YG-1 CO., LTD.

HEAD OFFICE

13-40, Songdogwahak-ro 16beon-gil, Yeonsu-gu, Incheon 21984, South Korea
Phone: +82-32-526-0909
www.yg1.solutions
E-mail: yg1@yg1.solutions

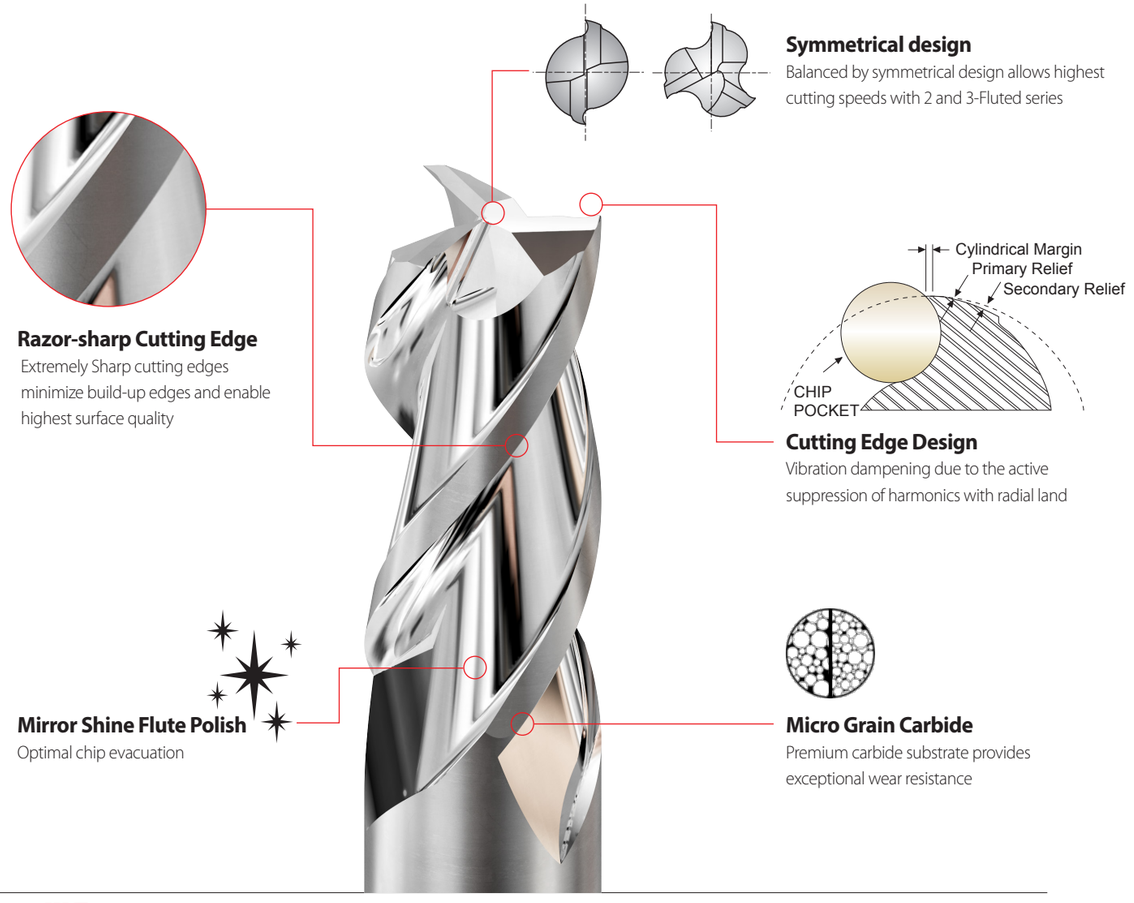
YouTube
Search 'YG-1' on social media outlets

ISO 9001 / ISO 14001

YG1YEAP2504002

ALU-POWER

- Excellent Cutting Performance in Nonferrous Materials like Aluminum due to mirror shine polished chip flutes and razor-sharp cutting edges
- Increased Tool Life and Higher Cutting Accuracy in the types of Aluminum prone to build-up edges
- The ultra fine grain carbide provides the edge integrity necessary for Excellent Surface Finishes
- Sophisticated flute design provides superior Chip Evacuation



Symmetrical design
Balanced by symmetrical design allows highest cutting speeds with 2 and 3-Fluted series

Razor-sharp Cutting Edge
Extremely Sharp cutting edges minimize build-up edges and enable highest surface quality

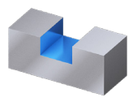
Cutting Edge Design
Vibration dampening due to the active suppression of harmonics with radial land

Mirror Shine Flute Polish
Optimal chip evacuation

Micro Grain Carbide
Premium carbide substrate provides exceptional wear resistance

CASE STUDY

TEST 1 Ø10 - 2 Flute Square 45° Helix End Mill

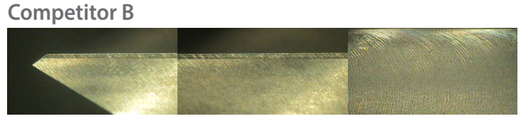


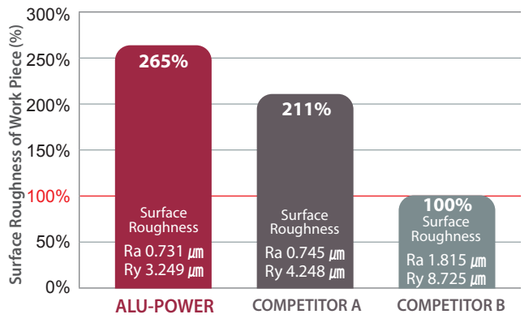
Slotting Application

ALU-POWER

Competitor A

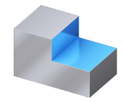
Competitor B





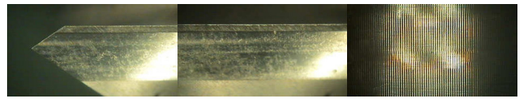
Tool	2 Flute Square, 45° Helix
Size	Ø10 x Ø10 x 27 x 75
Work Material	AL6061
RPM	7,500 rev./min.
Feed	1,750 mm/min.
Cutting Depth	3 mm (Axial)
Coolant	Wet Cut
Milling Method	Slotting
Machine	Machining Center

TEST 2 Ø10 - 3 Flute Square 45° Helix End Mill

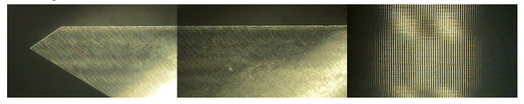


Down & Side Cutting Application

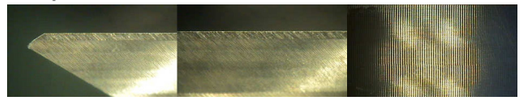
ALU-POWER

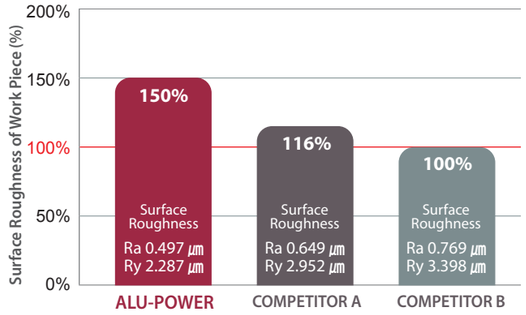


Competitor A



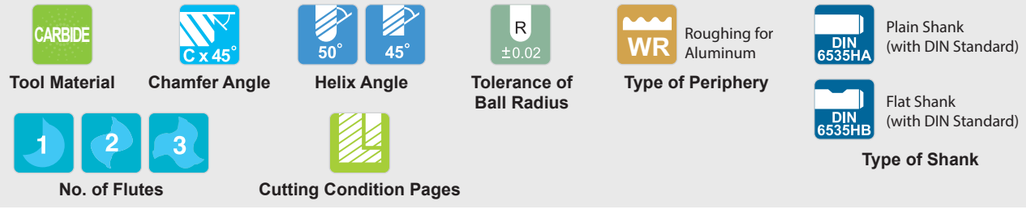
Competitor B





Tool	3 Flute Square, 45° Helix
Size	Ø10 x Ø10 x 27 x 75
Work Material	AL6061
RPM	7,500 rev./min.
Feed	2,500 mm/min.
Cutting Depth	20 mm (Axial) x 0.15 (Radial)
Coolant	Wet Cut
Milling Method	Down & Side Cutting
Machine	Machining Center

GUIDE TO ICONS



SELECTION GUIDE

SOLID CARBIDE
ALU POWER END MILLS

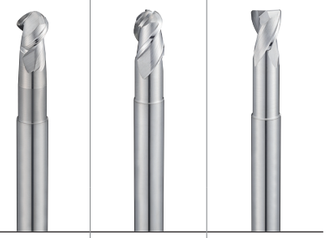
Razor-Sharp Cutting Edges for Soft and prone to Build-up Edge Materials

◎ : Excellent ○ : Good

Please visit globalyg1.com/mat for material search

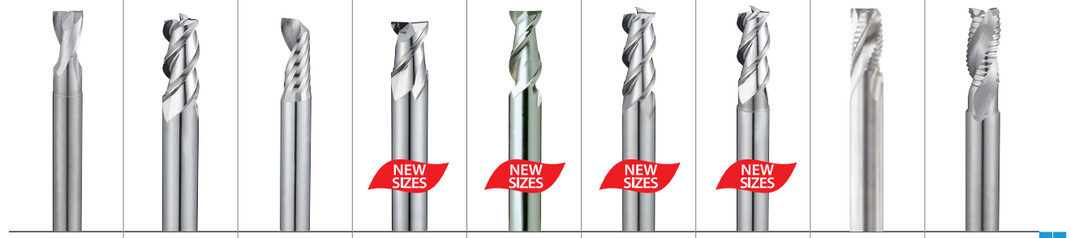
Recommended cutting conditions : p. 24

SERIES	E5910	E5908	E5909
FLUTE	2	3	2
HELIX ANGLE	50°	40°	30°
CUTTING EDGE SHAPE	BALL NOSE	BALL NOSE	CORNER RADIUS
SIZE MIN	R3.0	R1.0	D4.0
SIZE MAX	R10.0	R8.0	D20.0
PAGE	P6	P7	P8
	NECK	NECK	NECK
	Uncoated	Uncoated	Uncoated



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		Ni or Co Based	Annealed	250	25			
	34			Cured	350	38			
	35			Cast	320	34			
	36	Titanium Alloys	Pure Titanium		400 Rm				
	37		Alpha + Beta Alloys	Hardened	1050 Rm				
H	38	Hardened steel		Hardened	550	55			
	39			Hardened	630	60			
	40	Chilled Cast Iron		Cast	400	42			
	41	Hardened Cast Iron		Hardened	550	55			

SERIES	E5930	E5E51	E5E47	E5E48	E5522 E5521	E5E49	E5E50	E5742 E5711	E5E39 E5E40
FLUTE	2	3	1	2	2	3	3	3	3
HELIX ANGLE	25°	45°	30°	45°	45°	45°	45°	30°	30°
CUTTING EDGE SHAPE	CORNER RADIUS	CORNER RADIUS	SQUARE	SQUARE	SQUARE	SQUARE	SQUARE	ROUGHING	ROUGHING
SIZE MIN	D2.0	D3.0	D2.0	D3.0	D3.0	D3.0	D3.0	D6.0	D6.0
SIZE MAX	D20.0	D20.0	D12.0	D20.0	D20.0	D20.0	D20.0	D25.0	D20.0
PAGE	P9	P10	P11	P12	P13	P15	P22	P25	P26
	NECK	LONG LENGTH	-	SHORT LENGTH	LONG LENGTH	LONG LENGTH	NECK	LONG LENGTH	NECK
	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated	Uncoated



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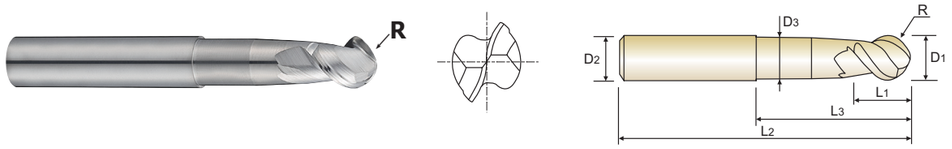
SOLID CARBIDE ALU-POWER END MILLS

CARBIDE, 2 FLUTE 50° HELIX BALL NOSE with NECK

PLAIN SHANK

E5910 SERIES

- ▶ Excellent results on aluminum and copper materials
- ▶ Optimized cutting edges for increased tool life
- ▶ Mirror surface flutes for excellent chip evacuation and surface finish



CARBIDE | 2 | 50° | R ±0.02 | DIN 6535HA | UNCOATED | p.27

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
	R(±0.02)	D1	D2	L1	L3	L2	D3
E5910060	R3.0	**6.0**	6	5.5	25	55	5.4
E5910080	R4.0	**8.0**	8	7	30	65	7.2
E5910100	R5.0	**10.0**	10	8.5	35	75	9
E5910120	R6.0	**12.0**	12	10.5	40	75	11
E5910160	R8.0	**16.0**	16	14	50	90	14.5
E5910200	R10.0	**20.0**	20	17	50	100	18

▶ DLC Coatings is available on your request.

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
±0.020	h5

◎ : Excellent ○ : Good

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

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

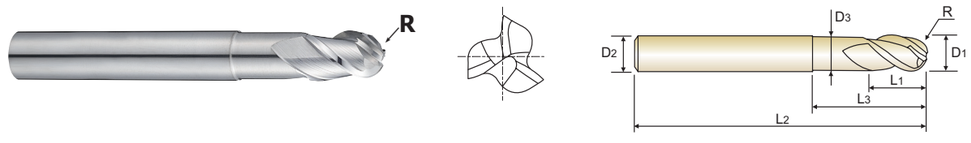
SOLID CARBIDE ALU-POWER END MILLS

CARBIDE, 3 FLUTE 40° HELIX BALL NOSE with NECK

PLAIN SHANK

E5908 SERIES

- ▶ Excellent results on aluminum and copper materials
- ▶ Optimized cutting edges for increased tool life
- ▶ Mirror surface flutes for excellent chip evacuation and surface finish



CARBIDE | 3 | 40° | R ±0.02 | DIN 6535HA | UNCOATED | p.27

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
	R(±0.02)	D1	D2	L1	L3	L2	D3
E5908020	R1.0	**2.0**	6	3	5	60	1.9
E5908025	R1.25	**2.5**	6	4	6	60	2.4
E5908030	R1.5	**3.0**	6	4.5	6.5	60	2.8
E5908035	R1.75	**3.5**	6	5	7	65	3.2
E5908040	R2.0	**4.0**	6	6	8	65	3.7
E5908050	R2.5	**5.0**	6	7.5	10	65	4.6
E5908060	R3.0	**6.0**	6	9	12	75	5.6
E5908080	R4.0	**8.0**	8	12	25	75	7.4
E5908100	R5.0	**10.0**	10	15	30	80	9.4
E5908120	R6.0	**12.0**	12	18	36	90	11.4
E5908160	R8.0	**16.0**	16	24	40	100	15.4

▶ DLC Coatings is available on your request.

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
0 ~ - 0.03	h5

◎ : Excellent ○ : Good

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

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

SOLID CARBIDE ALU-POWER END MILLS

PLAIN SHANK

CARBIDE, 2 FLUTE CORNER RADIUS with NECK

E5909 SERIES

- ▶ Excellent results on aluminum and copper materials
- ▶ Optimized cutting edges for increased tool life
- ▶ Mirror surface flutes for excellent chip evacuation and surface finish
- ▶ Reduces chipping of corners

CARBIDE | 2 | R ±0.01 | DIN 6535HA | UNCOATED

p.28

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
	R(±0.01)	D1	D2	L1	L3	L2	D3
E5909040	R0.3	**4.0**	6.0	5	10	50	3.6
E5909060	R0.5	**6.0**	6.0	8	20	60	5.4
E5909080	R0.6	**8.0**	8.0	10	30	70	7.2
E5909100	R0.8	**10.0**	10.0	12	36	80	9
E5909120	R1.0	**12.0**	12.0	14	40	90	11
E5909160	R1.3	**16.0**	16.0	18	45	100	14.5
E5909200	R1.6	**20.0**	20.0	24	45	100	18

▶ DLC Coatings is available on your request.

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
0 ~ - 0.03	h5

◎ : Excellent ○ : Good

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

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

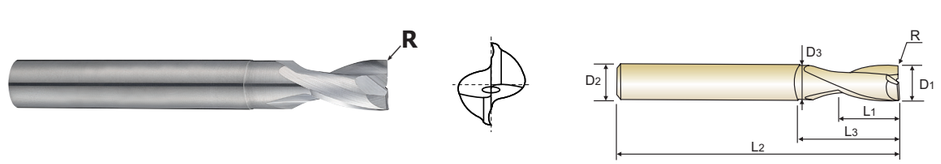
SOLID CARBIDE ALU-POWER END MILLS

PLAIN SHANK

CARBIDE, 2 FLUTE 25° HELIX CORNER RADIUS with NECK

E5930 SERIES

- ▶ Excellent results on aluminum and copper materials
- ▶ Optimized cutting edges for increased tool life
- ▶ Mirror surface flutes for excellent chip evacuation and surface finish
- ▶ Reduces chipping of corners



CARBIDE | 2 | 25° | DIN 6535HA | UNCOATED

p.27

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
	R(±0.01)	D1	D2	L1	L3	L2	D3
E5930020	R0.2	**2.0**	3	3	6	40	1.9
E5930030	R0.2	**3.0**	3	4	8	40	2.9
E5930040	R0.2	**4.0**	4	5	12	50	3.8
E5930050	R0.2	**5.0**	5	8	14	50	4.8
E5930060	R0.2	**6.0**	6	8	18	65	5.7
E5930080	R0.2	**8.0**	8	10	22	70	7.7
E5930100	R0.2	**10.0**	10	14	28	80	9.7
E5930120	R0.2	**12.0**	12	16	35	90	11.5
E5930160	R0.2	**16.0**	16	20	40	90	15.5
E5930200	R0.2	**20.0**	20	25	50	100	19.5

▶ DLC Coatings is available on your request.

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
0 ~ - 0.03	h5

◎ : Excellent ○ : Good

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

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

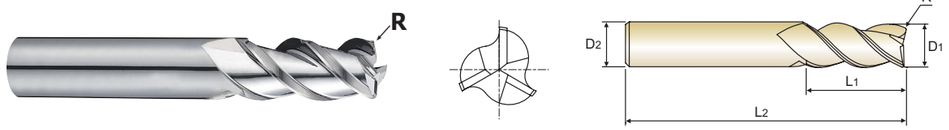
SOLID CARBIDE ALU-POWER END MILLS

CARBIDE, 3 FLUTE 45° HELIX LONG LENGTH CORNER RADIUS

PLAIN SHANK

E5E51 SERIES

- ▶ Excellent results on aluminum and copper materials
- ▶ Optimized cutting edges for increased tool life
- ▶ Mirror surface flutes for excellent chip evacuation and surface finish
- ▶ Reduces chipping of corners



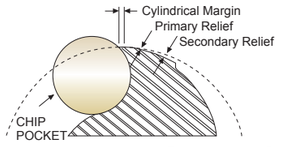
CARBIDE | 3 | 45° | DIN 6535HA | UNCOATED p.28

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	R	D1	D2	L1	L2
E5E51030	R0.5	**3.0**	6	12	57
E5E51901	R1.0	**3.0**	6	12	57
E5E51040	R0.5	**4.0**	6	15	57
E5E51902	R1.0	**4.0**	6	15	57
E5E51050	R0.5	**5.0**	6	20	57
E5E51903	R1.0	**5.0**	6	20	57
E5E51060	R0.5	**6.0**	6	20	65
E5E51904	R1.0	**6.0**	6	20	65
E5E51080	R0.5	**8.0**	8	22	65
E5E51905	R1.0	**8.0**	8	22	65
E5E51100	R0.5	**10.0**	10	25	70
E5E51906	R1.0	**10.0**	10	25	70
E5E51907	R2.0	**10.0**	10	25	70
E5E51120	R0.5	**12.0**	12	25	75
E5E51908	R1.0	**12.0**	12	25	75
E5E51909	R2.0	**12.0**	12	25	75
E5E51160	R0.5	**16.0**	16	35	90
E5E51910	R1.0	**16.0**	16	35	90
E5E51911	R2.0	**16.0**	16	35	90
E5E51200	R0.5	**20.0**	20	40	100
E5E51912	R1.0	**20.0**	20	40	100
E5E51913	R2.0	**20.0**	20	40	100

▶ DLC Coatings is available on your request.

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5



◎ : Excellent ○ : Good

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

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

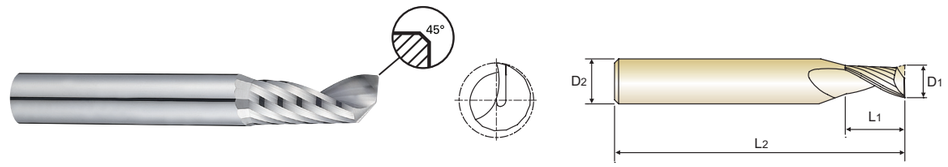
SOLID CARBIDE ALU-POWER END MILLS

CARBIDE, 1 FLUTE

PLAIN SHANK

E5E47 SERIES

- ▶ 1 Flute design allows excellent chip evacuation with plastic and acrylic materials
- ▶ Mirror surface flutes for excellent chip evacuation and surface finish



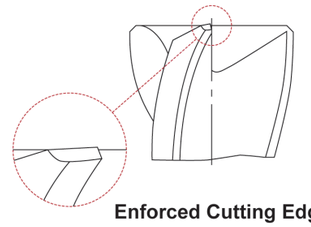
CARBIDE | 1 | 30° | DIN 6535HA | C x 45° | UNCOATED p.32

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	Chamfer
	D1	D2	L1	L2	
E5E47020	2.0	**3**	8	50	0.04
E5E47030	3.0	**3**	12	50	0.05
E5E47040	4.0	**4**	15	60	0.07
E5E47050	5.0	**5**	17	60	0.09
E5E47060	6.0	**6**	20	65	0.10
E5E47080	8.0	**8**	22	65	0.14
E5E47100	10.0	**10**	25	75	0.14
E5E47120	12.0	**12**	30	80	0.14

▶ DLC Coatings is available on your request.

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
0 ~ - 0.03	h5



Enforced Cutting Edge

◎ : Excellent ○ : Good

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

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

SOLID CARBIDE ALU-POWER END MILLS

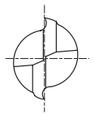
CARBIDE, 2 FLUTE 45° HELIX SHORT LENGTH

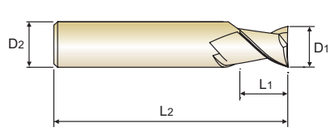
NEW SIZES

PLAIN SHANK

E5E48 SERIES

- ▶ Excellent results on aluminum and copper materials
- ▶ Optimized cutting edges for increased tool life
- ▶ Mirror surface flutes for excellent chip evacuation and surface finish





CARBIDE | 2 | 45° | DIN 6535HA | UNCOATED

p.29

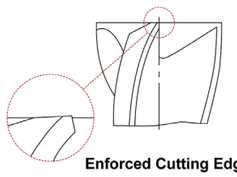
* NEW SIZE

Unit : mm

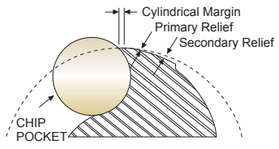
EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
* E5E48010	1.0	6	3	50
* E5E48901	1.0	6	6	60
* E5E48015	1.5	6	5	50
* E5E48902	1.5	6	8	60
* E5E48020	2.0	6	6	50
* E5E48903	2.0	6	10	60
* E5E48025	2.5	6	8	55
E5E48030	3.0	6	5	50
E5E48040	4.0	6	8	54
E5E48050	5.0	6	9	54
E5E48060	6.0	6	10	54
E5E48080	8.0	8	12	58
E5E48100	10.0	10	14	66
E5E48120	12.0	12	16	73
E5E48140	14.0	14	18	75
E5E48160	16.0	16	22	82
E5E48180	18.0	18	24	84
E5E48200	20.0	20	26	92

▶ DLC Coatings is available on your request.

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5



Enforced Cutting Edge



◎ : Excellent ○ : Good

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

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

SOLID CARBIDE ALU-POWER END MILLS

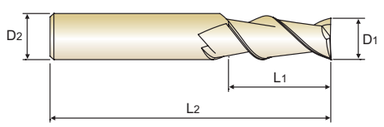
CARBIDE, 2 FLUTE 45° HELIX LONG LENGTH

NEW SIZES

PLAIN SHANK
FLAT SHANK

E5522 SERIES
E5521 SERIES

- ▶ Excellent results on aluminum and copper materials
- ▶ Optimized cutting edges for increased tool life
- ▶ Mirror surface flutes for excellent chip evacuation and surface finish



CARBIDE | 2 | 45° | DIN 6535HA | DIN 6535HB | C x 45° | UNCOATED

p.29

* NEW SIZE

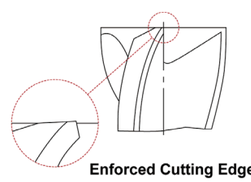
Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	Chamfer
PLAIN	FLAT	D1	D2	L1	L2	
E5522030	E5521030	3.0	6	8	57	0.05
* E5522901	-	3.0	6	11	55	0.05
* E5522902	-	3.0	6	15	65	0.05
E5522040	E5521040	4.0	6	11	57	0.05
* E5522903	-	4.0	6	13	55	0.05
* E5522904	-	4.0	6	16	65	0.05
E5522050	E5521050	5.0	6	13	57	0.05
* E5522905	-	5.0	6	17	55	0.05
* E5522906	-	5.0	6	22	60	0.05
E5522060	E5521060	6.0	6	13	57	0.05
* E5522907	-	6.0	6	17	60	0.05
* E5522908	-	6.0	6	25	70	0.05
* E5522909	-	7.0	8	22	65	0.05
E5522080	E5521080	8.0	8	19	63	0.05
* E5522910	-	8.0	8	22	70	0.05
* E5522911	-	8.0	8	30	80	0.05
E5522100	E5521100	10.0	10	22	7	0.1
* E5522912	-	10.0	10	27	75	0.1

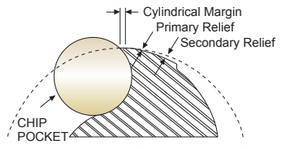
▶ DLC Coatings is available on your request.

▶ NEXT PAGE

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5



Enforced Cutting Edge



◎ : Excellent ○ : Good

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

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

SOLID CARBIDE ALU-POWER END MILLS

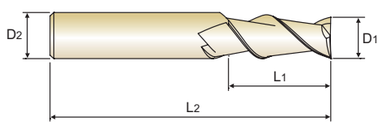
CARBIDE, 2 FLUTE 45° HELIX LONG LENGTH

NEW SIZES

PLAIN SHANK **E5522** SERIES

FLAT SHANK **E5521** SERIES

▶ Excellent results on aluminum and copper materials
▶ Optimized cutting edges for increased tool life
▶ Mirror surface flutes for excellent chip evacuation and surface finish



CARBIDE | 2 | 45° | DIN 6535HA | DIN 6535HB | C x 45° | UNCOATED | p.29

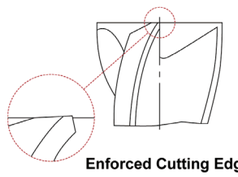
* NEW SIZE

Unit : mm

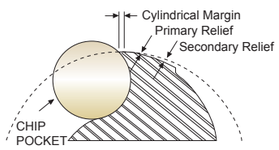
EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	Chamfer
PLAIN	FLAT	D1	D2	L1	L2	
* E5522913	-	**10.0**	10	35	90	0.1
E5522120	E5521120	**12.0**	12	26	83	0.1
* E5522914	-	**12.0**	12	32	80	0.1
* E5522915	-	**12.0**	12	40	95	0.1
E5522140	E5521140	**14.0**	14	26	83	0.1
* E5522916	-	**14.0**	14	37	90	0.1
E5522160	E5521160	**16.0**	16	32	92	0.1
* E5522917	-	**16.0**	16	42	100	0.1
* E5522918	-	**16.0**	16	52	110	0.1
E5522180	E5521180	**18.0**	18	32	92	0.1
* E5522919	-	**18.0**	18	48	100	0.1
E5522200	E5521200	**20.0**	20	38	104	0.1
* E5522920	-	**20.0**	20	48	100	0.1
* E5522921	-	**20.0**	20	55	110	0.1

▶ DLC Coatings is available on your request.

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5



Enforced Cutting Edge



◎ : Excellent ○ : Good

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

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

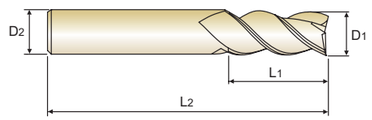
SOLID CARBIDE ALU-POWER END MILLS

CARBIDE, 3 FLUTE 45° HELIX LONG LENGTH

NEW SIZES

PLAIN SHANK **E5E49** SERIES

▶ Excellent results on aluminum and copper materials
▶ Optimized cutting edges for increased tool life
▶ Mirror surface flutes for excellent chip evacuation and surface finish



CARBIDE | 3 | 45° | DIN 6535HA | UNCOATED | p.30

* NEW SIZE

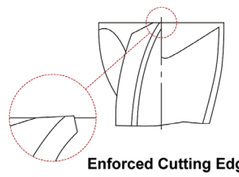
Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
* E5E49010	**1.0**	6	2	40
* E5E49901	**1.0**	6	3	50
* E5E49902	**1.0**	6	4	60
* E5E49903	**1.0**	6	5	60
* E5E49904	**1.0**	6	6	60
* E5E49015	**1.5**	6	3	40
* E5E49905	**1.5**	6	4	40
* E5E49906	**1.5**	6	5	50
* E5E49907	**1.5**	6	6	60
* E5E49908	**1.5**	6	8	60
* E5E49909	**1.5**	6	10	60
* E5E49020	**2.0**	6	3	40
* E5E49910	**2.0**	6	5	50
* E5E49911	**2.0**	6	6	50
* E5E49912	**2.0**	6	7	50
* E5E49913	**2.0**	6	8	60
* E5E49914	**2.0**	6	10	60

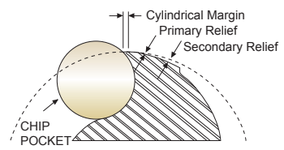
▶ DLC Coatings is available on your request.

▶ NEXT PAGE

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5



Enforced Cutting Edge



◎ : Excellent ○ : Good

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

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

SOLID CARBIDE ALU-POWER END MILLS

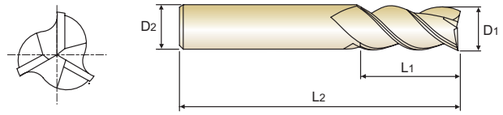
CARBIDE, 3 FLUTE 45° HELIX LONG LENGTH

NEW SIZES

PLAIN SHANK

E5E49 SERIES

- ▶ Excellent results on aluminum and copper materials
- ▶ Optimized cutting edges for increased tool life
- ▶ Mirror surface flutes for excellent chip evacuation and surface finish



CARBIDE | 3 | 45° | DIN 6535HA | UNCOATED

p.30

* NEW SIZE

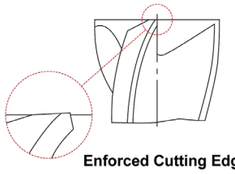
Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
* E5E49915	2.0	6	12	60
* E5E49025	2.5	6	4	40
* E5E49916	2.5	6	8	40
* E5E49917	2.5	6	10	55
* E5E49918	2.5	6	12	60
* E5E49919	2.5	6	15	60
* E5E49920	3.0	6	4	45
* E5E49921	3.0	6	8	45
* E5E49922	3.0	6	11	55
E5E49030	3.0	6	12	57
* E5E49923	3.0	6	15	65
* E5E49924	3.0	6	20	70
* E5E49925	3.0	6	25	75
* E5E49926	3.0	6	30	80
* E5E49035	3.5	6	12	55
* E5E49927	4.0	6	5	45
* E5E49928	4.0	6	8	45

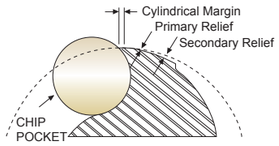
▶ DLC Coatings is available on your request.

▶ NEXT PAGE

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5



Enforced Cutting Edge



◎ : Excellent ○ : Good

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

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

SOLID CARBIDE ALU-POWER END MILLS

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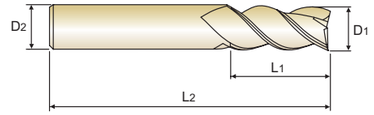


CARBIDE | 3 | 45° | DIN 6535HA | UNCOATED

p.30

* NEW SIZE

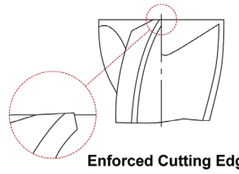
Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
* E5E49929	4.0	6	11	45
* E5E49930	4.0	6	13	55
E5E49040	4.0	6	15	57
* E5E49931	4.0	6	20	70
* E5E49932	4.0	6	26	75
* E5E49933	4.0	6	30	80
* E5E49045	4.5	6	15	55
* E5E49934	5.0	6	13	50
* E5E49935	5.0	6	17	55
E5E49050	5.0	6	20	57
* E5E49936	5.0	6	22	60
* E5E49937	5.0	6	25	70
* E5E49938	5.0	6	30	75
* E5E49939	5.0	6	35	80
* E5E49940	5.0	6	40	85
* E5E49941	5.0	6	45	90
* E5E49055	5.5	6	17	55

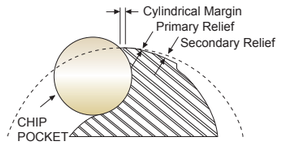
▶ DLC Coatings is available on your request.

▶ NEXT PAGE

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5



Enforced Cutting Edge



◎ : Excellent ○ : Good

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

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

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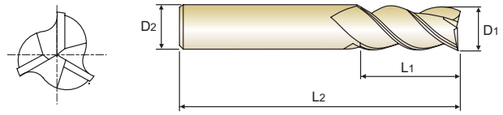


CARBIDE | 3 | 45° | DIN 6535HA | UNCOATED

p.30

* NEW SIZE

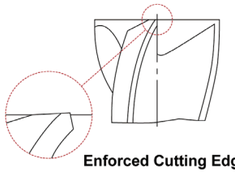
Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
* E5E49942	6.0	6	13	50
* E5E49943	6.0	6	17	60
E5E49060	6.0	6	20	65
* E5E49944	6.0	6	25	70
* E5E49945	6.0	6	30	75
* E5E49946	6.0	6	35	80
* E5E49947	6.0	6	42	90
* E5E49948	6.0	6	50	100
* E5E49070	7.0	8	22	65
* E5E49949	8.0	8	19	60
E5E49080	8.0	8	22	65
* E5E49950	8.0	8	28	80
* E5E49951	8.0	8	30	80
* E5E49952	8.0	8	35	85
* E5E49953	8.0	8	40	90
* E5E49954	8.0	8	45	95
* E5E49955	8.0	8	50	100

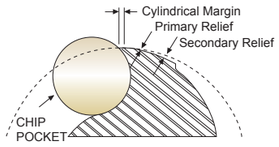
▶ DLC Coatings is available on your request.

▶ NEXT PAGE

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5



Enforced Cutting Edge



◎ : Excellent ○ : Good

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

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

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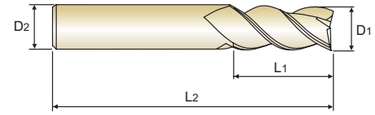


CARBIDE | 3 | 45° | DIN 6535HA | UNCOATED

p.30

* NEW SIZE

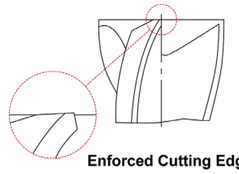
Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
* E5E49956	8.0	8	55	105
* E5E49957	8.0	8	60	110
* E5E49958	8.0	8	65	110
* E5E49090	9.0	10	27	70
* E5E49959	10.0	10	22	65
E5E49100	10.0	10	25	70
* E5E49960	10.0	10	32	90
* E5E49961	10.0	10	35	90
* E5E49962	10.0	10	40	90
* E5E49963	10.0	10	45	100
* E5E49964	10.0	10	50	100
* E5E49965	10.0	10	55	110
* E5E49966	10.0	10	60	110
* E5E49967	10.0	10	65	120
E5E49120	12.0	12	25	75
* E5E49968	12.0	12	30	80
* E5E49969	12.0	12	35	80

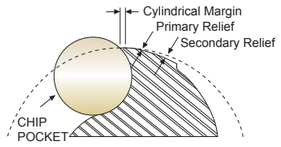
▶ DLC Coatings is available on your request.

▶ NEXT PAGE

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5



Enforced Cutting Edge



◎ : Excellent ○ : Good

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

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

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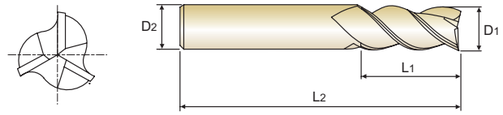


CARBIDE | 3 | 45° | DIN 6535HA | UNCOATED

p.30

* NEW SIZE

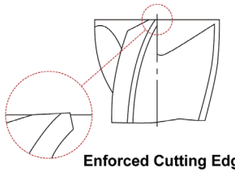
Unit : mm

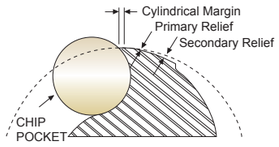
EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
* **E5E49970**	**12.0**	12	40	95
* **E5E49971**	**12.0**	12	45	100
* **E5E49972**	**12.0**	12	50	100
* **E5E49973**	**12.0**	12	55	110
* **E5E49974**	**12.0**	12	60	110
* **E5E49975**	**12.0**	12	65	120
* **E5E49976**	**12.0**	12	70	120
* **E5E49977**	**12.0**	12	75	135
* **E5E49978**	**12.0**	12	80	140
* **E5E49979**	**12.0**	12	90	150
* **E5E49140**	**14.0**	14	37	90
* **E5E49980**	**16.0**	16	32	90
E5E49160	**16.0**	16	35	90
* **E5E49981**	**16.0**	16	45	100
* **E5E49982**	**16.0**	16	55	110
* **E5E49983**	**16.0**	16	65	130
* **E5E49984**	**16.0**	16	75	150

▶ DLC Coatings is available on your request.

▶ NEXT PAGE

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5





◎ : Excellent ○ : Good

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

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

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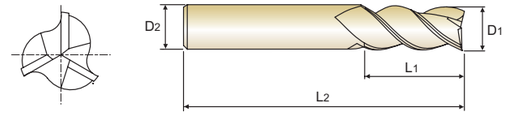


CARBIDE | 3 | 45° | DIN 6535HA | UNCOATED

p.30

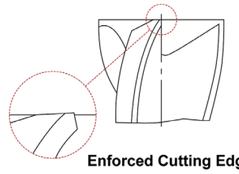
* NEW SIZE

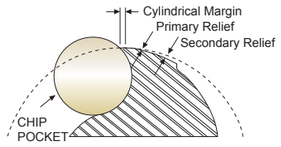
Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
* **E5E49985**	**16.0**	16	85	160
* **E5E49986**	**16.0**	16	95	180
* **E5E49987**	**16.0**	16	105	190
* **E5E49988**	**16.0**	16	115	200
* **E5E49180**	**18.0**	18	48	100
E5E49200	**20.0**	20	40	100
* **E5E49989**	**20.0**	20	45	100
* **E5E49990**	**20.0**	20	55	110
* **E5E49991**	**20.0**	20	65	130
* **E5E49992**	**20.0**	20	75	150
* **E5E49993**	**20.0**	20	85	160
* **E5E49994**	**20.0**	20	95	180
* **E5E49995**	**20.0**	20	105	190
* **E5E49996**	**20.0**	20	115	200
* **E5E49997**	**20.0**	20	125	220

▶ DLC Coatings is available on your request.

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5





◎ : Excellent ○ : Good

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

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

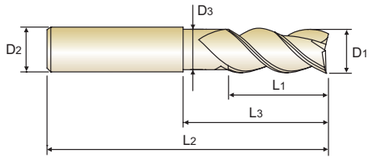
SOLID CARBIDE ALU-POWER END MILLS

CARBIDE, 3 FLUTE 45° HELIX with NECK NEW SIZES

PLAIN SHANK

E5E50 SERIES

- ▶ Excellent results on aluminum and copper materials
- ▶ Optimized cutting edges for increased tool life
- ▶ Mirror surface flutes for excellent chip evacuation and surface finish



CARBIDE | 3 | 45° | DIN 6535HA | UNCOATED

p.31

* NEW SIZE

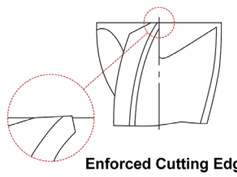
Unit : mm

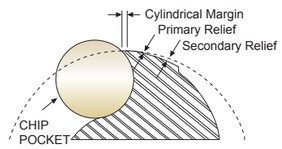
EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
	D1	D2	L1	L3	L2	D3
* E5E50010	1.0	4	2.5	3	60	0.9
* E5E50901	1.0	4	2.5	4	60	0.9
* E5E50902	1.0	4	2.5	6	60	0.9
* E5E50903	1.0	4	2.5	8	60	0.9
* E5E50904	1.0	4	2.5	10	60	0.9
* E5E50015	1.5	4	4	6	60	1.35
* E5E50905	1.5	4	4	8	60	1.35
* E5E50906	1.5	4	4	10	60	1.35
* E5E50907	1.5	4	4	12	60	1.35
* E5E50908	1.5	4	4	16	60	1.35
* E5E50020	2.0	4	6	8	60	1.8
* E5E50909	2.0	4	6	10	60	1.8
* E5E50910	2.0	4	6	12	60	1.8
* E5E50911	2.0	4	6	16	60	1.8
* E5E50025	2.5	6	7	10	60	2.25
* E5E50912	2.5	6	7	12	60	2.25
* E5E50913	2.5	6	7	16	60	2.25

▶ DLC Coatings is available on your request.

▶ NEXT PAGE

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5





◎ : Excellent ○ : Good

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

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

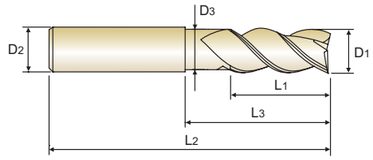
SOLID CARBIDE ALU-POWER END MILLS

CARBIDE, 3 FLUTE 45° HELIX with NECK NEW SIZES

PLAIN SHANK

E5E50 SERIES

- ▶ Excellent results on aluminum and copper materials
- ▶ Optimized cutting edges for increased tool life
- ▶ Mirror surface flutes for excellent chip evacuation and surface finish



CARBIDE | 3 | 45° | DIN 6535HA | UNCOATED

p.31

* NEW SIZE

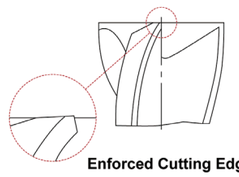
Unit : mm

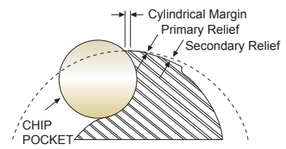
EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
	D1	D2	L1	L3	L2	D3
* E5E50914	2.5	6	7	20	60	2.25
E5E50030	3.0	6	8	12	57	2.7
* E5E50915	3.0	6	8	16	60	2.7
* E5E50916	3.0	6	8	20	60	2.7
* E5E50917	3.0	6	8	26	70	2.7
* E5E50918	3.0	6	8	30	80	2.7
E5E50040	4.0	6	11	18	57	3.7
* E5E50919	4.0	6	11	20	60	3.7
* E5E50920	4.0	6	11	26	70	3.7
* E5E50921	4.0	6	11	30	80	3.7
E5E50050	5.0	6	13	18	57	4.7
E5E50060	6.0	6	13	18	57	5.7
* E5E50922	6.0	6	15	25	90	5.7
* E5E50923	6.0	6	15	35	90	5.7
* E5E50924	6.0	6	15	45	90	5.7
E5E50080	8.0	8	21	25	63	7.4
* E5E50925	8.0	8	21	30	100	7.4

▶ DLC Coatings is available on your request.

▶ NEXT PAGE

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5





◎ : Excellent ○ : Good

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

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

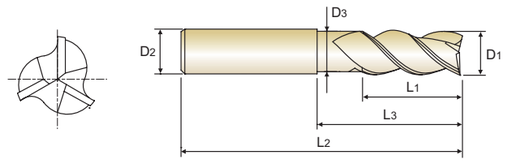
SOLID CARBIDE ALU-POWER END MILLS

CARBIDE, 3 FLUTE 45° HELIX with NECK NEW SIZES

PLAIN SHANK

E5E50 SERIES

▶ Excellent results on aluminum and copper materials
▶ Optimized cutting edges for increased tool life
▶ Mirror surface flutes for excellent chip evacuation and surface finish



CARBIDE | 3 | 45° | DIN 6535HA | UNCOATED p.31

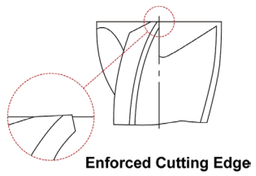
* NEW SIZE

Unit : mm

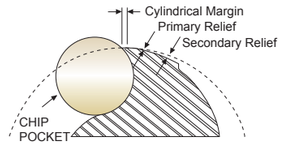
EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter
	D1	D2	L1	L3	L2	D3
* E5E50926	8.0	8	21	40	100	7.4
* E5E50927	8.0	8	21	50	100	7.4
E5E50100	10.0	10	22	30	72	9.2
* E5E50928	10.0	10	25	35	100	9.2
* E5E50929	10.0	10	25	45	100	9.2
* E5E50930	10.0	10	25	55	100	9.2
E5E50120	12.0	12	26	36	83	11
* E5E50931	12.0	12	30	40	110	11
* E5E50932	12.0	12	30	50	110	11
* E5E50933	12.0	12	30	60	110	11
E5E50160	16.0	16	36	42	92	15
E5E50200	20.0	20	41	52	104	19

▶ DLC Coatings is available on your request.

Mill Dia. Tolerance (mm)	Shank Dia. Tolerance
0 ~ - 0.015	h5



Enforced Cutting Edge



◎ : Excellent ○ : Good

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

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

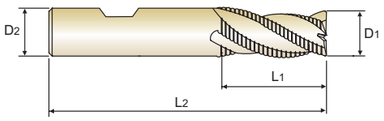
SOLID CARBIDE ALU-POWER END MILLS

CARBIDE, 3 FLUTE LONG LENGTH ROUGHING

PLAIN SHANK **E5742** SERIES

FLAT SHANK **E5711** SERIES

▶ Excellent results on aluminum and copper materials
▶ Optimized geometry reducing power consumption



CARBIDE | YG STD | WR | 3 | 30° | DIN 6535HA | DIN 6535HB | C x 45° | UNCOATED p.32

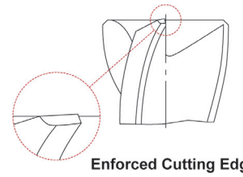
Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Overall Length	Chamfer
PLAIN	FLAT	D1(h10)	D2(h6)	L1	L2	
E5742060	E5711060	6.0	6	16	57	0.60
E5742070	E5711070	7.0	8	16	63	0.60
E5742080	E5711080	8.0	8	16	63	0.60
E5742090	E5711090	9.0	10	19	72	0.60
E5742100	E5711100	10.0	10	22	72	0.60
E5742120	E5711120	12.0	12	26	83	0.60
E5742140	E5711140	14.0	14	26	83	0.91
E5742160	E5711160	16.0	16	32	92	0.91
E5742180	E5711180	18.0	18	32	92	0.91
E5742200	E5711200	20.0	20	38	104	0.91
E5742250	E5711250	25.0	25	45	121	0.91

▶ DLC Coatings is available on your request.

Tolerances according to DIN 7160 & 7161

Tolerance range in ㎛					
Nominal-Diameter in ㎛					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
h10	0 / - 40	0 / - 48	0 / - 58	0 / - 70	0 / - 84
h5	0 / - 4	0 / - 5	0 / - 6	0 / - 8	0 / - 9



Enforced Cutting Edge

◎ : Excellent ○ : Good

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

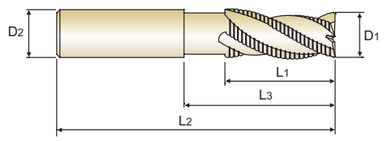
ISO	N										S							H			
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel		Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28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

SOLID CARBIDE ALU-POWER END MILLS

CARBIDE, 3 FLUTE ROUGHING with NECK

PLAIN SHANK **E5E39** SERIES
FLAT SHANK **E5E40** SERIES

▶ Excellent results on aluminum and copper materials
▶ Optimized geometry reducing power consumption



CARBIDE | YG STD | WR | 3 | 30° | DIN 6535HA | DIN 6535HB | C x 45° | UNCOATED

p.32

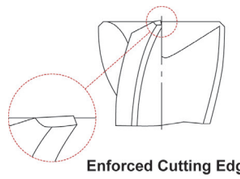
Unit : mm

EDP No.		Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	Neck Diameter	Chamfer
PLAIN	FLAT	D1	D2	L1	L3	L2	D3	
E5E39060	**E5E40060**	**6.0**	6	16	20	57	5	0.60
E5E39080	**E5E40080**	**8.0**	8	16	25	63	7	0.60
E5E39100	**E5E40100**	**10.0**	10	22	30	72	9	0.60
E5E39120	**E5E40120**	**12.0**	12	26	36	83	10.5	0.60
E5E39160	**E5E40160**	**16.0**	16	32	42	92	14.5	0.91
E5E39200	**E5E40200**	**20.0**	20	38	52	104	18.5	0.91

▶ DLC Coatings is available on your request.

Tolerances according to DIN 7160 & 7161

Tolerance range in ㎛					
Nominal-Diameter in ㎛					
	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
h10	0 - 40	0 - 48	0 - 58	0 - 70	0 - 84
h5	0 - 4	0 - 5	0 - 6	0 - 8	0 - 9



Enforced Cutting Edge

◎ : Excellent ○ : Good

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

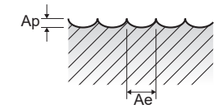
ISO	N										S							H			
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel		Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28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

E5910 SERIES

2 FLUTE BALL

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

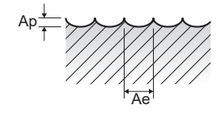
ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 6.0	8.0	10.0	12.0	16.0	20.0
N	21~22	Aluminum-wrought alloy	0.2D	0.5D	Vc	270	280	350	420	440	350
					fz	0.049	0.071	0.084	0.107	0.123	0.157
					RPM	14324	11141	11141	11141	8754	5570
					FEED	1404	1582	1872	2384	2153	1749
	23~24	Aluminum-cast, alloyed	0.2D	0.5D	Vc	176	182	228	273	286	228
					fz	0.049	0.071	0.084	0.107	0.123	0.157
					RPM	9311	7242	7242	7242	5690	3621
					FEED	912	1028	1217	1550	1400	1137
	26-28	Copper and Copper Alloys (Bronze / Brass)	0.2D	0.5D	Vc	85	85	105	125	135	105
					fz	0.04	0.06	0.069	0.089	0.101	0.131
					RPM	4509	3382	3342	3316	2686	1671
					FEED	361	406	461	590	543	438



E5908 SERIES

3 FLUTE BALL

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 2.0	2.5	3.0	3.5	4.0	5.0	6.0	8.0	10.0	12.0	16.0
N	21~22	Aluminum-wrought alloy	0.2D	0.5D	Vc	135	140	135	160	180	225	270	280	350	420	440
					fz	0.018	0.022	0.026	0.028	0.035	0.038	0.049	0.071	0.084	0.107	0.123
					RPM	21486	17825	14324	14551	14324	14324	14324	11141	11141	11141	8754
					FEED	1160	1176	1117	1222	1504	1633	2106	2373	2807	3576	3230
	23~24	Aluminum-cast, alloyed	0.2D	0.5D	Vc	88	91	88	104	117	146	176	182	228	273	286
					fz	0.018	0.022	0.026	0.028	0.035	0.038	0.049	0.071	0.084	0.107	0.123
					RPM	13966	11586	9311	9458	9311	9311	9311	7242	7242	7242	5690
					FEED	754	765	726	795	978	1061	1369	1542	1825	2325	2100
	26-27	Copper and Copper Alloys (Bronze / Brass)	0.2D	0.5D	Vc	40	40	40	50	55	70	85	85	105	125	135
					fz	0.015	0.018	0.022	0.022	0.028	0.031	0.04	0.06	0.069	0.089	0.101
					RPM	6366	5093	4244	4547	4377	4456	4509	3382	3342	3316	2686
					FEED	286	275	280	300	368	414	541	609	692	885	814



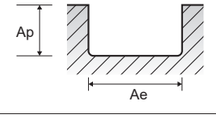
E5930 SERIES

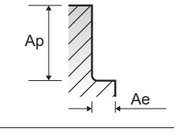
2 FLUTE CORNER RADIUS - SLOTTING

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	16.0	20.0
N	21~22	Aluminum-wrought alloy	1.0D	0.5D	Vc	65	100	130	165	195	200	250	300	320	250
					fz	0.022	0.035	0.046	0.05	0.058	0.09	0.11	0.135	0.156	0.2
					RPM	10345	10610	10345	10504	10345	7958	7958	7958	6366	3979
					FEED	455	743	952	1050	1200	1432	1751	2149	1986	1592
	23~24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	42	65	85	107	127	130	163	195	208	163
					fz	0.022	0.035	0.046	0.05	0.058	0.09	0.11	0.135	0.156	0.2
					RPM	6724	6897	6724	6828	6724	5173	5173	5173	4138	2586
					FEED	296	483	619	683	780	931	1138	1397	1291	1035

2 FLUTE CORNER RADIUS - 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	16.0	20.0
N	21~22	Aluminum-wrought alloy	Ø2~Ø10=0.25D Ø12~Ø20=0.5D	1.0D	Vc	65	100	130	165	195	200	250	300	320	250
					fz	0.039	0.046	0.054	0.065	0.077	0.115	0.135	0.170	0.194	0.250
					RPM	10345	10610	10345	10504	10345	7958	7958	7958	6366	3979
					FEED	807	976	1117	1366	1593	1830	2149	2706	2470	1989
	23~24	Aluminum-cast, alloyed	Ø2~Ø10=0.25D Ø12~Ø20=0.5D	1.0D	Vc	42	65	85	107	127	130	163	195	208	163
					fz	0.039	0.046	0.054	0.065	0.077	0.115	0.135	0.170	0.194	0.250
					RPM	6724	6897	6724	6828	6724	5173	5173	5173	4138	2586
					FEED	524	634	726	888	1036	1190	1397	1759	1606	1293





E5909 SERIES

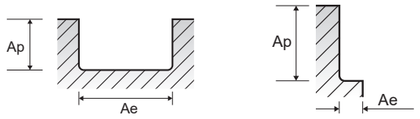
2 FLUTE CORNER RADIUS - SLOTTING

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

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 4.0	6.0	8.0	10.0	12.0	16.0	20.0
N	21~22	Aluminum-wrought alloy	1.0D	0.5D	Vc	130	195	200	250	300	320	250
					fz	0.046	0.058	0.09	0.11	0.135	0.156	0.2
					RPM	10345	10345	7958	7958	7958	6366	3979
					FEED	952	1200	1432	1751	2149	1986	1592
	23~24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	85	127	130	163	195	208	163
					fz	0.046	0.058	0.09	0.11	0.135	0.156	0.2
					RPM	6724	6724	5173	5173	5173	4138	2586
					FEED	619	780	931	1138	1397	1291	1035
	26-28	Copper and Copper Alloys (Bronze / Brass)	1.0D	0.5D	Vc	40	60	60	75	90	95	75
					fz	0.038	0.049	0.075	0.092	0.114	0.132	0.167
					RPM	3183	3183	2387	2387	2387	1890	1194
					FEED	242	312	358	439	544	499	399

2 FLUTE CORNER RADIUS - SIDE CUTTING

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 4.0	6.0	8.0	10.0	12.0	16.0	20.0
N	21~22	Aluminum-wrought alloy	~Ø10=0.25D Ø12~Ø20=0.5D	1.0D	Vc	130	195	200	250	300	320	250
					fz	0.054	0.077	0.115	0.135	0.17	0.194	0.25
					RPM	10345	10345	7958	7958	7958	6366	3979
					FEED	1117	1593	1830	2149	2706	2470	1989
	23~24	Aluminum-cast, alloyed	~Ø10=0.25D Ø12~Ø20=0.5D	1.0D	Vc	85	127	130	163	195	208	163
					fz	0.054	0.077	0.115	0.135	0.17	0.194	0.25
					RPM	6724	6724	5173	5173	5173	4138	2586
					FEED	726	1036	1190	1397	1759	1606	1293
	26-28	Copper and Copper Alloys (Bronze / Brass)	~Ø10=0.25D Ø12~Ø20=0.5D	1.0D	Vc	40	60	60	75	90	95	75
					fz	0.045	0.064	0.097	0.114	0.142	0.163	0.21
					RPM	3183	3183	2387	2387	2387	1890	1194
					FEED	286	407	463	544	678	616	501



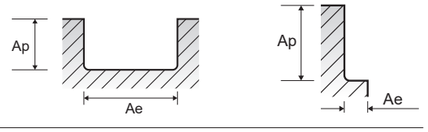
E5E51 SERIES

3 FLUTE CORNER RADIUS - SLOTTING

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	20.0
N	21~22	Aluminum-wrought alloy	1.0D	0.5D	Vc	95	125	155	190	200	250	300	300	250
					fz	0.039	0.050	0.055	0.066	0.096	0.117	0.145	0.174	0.220
					RPM	10080	9947	9868	10080	7958	7958	7958	5968	3979
					FEED	1179	1492	1628	1996	2292	2793	3462	3115	2626
	23~24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	62	81	101	124	130	163	195	195	163
					fz	0.039	0.050	0.055	0.066	0.096	0.117	0.145	0.174	0.220
					RPM	6552	6466	6414	6552	5173	5173	5173	3879	2586
					FEED	767	970	1058	1297	1490	1816	2250	2025	1707

3 FLUTE CORNER RADIUS - SIDE CUTTING

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	20.0
N	21~22	Aluminum-wrought alloy	0.15D	2.5D	Vc	95	125	155	190	200	250	300	300	250
					fz	0.050	0.061	0.072	0.083	0.125	0.145	0.179	0.220	0.262
					RPM	10080	9947	9868	10080	7958	7958	7958	5968	3979
					FEED	1512	1820	2131	2510	2984	3462	4273	3939	3127
	23~24	Aluminum-cast, alloyed	0.15D	2.5D	Vc	62	81	101	124	130	163	195	195	163
					fz	0.050	0.061	0.072	0.083	0.125	0.145	0.179	0.220	0.262
					RPM	6552	6466	6414	6552	5173	5173	5173	3879	2586
					FEED	983	1183	1385	1631	1940	2250	2778	2560	2033



E5E48, E5522, E5521 SERIES

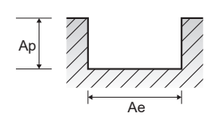
2 FLUTE - SLOTTING

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0
N	21~22	Aluminum-wrought alloy	1.0D	0.5D	Vc	53	62	71	83	95	125	155	190
					fz	0.015	0.020	0.025	0.030	0.035	0.045	0.050	0.060
					RPM	16870	13150	11300	10565	10080	9947	9868	10080
					FEED	505	525	565	635	706	895	987	1210
	23~24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	34	40	46	54	62	81	101	124
					fz	0.015	0.020	0.025	0.030	0.035	0.045	0.050	0.060
					RPM	10823	8488	7321	6875	6552	6466	6414	6552
					FEED	325	340	366	413	459	582	641	786

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 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	200	250	300	265	300	225	250
					fz	0.088	0.106	0.131	0.150	0.158	0.175	0.200
					RPM	7958	7958	7958	6025	5968	3979	3979
					FEED	1401	1687	2085	1808	1886	1393	1592
	23~24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	130	163	195	172	195	146	163
					fz	0.088	0.106	0.131	0.150	0.158	0.175	0.200
					RPM	5173	5173	5173	3916	3879	2586	2586
					FEED	910	1097	1355	1175	1226	905	1035

※ For long flute tools, it is recommended to adjust the conditions according to the following ratios.

Length of Cut	RPM	FEED
Up to 3D	100%	100%
Up to 5D	70%	80%
Up to 7D	Not recommended	
Over 7D		



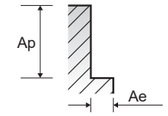
2 FLUTE - SIDE CUTTING

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 1.0	1.5	2.0	2.5	3.0	4.0	5.0	6.0
N	21~22	Aluminum-wrought alloy	Ø1~Ø10=0.25D Ø12~Ø20=0.5D	1.0D	Vc	53	62	71	83	95	125	155	190
					fz	0.025	0.030	0.035	0.040	0.045	0.055	0.065	0.075
					RPM	16870	13150	11300	10565	10080	9947	9868	10080
					FEED	845	790	790	845	907	1094	1283	1512
	23~24	Aluminum-cast, alloyed	Ø1~Ø10=0.25D Ø12~Ø20=0.5D	1.0D	Vc	34	40	46	54	62	81	101	124
					fz	0.015	0.020	0.025	0.030	0.045	0.055	0.065	0.075
					RPM	10823	8488	7321	6875	6552	6466	6414	6552
					FEED	325	340	366	413	590	711	834	983

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 8.0	10.0	12.0	14.0	16.0	18.0	20.0
N	21~22	Aluminum-wrought alloy	Ø1~Ø10=0.25D Ø12~Ø20=0.5D	1.0D	Vc	200	250	300	265	300	225	250
					fz	0.113	0.131	0.163	0.183	0.200	0.225	0.238
					RPM	7958	7958	7958	6025	5968	3979	3979
					FEED	1798	2085	2594	2205	2387	1790	1894
	23~24	Aluminum-cast, alloyed	Ø1~Ø10=0.25D Ø12~Ø20=0.5D	1.0D	Vc	130	163	195	172	195	146	163
					fz	0.113	0.131	0.163	0.183	0.200	0.225	0.238
					RPM	5173	5173	5173	3916	3879	2586	2586
					FEED	1169	1355	1686	1433	1552	1164	1231

※ For long flute tools, it is recommended to adjust the conditions according to the following ratios.

Length of Cut	RPM	FEED
Up to 3D	100%	100%
Up to 5D	70%	70%
Up to 7D	40%	70%
Over 7D	40%	50%



E5E49 SERIES

3 FLUTE - SLOTTING

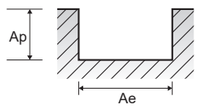
Vc = m/min. fz = mm/tooth
RPM = rev./min. FEED = mm/min.

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5
N	21~22	Aluminum-wrought alloy	1.0D	0.5D	Vc	53	61	63	63	65	75	90	100	110	120
					fz	0.023	0.027	0.027	0.033	0.035	0.035	0.045	0.050	0.050	0.060
					RPM	16870	12945	10027	8021	6897	6821	7162	7074	7003	6945
					FEED	1164	1049	812	794	724	716	967	1061	1050	1250
	23~24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	34	40	41	41	42	49	59	65	72	78
					fz	0.023	0.027	0.027	0.033	0.035	0.035	0.045	0.050	0.050	0.060
					RPM	10823	8488	6525	5220	4483	4456	4655	4598	4552	4514
					FEED	747	688	529	517	471	468	628	690	683	813

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 6.0	7.0	8.0	9.0	10.0	12.0	14.0	16.0	18.0	20.0
N	21~22	Aluminum-wrought alloy	1.0D	0.5D	Vc	130	130	140	160	175	210	185	210	160	175
					fz	0.060	0.081	0.088	0.097	0.106	0.131	0.150	0.158	0.173	0.200
					RPM	6897	5911	5570	5659	5570	5570	4206	4178	2829	2785
					FEED	1241	1436	1471	1647	1771	2189	1893	1980	1468	1671
	23~24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	85	85	91	104	114	137	120	137	104	114
					fz	0.060	0.081	0.088	0.097	0.106	0.131	0.150	0.158	0.173	0.200
					RPM	4483	3865	3621	3678	3621	3621	2728	2716	1839	1810
					FEED	807	939	956	1070	1151	1423	1228	1287	954	1086

※ For long flute tools, it is recommended to adjust the conditions according to the following ratios.

Length of Cut	RPM	FEED
Up to 3D	100%	100%
Up to 5D	70%	80%
Up to 7D	Not recommended	
Over 7D		



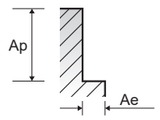
3 FLUTE - SIDE CUTTING

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5
N	21~22	Aluminum-wrought alloy	0.15D	1.5D ~ 2.5D	Vc	53	61	63	63	65	75	90	100	110	120
					fz	0.038	0.046	0.044	0.046	0.045	0.054	0.055	0.060	0.065	0.069
					RPM	16870	12945	10027	8021	6897	6821	7162	7074	7003	6945
					FEED	1923	1786	1324	1107	931	1105	1182	1273	1366	1438
	23~24	Aluminum-cast, alloyed	0.15D	1.5D ~ 2.5D	Vc	34	40	41	41	42	49	59	65	72	78
					fz	0.038	0.046	0.044	0.046	0.045	0.054	0.055	0.060	0.065	0.069
					RPM	10823	8488	6525	5220	4483	4456	4655	4598	4552	4514
					FEED	1234	1171	861	720	605	722	768	828	888	934

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 6.0	7.0	8.0	9.0	10.0	12.0	14.0	16.0	18.0	20.0
N	21~22	Aluminum-wrought alloy	0.15D	1.5D ~ 2.5D	Vc	130	130	140	160	175	210	185	210	160	175
					fz	0.075	0.096	0.113	0.122	0.131	0.163	0.183	0.200	0.225	0.238
					RPM	6897	5911	5570	5659	5570	5570	4206	4178	2829	2785
					FEED	1552	1702	1888	2071	2189	2724	2309	2507	1910	1989
	23~24	Aluminum-cast, alloyed	0.15D	1.5D ~ 2.5D	Vc	85	85	91	104	114	137	120	137	104	114
					fz	0.075	0.096	0.113	0.122	0.131	0.163	0.183	0.200	0.225	0.238
					RPM	4483	3865	3621	3678	3621	3621	2728	2716	1839	1810
					FEED	1009	1113	1227	1346	1423	1771	1498	1629	1241	1293

※ For long flute tools, it is recommended to adjust the conditions according to the following ratios.

Length of Cut	RPM	FEED
Up to 3D	100%	100%
Up to 5D	70%	70%
Up to 7D	40%	70%
Over 7D	40%	50%



E5E50 SERIES

3 FLUTE - SLOTTING

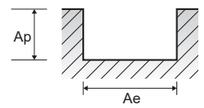
Vc = m/min. fz = mm/tooth
RPM = rev./min. FEED = mm/min.

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 1.0	1.5	2.0	2.5	3.0	4.0	5.0
N	21~22	Aluminum-wrought alloy	1.0D	0.5D	Vc	53	61	63	63	65	90	110
					fz	0.023	0.027	0.027	0.033	0.035	0.045	0.050
					RPM	16870	12945	10027	8021	6897	7162	7003
					FEED	1164	1049	812	794	724	967	1050
	23~24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	34	40	41	41	42	59	72
					fz	0.023	0.027	0.027	0.033	0.035	0.045	0.050
					RPM	10823	8488	6525	5220	4483	4655	4552
					FEED	747	688	529	517	471	628	683

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 6.0	8.0	9.0	10.0	12.0	16.0	20.0
N	21~22	Aluminum-wrought alloy	1.0D	0.5D	Vc	130	140	160	175	210	210	175
					fz	0.060	0.088	0.097	0.106	0.131	0.158	0.200
					RPM	6897	5570	5659	5570	5570	4178	2785
					FEED	1241	1471	1647	1771	2189	1980	1671
	23~24	Aluminum-cast, alloyed	1.0D	0.5D	Vc	85	91	104	114	137	137	114
					fz	0.060	0.088	0.097	0.106	0.131	0.158	0.200
					RPM	4483	3621	3678	3621	3621	2716	1810
					FEED	807	956	1070	1151	1423	1287	1086

※ For long neck type tools, condition adjustments are recommended as per the ratios below.

Neck length	RPM	FEED
Up to 3D	100%	100%
Over 3D ~ Up to 5D	70%	70%
Over 5D	50%	50%



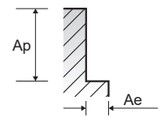
3 FLUTE - SIDE CUTTING

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 1.0	1.5	2.0	2.5	3.0	4.0	5.0
N	21~22	Aluminum-wrought alloy	0.15D	1.5D ~ 2.5D	Vc	53	61	63	63	65	90	110
					fz	0.038	0.046	0.044	0.046	0.045	0.055	0.065
					RPM	16870	12945	10027	8021	6897	7162	7003
					FEED	1923	1786	1324	1107	931	1182	1366
	23~24	Aluminum-cast, alloyed	0.15D	1.5D ~ 2.5D	Vc	34	40	41	41	42	59	72
					fz	0.038	0.046	0.044	0.046	0.045	0.055	0.065
					RPM	10823	8488	6525	5220	4483	4655	4552
					FEED	1234	1171	861	720	605	768	888

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 6.0	8.0	9.0	10.0	12.0	16.0	20.0
N	21~22	Aluminum-wrought alloy	0.15D	1.5D ~ 2.5D	Vc	130	140	160	175	210	210	175
					fz	0.075	0.113	0.122	0.131	0.163	0.200	0.238
					RPM	6897	5570	5659	5570	5570	4178	2785
					FEED	1552	1888	2071	2189	2724	2507	1989
	23~24	Aluminum-cast, alloyed	0.15D	1.5D ~ 2.5D	Vc	85	91	104	114	137	137	114
					fz	0.075	0.113	0.122	0.131	0.163	0.200	0.238
					RPM	4483	3621	3678	3621	3621	2716	1810
					FEED	1009	1227	1346	1423	1771	1629	1293

※ For long neck type tools, condition adjustments are recommended as per the ratios below.

Neck length	RPM	FEED
Up to 3D	100%	100%
Over 3D ~ Up to 5D	70%	70%
Over 5D	50%	50%

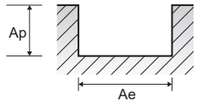


E5E47 SERIES

1 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
N	21~22	Aluminum-wrought alloy	1.0D	1.5D	Vc	145	170	190	190	190	195	190	190
					fz	0.065	0.094	0.120	0.150	0.180	0.244	0.333	0.440
					RPM	23077	18038	15120	12096	10080	7759	6048	5040
					FEED	1500	1696	1814	1814	1814	1893	2014	2218
	23~24	Aluminum-cast, alloyed	1.0D	1.5D	Vc	94	111	124	124	124	127	124	124
					fz	0.065	0.094	0.120	0.150	0.180	0.244	0.333	0.440
					RPM	15000	11724	9828	7862	6552	5043	3931	3276
					FEED	975	1102	1179	1179	1179	1231	1309	1441
	29.1	Non Metallic Materials (Duroplastic)	1.0D	1.5D	Vc	200	235	250	235	255	250	250	255
					fz	0.069	0.096	0.120	0.147	0.170	0.240	0.300	0.343
					RPM	31831	24934	19894	14961	13528	9947	7958	6764
					FEED	2196	2394	2387	2199	2300	2387	2387	2320



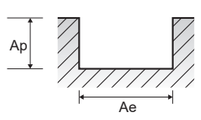
E5742, E5711, E5E39, E5E40 SERIES

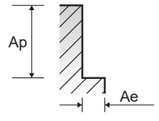
3 FLUTE ROUGHING - SLOTTING

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 6.0	8.0	10.0	12.0	16.0	20.0
N	21~22	Aluminum-wrought alloy	1.0D	1.5D	Vc	198	201	204	241	241	242
					fz	0.168	0.167	0.179	0.167	0.167	0.165
					RPM	10504	7998	6494	6393	4795	3852
					FEED	5294	4007	3487	3203	2402	1907
	23~24	Aluminum-cast, alloyed	1.0D	1.5D	Vc	129	131	133	157	157	157
					fz	0.168	0.167	0.179	0.167	0.167	0.165
					RPM	6828	5198	4221	4155	3116	2504
					FEED	3441	2604	2267	2082	1561	1239

3 FLUTE ROUGHING - SIDE CUTTING

ISO	VDI 3323	Material Description	Ae	Ap	Parameter	Diameter (Ø) 6.0	8.0	10.0	12.0	16.0	20.0
N	21~22	Aluminum-wrought alloy	0.5D	1.5D	Vc	254	264	267	320	322	320
					fz	0.168	0.168	0.169	0.165	0.167	0.163
					RPM	13475	10504	8499	8488	6406	5093
					FEED	6791	5294	4309	4202	3209	2490
	23~24	Aluminum-cast, alloyed	0.5D	1.5D	Vc	165	172	174	208	209	208
					fz	0.168	0.168	0.169	0.165	0.167	0.163
					RPM	8759	6828	5524	5517	4164	3310
					FEED	4414	3441	2801	2731	2086	1619





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