

Gra-Mate Endmill

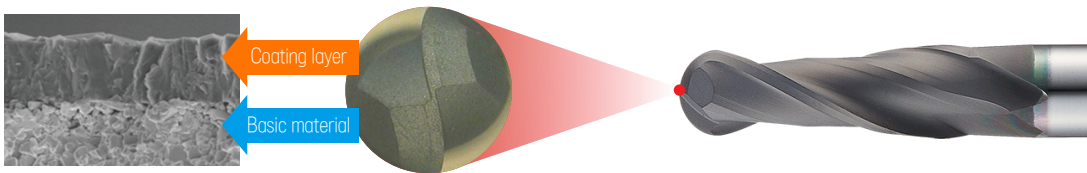
Graphite, Reinforced Plastics, Non-ferrous Materials

Characteristics

- Suitable for Graphite, Reinforced Plastics, Non-ferrous materials
- High hardness Diamond Coating for better tool life
- Maximizing and Stabilizing Coating Thickness for Improved Wear Resistance
- Various specifications for a variety of machining methods

Features

- High surface hardness and tool life with high adhesion diamond coating
- Minimize accidental damage by using dedicated materials with excellent wear resistance



Contents

Section		EDP No	Geometry	Product	Diameter(DC)		Page
Shape	Flute				Min	Max	
Square	2F	GE		2 Flutes Neck Square End Mill	0.5	12	399
	4F	WGE504		4 Flutes Square End Mill	2	20	400
Radius	2F	WGR502		2 Flutes Neck Radius End Mill	0.2	6	401
	4F	WGR504		4 Flutes Radius End Mill	3	20	403
Ball	2F	G		2 Flutes Neck Ball End Mill	0.5	12	405
	4F	WGB504		4 Flutes Ball End Mill	1	20	408

EDP No. System

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

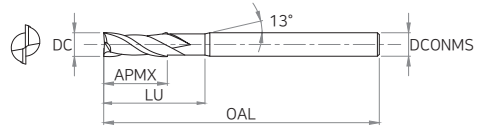
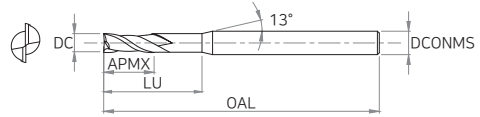


①	②	③	④	⑤	⑥	⑦	⑧
Section	Appearance	Grade	Length, Shank Type	Flutes	Cutting Dia	Corner R	Shank Dia
G : Graphite	E : Square	5 : Grade	0 : Straight, Neck	2 : 2 Flutes	0.2	0.05	40
WG : Winner Graphite	R : Radius			4 : 4 Flutes	~	~	~
					20	1	200

EX) 4 Flutes / Cutting Dia \varnothing 8 / Corner R 1.0 / Shank Dia 130 / 50 Grade / Corner Radius Endmill For Graphith

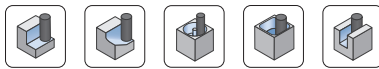
GE 2 Flutes Neck Square End Mill

Endmill



► Tolerance

DC		Shank Dia
All Sizes	0 ~ -0.03	h6



EDP No	DC	APMX	LU	OAL	DCON MS	EDP No	DC	APMX	LU	OAL	DCON MS
GE 00501006	0.5	1	6	50	4	GE 04012S	4	12	-	60	6
GE 00601206	0.6	1.2	6	50	4	GE 0401216	4	12	16	60	6
GE 00601210	0.6	1.2	10	50	4	GE 0401220	4	12	20	60	6
GE 00701506	0.7	1.5	6	50	4	GE 0501520	5	15	20	60	6
GE 00802006	0.8	2	6	50	4	GE 06020S	6	20	-	60	6
GE 0100308	1	3	8	60	4	GE 0602030	6	20	30	80	6
GE 0100310	1	3	10	60	4	GE 0603050	6	30	50	150	6
GE 0100312	1	3	12	60	4	GE 08025S	8	25	-	70	8
GE 0150412	1.5	4	12	60	4	GE 0802540	8	25	40	100	8
GE 0200612	2	6	12	60	4	GE 0804070	8	40	70	150	8
GE 0200612S6	2	6	12	60	6	GE 10030S	10	30	-	80	10
GE 0250812	2.5	8	12	60	4	GE 1003050	10	30	50	100	10
GE 0301012	3	10	12	60	4	GE 1004580	10	45	80	160	10
GE 0301016	3	10	16	60	4	GE 12030S	12	30	-	80	12
GE 0301012S6	3	10	12	60	6	GE 1203050	12	30	50	110	12
GE 0301016S6	3	10	16	60	6	GE 1205080	12	50	80	160	12

Zamus Star

E-Star

U-Wing

Zamus Thunder

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate

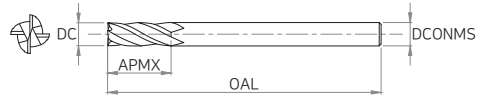
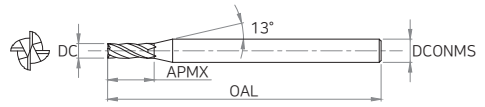
► Applicable Working Material

○ : 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					
							◎	○		

WGE504 4 Flutes Square End Mill

Endmill



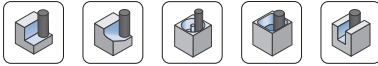
Zamus Star

E-Star

► Tolerance

DC		Shank Dia
All Sizes	0 ~ -0.03	h6

U-Wing



Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper -Mate

EDP No	DC	APMX	OAL	DCONMS	EDP No	DC	APMX	OAL	DCONMS
WGE504 020	2	6	50	4	WGE504 06030	6	30	150	6
WGE504 02008	2	8	50	4	WGE504 080	8	20	70	8
WGE504 02010	2	10	50	4	WGE504 08030	8	30	110	8
WGE504 025	2.5	8	50	4	WGE504 08040	8	40	150	8
WGE504 030	3	8	50	6	WGE504 100	10	25	75	10
WGE504 03010	3	10	50	6	WGE504 10040	10	40	110	10
WGE504 03012	3	12	50	6	WGE504 10050	10	50	150	10
WGE504 03016	3	16	60	6	WGE504 120	12	30	80	12
WGE504 03020	3	20	60	6	WGE504 12050	12	50	120	12
WGE504 040	4	10	50	6	WGE504 12060	12	60	160	12
WGE504 04012	4	12	50	6	WGE504 160	16	50	110	16
WGE504 04016	4	16	60	6	WGE504 16070	16	70	160	16
WGE504 04020	4	20	60	6	WGE504 16090	16	90	160	16
WGE504 04025	4	25	60	6	WGE504 160100	16	100	200	16
WGE504 050	5	15	60	6	WGE504 200	20	70	160	20
WGE504 060	5	15	60	6	WGE504 20090	20	90	160	20
WGE504 06020	6	20	110	6	WGE504 200100	20	100	200	20

Gra -Mate

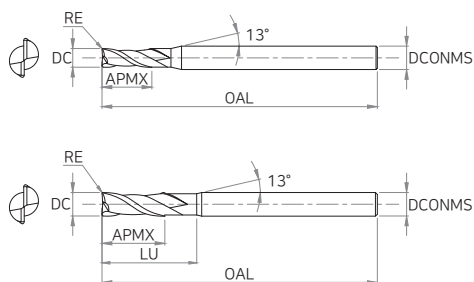
► Applicable Working Material

○ : 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~	Steel ~HB225	Alloy Steel HB225 ~325	Prehardened Steel HRC30~50	Cast Iron ~FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
							◎	○		

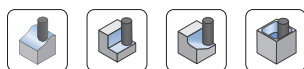
WGR502 2 Flutes Neck Radius End Mill

Endmill



► Tolerance

DC		Shank Dia
All Sizes	0 ~ -0.02	h6



CARBIDE
Diamond
2
30° HELIX
R ±0.01
DATA P.738

All Sizes

EDP No	DC	RE	APMX	LU	OAL	DCONMS
WGR502 002	0.2	-	0.3	-	40	3
WGR502 003	0.3	-	0.5	-	40	3
WGR502 004	0.4	-	0.6	-	40	3
WGR502 005025	0.5	0.05	0.7	2.5	40	3
WGR502 005040	0.5	0.05	0.7	4	40	3
WGR502 006030	0.6	0.05	0.9	3	40	3
WGR502 006050	0.6	0.05	0.9	5	40	3
WGR502 008040	0.8	0.05	1.2	4	40	3
WGR502 008070	0.8	0.05	1.2	7	40	3
WGR502 010050	1	0.1	1.5	5	40	3
WGR502 010085	1	0.1	1.5	8.5	40	3
WGR502 010120	1	0.1	1.5	12	40	3
WGR502 012060	1.2	0.1	1.8	6	50	3
WGR502 012100	1.2	0.1	1.8	10	50	3
WGR502 015075	1.5	0.15	2.2	7.5	50	3
WGR502 015120	1.5	0.15	2.2	12	50	3
WGR502 015180	1.5	0.15	2.2	18	50	3
WGR502 020100	2	0.15	2.2	10	60	3
WGR502 020160	2	0.15	2.2	16	60	3
WGR502 020250	2	0.15	2.2	25	60	3

► 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					
							◎	○		

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate

WGR502 2 Flutes Neck Radius End Mill

Endmill

EDP No	DC	RE	APMX	LU	OAL	DCONMS
WGR502 030100	3	0.2	3	10	65	4
WGR502 030150	3	0.2	3	15	65	4
WGR502 030200	3	0.2	3	20	65	4
WGR502 030250	3	0.2	3	25	75	4
WGR502 030300	3	0.2	3	30	75	4
WGR502 040200	4	0.2	4	20	65	6
WGR502 040300	4	0.2	4	30	75	6
WGR502 040400	4	0.2	4	40	90	6
WGR502 050200	5	0.3	5	20	75	6
WGR502 050300	5	0.3	5	30	75	6
WGR502 050400	5	0.3	5	40	90	6
WGR502 050500	5	0.3	5	50	90	6
WGR502 060300	6	0.3	6	30	75	6
WGR502 060400	6	0.3	6	40	90	6
WGR502 060500	6	0.3	6	50	90	6
WGR502 060600	6	0.3	6	60	100	6

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper -Mate

Gra -Mate

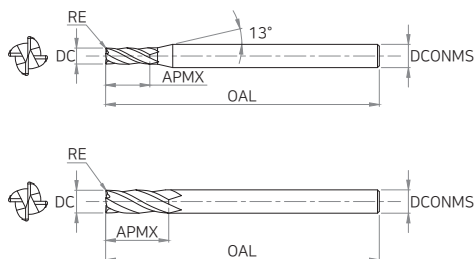
► Applicable Working Material

○ : 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					
							◎	○		

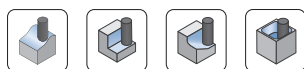
WGR504 4 Flutes Radius End Mill

Endmill



► Tolerance

DC		Shank Dia
∅3 ~ ∅12	0 ~ -0.02	
∅16 ~ ∅20	0 ~ -0.03	



CARBIDE
Diamond
4
30° HELIX
R ±0.01
R ±0.015
DATA P.738

∅12 OR UNDER ABOVE ∅12

EDP No	DC	RE	APMX	OAL	DCONMS
WGR504 03002080	3	0.2	8	80	4
WGR504 03003080	3	0.3	8	80	4
WGR504 03005080	3	0.5	8	80	4
WGR504 04003100	4	0.3	10	100	4
WGR504 04005100	4	0.5	10	100	4
WGR504 04010100	4	1	10	100	4
WGR504 06003110	6	0.3	15	110	6
WGR504 06005110	6	0.5	15	110	6
WGR504 06010110	6	1	15	110	6
WGR504 08005110	8	0.5	20	110	8
WGR504 08010110	8	1	20	110	8
WGR504 08005130	8	0.5	20	130	8
WGR504 08010130	8	1	20	130	8
WGR504 10005130	10	0.5	25	130	10
WGR504 10010130	10	1	25	130	10
WGR504 10005150	10	0.5	25	150	10
WGR504 10010150	10	1	25	150	10
WGR504 12005130	12	0.5	30	130	12
WGR504 12010130	12	1	30	130	12
WGR504 12005150	12	0.5	30	150	12

► 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					
							◎	○		

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate

WGR504 4 Flutes Radius End Mill

Endmill

EDP No	DC	RE	APMX	OAL	DCONMS
WGR504 12010150	12	1	30	150	12
WGR504 16005200	16	0.5	32	200	16
WGR504 16010200	16	1	32	200	16
WGR504 20005200	20	0.5	40	200	20
WGR504 20010200	20	1	40	200	20

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate

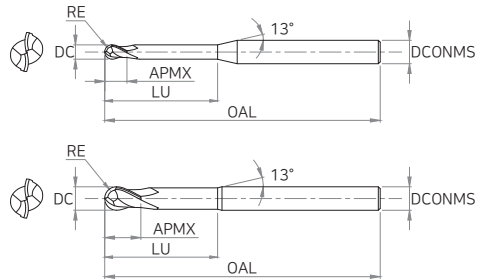
► Applicable Working Material

○ : 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					
							◎	○		

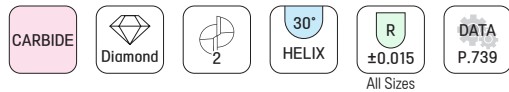


2 Flutes Neck Ball End Mill



► Tolerance

DC		Shank Dia
All Sizes	0 ~ -0.03	h6



EDP No	DC	RE	APMX	LU	OAL	DCONMS
G 00501003	0.5	0.25	1	3	50	4
G 00501006	0.5	0.25	1	6	50	4
G 00501010	0.5	0.25	1	10	50	4
G 00601203	0.6	0.3	1.2	3	50	4
G 00601206	0.6	0.3	1.2	6	50	4
G 00601208	0.6	0.3	1.2	8	50	4
G 00601210	0.6	0.3	1.2	10	50	4
G 00601212	0.6	0.3	1.2	12	50	4
G 0080164	0.8	0.4	1.6	4	50	4
G 0080166	0.8	0.4	1.6	6	50	4
G 0080168	0.8	0.4	1.6	8	50	4
G 0100306	1	0.5	3	6	60	4
G 0100308	1	0.5	3	8	60	4
G 0100310	1	0.5	3	10	60	4
G 0100312	1	0.5	3	12	60	4
G 0100314	1	0.5	3	14	60	4
G 0100316	1	0.5	3	16	60	4
G 0100318	1	0.5	3	18	60	4
G 0100320	1	0.5	3	20	60	4
G 0120410	1.2	0.6	4	10	70	4

► 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~	Carbon Steel ~HB225	Alloy Steel HB225 ~325	Prehardened Steel HRc30~50	Cast Iron ~FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
							◎	○		

Endmill

Zamus Star

E-Star

U-Wing

Zamus Thunder

X-Star

S-Wing

A-Wing

Standard

Copper-Mate

Gra-Mate



2 Flutes Neck Ball End Mill

Endmill

	EDP No	DC	RE	APMX	LU	OAL	DCONMS
	G 0150510	1.5	0.75	5	10	60	4
	G 0150512	1.5	0.75	5	12	60	4
Zamus Star	G 0150516	1.5	0.75	5	16	60	4
	G 0150520	1.5	0.75	5	20	60	4
	G 0150525	1.5	0.75	5	25	70	4
	G 0150530	1.5	0.75	5	30	70	4
E-Star	G 0200812	2	1	8	12	60	4
	G 0200816	2	1	8	16	60	4
	G 0200820	2	1	8	20	60	4
	G 0200825	2	1	8	25	70	4
U-Wing	G 0200830	2	1	8	30	70	4
	G 0200835	2	1	8	35	80	4
	G 0200840	2	1	8	40	80	4
Zamus Thunder	G 0201020	2	1	10	20	80	4
	G 0201020L	2	1	10	20	100	4
	G 0251020	2.5	1.25	10	20	80	4
X-Star	G 0301216	3	1.5	12	16	60	6
	G 0301220	3	1.5	12	20	70	6
	G 0301225	3	1.5	12	25	70	6
	G 0301230	3	1.5	12	30	80	6
S-Wing	G 0301235	3	1.5	12	35	80	6
	G 0301240	3	1.5	12	40	90	6
	G 0301245	3	1.5	12	45	90	6
A-Wing	G 0301525	3	1.5	15	25	80	4
	G 04015S	4	2	15	-	50	4
	G 04015M	4	2	15	-	80	4
	G 04015L	4	2	15	-	120	4
Standard	G 0401520	4	2	15	20	60	6
	G 0401525	4	2	15	25	70	6
	G 0401530	4	2	15	30	80	6
Copper-Mate	G 0401535	4	2	15	35	80	6
	G 0401540	4	2	15	40	90	6
	G 0401545	4	2	15	45	90	6
Gra-Mate	G 0401550	4	2	15	50	100	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					
							◎	○		



2 Flutes Neck Ball End Mill

Endmill

EDP No	DC	RE	APMX	LU	OAL	DCONMS
G 0402030	4	2	20	30	80	4
G 0503050	5	2.5	30	50	100	6
G 0503050L	5	2.5	30	50	150	6
G 06020S	6	3	20	-	70	6
G 06020M	6	3	20	-	100	6
G 06020L	6	3	20	-	150	6
G 0603050	6	3	30	50	100	6
G 0603050L	6	3	30		150	6
G 08025S	8	4	25	-	70	8
G 08025M	8	4	25	-	110	8
G 08025L	8	4	25	-	160	8
G 0804060	8	4	40	60	110	8
G 0804060L	8	4	40		200	8
G 10030S	10	5	30	-	80	10
G 10030M	10	5	30	-	120	10
G 10030L	10	5	30	-	170	10
G 1005070	10	5	50	70	120	10
G 1005070L	10	5	50	70	200	10
G 12035S	12	6	35	-	80	12
G 12035M	12	6	35	-	130	12
G 12035L	12	6	35	-	180	12
G 1205575	12	6	55	75	130	12
G 1205575L	12	6	55	75	200	12

Zamus Star

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Standard

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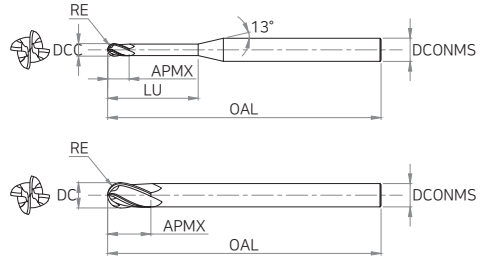
► Applicable Working Material

○ : 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					
							◎	○		

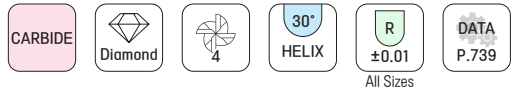
WGB504 4 Flutes Ball End Mill

Endmill



► Tolerance

DC		Shank Dia
Ø1 ~ Ø12	0 ~ -0.02	h6
Ø16 ~ Ø20	0 ~ -0.03	



EDP No	DC	RE	APMX	LU	OAL	DCONMS
WGB504 010	1	0.5	3	-	60	4
WGB504 01010	1	0.5	3	10	60	4
WGB504 01015	1	0.5	3	15	60	4
WGB504 01020	1	0.5	3	20	60	4
WGB504 01025	1	0.5	3	25	80	4
WGB504 01030	1	0.5	3	30	80	4
WGB504 015	1.5	0.75	4	-	60	4
WGB504 01510	1.5	0.75	4	10	80	4
WGB504 01515	1.5	0.75	4	15	80	4
WGB504 01520	1.5	0.75	4	20	80	4
WGB504 01525	1.5	0.75	4	25	80	4
WGB504 01530	1.5	0.75	4	30	80	4
WGB504 020	2	1	6	-	60	4
WGB504 02010	2	1	6	10	80	4
WGB504 02015	2	1	6	15	80	4
WGB504 02020	2	1	6	20	80	4
WGB504 02025	2	1	6	25	80	4
WGB504 02030	2	1	6	30	80	4
WGB504 02040	2	1	6	40	100	4
WGB504 030	3	1.5	9	-	60	4
WGB504 03015	3	1.5	9	15	100	4

► 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					
							◎	○		

WGB504 4 Flutes Ball End Mill

Endmill

EDP No	DC	RE	APMX	LU	OAL	DCONMS	
WGB504 03020	3	1.5	9	20	100	4	
WGB504 03025	3	1.5	9	25	100	4	
WGB504 03030	3	1.5	9	30	100	4	
WGB504 03040	3	1.5	9	40	100	4	Zamus Star
WGB504 03050	3	1.5	9	50	100	4	
WGB504 040060	4	2	12	-	60	4	
WGB504 040080	4	2	12	-	80	4	E-Star
WGB504 040110	4	2	12	-	110	4	
WGB504 040130	4	2	12	-	130	4	
WGB504 040150	4	2	12	-	150	4	
WGB504 050080	5	2.5	15	25	80	6	U-Wing
WGB504 050110	5	2.5	15	25	110	6	
WGB504 060090	6	3	20	-	90	6	
WGB504 060110	6	3	20	-	110	6	Zamus Thunder
WGB504 060130	6	3	20	-	130	6	
WGB504 060150	6	3	20	-	150	6	
WGB504 060180	6	3	20	-	180	6	
WGB504 080110	8	4	25	-	110	8	X-Star
WGB504 080130	8	4	25	-	130	8	
WGB504 080150	8	4	25	-	150	8	
WGB504 080200	8	4	25	-	200	8	S-Wing
WGB504 100110	10	5	30	-	110	10	
WGB504 100130	10	5	30	-	130	10	
WGB504 100150	10	5	30	-	150	10	
WGB504 100180	10	5	30	-	180	10	A-Wing
WGB504 100200	10	5	30	-	200	10	
WGB504 120110	12	6	35	-	110	12	
WGB504 120130	12	6	35	-	130	12	Standard
WGB504 120150	12	6	35	-	150	12	
WGB504 120180	12	6	35	-	180	12	
WGB504 120200	12	6	35	-	200	12	
WGB504 160150	16	8	50	-	150	16	Copper-Mate
WGB504 160200	16	8	50	-	200	16	
WGB504 200150	20	10	60	-	150	20	
WGB504 200200	20	10	60	-	200	20	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					
							◎	○		