404	2094	2607	3398	4189	5693	5513	5637	5637

**2 FLUTE CORNER RADIUS - SIDE CUTTING**

ISO 3323	Material Description	Ap	Ae	Diameter (Ø)									
				1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	
21-22	Aluminum-wrought alloy	Vc	0.5D	155	315	470	630	785	840	840	840	840	840
		Fz	1.0D	0.014	0.028	0.042	0.053	0.065	0.079	0.105	0.131	0.157	0.157
N 26-28	Copper and Copper Alloys (Bronze / Brass)	Vc	0.5D	49338	50134	49869	50134	49975	49869	37401	29921	24934	24934
		Fz	1.0D	1381	2807	4189	5314	6497	7879	7854	7839	7839	7839
29.1	Duroplastic	Vc	0.5D	155	315	470	630	630	630	630	630	630	630
		Fz	1.0D	0.012	0.025	0.037	0.047	0.06	0.073	0.094	0.12	0.141	0.141
29.1	Duroplastic	Vc	0.5D	49338	50134	49869	50134	40107	33423	23607	20054	16711	16711
		Fz	1.0D	1184	2507	3690	4713	4813	4880	4713	4813	4713	4713
29.1	Duroplastic	Vc	0.5D	155	315	470	630	785	940	1255	1255	1265	1265
		Fz	1.0D	0.012	0.025	0.037	0.05	0.065	0.075	0.084	0.105	0.125	0.125
29.1	Duroplastic	Vc	0.5D	49338	50134	49869	50134	49975	49869	49935	39948	33555	33555
		Fz	1.0D	1184	2507	3690	5013	6497	7480	8389	8389	8389	8389

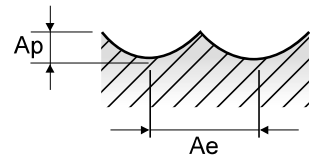


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**SGED27 SERIES 2 FLUTE BALL**

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

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)											
						0.5	0.6	0.8	1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0
N	21	Aluminum-wrought alloy	0.05D	0.02D	Vc	80	95	125	155	250	245	240	240	245	250	250	250
					fz	0.005	0.007	0.009	0.01	0.022	0.03	0.042	0.052	0.061	0.079	0.1	0.122
					RPM	50930	50399	49736	49338	39789	25995	19099	15279	12998	9947	7958	6631
	26-28	Copper and Copper Alloys (Bronze / Brass)	0.05D	0.02D	Vc	80	95	110	110	125	125	120	120	125	125	125	125
					fz	0.005	0.007	0.009	0.011	0.02	0.028	0.038	0.047	0.055	0.072	0.091	0.111
					RPM	50930	50399	43768	35014	19894	13263	9549	7639	6631	4974	3979	3316
	29.1	Duroplastic	0.05D	0.02D	Vc	80	95	125	155	315	370	360	365	370	375	375	375
					fz	0.004	0.005	0.006	0.006	0.013	0.019	0.027	0.033	0.039	0.05	0.064	0.077
					RPM	50930	50399	49736	49338	50134	39258	28648	23237	19629	14921	11937	9947
FEED	407	504	597	592	1303	1492	1547	1534	1531	1492	1528	1532					



**SGED30, SGED31 SERIES**

**2 FLUTE - SLOTTING**

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)										
						0.5	0.6	0.8	1.0	2.0	3.0	4.0	6.0	8.0	10.0	12.0
N	21-22	Aluminum-wrought alloy	1.0D	0.5D	Vc	80	95	125	155	315	330	325	325	330	325	330
					fz	0.005	0.006	0.008	0.01	0.01	0.023	0.032	0.048	0.064	0.081	0.097
					RPM	50930	50399	49736	49338	50134	35014	25863	17242	13130	10345	8754
	26-28	Copper and Copper Alloys (Bronze / Brass)	1.0D	0.5D	Vc	80	95	105	110	160	165	160	165	165	160	165
					fz	0.005	0.006	0.008	0.01	0.01	0.023	0.032	0.048	0.064	0.081	0.097
					RPM	50930	50399	41778	35014	25465	17507	12732	8754	6565	5093	4377
	29.1	Duroplastic	1.0D	0.5D	Vc	80	95	125	155	315	470	490	490	500	490	495
					fz	0.001	0.002	0.002	0.003	0.004	0.007	0.009	0.014	0.018	0.023	0.028
					RPM	50930	50399	49736	49338	50134	49869	38993	25995	19894	15597	13130
FEED	102	202	199	296	401	698	702	728	716	717	735					

**2 FLUTE - SIDE CUTTING**

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø)										
						0.5	0.6	0.8	1.0	2.0	3.0	4.0	6.0	8.0	10.0	12.0
N	21-22	Aluminum-wrought alloy	0.5D	1.0D	Vc	80	95	125	130	260	260	265	270	265	265	270
					fz	0.005	0.006	0.008	0.01	0.011	0.025	0.034	0.053	0.069	0.086	0.107
					RPM	50930	50399	49736	41380	41380	27587	21088	14324	10544	8435	7162
	26-28	Copper and Copper Alloys (Bronze / Brass)	0.5D	1.0D	Vc	80	85	85	85	170	175	175	180	175	175	180
					fz	0.005	0.006	0.008	0.01	0.01	0.023	0.032	0.05	0.064	0.08	0.1
					RPM	50930	45094	33820	27056	27056	18568	13926	9549	6963	5570	4775
	29.1	Duroplastic	0.5D	1.0D	Vc	80	95	125	155	315	350	350	360	350	350	360
					fz	0.004	0.005	0.006	0.008	0.009	0.018	0.026	0.04	0.051	0.064	0.08
					RPM	50930	50399	49736	49338	50134	37136	27852	19099	13926	11141	9549
FEED	407	504	597	789	902	1337	1448	1528	1420	1426	1528					

