

A-Wing Endmill NEW

For Aluminum

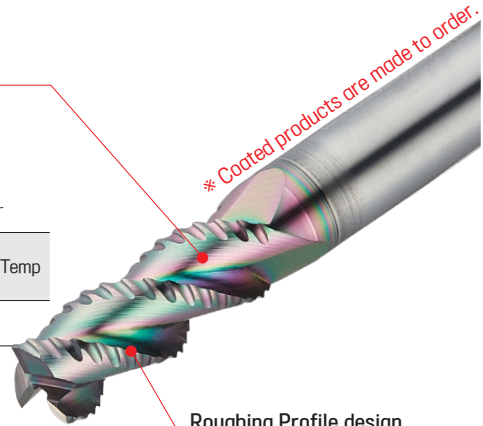
Features

- Specialized design for cutting aluminum and aluminum alloys
- Excellent chip evacuation through Profile design
- Applicable on a wide range of machining from roughing to finishing
- Wide range of product specification

D.L.C Coating info

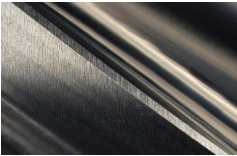
- Our pure carbon-based, diamond-like coating, applied with FVAS (Filtered Vacuum Arc Source) technology, delivers exceptional surface finish and release performance, significantly reducing wear and material buildup when machining non-ferrous metals like aluminum and copper

Color	Film hardness (Hv)	Friction Coefficient	Coating Thickness (pin axis, μm)	Max. Operating Temp ($^{\circ}\text{C}$)
Rainbow	4000~7000	0.15	0.1~0.7	500



Cylindrical Land

- Reduced vibration and chatter
- Reduced friction, improved surface finish



Roughing Profile design

- Enhanced performance with dual profile design
- Excellent chip evacuation
- Reduced machining load

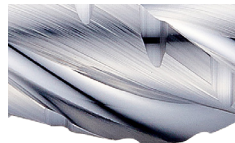


Chip Breaker Profile design

- Short chip formation
- Improved chip evacuation performance

Fine Surface Finish on the Grooves

- Enhanced adhesion, reduced machining load
- Enhanced chip evacuation



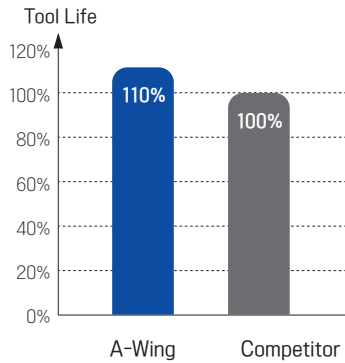
High toughness material

- Provides chipping resistance and machining stability

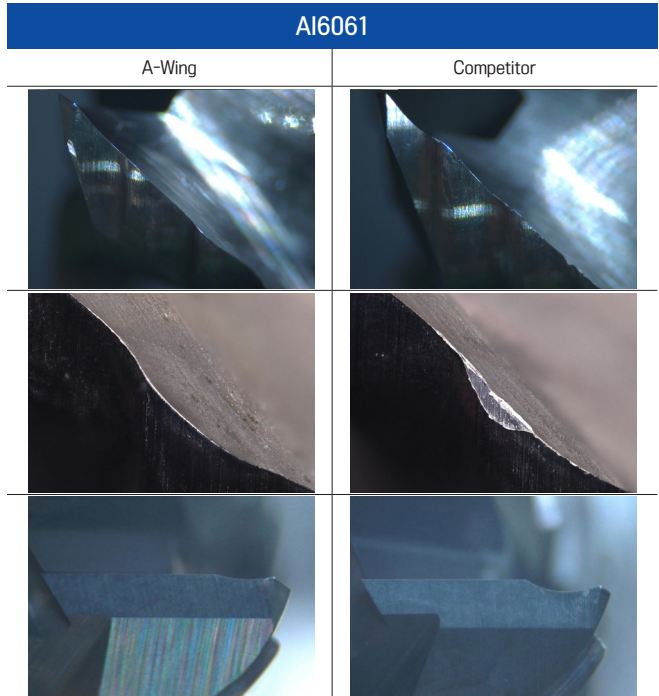


Case Study

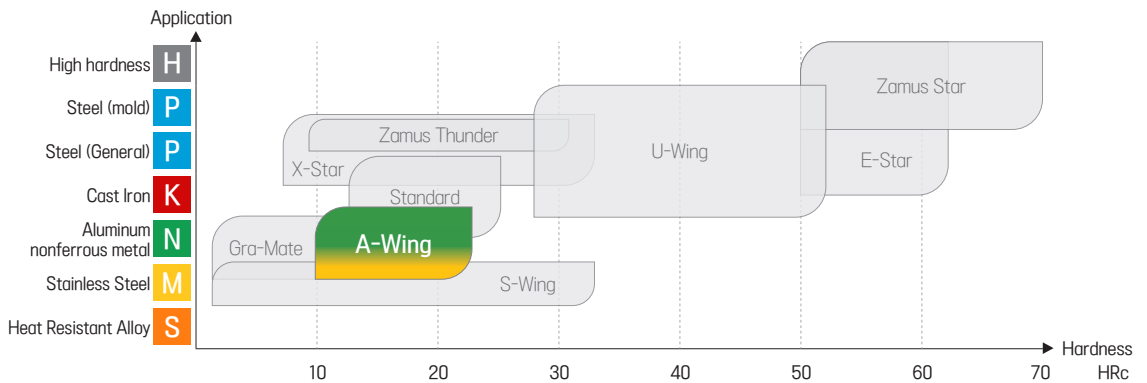
► 3F D10.0 Roughing End Mill



Cutting Condition	
Cutting Method	Shoudering
RPM	8,500
Feed	4,300
ap	10
ae	5
Coolant	Wet Machining



Applications



A-Wing Endmill NEW

For Aluminum

Contents

Section		EDP No	Geometry	Product	Diameter(DC)		Page
Shape	Flute				Min	Max	
Square	1F	AWE311		1 Flutes Square End Mill	1	12	359
		AWE311...C					
	2F	AWE312		2 Flutes Square End Mill	1	20	361
		AWE312...C					
	3F	AWE313		3 Flutes Square End Mill	1	20	363
		AWE313...C					
3F	AWE323		3 Flutes Square End Mill	1.5	20	366	
	AWE323...C						
Radius	2F	AWR312		2 Flutes Radius End Mill	1	20	368
		AWR312...C					
	3F	AWR313		3 Flutes Radius End Mill	1	20	370
		AWR313...C					
Ball	2F	AWB312		2 Flutes Ball End Mill	6	20	372
		AWB312...C					
Chip Breaker (Nick)	3F	AWN513		3 Flutes Chip Breaker End Mill	3	20	373
		AWN513...C					
Roughing	3F	AWF513		3 Flutes 38° Helix Roughing End Mill	4	20	374
		AWF513...C					
	3F	AWF583		3 Flutes 45° Helix Roughing End Mill	4	20	376
		AWF583...C					

EDP No. System

*If expressed as an integer, the decimal point is omitted.



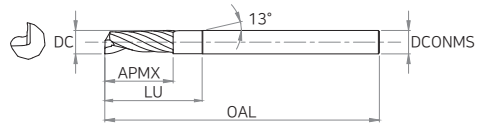
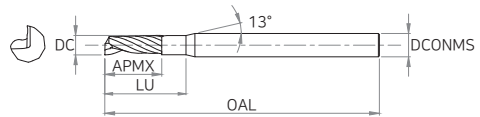
①	②	③	④	⑤	⑥		⑦		⑧	⑨
Section	Shape	Grade	Appearance	Flutes	Cutting Dia	Corner R	Length of Cut	Effective Length	Shank Dia	Coating
AW : A-WING	E : Flat	3 : Grade	1 : Neck	1 : 1 Flutes	1	0.05	2	7	4	C
	R : Radius	5 : Grade	2 : Long Shank	2 : 2 Flutes	~	~	~	~	~	
	B : Ball		8 : High Helix	3 : 3 Flutes	20	10	150	160	20	
	N : Chip breaker(Nick)									
	F : Roughing									

EX) AWE3120100354C (A-WING HRc30 2F D1 LOC3 Shank Dia.4 Flat type coated End Mill)

AWE311

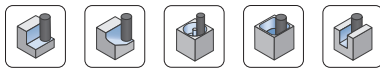
1 Flutes Square End Mill

※ Coated products are made to order



► Tolerance

DC		Shank Dia
Ø1 ~ Ø5	0 ~ -0.02	
Ø6 ~ Ø12	0 ~ -0.03	



EDP No		DC	APMX	LU	OAL	DCONMS
Uncoated	Coated					
AWE311 01003	AWE311 01003C	1	3	8	45	6
AWE311 010045	AWE311 010045C	1	4.5	9.5	45	6
AWE311 01006	AWE311 01006C	1	6	11	50	6
AWE311 01203	AWE311 01203C	1.2	3	8	45	6
AWE311 01205	AWE311 01205C	1.2	5	10	45	6
AWE311 01206	AWE311 01206C	1.2	6	11	50	6
AWE311 01504	AWE311 01504C	1.5	4	9	45	6
AWE311 01506	AWE311 01506C	1.5	6	11	50	6
AWE311 01508	AWE311 01508C	1.5	8	13	50	6
AWE311 02006	AWE311 02006C	2	6	11	50	6
AWE311 02008	AWE311 02008C	2	8	13	50	6
AWE311 02010	AWE311 02010C	2	10	15	50	6
AWE311 02507	AWE311 02507C	2.5	7	12	50	6
AWE311 02508	AWE311 02508C	2.5	8	13	50	6
AWE311 02510	AWE311 02510C	2.5	10	15	50	6
AWE311 02512	AWE311 02512C	2.5	12	17	50	6
AWE311 03008	AWE311 03008C	3	8	13	50	6
AWE311 03012	AWE311 03012C	3	12	17	50	6
AWE311 03015	AWE311 03015C	3	15	20	50	6
AWE311 04010	AWE311 04010C	4	10	15	50	6

► Applicable Working Material

○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRc55	SKD11 HRc55~	~HB225	HB225 ~325	HRc30~50	~FCD500					
						○		◎		

Endmill

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate

AWE311

1 Flutes Square End Mill

* Coated products are made to order

Endmill

EDP No		DC	APMX	LU	OAL	DCONMS
Uncoated	Coated					
AWE311 04015	AWE311 04015C	4	15	20	50	6
AWE311 04020	AWE311 04020C	4	20	25	60	6
AWE311 05013	AWE311 05013C	5	13	18	60	6
AWE311 05020	AWE311 05020C	5	20	25	60	6
AWE311 05025	AWE311 05025C	5	25	30	60	6
AWE311 06015	AWE311 06015C	6	15	22	60	6
AWE311 06020	AWE311 06020C	6	20	27	60	6
AWE311 06025	AWE311 06025C	6	25	32	60	6
AWE311 08020	AWE311 08020C	8	20	27	70	8
AWE311 08025	AWE311 08025C	8	25	32	75	8
AWE311 10022	AWE311 10022C	10	22	30	75	10
AWE311 10030	AWE311 10030C	10	30	38	80	10
AWE311 12026	AWE311 12026C	12	26	36	75	12
AWE311 12035	AWE311 12035C	12	35	45	90	12

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper -Mate

Gra -Mate

► Applicable Working Material

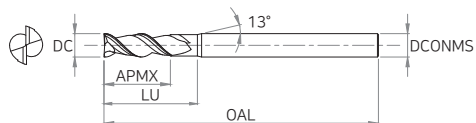
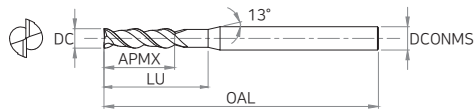
○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRc55	SKD11 HRc55~	~HB225	HB225 ~325	HRc30-50	~FCD500					
						○		◎		

AWE312

2 Flutes Square End Mill

※ Coated products are made to order



► Tolerance

DC		Shank Dia
All Sizes	0 ~ -0.02	h5



EDP No		DC	APMX	LU	OAL	DCONMS
Uncoated	Coated					
AWE312 01003S4	AWE312 01003S4C	1	3	8	50	4
AWE312 01006	AWE312 01006C	1	6	11	60	6
AWE312 01204	AWE312 01204C	1.2	4	9	50	6
AWE312 01506	AWE312 01506C	1.5	6	11	50	6
AWE312 01508	AWE312 01508C	1.5	8	13	60	6
AWE312 02006S4	AWE312 02006S4C	2	6	11	50	4
AWE312 02006	AWE312 02006C	2	6	11	50	6
AWE312 02010	AWE312 02010C	2	10	15	60	6
AWE312 02508	AWE312 02508C	2.5	8	13	55	6
AWE312 02512	AWE312 02512C	2.5	12	17	55	6
AWE312 03012	AWE312 03012C	3	12	17	55	6
AWE312 03015	AWE312 03015C	3	15	20	65	6
AWE312 03514	AWE312 03514C	3.5	14	19	57	6
AWE312 04014	AWE312 04014C	4	14	19	55	6
AWE312 04016	AWE312 04016C	4	16	21	65	6
AWE312 05017	AWE312 05017C	5	17	22	55	6
AWE312 05022	AWE312 05022C	5	22	27	60	6
AWE312 06017	AWE312 06017C	6	17	24	60	6
AWE312 06022	AWE312 06022C	6	22	29	60	6
AWE312 06025	AWE312 06025C	6	25	32	70	6

► Applicable Working Material

○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRc55	SKD11 HRc55~	~HB225	HB225 ~325	HRc30~50	~FCD500	○		◎		

AWE312

2 Flutes Square End Mill

* Coated products are made to order

Endmill

	EDP No		DC	APMX	LU	OAL	DCONMS
	Uncoated	Coated					
	AWE312 07022	AWE312 07022C	7	22	29	65	8
	AWE312 08023	AWE312 08023C	8	23	30	70	8
Zamus Star	AWE312 08031	AWE312 08031C	8	31	38	80	8
	AWE312 09025	AWE312 09025C	9	25	32	72	10
	AWE312 10028	AWE312 10028C	10	28	36	75	10
	AWE312 10036	AWE312 10036C	10	36	44	90	10
E-Star	AWE312 11030	AWE312 11030C	11	30	38	80	12
	AWE312 12033	AWE312 12033C	12	33	43	80	12
	AWE312 12041	AWE312 12041C	12	41	51	95	12
	AWE312 12045	AWE312 12045C	12	45	55	100	12
U-Wing	AWE312 13035	AWE312 13035C	13	35	45	85	14
	AWE312 14038S14	AWE312 14038S14C	14	38	58	90	14
	AWE312 14038	AWE312 14038C	14	38	58	90	16
Zamus Thunder	AWE312 15040	AWE312 15040C	15	40	50	90	16
	AWE312 16045	AWE312 16045C	16	45	55	100	16
	AWE312 16053	AWE312 16053C	16	53	63	110	16
	AWE312 18049	AWE312 18049C	18	49	59	100	18
X-Star	AWE312 20050	AWE312 20050C	20	50	60	110	20
	AWE312 20055	AWE312 20055C	20	55	65	110	20

S-Wing

A-Wing

Standard

Copper
-Mate

Gra
-Mate

► Applicable Working Material

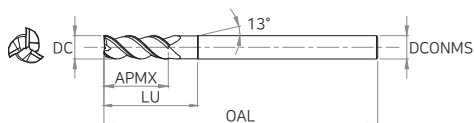
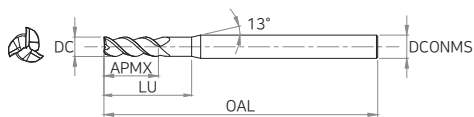
○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRC55	SKD11 HRC55~	~HB225	HB225 ~325	HRc30~50	~FCD500					
						○		◎		

AWE313

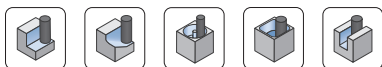
3 Flutes Square End Mill

※ Coated products are made to order



► Tolerance

DC		Shank Dia
All Sizes	0 ~ -0.02	h5



EDP No		DC	APMX	LU	OAL	DCONMS
Uncoated	Coated					
AWE313 01002	AWE313 01002C	1	2	7	40	6
AWE313 01003	AWE313 01003C	1	3	8	50	6
AWE313 01004	AWE313 01004C	1	4	9	60	6
AWE313 01006	AWE313 01006C	1	6	11	60	6
AWE313 01204	AWE313 01204C	1.2	4	9	50	6
AWE313 01503	AWE313 01503C	1.5	3	8	45	6
AWE313 01504	AWE313 01504C	1.5	4	9	45	6
AWE313 01505	AWE313 01505C	1.5	5	10	50	6
AWE313 01506	AWE313 01506C	1.5	6	11	60	6
AWE313 01508	AWE313 01508C	1.5	8	13	60	6
AWE313 01510	AWE313 01510C	1.5	10	15	60	6
AWE313 02003	AWE313 02003C	2	3	8	45	6
AWE313 02006	AWE313 02006C	2	6	11	50	6
AWE313 02008	AWE313 02008C	2	8	13	60	6
AWE313 02010	AWE313 02010C	2	10	15	60	6
AWE313 02012	AWE313 02012C	2	12	17	60	6
AWE313 02504	AWE313 02504C	2.5	4	9	45	6
AWE313 02508	AWE313 02508C	2.5	8	13	50	6
AWE313 02510	AWE313 02510C	2.5	10	15	55	6
AWE313 02512	AWE313 02512C	2.5	12	17	60	6

► Applicable Working Material

○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRc55	SKD11 HRc55~	~HB225	HB225 ~325	HRc30~50	~FCD500					
						○		◎		

Endmill

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate

AWE313

3 Flutes Square End Mill

* Coated products are made to order

Endmill

	EDP No		DC	APMX	LU	OAL	DCONMS
	Uncoated	Coated					
	AWE313 03004	AWE313 03004C	3	4	9	45	6
	AWE313 03008	AWE313 03008C	3	8	13	50	6
Zamus Star	AWE313 03012	AWE313 03012C	3	12	17	55	6
	AWE313 03015	AWE313 03015C	3	15	20	65	6
	AWE313 03512	AWE313 03512C	3.5	12	17	55	6
	AWE313 04006	AWE313 04006C	4	6	11	45	6
E-Star	AWE313 04008	AWE313 04008C	4	8	13	50	6
	AWE313 04011	AWE313 04011C	4	11	16	50	6
	AWE313 04014	AWE313 04014C	4	14	19	55	6
	AWE313 04016	AWE313 04016C	4	16	21	65	6
U-Wing	AWE313 04020	AWE313 04020C	4	20	25	70	6
	AWE313 04515	AWE313 04515C	4.5	15	20	55	6
	AWE313 05006	AWE313 05006C	5	6	11	45	6
Zamus Thunder	AWE313 05017	AWE313 05017C	5	17	22	55	6
	AWE313 05022	AWE313 05022C	5	22	27	60	6
	AWE313 05026	AWE313 05026C	5	26	31	70	6
	AWE313 05517	AWE313 05517C	5.5	17	22	55	6
X-Star	AWE313 06007	AWE313 06007C	6	7	14	50	6
	AWE313 06013	AWE313 06013C	6	13	20	55	6
	AWE313 06017	AWE313 06017C	6	17	24	60	6
S-Wing	AWE313 06022	AWE313 06022C	6	22	29	60	6
	AWE313 06026	AWE313 06026C	6	26	33	70	6
	AWE313 06031	AWE313 06031C	6	31	38	75	6
A-Wing	AWE313 07023	AWE313 07023C	7	23	30	65	8
	AWE313 08012	AWE313 08012C	8	12	19	60	8
	AWE313 08020	AWE313 08020C	8	20	27	60	8
	AWE313 08023	AWE313 08023C	8	23	30	70	8
Standard	AWE313 08029	AWE313 08029C	8	29	36	80	8
	AWE313 08031	AWE313 08031C	8	31	38	80	8
	AWE313 08036	AWE313 08036C	8	36	43	85	8
Copper-Mate	AWE313 09028	AWE313 09028C	9	28	35	70	10
	AWE313 10012	AWE313 10012C	10	12	20	65	10
	AWE313 10015	AWE313 10015C	10	15	23	65	10
Gra-Mate	AWE313 10023	AWE313 10023C	10	23	31	65	10

► Applicable Working Material

○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRC55	SKD11 HRC55~	Steel ~HB225	Alloy Steel HB225 ~325	Prehardened Steel HRC30-50	Cast Iron ~FCD500					
						○		◎		

AWE313

3 Flutes Square End Mill

※ Coated products are made to order

Endmill

EDP No		DC	APMX	LU	OAL	DCONMS
Uncoated	Coated					
AWE313 10028	AWE313 10028C	10	28	36	75	10
AWE313 10033	AWE313 10033C	10	33	41	90	10
AWE313 10036	AWE313 10036C	10	36	44	90	10
AWE313 10041	AWE313 10041C	10	41	49	90	10
AWE313 10046	AWE313 10046C	10	46	54	100	10
AWE313 10051	AWE313 10051C	10	51	59	100	10
AWE313 11030	AWE313 11030C	11	30	38	80	12
AWE313 12014	AWE313 12014C	12	14	24	70	12
AWE313 12027	AWE313 12027C	12	27	37	75	12
AWE313 12033	AWE313 12033C	12	33	43	80	12
AWE313 12041	AWE313 12041C	12	41	51	95	12
AWE313 12046	AWE313 12046C	12	46	56	100	12
AWE313 12051	AWE313 12051C	12	51	61	100	12
AWE313 12056	AWE313 12056C	12	56	66	110	12
AWE313 12061	AWE313 12061C	12	61	71	110	12
AWE313 13035	AWE313 13035C	13	35	45	85	14
AWE313 14038S14	AWE313 14038S14C	14	38	48	90	14
AWE313 14038	AWE313 14038C	14	38	48	90	16
AWE313 15040	AWE313 15040C	15	40	50	90	16
AWE313 16019	AWE313 16019C	16	19	29	90	16
AWE313 16033	AWE313 16033C	16	33	43	90	16
AWE313 16045	AWE313 16045C	16	45	55	100	16
AWE313 16053	AWE313 16053C	16	53	63	105	16
AWE313 16056	AWE313 16056C	16	56	66	110	16
AWE313 16066	AWE313 16066C	16	66	76	130	16
AWE313 16076	AWE313 16076C	16	76	86	150	16
AWE313 18049	AWE313 18049C	18	49	59	100	18
AWE313 20023	AWE313 20023C	20	23	33	90	20
AWE313 20039	AWE313 20039C	20	39	49	95	20
AWE313 20050	AWE313 20050C	20	50	60	105	20
AWE313 20055	AWE313 20055C	20	55	65	110	20
AWE313 20060	AWE313 20060C	20	60	70	120	20
AWE313 20065	AWE313 20065C	20	65	75	130	20
AWE313 20070	AWE313 20070C	20	70	80	130	20
AWE313 20076	AWE313 20076C	20	76	86	150	20

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate

► Applicable Working Material

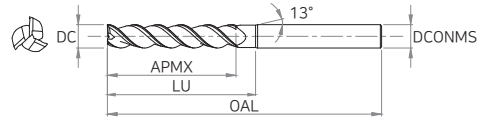
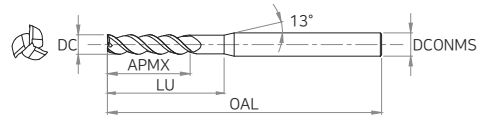
○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRc55	SKD11 HRc55~	~HB225	HB225 ~325	HRc30~50	~FCD500					
						○		◎		

AWE323

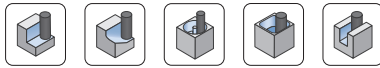
3 Flutes Square End Mill

* Coated products are made to order



► Tolerance

DC		Shank Dia
All Sizes	0 ~ -0.02	h5



	EDP No		DC	APMX	LU	OAL	DCONMS
	Uncoated	Coated					
Zamus Star	AWE323 01512	AWE323 01512C	1.5	12	17	60	6
	AWE323 02014	AWE323 02014C	2	14	19	60	6
	AWE323 02016	AWE323 02016C	2	16	21	60	6
X-Star	AWE323 02515	AWE323 02515C	2.5	15	20	60	6
	AWE323 03020	AWE323 03020C	3	20	25	70	6
	AWE323 03025	AWE323 03025C	3	25	30	75	6
S-Wing	AWE323 03030	AWE323 03030C	3	30	35	80	6
	AWE323 04026	AWE323 04026C	4	26	31	75	6
	AWE323 04030	AWE323 04030C	4	30	35	80	6
A-Wing	AWE323 05031	AWE323 05031C	5	31	36	75	6
	AWE323 05036	AWE323 05036C	5	36	41	80	6
	AWE323 05041	AWE323 05041C	5	41	46	85	6
	AWE323 05046	AWE323 05046C	5	46	51	90	6
Standard	AWE323 06036	AWE323 06036C	6	36	43	80	6
	AWE323 06043	AWE323 06043C	6	43	50	90	6
	AWE323 06051	AWE323 06051C	6	51	58	100	6
Copper-Mate	AWE323 08041	AWE323 08041C	8	41	48	90	8
	AWE323 08046	AWE323 08046C	8	46	53	95	8
	AWE323 08051	AWE323 08051C	8	51	58	100	8
Gra-Mate	AWE323 08056	AWE323 08056C	8	56	63	105	8

► Applicable Working Material

○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRC55	SKD11 HRC55~	Steel ~HB225	Alloy Steel HB225 ~325	Prehardened Steel HRC30-50	Cast Iron ~FCD500	○		◎		

AWE323

3 Flutes Square End Mill

※ Coated products are made to order

Endmill

EDP No		DC	APMX	LU	OAL	DCONMS
Uncoated	Coated					
AWE323 08060	AWE323 08060C	8	60	67	110	8
AWE323 08066	AWE323 08066C	8	66	73	110	8
AWE323 10056	AWE323 10056C	10	56	64	110	10
AWE323 10061	AWE323 10061C	10	61	69	110	10
AWE323 10066	AWE323 10066C	10	66	74	120	10
AWE323 12066	AWE323 12066C	12	66	76	120	12
AWE323 12071	AWE323 12071C	12	71	81	120	12
AWE323 12076	AWE323 12076C	12	76	86	135	12
AWE323 12080	AWE323 12080C	12	80	90	140	12
AWE323 16080	AWE323 16080C	16	80	90	160	16
AWE323 16086	AWE323 16086C	16	86	96	160	16
AWE323 16096	AWE323 16096C	16	96	106	180	16
AWE323 160100	AWE323 160100C	16	100	110	190	16
AWE323 160106	AWE323 160106C	16	106	116	190	16
AWE323 160116	AWE323 160116C	16	116	126	200	16
AWE323 20086	AWE323 20086C	20	86	96	160	20
AWE323 20096	AWE323 20096C	20	96	106	180	20
AWE323 200106	AWE323 200106C	20	106	116	190	20
AWE323 200116	AWE323 200116C	20	116	126	200	20
AWE323 200126	AWE323 200126C	20	126	136	220	20
AWE323 200150	AWE323 200150C	20	150	160	220	20

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate

▶ Applicable Working Material

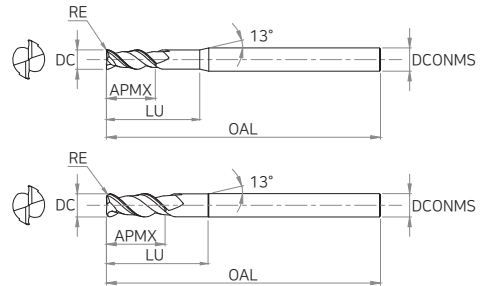
○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRc55	SKD11 HRc55~	~HB225	HB225 ~325	Steel HRc30~50	~FCD500					
						○		◎		

AWR312

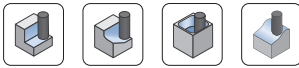
2 Flutes Radius End Mill

* Coated products are made to order



► Tolerance

DC		Shank Dia
All Sizes	0 ~ -0.02	h5



	EDP No		DC	RE	APMX	LU	OAL	DCONMS
	Uncoated	Coated						
Zamus Thunder	AWR312 010005	AWR312 010005C	1	0.05	3	8	45	6
	AWR312 015005	AWR312 015005C	1.5	0.05	5	10	45	6
X-Star	AWR312 02001	AWR312 02001C	2	0.1	6	11	45	6
	AWR312 0200112	AWR312 0200112C	2	0.1	12	17	50	6
	AWR312 03001	AWR312 03001C	3	0.1	10	15	50	6
	AWR312 0300120	AWR312 0300120C	3	0.1	20	25	60	6
S-Wing	AWR312 04001	AWR312 04001C	4	0.1	12	17	50	6
	AWR312 0400120	AWR312 0400120C	4	0.1	20	25	60	6
A-Wing	AWR312 05001	AWR312 05001C	5	0.1	15	20	55	6
	AWR312 06001	AWR312 06001C	6	0.1	15	22	55	6
	AWR312 06005	AWR312 06005C	6	0.5	15	22	55	6
	AWR312 06010	AWR312 06010C	6	1	15	22	55	6
Standard	AWR312 06015	AWR312 06015C	6	1.5	15	22	55	6
	AWR312 06020	AWR312 06020C	6	2	15	22	55	6
	AWR312 07001	AWR312 07001C	7	0.1	20	27	60	8
Copper-Mate	AWR312 08001	AWR312 08001C	8	0.1	20	27	60	8
	AWR312 08005	AWR312 08005C	8	0.5	20	27	60	8
	AWR312 08010	AWR312 08010C	8	1	20	27	60	8
	AWR312 08015	AWR312 08015C	8	1.5	20	27	60	8
Gra-Mate	AWR312 08020	AWR312 08020C	8	2	20	27	60	8

► Applicable Working Material

○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRC55	SKD11 HRC55~	Steel ~HB225	HB225 ~325	Steel HRC30-50	~FCD500					
						○		◎		

AWR312

2 Flutes Radius End Mill

※ Coated products are made to order

Endmill

EDP No		DC	RE	APMX	LU	OAL	DCONMS
Uncoated	Coated						
AWR312 08030	AWR312 08030C	8	3	20	27	60	8
AWR312 09001	AWR312 09001C	9	0.1	25	32	70	10
AWR312 10002	AWR312 10002C	10	0.2	25	33	70	10
AWR312 10005	AWR312 10005C	10	0.5	25	33	70	10
AWR312 10010	AWR312 10010C	10	1	25	33	70	10
AWR312 10015	AWR312 10015C	10	1.5	25	33	70	10
AWR312 10020	AWR312 10020C	10	2	25	33	70	10
AWR312 10030	AWR312 10030C	10	3	25	33	70	10
AWR312 10040	AWR312 10040C	10	4	25	33	70	10
AWR312 11005	AWR312 11005C	11	0.5	30	38	80	12
AWR312 12005	AWR312 12005C	12	0.5	30	40	80	12
AWR312 12010	AWR312 12010C	12	1	30	40	80	12
AWR312 12020	AWR312 12020C	12	2	30	40	80	12
AWR312 12030	AWR312 12030C	12	3	30	40	80	12
AWR312 12040	AWR312 12040C	12	4	30	40	80	12
AWR312 14010S14	AWR312 14010S14C	14	1	35	45	85	14
AWR312 14020S14	AWR312 14020S14C	14	2	35	45	85	14
AWR312 14030S14	AWR312 14030S14C	14	3	35	45	85	14
AWR312 14040S14	AWR312 14040S14C	14	4	35	45	85	14
AWR312 14050S14	AWR312 14050S14C	14	5	35	45	85	14
AWR312 14010	AWR312 14010C	14	1	35	45	85	16
AWR312 14020	AWR312 14020C	14	2	35	45	85	16
AWR312 14030	AWR312 14030C	14	3	35	45	85	16
AWR312 14040	AWR312 14040C	14	4	35	45	85	16
AWR312 14050	AWR312 14050C	14	5	35	45	85	16
AWR312 16010	AWR312 16010C	16	1	40	50	90	16
AWR312 16020	AWR312 16020C	16	2	40	50	90	16
AWR312 16030	AWR312 16030C	16	3	40	50	90	16
AWR312 16040	AWR312 16040C	16	4	40	50	90	16
AWR312 16050	AWR312 16050C	16	5	40	50	90	16
AWR312 20010	AWR312 20010C	20	1	45	55	100	20
AWR312 20020	AWR312 20020C	20	2	45	55	100	20
AWR312 20030	AWR312 20030C	20	3	45	55	100	20
AWR312 20040	AWR312 20040C	20	4	45	55	100	20
AWR312 20050	AWR312 20050C	20	5	45	55	100	20

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate

► Applicable Working Material

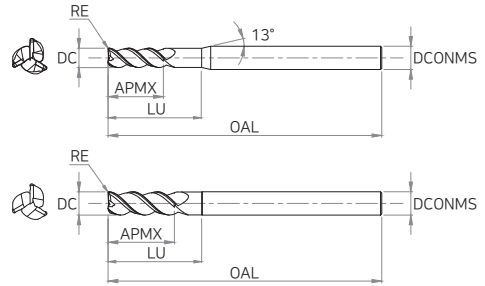
○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRc55	SKD11 HRc55~	~HB225	HB225 ~325	HRc30~50	~FCD500					
						○		◎		

AWR313

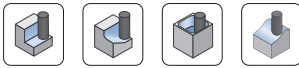
3 Flutes Radius End Mill

* Coated products are made to order



► Tolerance

DC		Shank Dia
All Sizes	0 ~ -0.02	h5



	EDP No		DC	RE	APMX	LU	OAL	DCONMS
	Uncoated	Coated						
Zamus Star	AWR313 01001	AWR313 01001C	1	0.1	3	8	50	6
	AWR313 01501	AWR313 01501C	1.5	0.1	5	10	50	6
E-Star	AWR313 02001	AWR313 02001C	2	0.1	6	11	50	6
	AWR313 02502	AWR313 02502C	2.5	0.2	10	15	50	6
U-Wing	AWR313 03001	AWR313 03001C	3	0.1	12	17	60	6
	AWR313 03002	AWR313 03002C	3	0.2	12	17	60	6
Zamus Thunder	AWR313 04002	AWR313 04002C	4	0.2	14	19	60	6
	AWR313 04005	AWR313 04005C	4	0.5	14	19	60	6
X-Star	AWR313 04010	AWR313 04010C	4	1	14	19	60	6
	AWR313 06003	AWR313 06003C	6	0.3	17	24	60	6
	AWR313 06005	AWR313 06005C	6	0.5	17	24	60	6
	AWR313 06010	AWR313 06010C	6	1	17	24	60	6
S-Wing	AWR313 06015	AWR313 06015C	6	1.5	17	24	60	6
	AWR313 06020	AWR313 06020C	6	2	17	24	60	6
A-Wing	AWR313 08003	AWR313 08003C	8	0.3	20	27	60	8
	AWR313 08005	AWR313 08005C	8	0.5	20	27	60	8
	AWR313 08010	AWR313 08010C	8	1	20	27	60	8
	AWR313 08015	AWR313 08015C	8	1.5	20	27	60	8
Standard	AWR313 08020	AWR313 08020C	8	2	20	27	60	8
	AWR313 08030	AWR313 08030C	8	3	20	27	60	8

► Applicable Working Material

○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRC55	SKD11 HRC55~	Steel ~HB225	HB225 ~325	Steel HRC30-50	~FCD500					
						○		◎		

AWR313

3 Flutes Radius End Mill

※ Coated products are made to order

Endmill

EDP No		DC	RE	APMX	LU	OAL	DCONMS
Uncoated	Coated						
AWR313 10003	AWR313 10003C	10	0.3	25	33	70	10
AWR313 10005	AWR313 10005C	10	0.5	25	33	70	10
AWR313 10010	AWR313 10010C	10	1	25	33	70	10
AWR313 10015	AWR313 10015C	10	1.5	25	33	70	10
AWR313 10020	AWR313 10020C	10	2	25	33	70	10
AWR313 10030	AWR313 10030C	10	3	25	33	70	10
AWR313 10040	AWR313 10040C	10	4	25	33	70	10
AWR313 12005	AWR313 12005C	12	0.5	30	40	80	12
AWR313 12010	AWR313 12010C	12	1	30	40	80	12
AWR313 12020	AWR313 12020C	12	2	30	40	80	12
AWR313 12030	AWR313 12030C	12	3	30	40	80	12
AWR313 12040	AWR313 12040C	12	4	30	40	80	12
AWR313 14010S14	AWR313 14010S14C	14	1	35	45	85	14
AWR313 14020S14	AWR313 14020S14C	14	2	35	45	85	14
AWR313 14030S14	AWR313 14030S14C	14	3	35	45	85	14
AWR313 14040S14	AWR313 14040S14C	14	4	35	45	85	14
AWR313 14050S14	AWR313 14050S14C	14	5	35	45	85	14
AWR313 14005	AWR313 14005C	14	0.5	35	45	85	16
AWR313 14010	AWR313 14010C	14	1	35	45	85	16
AWR313 14020	AWR313 14020C	14	2	35	45	85	16
AWR313 14030	AWR313 14030C	14	3	35	45	85	16
AWR313 14040	AWR313 14040C	14	4	35	45	85	16
AWR313 14050	AWR313 14050C	16	5	35	45	85	16
AWR313 16005	AWR313 16005C	16	0.5	40	50	90	16
AWR313 16010	AWR313 16010C	16	1	40	50	90	16
AWR313 16020	AWR313 16020C	16	2	40	50	90	16
AWR313 16030	AWR313 16030C	16	3	40	50	90	16
AWR313 16040	AWR313 16040C	16	4	40	50	90	16
AWR313 16050	AWR313 16050C	16	5	40	50	90	16
AWR313 20005	AWR313 20005C	20	0.5	45	55	100	20
AWR313 20010	AWR313 20010C	20	1	45	55	100	20
AWR313 20020	AWR313 20020C	20	2	45	55	100	20
AWR313 20030	AWR313 20030C	20	3	45	55	100	20
AWR313 20040	AWR313 20040C	20	4	45	55	100	20
AWR313 20050	AWR313 20050C	20	5	45	55	100	20

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate

► Applicable Working Material

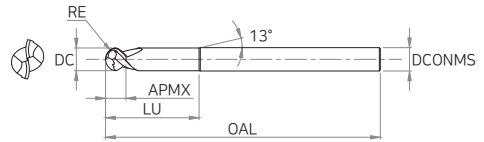
○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRc55	SKD11 HRc55~	~HB225	HB225 ~325	HRc30~50	~FCD500					
						○		◎		

AWB312

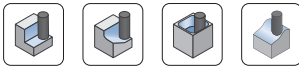
2 Flutes Ball End Mill

* Coated products are made to order



► Tolerance

DC		Shank Dia
All Sizes	0 ~ -0.02	h5



	EDP No		DC	RE	APMX	LU	OAL	DCONMS
	Uncoated	Coated						
Zamus Star	AWB312 06025	AWB312 06025C	6	3	5.5	25	55	6
	AWB312 06040	AWB312 06040C	6	3	5.5	40	90	6
	AWB312 08030	AWB312 08030C	8	4	7	30	65	8
	AWB312 08050	AWB312 08050C	8	4	7	50	100	8
	AWB312 10035	AWB312 10035C	10	5	8.5	35	75	10
	AWB312 10050	AWB312 10050C	10	5	10	50	100	10
	AWB312 10060	AWB312 10060C	10	5	10	60	150	10
	AWB312 12040	AWB312 12040C	12	6	10.5	40	75	12
	AWB312 12050	AWB312 12050C	12	6	12	50	110	12
	AWB312 12060	AWB312 12060C	12	6	12	60	150	12
	AWB312 16050	AWB312 16050C	16	8	14	50	90	16
	AWB312 16070	AWB312 16070C	16	8	16	70	150	16
	AWB312 16090	AWB312 16090C	16	8	16	90	200	16
	AWB312 20050	AWB312 20050C	20	10	17	50	100	20

► Applicable Working Material

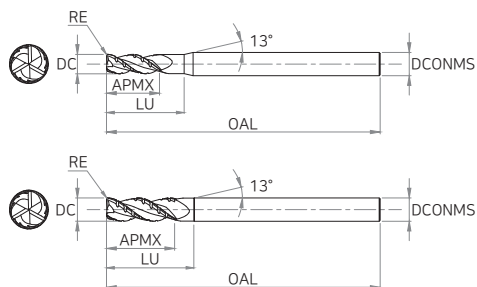
○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRC55	SKD11 HRC55~	Steel ~HB225	HB225 ~325	Steel HRC30-50	~FC500					
						○		◎		

AWN513

3 Flutes Chip Breaker End Mill

※ Coated products are made to order



► Tolerance

DC		Shank Dia
All Sizes	0 ~ -0.02	h5



EDP No		DC	RE	APMX	LU	OAL	DCONMS
Uncoated	Coated						
AWN513 03011	AWN513 03011C	3	0.2	11	16	55	6
AWN513 04013	AWN513 04013C	4	0.2	13	18	55	6
AWN513 05017	AWN513 05017C	5	0.2	17	22	55	6
AWN513 06017	AWN513 06017C	6	0.3	17	24	60	6
AWN513 06025	AWN513 06025C	6	0.3	25	32	80	6
AWN513 08022	AWN513 08022C	8	0.3	22	29	70	8
AWN513 08030	AWN513 08030C	8	0.3	30	37	90	8
AWN513 10027	AWN513 10027C	10	0.5	27	35	75	10
AWN513 10040	AWN513 10040C	10	0.5	40	48	100	10
AWN513 12035	AWN513 12035C	12	0.5	35	45	90	12
AWN513 12050	AWN513 12050C	12	0.5	50	60	110	12
AWN513 16042	AWN513 16042C	16	0.5	42	52	100	16
AWN513 16052	AWN513 16052C	16	0.5	52	62	150	16
AWN513 20048	AWN513 20048C	20	0.5	48	58	100	20
AWN513 20055	AWN513 20055C	20	0.5	55	65	160	20

► Applicable Working Material

○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRc55	SKD11 HRc55~	~HB225	HB225 ~325	HRc30~50	~FCD500					
						○		◎		

Endmill

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

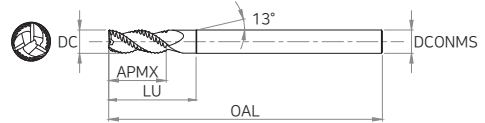
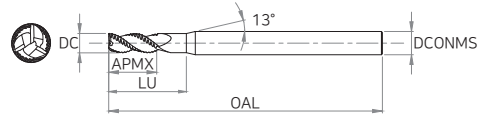
Gra-Mate

AWF513

3 Flutes 38° Helix Roughing End Mill

* Coated products are made to order

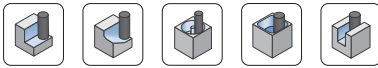
Endmill



► Tolerance

DC		Shank Dia
ø4 ~ ø6	0 ~ -0.048	
ø7 ~ ø10	0 ~ -0.058	
ø12 ~ ø18	0 ~ -0.07	
ø20 ~	0 ~ -0.084	

h5



	EDP No		DC	APMX	LU	OAL	DCONMS
	Uncoated	Coated					
Zamus Star	AWF513 04010	AWF513 04010C	4	10	15	55	6
	AWF513 05015	AWF513 05015C	5	15	20	55	6
E-Star	AWF513 06016	AWF513 06016C	6	16	23	60	6
	AWF513 06025	AWF513 06025C	6	25	32	80	6
	AWF513 07016	AWF513 07016C	7	16	23	63	8
S-Wing	AWF513 08020	AWF513 08020C	8	20	27	65	8
	AWF513 08030	AWF513 08030C	8	30	37	90	8
	AWF513 09019	AWF513 09019C	9	19	26	72	10
A-Wing	AWF513 10025	AWF513 10025C	10	25	33	75	10
	AWF513 10040	AWF513 10040C	10	40	48	100	10
	AWF513 12030	AWF513 12030C	12	30	40	90	12
Standard	AWF513 12050	AWF513 12050C	12	50	60	110	12
	AWF513 14035S14	AWF513 14035S14C	14	35	45	100	14
	AWF513 14035	AWF513 14035C	14	35	45	100	16
Copper-Mate	AWF513 16042	AWF513 16042C	16	42	52	100	16
	AWF513 16052	AWF513 16052C	16	52	62	150	16
	AWF513 16065	AWF513 16065C	16	65	75	150	16
Gra-Mate	AWF513 18032	AWF513 18032C	18	32	42	92	18

► Applicable Working Material

○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRC55	SKD11 HRC55~	~HB225	~325	HRC30-50	~FCD500					
						○		◎		

AWF513

3 Flutes 38° Helix Roughing End Mill

※ Coated products are made to order

Endmill

EDP No		DC	APMX	LU	OAL	DCONMS
Uncoated	Coated					
AWF513 20038	AWF513 20038C	20	38	48	104	20
AWF513 20055	AWF513 20055C	20	55	65	160	20

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate

► Applicable Working Material

○ : GOOD ◎ : EXCELLENT

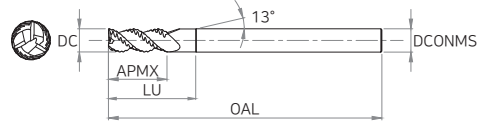
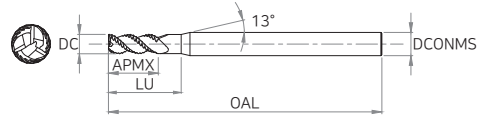
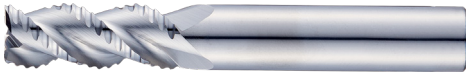
H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRc55	SKD11 HRc55~	~HB225	HB225 ~325	HRc30~50	~FCD500					
						○		◎		

AWF583

3 Flutes 45° Helix Roughing End Mill

* Coated products are made to order

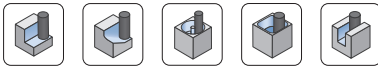
Endmill



► Tolerance

DC		Shank Dia
Ø4 ~ Ø6	0 ~ -0.048	
Ø8 ~ Ø10	0 ~ -0.058	
Ø12 ~ Ø18	0 ~ -0.07	
Ø20 ~	0 ~ -0.084	

h5



	EDP No		DC	APMX	LU	OAL	DCONMS
	Uncoated	Coated					
Zamus Star	AWF583 04006	AWF583 04006C	4	6	12	60	6
	AWF583 04010	AWF583 04010C	4	10	15	60	6
E-Star	AWF583 05007	AWF583 05007C	5	7	20	60	6
	AWF583 05015	AWF583 05015C	5	15	20	60	6
U-Wing	AWF583 06008	AWF583 06008C	6	8	20	70	6
	AWF583 06015	AWF583 06015C	6	15	22	60	6
Zamus Thunder	AWF583 06025	AWF583 06025C	6	25	32	80	6
	AWF583 08010	AWF583 08010C	8	10	26	80	8
X-Star	AWF583 08020	AWF583 08020C	8	20	27	65	8
	AWF583 08030	AWF583 08030C	8	30	37	90	8
S-Wing	AWF583 10012	AWF583 10012C	10	12	32	90	10
	AWF583 10025	AWF583 10025C	10	25	33	70	10
A-Wing	AWF583 10040	AWF583 10040C	10	40	48	100	10
	AWF583 12014	AWF583 12014C	12	14	36	100	12
	AWF583 12030	AWF583 12030C	12	30	40	90	12
	AWF583 12050	AWF583 12050C	12	50	60	110	12
Copper-Mate	AWF583 14035	AWF583 14035C	14	35	45	100	16
	AWF583 16018	AWF583 16018C	16	18	46	120	16
	AWF583 16042	AWF583 16042C	16	42	52	100	16
Gra-Mate	AWF583 16052	AWF583 16052C	16	52	62	150	16

► Applicable Working Material

○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRC55	SKD11 HRC55~	Steel ~HB225	Alloy Steel HB225 ~325	Prehardened Steel HRC30-50	Cast Iron ~FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
						○		◎		

AWF583

3 Flutes 45° Helix Roughing End Mill

※ Coated products are made to order

Endmill

EDP No		DC	APMX	LU	OAL	DCONMS
Uncoated	Coated					
AWF583 18045	AWF583 18045	18	45	55	110	20
AWF583 20022	AWF583 20022	20	22	52	120	20
AWF583 20048	AWF583 20048	20	48	58	110	20
AWF583 20055	AWF583 20055	20	55	65	160	20

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate

► Applicable Working Material

○ : GOOD ◎ : EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel	Alloy Steel	Prehardened Steel	Cast Iron	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 ~HRc55	SKD11 HRc55~	HB225 ~HB225	HB225 ~325	HRc30~50	~FCD500					
						○		◎		