

procarb
CUTTING TOOLS

prosolid
VOLUME-2



The complete Range of SOLID TOOLS



Prosoild Standard Series

High Performance products with high flexibility, high economy and complete specifications.

Prosoild Special End Mill Series

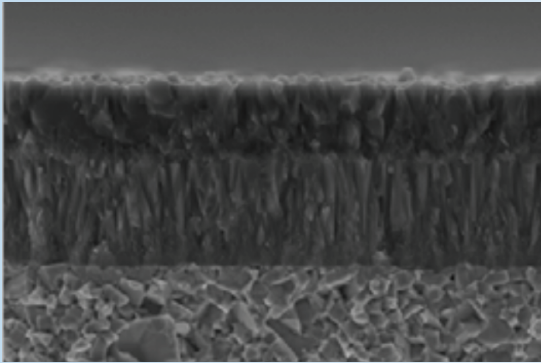
A unique quality tool that meets specific needs and has high efficiency, reliability and durability.

Prosoild Tailor Made Solution

Specially designed to meet high performance requirements of custom products and advanced non-standard products.

SOLID END MILLS

ABOUT COATING



Smooth Surface Finile

Unquie coating Treatment Technology

Ultrafine Subtrates

Improved Wear Resistance



DLC COATING

Hardness similar to that of PECVD Diamond Like Carbon coating with high adhesion strength
(Plasma Enhanced Chemical Vapor Deposition)

ALTIN +TISIN COATING

The coating has good high temperature resistance and low friction coefficient .it is suitable for coating on high-speed steel or carbide drills and is suitable for deep hole drilling and milling

TIALSIN COATING

The coating has good performance in drilling and milling cast iron or ordinary steel , reducing the phenomenon of sticking. Suitable for coating on HSS or carbide drills, also suitable for deep hole drilling and milling

ALTIN COATING

The coating can exert excellent performance on difficult-to-machine materials such as cutting hardness between 45HRC especially suitable for high-speed cutting

Index

HX

Xtra Hardness Series

01-21

HG

High Hardness Series

22-40

GM

Universal Series

41-60

UgM

Efficient Series

61

UgAl

Efficient Aluminum Series

62-63

CX

Copper/Aluminum Series

64-82

NX

Graphite Processing Series

83-88

HX

tra Hardness Series

Recommended Machinng Hardness

HRC50-65



Featuring a 0.2µm ultra-fine micro-grain substrate, this alloy milling cutter combines exceptional toughness and hardness..



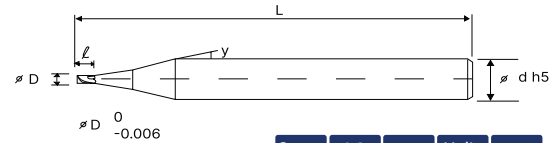
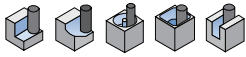
The TiSiN coating, a [super-hard composite coating](#) based on TiSiN, delivers ultra-high high-temperature resistance, making it ideal for dry cutting or micro-lubrication machining.



It enables [high-speed, long tool life](#) machining for hardened steels, quenched steels (e.g., SKD11, SKD61, SKH), and other challenging materials



2-Flute Micro Diameter End Mill



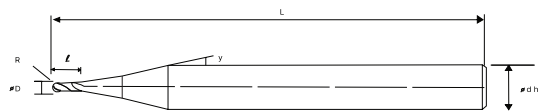
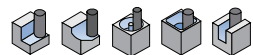
EDP NO.	D	ℓ	y	d	L
HXE7020005	0.05	0.1	13°	4	50
HXE7020006	0.06	0.12	13°	4	50
HXE7020007	0.07	0.14	13°	4	50
HXE7020008	0.08	0.16	13°	4	50
HXE7020009	0.09	0.18	13°	4	50
HXE702001	0.1	0.2	13°	4	50
HXE7020015	0.15	0.3	13°	4	50
HXE702002	0.2	0.4	13°	4	50
HXE7020025	0.25	0.5	13°	4	50
HXE702003	0.3	0.6	13°	4	50
HXE7020035	0.35	0.7	13°	4	50
HXE702004	0.4	0.8	13°	4	50
HXE7020045	0.45	0.9	13°	4	50
HXE702005	0.5	1	13°	4	50
HXE7020055	0.55	1.1	13°	4	50
HXE702006	0.6	1.2	13°	4	50
HXE7020065	0.65	1.3	13°	4	50
HXE702007	0.7	1.4	13°	4	50
HXE7020075	0.75	1.5	13°	4	50
HXE702008	0.8	1.6	13°	4	50
HXE7020085	0.85	1.7	13°	4	50
HXE702009	0.9	1.8	13°	4	50

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	●		○	○					○	○

2-Flute Micro Diameter Ball End Mill



R=0.003



EDP NO.	R	ℓ	D	γ	d	L
HXB702001	R0.05	0.2	0.1	13°	4	50
HXB702015	R0.075	0.3	0.15	13°	4	50
HXB702002	R0.1	0.4	0.2	13°	4	50
HXB702003	R0.15	0.6	0.3	13°	4	50
HXB702004	R0.2	0.8	0.4	13°	4	50
HXB702005	R0.25	1	0.5	13°	4	50
HXB702006	R0.3	1.2	0.6	13°	4	50
HXB702007	R0.35	1.4	0.7	13°	4	50
HXB702008	R0.4	1.6	0.8	13°	4	50
HXB702009	R0.45	1.8	0.9	13°	4	50

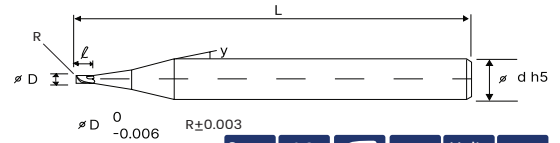
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61-HRC55	SKD61-HRC62									
●	●		○	○					○	○

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2-Flute Micro Diameter Corner Radius End Mill



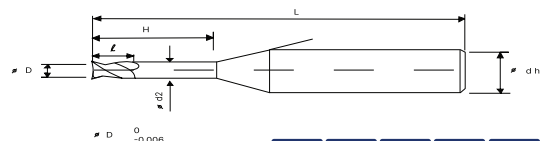
EDP NO.	D	R	ℓ	γ	d	L
HXB702002002	0.2	0.02	0.4	13°	4	50
HXB702002005		0.05				50
HXB702003002	0.3	0.02	0.6	13°	4	50
HXB702003005		0.05				50
HXB702004002	0.4	0.02	0.8	13°	4	50
HXB702004005		0.05				50
HXB70200401		0.1				50
HXB702006002	0.6	0.02	1.0	13°	4	50
HXB702006005		0.05				50
HXB70200601		0.1				50
HXB702005002	0.5	0.02	1.2	13°	4	50
HXB702005005		0.05				50
HXB70200501		0.1				50
HXB70200502		0.2				50
HXB702008002	0.8	0.02	1.6	13°	4	50
HXB702008005		0.05				50
HXB702008001		0.1				50
HXB70200802		0.2				50

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	●		○	○					○	○

2-Flute Rib Process Square End Mill



Super
UMG 0.2
μm 2 Flutes Helix
30° TiSiN

EDP NO.	D	H	ℓ	d2	γ	d	L
HXRE712001003	0.1	0.3	0.1	0.085	12°	4	50
HXRE712001005		0.5					50
HXRE712001008		0.8					50
HXRE71200101		1					50
HXRE7120015005	0.15	0.5	0.15	0.13	12°	4	50
HXRE712001501		1					50
HXRE71200201	0.2	1	0.2	0.18	12°	4	50
HXRE712002015		1.5					50
HXRE71200202		2					50
HXRE71200203		3					50
HXRE71200204	0.3	4	0.3	0.28	12°	4	50
HXRE71200301		1					50
HXRE712003015		1.5					50
HXRE71200302		2					50
HXRE71200303	0.4	3	0.4	0.37	12°	4	50
HXRE71200304		4					50
HXRE71200305		5					50
HXRE712004015		1.5	0.5	0.46	12°	4	50
HXRE71200402	0.5	2					50
HXRE71200403		3					50
HXRE71200404		4					50
HXRE71200405	0.6	5	0.6	0.56	12°	4	50
HXRE71200406		6					50
HXRE71200502		2					50
HXRE71200503		3					50
HXRE71200504	0.7	4	0.7	0.66	12°	4	50
HXRE71200505		5					50
HXRE71200506		6					50
HXRE71200508		8					50
HXRE71200510	0.8	10	0.8	0.76	12°	4	50
HXRE71200602		2					50
HXRE71200603		3					50
HXRE71200604		4					50
HXRE71200605	0.9	5	0.9	0.86	12°	4	50
HXRE71200606		6					50
HXRE71200608		8					50
HXRE71200610		10					50
HXRE71200702	1.0	2	1.0	1.06	12°	4	50
HXRE71200703		3					50
HXRE71200704		4					50
HXRE71200705		5					50
HXRE71200706	1.2	6	1.2	1.26	12°	4	50
HXRE71200708		8					50
HXRE71200710		10					50

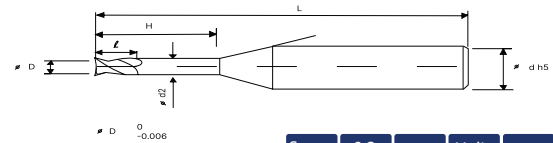
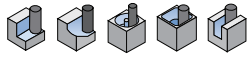
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	●		○	○					○	○

Click here for INDEX

2-Flute Rib Process Square End Mill



Super
UMG 0.2
μm 2 Flutes Helix
30° TiSiN

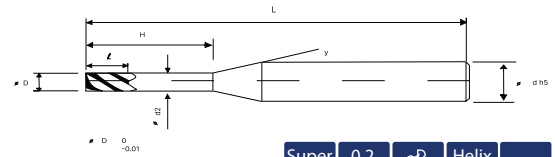
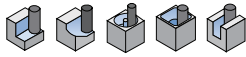
EDP NO.	D	H	ℓ	d2	γ	d	L
HXRE71200802	0.8	2	0.8	0.76	12°	4	50
HXRE71200803		3					50
HXRE71200804		4					50
HXRE71200805		5					50
HXRE71200806		6					50
HXRE71200808		8					50
HXRE71200810		10					50

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	●		○	○					○	○

4-Flute Rib Process Square End Mill



EDP NO.	D	H	ℓ	d2	γ	d	L
HXRE71401004	1	4	1.5	0.95	14°	4	50
HXRE71401005		5					50
HXRE71401006		6					50
HXRE71401008		8					50
HXRE71401010		10					50
HXRE71401012		12					50
HXRE71401014		14					50
HXRE71401016		16					50
HXRE71401018		18					50
HXRE71401020		20					50
HXRE71401506	1.5	6	2.3	1.45	14°	4	50
HXRE71401508		8					50
HXRE71401510		10					50
HXRE71401512		12					50
HXRE71401514		14					50
HXRE71401516		16					50
HXRE71401518		18					50
HXRE71401520		20					50
HXRE71402006	2	6	3	1.94	14°	4	50
HXRE71402008		8					50
HXRE71402010		10					50
HXRE71402012		12					50
HXRE71402014		14					50
HXRE71402016		16					50
HXRE71402018		18					50
HXRE71402020		20					50
HXRE71403010	3	10	4.5	2.9	14°	4	50
HXRE71403012		12					50
HXRE71403014		14					50
HXRE71403016		16					50
HXRE71403018		18					50
HXRE71403020		20					50
HXRE7140301606		16				6	60
HXRE7140301806		18					60
HXRE7140302006		20					60
HXRE7140302506		25					60
HXRE714030160675		16					75
HXRE714030180675		18					75
HXRE714030200675		20					75
HXRE714030250675		25					75
HXRE714030300675		30					75
HXRE714030350675		35					75

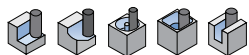
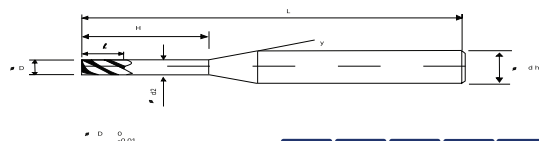
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	●		○	○					○	○

Click here for INDEX

4-Flute Rib Process Square End Mill



Super UMG	0.2 µm	4 Flutes	Helix 45°	TiSiN
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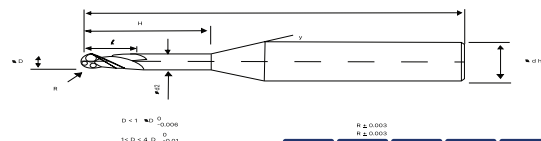
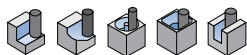
EDP NO.	D	H	ℓ	d2	y	d	L
HXRE7140401606	4	16	6	3.8	14°	6	60
HXRE7140401806		18					60
HXRE7140402006		20					60
HXRE7140402506		25					60
HXRE7140401606		16					75
HXRE714040180675		18					75
HXRE714040200675		20					75
HXRE714040250675		25					75
HXRE714040300675		30					75
HXRE714040350675		35					75

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	●		○	○					○	○

2-Flute Rib Process Ball End Mill



D < 1 mm 0.0009
12 D ≤ 4 mm 0.001

Super
UMG

0.2
µm

2 Flutes

Helix
30°

TiSiN

EDP NO.	R	H	ℓ	D	d2	y	d	L
HXRB712001003	R0.05	0.3	0.1	0.1	0.085	12°	4	50
HXRB712001005		0.5						50
HXRB712001008		0.8						50
HXRB71200101		1						50
HXRB712001505	R0.075	0.5	0.15	0.15	0.13	12°	4	50
HXRB712001501		1						50
HXRB71200201		1						50
HXRB712002015	R0.1	1.5	0.2	0.2	0.18	12°	4	50
HXRB71200202		2						50
HXRB71200203		3						50
HXRB71200301		1						50
HXRB712003015	R0.15	1.5	0.3	0.3	0.28	12°	4	50
HXRB71200302		2						50
HXRB71200303		3						50
HXRB71200304		4						50
HXRB71200305		5						50
HXRB712004015		1.5						50
HXRB71200402	R0.2	2	0.4	0.4	0.37	12°	4	50
HXRB71200403		3						50
HXRB71200404		4						50
HXRB71200405		5						50
HXRB71200406		6						50
HXRB71200502		2						50
HXRB71200503	R0.25	3	0.5	0.5	0.46	12°	4	50
HXRB71200504		4						50
HXRB71200505		5						50
HXRB71200506		6						50
HXRB71200508		8						50
HXRB71200602		2						50
HXRB71200603	R0.3	3	0.6	0.6	0.56	12°	4	50
HXRB71200604		4						50
HXRB71200605		5						50
HXRB71200606		6						50
HXRB71200608		8						50
HXRB71200610		10						50
HXRB71200802	R0.4	2	0.8	0.8	0.76	12°	4	50
HXRB71200803		3						50
HXRB71200804		4						50
HXRB71200805		5						50
HXRB71200806		6						50
HXRB71200808		8						50
HXRB71200810		10						50

HX

HG

GM

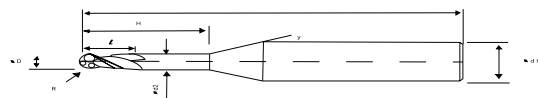
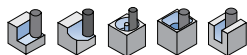
Ug
M

Ug
Al

CX

NX

2-Flute Rib Process Ball End Mill



D < 1
12 D < 4 D

R < 0.008
R < 0.003

Super
UMG

0.2
mm

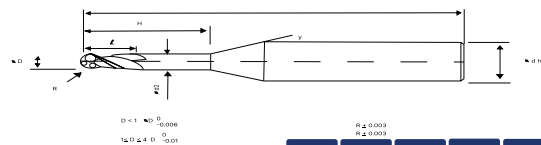
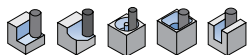
2 Flutes

Helix
30°

TiSiN

EDP NO.	R	H	ℓ	D	d2	γ	d	L
HXRB71201003	R0.5	3	1	1	0.95	14°	4	50
HXRB71201004		4						50
HXRB71201005		5						50
HXRB71201006		6						50
HXRB71201008		8						50
HXRB71201010		10						50
HXRB71201012		12						50
HXRB71201014		14						50
HXRB71201016		16						50
HXRB71201018		18						50
HXRB71201020		20						50
HXRB71201504	R0.75	4	1.5	1.5	1.45	14°	4	50
HXRB71201505		5						50
HXRB71201506		6						50
HXRB71201508		8						50
HXRB71201510		10						50
HXRB71201512		12						50
HXRB71201516		16						50
HXRB71201518		18						50
HXRB71201520		20						50
HXRB71202006	R1	6	2	2	1.94	14°	4	50
HXRB71202008		8						50
HXRB71202010		10						50
HXRB71202012		12						50
HXRB71202014		14						50
HXRB71202016		16						50
HXRB71202018		18						50
HXRB71202020		20						50
HXRB7120201606		16					6	50
HXRB7120201806		18						50
HXRB7120202006		20						50
HXRB7120202506		25						50
HXRB71203008	R1.5	8	3	3	2.9	14°	4	50
HXRB71203010		10						50
HXRB71203012		12						50
HXRB71203016		16						50
HXRB71203020		20						50
HXRB7120301606		16					6	60
HXRB7120301806		18						60
HXRB7120302006		20						60
HXRB7120302506		25						60

2-Flute Rib Process Ball End Mill



Super UMG	0.2 μm	2 Flutes	Helix 30°	TiSiN
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EDP NO.	R	H	ℓ	D	d2	y	d	L
HXRB712030160675	R1.5	16	3	3	2.9	14°	6	75
HXRB712030180675		18						75
HXRB712030200675		20						75
HXRB712030250675		25						75
HXRB712030300675		30						75
HXRB7120401606	R2	16	4	4	3.8	14°	6	60
HXRB7120401806		18						60
HXRB7120402006		20						60
HXRB7120402506		25						60
HXRB712040160675		16						75
HXRB712040180675		18						75
HXRB712040200675		20						75
HXRB712040250675		25						75
HXRB712040300675		30						75
HXRB712040350675		35						75

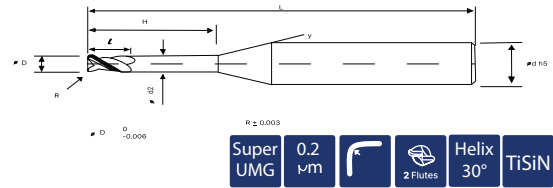
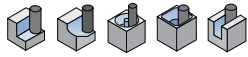
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	●		○	○					○	○

Click here for INDEX

2-Flute Rib Process Corner Radius End Mill



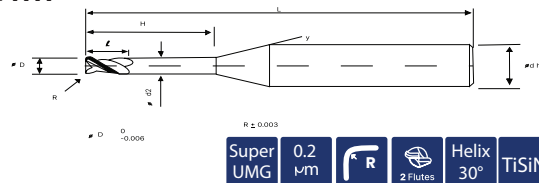
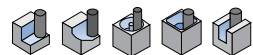
EDP NO.	D	R	H	ℓ	d2	y	d	L
HXRR71200200201	0.2	0.02	1	0.2	0.18	12°	4	50
HXRR712002002015			1.5					50
HXRR71200200202			2					50
HXRR71200200203			3					50
HXRR71200200501		0.05	1					50
HXRR71200200515			1.5					50
HXRR71200200502			2					50
HXRR71200200503			3					50
HXRR71200300201	0.3	0.02	1	0.3	0.28	12°	4	50
HXRR712003002015			1.5					50
HXRR71200300202			2					50
HXRR71200300203			3					50
HXRR71200300204			4					50
HXRR71200300501		0.05	1					50
HXRR712003005015			1.5					50
HXRR71200300502			2					50
HXRR71200300503			3					50
HXRR71200300504			4					50
HXRR71200400201	0.4	0.02	1	0.4	0.37	12°	4	50
HXRR712004002015			1.5					50
HXRR71200400202			2					50
HXRR71200400203			3					50
HXRR71200400204			4					50
HXRR71200400205			5					50
HXRR71200400206			6					50
HXRR71200400501		0.05	1					50
HXRR712004005015			1.5					50
HXRR71200400502			2					50
HXRR71200400503			3					50
HXRR71200400504			4					50
HXRR71200400505			5					50
HXRR71200400506			6					50
HXRR7120040101		0.1	1					50
HXRR71200401015			1.5					50
HXRR71200401002			2					50
HXRR71200401003			3					50
HXRR71200401004			4					50
HXRR71200401005			5					50
HXRR71200401006			6					50
HXRR7120050202	0.5	0.02	2	0.5	0.46	12°	4	50
HXRR7120050203			3					50
HXRR7120050204			4					50
HXRR7120050205			5					50

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	●		○	○					○	○

2-Flute Rib Process Corner Radius End Mill



EDP NO.	D	R	H	ℓ	d2	Y	d	L
HXRR71200500206	0.5	0.02	6	0.5	0.46	12°	4	50
HXRR71200500208			8					50
HXRR71200500210			10					50
HXRR71200500502		0.05	2					50
HXRR71200500503			3					50
HXRR71200500504			4					50
HXRR71200500505			5					50
HXRR71200500506			6					50
HXRR71200500508			8					50
HXRR71200500510			10					50
HXRR7120050102		0.1	2					50
HXRR7120050103			3					50
HXRR7120050104			4					50
HXRR7120050105			5					50
HXRR7120050106			6					50
HXRR7120050108			8					50
HXRR7120050110			10					50
HXRR71200600202	0.6	0.02	2	0.6	0.56	12°	4	50
HXRR71200600203			3					50
HXRR71200600204			4					50
HXRR71200600205			5					50
HXRR71200600206			6					50
HXRR71200600208			8					50
HXRR71200600210			10					50
HXRR71200600502		0.05	2					50
HXRR71200600503			3					50
HXRR71200600504			4					50
HXRR71200600505			5					50
HXRR71200600506			6					50
HXRR71200600508			8					50
HXRR71200600510			10					50
HXRR7120060102		0.1	2					50
HXRR7120060103			3					50
HXRR7120060104			4					50
HXRR7120060105			5					50
HXRR7120060106			6					50
HXRR7120060108			8					50
HXRR7120060110			10					50
HXRR7120060202		0.2	2					50
HXRR7120060203			3					50
HXRR7120060204			4					50
HXRR7120060205			5					50
HXRR7120060206			6					50
HXRR7120060208			8					50
HXRR7120060210			10					50

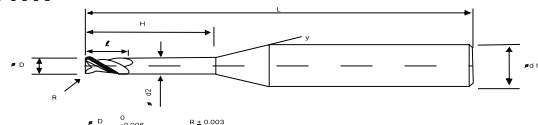
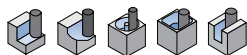
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	●		○	○					○	○

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2-Flute Rib Process Corner Radius End Mill



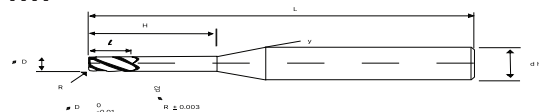
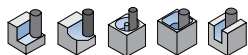
EDP EDP NO.	D	R	H	ℓ	d2	y	d	L
HXRR71200800202	0.8	0.02	2	0.8	0.76	12°	4	50
HXRR71200800203			3					50
HXRR71200800204			4					50
HXRR71200800205			5					50
HXRR71200800206			6					50
HXRR71200800208			8					50
HXRR71200800210			10					50
HXRR71200800502		0.05	2					50
HXRR71200800503			3					50
HXRR71200800504			4					50
HXRR71200800505			5					50
HXRR71200800506			6					50
HXRR71200800508			8					50
HXRR71200800510			10					50
HXRR7120080102		0.1	2					50
HXRR7120080103			3					50
HXRR7120080104			4					50
HXRR7120080105			5					50
HXRR7120080106			6					50
HXRR7120080108			8					50
HXRR7120080110			10					50
HXRR7120080202		0.2	2					50
HXRR7120080203			3					50
HXRR7120080204			4					50
HXRR7120080205			5					50
HXRR7120080206			6					50
HXRR7120080208			8					50
HXRR7120080210			10					50

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	●		○	○					○	○

4-Flute Rib Process Corner Radius End Mill



Super
UMG 0.2
μm R 4 Flutes Helix
35° TiSiN

EDP NO.	D	R	H	ℓ	d2	y	d	L
HXRR7140100104	1	0.1	4	1.5	0.95	14°	4	50
HXRR7140100106			6					50
HXRR7140100108			8					50
HXRR7140100110			10					50
HXRR7140100112			12					50
HXRR7140100114			14					50
HXRR7140100116			16					50
HXRR7140100118			18					50
HXRR7140100120			20					50
HXRR7140100204		0.2	4					50
HXRR7140100206			6					50
HXRR7140100208			8					50
HXRR7140100210			10					50
HXRR7140100212			12					50
HXRR7140100214			14					50
HXRR7140100216			16					50
HXRR7140100218			18					50
HXRR7140100220			20					50
HXRR7140150106	1.5	0.1	6	2.3	1.45	14°	4	50
HXRR7140150108			8					50
HXRR7140150110			10					50
HXRR7140150112			12					50
HXRR7140150114			14					50
HXRR7140150116			16					50
HXRR7140150118			18					50
HXRR7140150120			20					50
HXRR7140150206		0.2	6					50
HXRR7140150208			8					50
HXRR7140150210			10					50
HXRR7140150212			12					50
HXRR7140150214			14					50
HXRR7140150216			16					50
HXRR7140150218			18					50
HXRR7140150220			20					50
HXRR7140200106	2	0.1	6	3	1.94	14°	4	50
HXRR7140200108			8					50
HXRR7140200110			10					50
HXRR7140200112			12					50
HXRR7140200114			14					50
HXRR7140200116			16					50
HXRR7140200118			18					50
HXRR7140200120			20					50

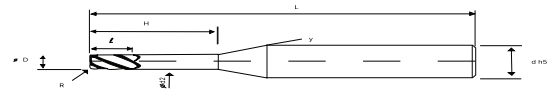
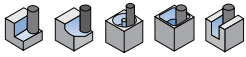
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	●		○	○					○	○

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4-Flute Rib Process Corner Radius End Mill



D ±0.01

R ±0.003

Super
UMG

0.2
µm

R

4 Flutes

Helix
35°

TiSiN

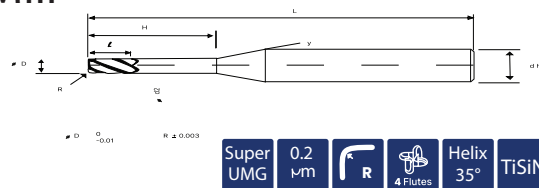
EDP NO.	D	R	H	ℓ	d2	γ	d	L
HXRR7140200206	2	0.2	6	3	1.94	14°	4	50
HXRR7140200208			8					50
HXRR7140200210			10					50
HXRR7140200212			12					50
HXRR7140200214			14					50
HXRR7140200216			16					50
HXRR7140200218			18					50
HXRR7140200220			20					50
HXRR7140200506		0.5	6					50
HXRR7140200508			8					50
HXRR7140200510			10					50
HXRR7140200512			12					50
HXRR7140200514			14					50
HXRR7140200516			16					50
HXRR7140200518			18					50
HXRR7140200520			20					50
HXRR7140300110	3	0.1	10	4.5	2.9	14°	4	50
HXRR7140300112			12					50
HXRR7140300114			14					50
HXRR7140300116			16					50
HXRR7140300118			18					50
HXRR7140300120			20					50
HXRR7140300210		0.2	10					50
HXRR7140300212			12					50
HXRR7140300214			14					50
HXRR7140300216			16					50
HXRR7140300218			18					50
HXRR7140300220			20					50
HXRR7140300510		0.5	10					50
HXRR7140300512			12					50
HXRR7140300514			14					50
HXRR7140300516			16					50
HXRR7140300518			18					50
HXRR7140300520			20					50
HXRR714030021206		0.2	12				6	60
HXRR714030021406			14					60
HXRR714030021606			16					60
HXRR714030021806			18					60
HXRR714030022006			20					60
HXRR714030022506			25					60

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	●		○	○					○	○

4-Flute Rib Process Corner Radius End Mill



EDP NO.	D	R	H	ℓ	d2	y	d	L
HXRR714030051206	3	0.5	12	4.5	2.9	14°	6	60
HXRR714030051406			14					60
HXRR714030051606			16					60
HXRR714030051806			18					60
HXRR714030052006			20					60
HXRR714030052506			25					60
HXRR71403002120675		0.2	12					75
HXRR71403002140675			14					75
HXRR71403002160675			16					75
HXRR71403002180675			18					75
HXRR71403002200675			20					75
HXRR71403002250675			25					75
HXRR71403002300675			30					75
HXRR71403005120675		0.5	12					75
HXRR71403005140675			14					75
HXRR71403005160675			16					75
HXRR71403005180675			18					75
HXRR71403005200675			20					75
HXRR71403005250675			25					75
HXRR71403005300675			30					75
HXRR714040021606	4	0.2	16	6	3.8	14°	6	60
HXRR714040022006			20					60
HXRR714040022506			25					60
HXRR714040051606		0.5	16					60
HXRR714040052006			20					60
HXRR714040052506			25					60
HXRR714040021675		0.2	16					75
HXRR714040022075			20					75
HXRR714040022575			25					75
HXRR714040023075			30					75
HXRR714040023575			35					75
HXRR714040051675		0.5	16					75
HXRR714040052075			20					75
HXRR714040052575			25					75
HXRR714040053075			30					75
HXRR714040053575			35					75

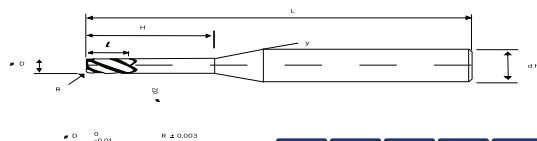
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel -HB225	Alloy Steel HB225 -325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	●		○	○					○	○

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4-Flute Square End Mill



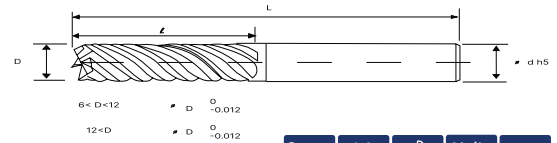
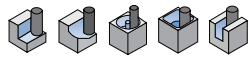
EDP NO.	D	ℓ	y	d	L
HXE704010	1	3	12°	4	50
HXE704015	1.5	4	12°	4	50
HXE704020	2	6	10°	4	50
HXE704025	2.5	8	10°	4	50
HXE704030	3	8	10°	4	50
HXE704040	4	11	-	4	50
HXE70404075	4	15	-	4	75
HXE704040100	4	15	-	4	100
HXE704050	5	13	10°	6	50
HXE70405075	5	18	10°	6	75
HXE704060	6	15	-	6	50
HXE70406060	6	15	-	6	60
HXE70406075	6	20	-	6	75
HXE704060100	6	24	-	6	100
HXE704080	8	20	-	8	60
HXE70408075	8	25	-	8	75
HXE704080100	8	32	-	8	100
HXE704100	10	25	-	10	75
HXE704100100	10	40	-	10	100
HXE704120	12	30	-	12	75
HXE704120100	12	45	-	12	100
HXE704160	16	45	-	16	100
HXE70416150	16	65	-	16	150
HXE704200	20	45	-	20	100
HXE704200150	20	75	-	20	150

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	●		○	○					○	○

6-Flute Square End Mill



EDP NO.	D	ℓ	d	L
HXE706060	6	18	6	60
HXE70606075	6	24	6	75
HXE706080	8	20	8	60
HXE70608075	8	32	8	75
HXE706100	10	30	10	75
HXE706100100	10	40	10	100
HXE706120	12	32	12	75
HXE706120100	12	45	12	100
HXE706160	16	40	16	100

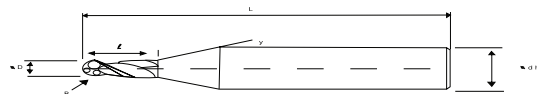
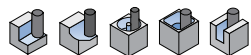
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	●		○	○					○	○

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2-Flute Ball Nose End Mill



1.6 ± 0.005
R ± 0.005
D ± 0.005

Super
UMG 0.2
μm 2 Flutes Helix
30° TiSiN

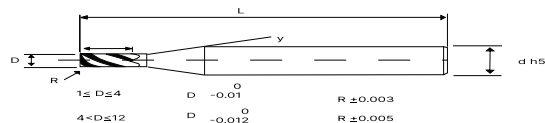
EDP NO.	R	D	ℓ	y	d	L
HXB702010	R0.5	1	2	12°	4	50
HXB702015	R0.75	1.5	3	12°	4	50
HXB702020	R1	2	4	10°	4	50
HXB702030	R1.5	3	6	10°	4	50
HXB702040	R2	4	6	-	4	50
HXB70204075	R2	4	6	-	4	75
HXB702050	R2.5	5	7.5	10°	6	50
HXB70205060	R2.5	5	7.5	10°	6	60
HXB70205075	R2.5	5	7.5	10°	6	75
HXB702050100	R2.5	5	7.5	10°	6	100
HXB702060	R3	6	9	-	6	50
HXB70206060	R3	6	9	-	6	60
HXB70206075	R3	6	9	-	6	75
HXB702060100	R3	6	9	-	6	100
HXB702080	R4	8	12	-	8	60
HXB70208075	R4	8	12	-	8	75
HXB702080100	R4	8	12	-	8	100
HXB702100	R5	10	15	-	10	75
HXB702100100	R5	10	15	-	10	100
HXB702120	R6	12	18	-	12	75
HXB702120100	R6	12	18	-	12	100

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	●		○	○					○	○

4-Flute Corner Radius End Mill



EDP NO.	D	R	ℓ	y	d	L
HXR704010005	1	0.05	3	12°	4	50
HXR70401001		0.1	3			50
HXR70401002		0.2	3			50
HXR70401501	1.5	0.1	4	12°	4	50
HXR70401502		0.2	4			50
HXR70402001	2	0.1	6	10°	4	50
HXR70402002		0.2	6			50
HXR70402005		0.5	6			50
HXR70403001	3	0.1	8	10°	4	50
HXR70403002		0.2	8			50
HXR70403005		0.5	8			50
HXR70404002	4	0.2	10	-	4	50
HXR70404005		0.5	10			50
HXR70404010		1	10			50
HXR70406002	6	0.2	15	-	6	50
HXR7040600275		0.2	18			75
HXR70406002100		0.2	20			100
HXR70406005		0.5	15			50
HXR7040600575		0.5	18			75
HXR70406005100		0.5	20			100
HXR70406010		1	15			50
HXR7040601075		1	18			75
HXR70406010100		1	20			100
HXR70408005	8	0.5	20	-	8	60
HXR7040800575		0.5	25			75
HXR70408005100		0.5	25			100
HXR70408010		1	20			60
HXR7040801075		1	25			75
HXR70408010100	10	1	25	-	10	100
HXR7041005		0.5	25			75
HXR7041005100		0.5	30			100
HXR70410010		1	25			75
HXR70410010100	12	1	30	-	12	100
HXR70412005		0.5	30			75
HXR70412005100		0.5	36			100
HXR70412010		1	30			75
HXR70412010100		1	36			100

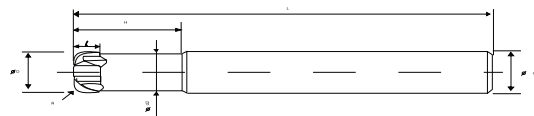
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	●		○	○					○	○

Click here for INDEX

Strong High Feed Corner Radius End Mill



EDP NO.	D	R	ℓ	H	d2	d	L
HXHFR70406015	6	1.5	2.5	12	5.4	6	75
HXHFR70408020	8	2	3.5	16	7.2	8	75
HXHFR70410020	10	2	4	20	9	10	100
HXHFR70412020	12	2	5	24	11	12	100

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	●		○	○					○	○

HG

High Hardness Series

Recommended Machinng Hardness

HRC50-60



0.4µm **Ultra-Fine Micro-Grain** Substrate Manufactured with a premium 0.4µm ultra-fine micro-grain carbide substrate, delivering an ideal combination of toughness, wear resistance, and cutting stability..



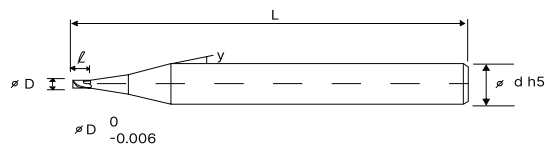
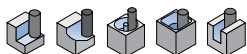
Advanced **AlCrN Coating Technology** Based on AlCrN outstanding machining versatility, supporting applications from soft steels to 60 HRC hardened steels while maintaining reliable performance in both dry and wet machining conditions.



Optimized for **Precision Finishing Designed** for precision finishing and semi-finishing operations on materials including P20, 718, NAK80, H13, and S136, ensuring consistent surface quality and extended tool life.



2-Flute Micro Diameter End Mill



EDP NO.	D	ℓ	y	d	L
HGE6020005	0.05	0.1	13°	4	50
HGE6020006	0.06	0.12	13°	4	50
HGE6020007	0.07	0.14	13°	4	50
HGE6020008	0.08	0.16	13°	4	50
HGE6020009	0.09	0.18	13°	4	50
HGE602005	0.1	0.2	13°	4	50
HGE6020015	0.15	0.3	13°	4	50
HGE602002	0.2	0.4	13°	4	50
HGE6020025	0.25	0.5	13°	4	50
HGE602003	0.3	0.6	13°	4	50
HGE6020035	0.35	0.7	13°	4	50
HGE602004	0.4	0.8	13°	4	50
HGE6020045	0.45	0.9	13°	4	50
HGE602005	0.5	1	13°	4	50
HGE6020055	0.55	1.1	13°	4	50
HGE602006	0.6	1.2	13°	4	50
HGE6020065	0.65	1.3	13°	4	50
HGE602007	0.7	1.4	13°	4	50
HGE6020075	0.75	1.5	13°	4	50
HGE602008	0.8	1.6	13°	4	50
HGE6020085	0.85	1.7	13°	4	50
HGE602009	0.9	1.8	13°	4	50

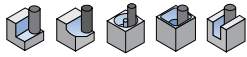
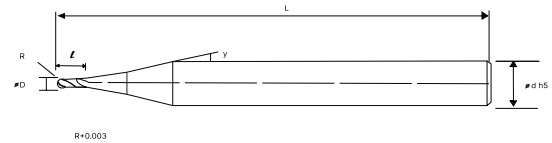
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61-HRC55	SKD61-HRC62									
●	○		●	●	○				○	

Click here for INDEX

2-Flute Micro Diameter Ball End Mill



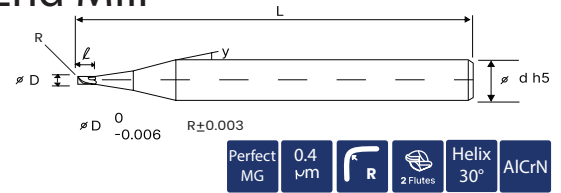
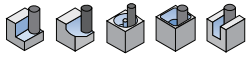
EDP NO.	R	ℓ	D	γ	d	L
HGB602001	R0.05	0.2	0.1	13°	4	50
HGB602015	R0.075	0.3	0.15	13°	4	50
HGB602002	R0.1	0.4	0.2	13°	4	50
HGB602003	R0.15	0.6	0.3	13°	4	50
HGB602004	R0.2	0.8	0.4	13°	4	50
HGB602005	R0.25	1	0.5	13°	4	50
HGB602006	R0.3	1.2	0.6	13°	4	50
HGB602007	R0.35	1.4	0.7	13°	4	50
HGB602008	R0.4	1.6	0.8	13°	4	50
HGB602009	R0.45	1.8	0.9	13°	4	50

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	○		●	●	○				○	

2-Flute Micro Diameter Corner Radius End Mill



EDP NO.	D	R	ℓ	γ	d	L
HGB602002002	0.2	0.02	0.4	13°	4	50
HGB602002005		0.05				50
HGB602003002	0.3	0.02	0.6	13°	4	50
HGB602003005		0.05				50
HGB602004002	0.4	0.02	0.8	13°	4	50
HGB602004005		0.5				50
HGB60200401		0.1				50
HGB602006002	0.6	0.02	1.0	13°	4	50
HGB602006005		0.05				50
HGB60200601		0.1				50
HGB602005002	0.5	0.02	1.2	13°	4	50
HGB602005005		0.05				50
HGB60200501		0.1				50
HGB60200502		0.2				50
HGB602008002	0.8	0.02	1.6	13°	4	50
HGB602008005		0.05				50
HGB602008001		0.1				50
HGB60200802		0.2				50

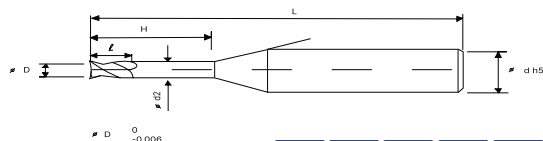
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61-HRc55	SKD61-HRc62									
●	○		●	●	○				○	

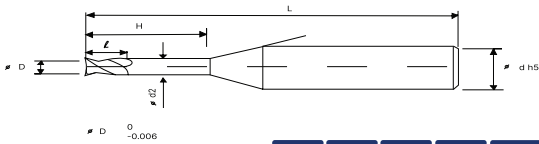
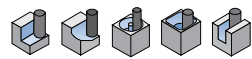
Click here for INDEX

2-Flute Rib Process Square End Mill



EDP NO.	D	H	ℓ	d2	y	d	L
HGRE612001003	0.1	0.3	0.1	0.085	12°	4	50
HGRE612001005		0.5					50
HGRE612001008		0.8					50
HGRE61200101		1					50
HGRE6120015005	0.15	0.5	0.15	0.13	12°	4	50
HGRE612001501		1					50
HGRE61200201	0.2	1	0.2	0.18	12°	4	50
HGRE612002015		1.5					50
HGRE61200202		2					50
HGRE61200203		3					50
HGRE61200204	0.3	4	0.3	0.28	12°	4	50
HGRE61200301		1					50
HGRE612003015		1.5					50
HGRE61200302		2					50
HGRE61200303		3					50
HGRE61200304		4					50
HGRE61200305		5					50
HGRE612004015	0.4	1.5	0.4	0.37	12°	4	50
HGRE61200402		2					50
HGRE61200403		3					50
HGRE61200404		4					50
HGRE61200405		5					50
HGRE61200406		6					50
HGRE61200502	0.5	2	0.5	0.46	12°	4	50
HGRE61200503		3					50
HGRE61200504		4					50
HGRE61200505		5					50
HGRE61200506		6					50
HGRE61200508		8					50
HGRE61200510	0.6	10	0.6	0.56	12°	4	50
HGRE61200602		2					50
HGRE61200603		3					50
HGRE61200604		4					50
HGRE61200605		5					50
HGRE61200606		6					50
HGRE61200608	0.7	8	0.7	0.66	12°	4	50
HGRE61200610		10					50
HGRE61200702		2					50
HGRE61200703		3					50
HGRE61200704	0.7	4	0.7	0.66	12°	4	50
HGRE61200705		5					50
HGRE61200706		6					50
HGRE61200708		8					50
HGRE61200710		10					50

2-Flute Rib Process Square End Mill



Perfect
MG

0.4
mm

2 Flutes

Helix
30°

AlCrN

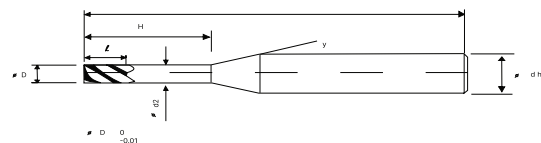
EDP NO.	D	H	ℓ	d2	y	d	L
HGRE71200802	0.8	2	0.8	0.76	12°	4	50
HGRE71200803		3					50
HGRE71200804		4					50
HGRE71200805		5					50
HGRE71200806		6					50
HGRE71200808		8					50
HGRE71200810		10					50

Applicable Working Material

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61-HRc55	SKD61-HRc62									
●	○		●	●	○				○	

○:GOOD ●:EXCELLENT

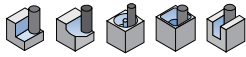
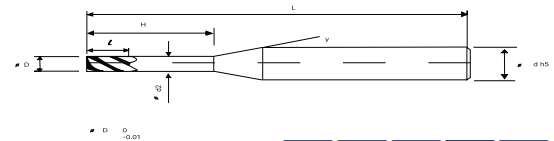
4-Flute Rib Process Square End Mill



Perfect
MG 0.4
μm 4 Flutes Helix
35° AlCrN

EDP NO.	D	H	ℓ	d2	y	d	L
HGRE61401004	1	4	1.5	0.95	14°	4	50
HGRE61401005		5					50
HGRE61401006		6					50
HGRE61401008		8					50
HGRE61401010		10					50
HGRE61401012		12					50
HGRE61401014		14					50
HGRE61401016		16					50
HGRE61401018		18					50
HGRE61401020		20					50
HGRE61401506	1.5	6	2.3	1.45	14°	4	50
HGRE61401508		8					50
HGRE61401510		10					50
HGRE61401512		12					50
HGRE61401514		14					50
HGRE61401516		16					50
HGRE61401518		18					50
HGRE61401520		20					50
HGRE61402006	2	6	3	1.94	14°	4	50
HGRE61402008		8					50
HGRE61402010		10					50
HGRE61402012		12					50
HGRE61402014		14					50
HGRE61402016		16					50
HGRE61402018		18					50
HGRE61402020		20					50
HGRE61403010	3	10	4.5	2.9	14°	4	50
HGRE61403012		12					50
HGRE61403014		14					50
HGRE61403016		16					50
HGRE61403018		18					50
HGRE61403020		20					50
HGRE6140301606		16				6	60
HGRE6140301806		18					60
HGRE6140302006		20					60
HGRE6140302506		25					60
HGRE614030160675		16					75
HGRE614030180675		18					75
HGRE614030200675		20					75
HGRE614030250675		25					75
HGRE614030300675		30					75
HGRE614030350675		35					75

4-Flute Rib Process Square End Mill



EDP NO.	D	H	ℓ	d2	y	d	L
HGRE6140401606	4	16	6	3.8	14°	6	60
HGRE6140401806		18					60
HGRE6140402006		20					60
HGRE6140402506		25					60
HGRE614040160675		16					75
HGRE614040180675		18					75
HGRE614040200675		20					75
HGRE614040250675		25					75
HGRE614040300675		30					75
HGRE614040350675		35					75

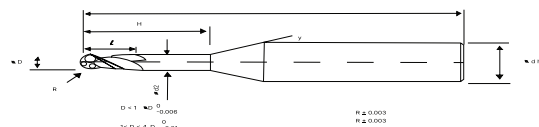
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
●	○		●	●	○				○	

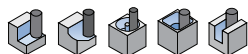
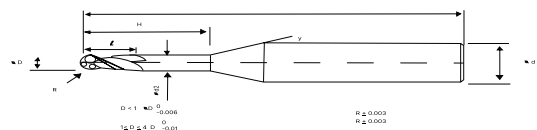
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2-Flute Rib Process Ball End Mill



EDP NO.	R	H	ℓ	D	d2	γ	d	L
HGRB612001003	R0.5	0.3	0.1	0.1	0.085	12°	4	50
HGRB612001005		0.5						50
HGRB612001008		0.8						50
HGRB61200101		1						50
HGRB612001505	R0.075	0.5	0.15	0.15	0.13	12°	4	50
HGRB612001501		1						50
HGRB61200201	R0.1	1	0.2	0.2	0.18	12°	4	50
HGRB612002015		1.5						50
HGRB61200202		2						50
HGRB61200203		3						50
HGRB61200301	R0.15	1	0.3	0.3	0.28	12°	4	50
HGRB612003015		1.5						50
HGRB61200302		2						50
HGRB61200303		3						50
HGRB61200304		4						50
HGRB61200305		5						50
HGRB612004015	R0.2	1.5	0.4	0.4	0.37	12°	4	50
HGRB61200402		2						50
HGRB61200403		3						50
HGRB61200404		4						50
HGRB61200405		5						50
HGRB61200406		6						50
HGRB61200502	R0.25	2	0.5	0.5	0.46	12°	4	50
HGRB61200503		3						50
HGRB61200504		4						50
HGRB61200505		5						50
HGRB61200506		6						50
HGRB61200508		8						50
HGRB61200602	R0.3	2	0.6	0.6	0.56	12°	4	50
HGRB61200603		3						50
HGRB61200604		4						50
HGRB61200605		5						50
HGRB61200606		6						50
HGRB61200608		8						50
HGRB61200610		10						50
HGRB61200802	R0.4	2	0.8	0.8	0.76	12°	4	50
HGRB61200803		3						50
HGRB61200804		4						50
HGRB61200805		5						50
HGRB61200806		6						50
HGRB61200808		8						50
HGRB61200810		10						50

2-Flute Rib Process Ball End Mill



EDP NO.	R	H	ℓ	D	d2	y	d	L
HGRB61201003	R0.5	3	1	1	0.95	14°	4	50
HGRB61201004		4						50
HGRB61201005		5						50
HGRB61201006		6						50
HGRB61201008		8						50
HGRB61201010		10						50
HGRB61201012		12						50
HGRB61201014		14						50
HGRB61201016		15						50
HGRB61201018		18						50
HGRB61201020		20						50
HGRB61201504	R0.75	4	1.5	1.5	1.45	14°	4	50
HGRB61201505		5						50
HGRB61201506		6						50
HGRB61201508		8						50
HGRB61201510		10						50
HGRB61201512		12						50
HGRB61201516		16						50
HGRB61201518		18						50
HGRB61201520		20						50
HGRB61202006	R1	6	2	2	1.94	14°	4	50
HGRB61202008		8						50
HGRB61202010		10						50
HGRB61202012		12						50
HGRB61202014		14						50
HGRB61202016		16						50
HGRB61202018		18						50
HGRB61202020		20						50
HGRB6120201606		16					6	50
HGRB6120201806		18						50
HGRB6120202006		20						50
HGRB6120202506		25						50
HGRB61203008	R1.5	8	3	3	2.9	14°	4	50
HGRB61203010		10						50
HGRB61203012		12						50
HGRB61203016		16						50
HGRB61203020		20						50
HGRB6120301606		16					6	60
HGRB6120301806		18						60
HGRB6120302006		20						60
HGRB6120302506		25						60

HX

HG

GM

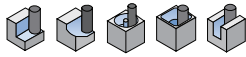
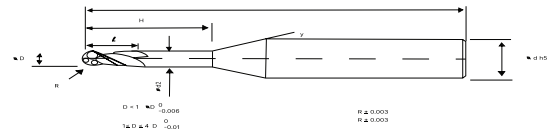
Ug
M

Ug
Al

CX

NX

2-Flute Rib Process Ball End Mill



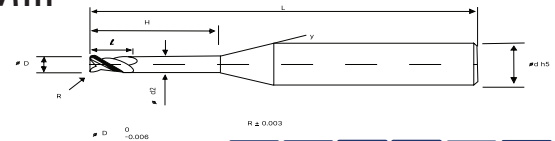
EDP NO.	R	H	ℓ	D	d2	γ	d	L
HGRB612030160675	R1.5	16	3	3	2.9	14°	6	75
HGRB612030180675		18						75
HGRB612030200675		20						75
HGRB612030250675		25						75
HGRB612030300675		30						75
HGRB6120401606	R2	16	4	4	3.8	14°	6	60
HGRB6120401806		18						60
HGRB6120402006		20						60
HGRB6120402506		25						60
HGRB612040160675		16						75
HGRB612040180675		18						75
HGRB612040200675		20						75
HGRB612040250675		25						75
HGRB612040300675		30						75
HGRB612040350675		35						75

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	○		●	●	○				○	

2-Flute Rib Process Corner Radius End Mill



EDP NO.	D	R	H	ℓ	d2	y	d	L
HGRR61200200201	0.2	0.02	1	0.2	0.18	12°	4	50
HGRR612002002015			1.5					50
HGRR6200200202			2					50
HGRR61200200203			3					50
HGRR61200200501		0.05	1					50
HGRR61200200515			1.5					50
HGRR61200200502			2					50
HGRR61200200503			3					50
HGRR61200300201	0.3	0.02	1	0.3	0.28	12°	4	50
HGRR612003002015			1.5					50
HGRR61200300202			2					50
HGRR61200300203			3					50
HGRR61200300204		0.05	4					50
HGRR61200300501			1					50
HGRR612003005015			1.5					50
HGRR61200300502			2					50
HGRR61200300503			3					50
HGRR61200300504			4					50
HGRR61200400201	0.4	0.02	1	0.4	0.37	12°	4	50
HGRR612004002015			1.5					50
HGRR61200400202			2					50
HGRR61200400203			3					50
HGRR61200400204			4					50
HGRR61200400205			5					50
HGRR61200400206			6					50
HGRR61200400501		0.05	1					50
HGRR612004005015			1.5					50
HGRR61200400502			2					50
HGRR61200400503			3					50
HGRR61200400504			4					50
HGRR61200400505			5					50
HGRR61200400506			6					50
HGRR6120040101		0.1	1					50
HGRR61200401015			1.5					50
HGRR61200401002			2					50
HGRR61200401003			3					50
HGRR61200401004			4					50
HGRR61200401005			5					50
HGRR61200401006			6					50
HGRR6120050202	0.5	0.02	2	0.5	0.46	12°	4	50
HGRR6120050203			3					50
HGRR6120050204			4					50
HGRR6120050205			5					50

HX

HG

GM

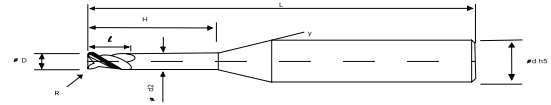
Ug
M

Ug
Al

CX

NX

2-Flute Rib Process Corner Radius End Mill



± D 0.003
-0.008

Perfect
MG

0.4
μm

R

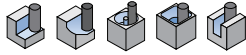
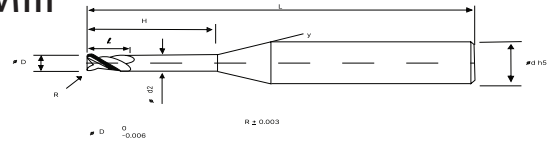
2 Flutes

Helix
30°

AlCrN

EDP NO.	D	R	H	ℓ	d2	Y	d	L
HGRR61200500206	0.5	0.02	6	0.5	0.46	12°	4	50
HGRR61200500208			8					50
HGRR61200500210			10					50
HGRR61200500502		0.05	2					50
HGRR61200500503			3					50
HGRR61200500504			4					50
HGRR61200500505			5					50
HGRR61200500506			6					50
HGRR61200500508			8					50
HGRR61200500510			10					50
HGRR6120050102		0.1	2					50
HGRR6120050103			3					50
HGRR6120050104			4					50
HGRR6120050105			5					50
HGRR6120050106			6					50
HGRR6120050108			8					50
HGRR6120050110			10					50
HGRR61200600202	0.6	0.02	2	0.6	0.56	12°	4	50
HGRR61200600203			3					50
HGRR61200600204			4					50
HGRR61200600205			5					50
HGRR61200600206			6					50
HGRR61200600208			8					50
HGRR61200600210			10					50
HGRR61200600502		0.05	2					50
HGRR61200600503			3					50
HGRR61200600504			4					50
HGRR61200600505			5					50
HGRR61200600506			6					50
HGRR61200600508			8					50
HGRR61200600510			10					50
HGRR6120060102		0.1	2					50
HGRR6120060103			3					50
HGRR6120060104			4					50
HGRR6120060105			5					50
HGRR6120060106			6					50
HGRR6120060108			8					50
HGRR6120060110			10					50
HGRR6120060202		0.2	2					50
HGRR6120060203			3					50
HGRR6120060204			4					50
HGRR6120060205			5					50
HGRR6120060206			6					50
HGRR6120060208			8					50
HGRR6120060210			10					50

2-Flute Rib Process Corner Radius End Mill



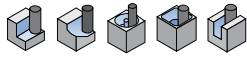
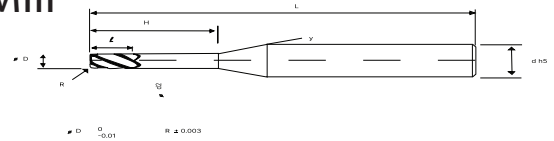
EDP NO.	D	R	H	ℓ	d2	y	d	L
HGRR61200800202	0.8	0.02	2	0.8	0.76	12°	4	50
HGRR61200800203			3					50
HGRR61200800204			4					50
HGRR61200800205			5					50
HGRR61200800206			6					50
HGRR61200800208			8					50
HGRR61200800210			10					50
HGRR61200800502		0.05	2					50
HGRR61200800503			3					50
HGRR61200800504			4					50
HGRR61200800505			5					50
HGRR61200800506			6					50
HGRR61200800508			8					50
HGRR61200800510			10					50
HGRR6120080102		0.1	2					50
HGRR6120080103			3					50
HGRR6120080104			4					50
HGRR6120080105			5					50
HGRR6120080106			6					50
HGRR6120080108			8					50
HGRR6120080110			10					50
HGRR6120080202		0.2	2					50
HGRR6120080203			3					50
HGRR6120080204			4					50
HGRR6120080205			5					50
HGRR6120080206			6					50
HGRR6120080208			8					50
HGRR6120080210			10					50

Applicable Working Material

○:GOOD ●:EXCELLENT

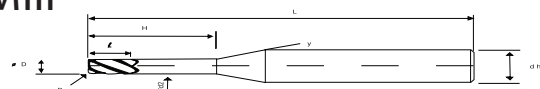
H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	○		●	●	○				○	

4-Flute Rib Process Corner Radius End Mill



EDP NO.	D	R	H	ℓ	d2	y	d	L
HGRR6140100104	1	0.1	4	1.5	0.95	14°	4	50
HGRR6140100106			6					50
HGRR6140100108			8					50
HGRR6140100110			10					50
HGRR6140100112			12					50
HGRR6140100114			14					50
HGRR6140100116			16					50
HGRR6140100118			18					50
HGRR6140100120			20					50
HGRR6140100204		0.2	4					50
HGRR6140100206			6					50
HGRR6140100208			8					50
HGRR6140100210			10					50
HGRR6140100212			12					50
HGRR6140100214			14					50
HGRR6140100216			16					50
HGRR6140100218			18					50
HGRR6140100220			20					50
HGRR6140150106	1.5	0.1	6	2.3	1.45	14°	4	50
HGRR6140150108			8					50
HGRR6140150110			10					50
HGRR6140150112			12					50
HGRR6140150114			14					50
HGRR6140150116			16					50
HGRR6140150118			18					50
HGRR6140150120			20					50
HGRR6140150206		0.2	6					50
HGRR6140150208			8					50
HGRR6140150210			10					50
HGRR6140150212			12					50
HGRR6140150214			14					50
HGRR6140150216			16					50
HGRR6140150218			18					50
HGRR6140150220			20					50
HGRR6140200106	2	0.1	6	3	1.94	14°	4	50
HGRR6140200108			8					50
HGRR6140200110			10					50
HGRR6140200112			12					50
HGRR6140200114			14					50
HGRR6140200116			16					50
HGRR6140200118			18					50
HGRR6140200120			20					50

4-Flute Rib Process Corner Radius End Mill



EDP NO.	D	R	H	L	d2	y	d	L
HGRR6140200206	2	0.2	6	3	1.94	14°	4	50
HGRR6140200208			8					50
HGRR6140200210			10					50
HGRR6140200212			12					50
HGRR6140200214			14					50
HGRR6140200216			16					50
HGRR6140200218			18					50
HGRR6140200220			20					50
HGRR6140200506		0.5	6					50
HGRR6140200508			8					50
HGRR6140200510			10					50
HGRR6140200512			12					50
HGRR6140200514			14					50
HGRR6140200516			16					50
HGRR6140200518			18					50
HGRR6140200520			20					50
HGRR6140300110	3	0.1	10	4.5	2.9	14°	4	50
HGRR6140300112			12					50
HGRR6140300114			14					50
HGRR6140300116			16					50
HGRR6140300118			18					50
HGRR6140300120			20					50
HGRR6140300210		0.2	10					50
HGRR6140300212			12					50
HGRR6140300214			14					50
HGRR6140300216			16					50
HGRR6140300218			18					50
HGRR6140300220			20					50
HGRR6140300510		0.5	10					50
HGRR6140300512			12					50
HGRR6140300514			14					50
HGRR6140300516			16					50
HGRR6140300518			18					50
HGRR6140300520			20					50
HGRR614030021206		0.2	12				6	60
HGRR614030021406			14					60
HGRR614030021606			16					60
HGRR614030021806			18					60
HGRR614030022006			20					60
HGRR614030022506			25					60

HX

HG

GM

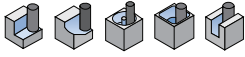
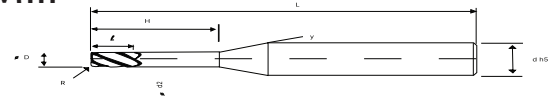
Ug
M

Ug
Al

CX

NX

4-Flute Rib Process Corner Radius End Mill



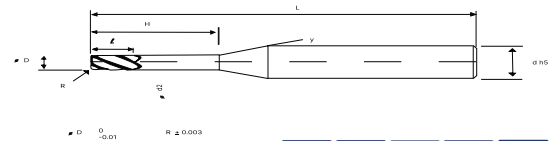
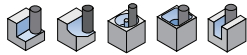
EDP NO.	D	R	H	ℓ	d2	y	d	L
HGRR614030051206	3	0.5	12	4.5	2.9	14°	6	60
HGRR614030051406			14					60
HGRR614030051606			16					60
HGRR614030051806			18					60
HGRR614030052006			20					60
HGRR614030052506			25					60
HGRR61403002120675		0.2	12					75
HGRR61403002140675			14					75
HGRR61403002160675			16					75
HGRR61403002180675			18					75
HGRR61403002200675			20					75
HGRR61403002250675			25					75
HGRR61403002300675			30					75
HGRR61403005120675		0.5	12					75
HGRR61403005140675			14					75
HGRR61403005160675			16					75
HGRR61403005180675			18					75
HGRR61403005200675			20					75
HGRR61403005250675			25					75
HGRR61403005300675			30					75
HGRR614040021606	4	0.2	16	6	3.8	14°	6	60
HGRR614040022006			20					60
HGRR614040022506			25					60
HGRR614040051606		0.5	16					60
HGRR614040052006			20					60
HGRR614040052506			25					60
HGRR61404002160675		0.2	16					75
HGRR61404002200675			20					75
HGRR61404002250675			25					75
HGRR61404002300675			30					75
HGRR61404002350675			35					75
HGRR61404005160675		0.5	16					75
HGRR61404005200675			20					75
HGRR61404005250675			25					75
HGRR61404005300675			30					75
HGRR61404005350675			35					75

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	○		●	●	○				○	

4-Flute Square End Mill



Perfect MG 0.4 μ m 4 Flutes Helix 35° AlCrN

EDP NO.	D	ℓ	y	d	L
HGE604010	1	3	12°	4	50
HGE604015	1.5	4	12°	4	50
HGE604020	2	6	10°	4	50
HGE604025	2.5	8	10°	4	50
HGE604030	3	8	10°	4	50
HGE604040	4	11	-	4	50
HGE60404075	4	15	-	4	75
HGE604040100	4	15	-	4	100
HGE604050	5	13	10°	6	50
HGE60405075	5	18	10°	6	75
HGE604060	6	15	-	6	50
HGE60406060	6	15	-	6	60
HGE60406075	6	20	-	6	75
HGE604060100	6	24	-	6	100
HGE604080	8	20	-	68	80
HGE60408075	8	25	-	8	75
HGE604080100	8	32	-	8	100
HGE604100	10	25	-	10	75
HGE604100100	10	40	-	10	100
HGE604120	12	30	-	12	75
HGE604120100	12	45	-	12	100
HGE604160	16	45	-	16	100
HGE60416150	16	65	-	16	150
HGE604200	20	45	-	20	100
HGE604200150	20	75	-	20	150

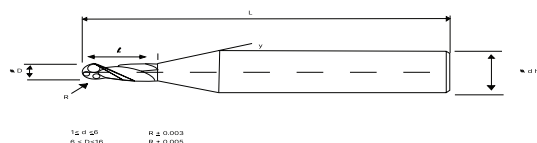
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	○		●	●	○				○	

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2-Flute Ball NoseEnd Mill



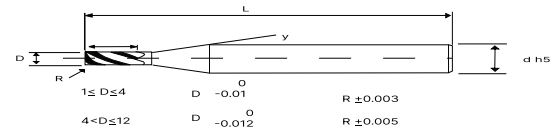
EDP NO.	R	D	ℓ	γ	d	L
HGB602010	R0.5	1	2	12°	4	50
HGB602015	R0.75	1.5	3	12°	4	50
HGB602020	R1	2	4	10°	4	50
HGB602030	R1.5	3	6	10°	4	50
HGB602040	R2	4	8	-	4	50
HGB60204075	R2	4	8	-	4	75
HGB602050	R2.5	5	10	10°	6	50
HGB60205060	R2.5	5	10	10°	6	60
HGB60205075	R2.5	5	10	10°	6	75
HGB602050100	R2.5	5	10	10°	6	100
HGB602060	R3	6	12	-	6	50
HGB60206060	R3	6	12	-	6	60
HGB60206075	R3	6	12	-	6	75
HGB602060100	R3	6	12	-	6	100
HGB602080	R4	8	16	-	8	60
HGB60208075	R4	8	16	-	8	75
HGB602080100	R4	8	16	-	8	100
HGB602100	R5	10	20	-	10	75
HGB602100100	R5	10	20	-	10	100
HGB602120	R8	12	24	-	12	75
HGB602120100	R6	12	24	-	12	100
HGB602160	R8	16	32	-	16	100
HGB60216050	R8	16	32	-	16	150

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel -HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	○		●	●	○				○	

4-Flute Corner Radius End Mill



EDP NO.	D	R	ℓ	y	d	L
HGR604010005	1	0.05	3	12°	4	50
HGR60401001		0.1	3			50
HGR60401002		0.2	3			50
HGR60401501	1.5	0.1	4	12°	4	50
HGR60401502		0.2	4			50
HGR60402001	2	0.1	6	10°	4	50
HGR60402002		0.2	6			50
HGR60402005		0.5	6			50
HGR60403001	3	0.1	8	10°	4	50
HGR60403002		0.2	8			50
HGR60403005		0.5	8			50
HGR60404002	4	0.2	10	-	4	50
HGR60404005		0.5	10			50
HGR60404010		1	10			50
HGR60406002	6	0.2	15	-	6	50
HGR6040600275		0.2	18			75
HGR60406002100		0.2	20			100
HGR60406005		0.5	15			50
HGR6040600575		0.5	18			75
HGR60406005100		0.5	20			100
HGR60406010		1	15			50
HGR6040601075		1	18			75
HGR60406010100		1	20			100
HGR60408005	8	0.5	20	-	8	60
HGR6040800575		0.5	25			75
HGR60408005100		0.5	25			100
HGR60408010		1	20			60
HGR6040801075		1	25			75
HGR60408010100		1	25			100
HGR6041005	10	0.5	25	-	10	75
HGR6041005100		0.5	30			100
HGR60410010		1	25			75
HGR60410010100		1	30			100
HGR60412005	12	0.5	30	-	12	75
HGR60412005100		0.5	36			100
HGR60412010		1	30			75
HGR60412010100		1	36			100

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel -HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
●	○		●	●	○				○	

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GM

Universal Series

Recommended Machining Hardness

< HRC50



High-Quality Carbide Substrate Built on a 0.4µm **ultra-fine micro-grain carbide** substrate, delivering outstanding strength, structural stability, and consistent cutting performance.



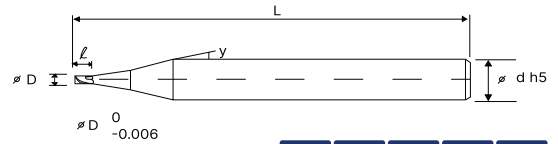
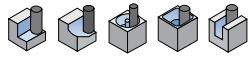
Advanced TiSi Coating Technology **composite coating** provides superior wear resistance while maintaining the ideal balance between hardness and toughness for versatile machining operations.



Versatile **Performance Across Materials Optimized** for machining materials such as P20, 45 Steel, 304 Stainless Steel, 718H, NAK80, and S136 before heat treatment, ensuring excellent surface finish, longer tool life, and dependable performance in everyday manufacturing applications.



2-Flute Micro Diameter End Mill



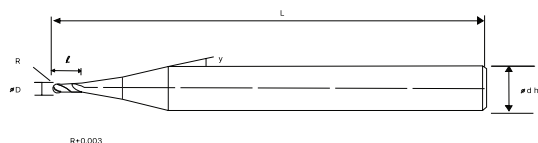
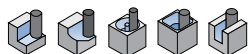
EDP NO.	D	ℓ	y	d	L
GME5020005	0.05	0.1	13°	4	50
GME5020006	0.06	0.12	13°	4	50
GME5020007	0.07	0.14	13°	4	50
GME5020008	0.08	0.16	13°	4	50
GME5020009	0.09	0.18	13°	4	50
GME502005	0.1	0.2	13°	4	50
GME5020015	0.15	0.3	13°	4	50
GME502002	0.2	0.4	13°	4	50
GME5020025	0.25	0.5	13°	4	50
GME502003	0.3	0.6	13°	4	50
GME5020035	0.35	0.7	13°	4	50
GME502004	0.4	0.8	13°	4	50
GME5020045	0.45	0.9	13°	4	50
GME502005	0.5	1	13°	4	50
GME5020055	0.55	1.1	13°	4	50
GME502006	0.6	1.2	13°	4	50
GME5020065	0.65	1.3	13°	4	50
GME502007	0.7	1.4	13°	4	50
GME5020075	0.75	1.5	13°	4	50
GME502008	0.8	1.6	13°	4	50
GME5020085	0.85	1.7	13°	4	50
GME502009	0.9	1.8	13°	4	50

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
○		●	●	●	●				●	○

2-Flute Micro Diameter End Mill



Perfect MG 0.6 μm 2 Flutes Helix 30° TiSi

EDP NO.	R	ℓ	D	y	d	L
GMB502001	R0.05	0.2	0.1	13°	4	50
GMB502015	R0.075	0.3	0.15	13°	4	50
GMB502002	R0.1	0.4	0.2	13°	4	50
GMB502003	R0.15	0.6	0.3	13°	4	50
GMB502004	R0.2	0.8	0.4	13°	4	50
GMB502005	R0.25	1	0.5	13°	4	50
GMB502006	R0.3	1.2	0.6	13°	4	50
GMB502007	R0.35	1.4	0.7	13°	4	50
GMB502008	R0.4	1.6	0.8	13°	4	50
GMB502009	R0.45	1.8	0.9	13°	4	50

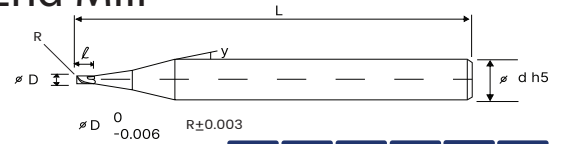
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225 -325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62	●	●	●	●				●	○

Click here for INDEX

2-Flute Micro Diameter Corner Radius End Mill



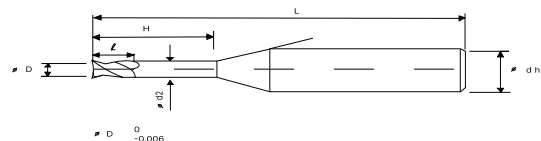
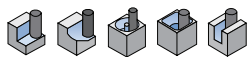
EDP NO.	D	R	ℓ	y	d	L
GMB502002002	0.2	0.02	0.4	13°	4	50
GMB502002005		0.05				50
GMB502003002	0.3	0.02	0.6	13°	4	50
GMB502003005		0.05				50
GMB502004002	0.4	0.02	0.8	13°	4	50
GMB502004005		0.5				50
GMB50200401		0.1				50
GMB502006002	0.6	0.02	1.0	13°	4	50
GMB502006005		0.05				50
GMB50200601		0.1				50
GMB502005002	0.5	0.02	1.2	13°	4	50
GMB502005005		0.05				50
GMB50200501		0.1				50
GMB50200502		0.2				50
GMB502008002	0.8	0.02	1.6	13°	4	50
GMB502008005		0.05				50
GMB502008001		0.1				50
GMB50200802		0.2				50

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel -HB225	Alloy Steel HB225 -325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
○		●	●	●	●				●	○

2-Flute Rib Process Square End Mill



EDP NO.	D	H	ℓ	d2	y	d	L
GMRES12001003	0.1	0.3	0.1	0.085	12°	4	50
GMRES12001005		0.5					50
GMRES12001008		0.8					50
GMRES1200101		1					50
GMRES120015005	0.15	0.5	0.15	0.13	12°	4	50
GMRES12001501		1					50
GMRES1200201	0.2	1	0.2	0.18	12°	4	50
GMRES12002015		1.5					50
GMRES1200202		2					50
GMRES1200203		3					50
GMRES1200204	0.3	4	0.3	0.28	12°	4	50
GMRES1200301		1					50
GMRES12003015		1.5					50
GMRES1200302		2					50
GMRES1200303		3					50
GMRES1200304	0.4	4	0.4	0.37	12°	4	50
GMRES1200305		5					50
GMRES12004015		1.5					50
GMRES1200402	0.5	2	0.5	0.46	12°	4	50
GMRES1200403		3					50
GMRES1200404		4					50
GMRES1200405		5					50
GMRES1200406	0.6	6	0.6	0.56	12°	4	50
GMRES1200502		2					50
GMRES1200503		3					50
GMRES1200504		4					50
GMRES1200505		5					50
GMRES1200506		6					50
GMRES1200508	0.7	8	0.7	0.66	12°	4	50
GMRES1200510		10					50
GMRES1200602	0.8	2	0.8	0.76	12°	4	50
GMRES1200603		3					50
GMRES1200604		4					50
GMRES1200605		5					50
GMRES1200606		6					50
GMRES1200608		8					50
GMRES1200610		10					50
GMRES1200702	0.9	2	0.9	0.86	12°	4	50
GMRES1200703		3					50
GMRES1200704		4					50
GMRES1200705		5					50
GMRES1200706		6					50
GMRES1200708		8					50
GMRES1200710		10					50

HX

HG

GM

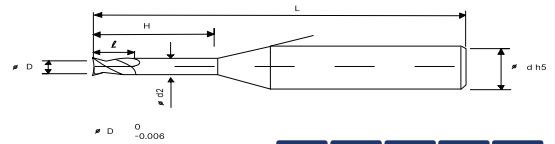
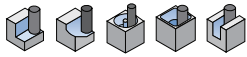
Ug
M

Ug
Al

CX

NX

2-Flute Rib Process Square End Mill



Perfect MG	0.6 μm	2 Flutes	Helix 30°	TiSi
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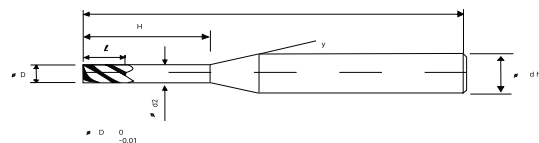
EDP NO.	D	H	ℓ	d2	y	d	L
GMRE51200802	0.8	2	0.8	0.76	12°	4	50
GMRE51200803		3					50
GMRE51200804		4					50
GMRE51200805		5					50
GMRE51200806		6					50
GMRE51200808		8					50
GMRE51200810		10					50

Applicable Working Material

○:GOOD ●:EXCELLENT

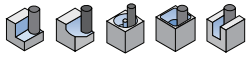
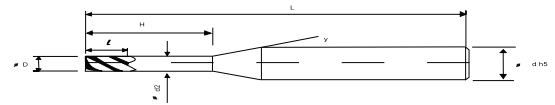
H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
○		●	●	●	●				●	○

4-Flute Rib Process Square End Mill



EDP NO.	D	H	ℓ	d2	y	d	L
GMRE51401004	1	4	1.5	0.95	14°	4	50
GMRE51401005		5					50
GMRE51401006		6					50
GMRE51401008		8					50
GMRE51401010		10					50
GMRE51401012		12					50
GMRE51401014		14					50
GMRE51401016		16					50
GMRE51401018		18					50
GMRE51401020		20					50
GMRE51401506	1.5	6	2.3	1.45	14°	4	50
GMRE51401508		8					50
GMRE51401510		10					50
GMRE51401512		12					50
GMRE51401514		14					50
GMRE51401516		16					50
GMRE51401518		18					50
GMRE51401520		20					50
GMRE51402006	2	6	3	1.94	14°	4	50
GMRE51402008		8					50
GMRE51402010		10					50
GMRE51402012		12					50
GMRE51402014		14					50
GMRE51402016		16					50
GMRE51402018		18					50
GMRE51402020		20					50
GMRE51403010	3	10	4.5	2.9	14°	4	50
GMRE51403012		12					50
GMRE51403014		14					50
GMRE51403016		16					50
GMRE51403018		18					50
GMRE51403020		20					50
GMRE5140301606		16	4.5	2.9	14°	6	60
GMRE5140301806		18					60
GMRE5140302006		20					60
GMRE5140302506		25					60
GMRE514030160675		16					75
GMRE514030180675		18					75
GMRE514030200675		20					75
GMRE514030250675		25					75
GMRE514030300675		30					75
GMRE514030350675		35					75

4-Flute Rib Process Square End Mill



Perfect
MG 0.6
μm 4 Flutes Helix
35° TiSi

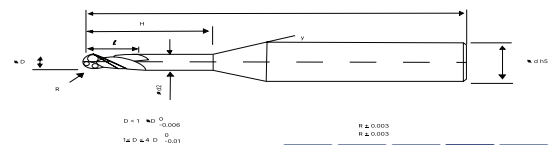
EDP NO.	D	H	ℓ	d2	y	d	L
GMRE5140401606	4	16	6	3.8	14°	6	60
GMRE5140401806		18					60
GMRE5140402006		20					60
GMRE5140402506		25					60
GMRE514040160675		16					75
GMRE514040180675		18					75
GMRE514040200675		20					75
GMRE514040250675		25					75
GMRE514040300675		30					75
GMRE514040350675		35					75

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62	●	●	●	●				●	○

2-Flute Rib Process Ball End Mill



EDP NO.	R	H	ℓ	D	d2	y	d	L
GMRE512001003	R0.5	0.3	0.1	0.1	0.085	12°	4	50
GMRE512001005		0.5						50
GMRE512001008		0.8						50
GMRE51200101		1						50
GMRE5120015005	R0.075	0.5	0.15	0.15	0.13	12°	4	50
GMRE512001501		1						50
GMRE51200201	R0.1	1	0.2	0.2	0.18	12°	4	50
GMRE512002015		1.5						50
GMRE51200202		2						50
GMRE51200203		3						50
GMRE51200301	R0.15	1	0.3	0.3	0.28	12°	4	50
GMRE512003015		1.5						50
GMRE51200302		2						50
GMRE51200303		3						50
GMRE51200304		4						50
GMRE51200305		5						50
GMRE512004015	R0.2	1.5	0.4	0.4	0.37	12°	4	50
GMRE51200402		2						50
GMRE51200403		3						50
GMRE51200404		4						50
GMRE51200405		5						50
GMRE51200406		6						50
GMRE51200502	R0.25	2	0.5	0.5	0.46	12°	4	50
GMRE51200503		3						50
GMRE51200504		4						50
GMRE51200505		5						50
GMRE51200506		6						50
GMRE51200508		8						50
GMRE51200602	R0.3	2	0.6	0.6	0.56	12°	4	50
GMRE51200603		3						50
GMRE51200604		4						50
GMRE51200605		5						50
GMRE51200606		6						50
GMRE51200608		8						50
GMRE51200610		10						50
GMRE51200702	R0.4	2	0.8	0.8	0.76	12°	4	50
GMRE51200703		3						50
GMRE51200704		4						50
GMRE51200705		5						50
GMRE51200706		6						50
GMRE51200708		8						50
GMRE51200710		10						50

HX

HG

GM

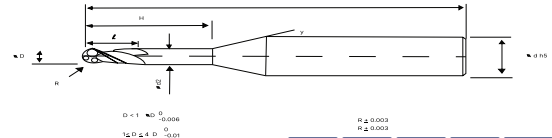
Ug
M

Ug
Al

CX

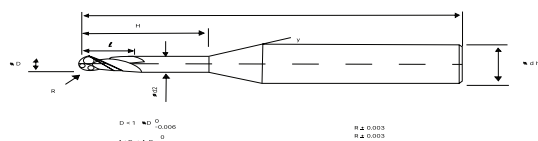
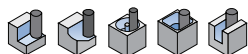
NX

2-Flute Rib Process Ball End Mill



EDP NO.	R	H	ℓ	D	d2	y	d	L
GMRB51201003	R0.5	3	1	1	0.95	14°	4	50
GMRB51201004		4						50
GMRB51201005		5						50
GMRB51201006		6						50
GMRB51201008		8						50
GMRB51201010		10						50
GMRB51201012		12						50
GMRB51201014		14						50
GMRB51201016		15						50
GMRB51201018		18						50
GMRB51201020		20						50
GMRB51201504	R0.75	4	1.5	1.5	1.45	14°	4	50
GMRB51201505		5						50
GMRB51201506		6						50
GMRB51201508		8						50
GMRB51201510		10						50
GMRB51201512		12						50
GMRB51201516		16						50
GMRB51201518		18						50
GMRB51201520		20						50
GMRB51202006	R1	6	2	2	1.94	14°	4	50
GMRB51202008		8						50
GMRB51202010		10						50
GMRB51202012		12						50
GMRB51202014		14						50
GMRB51202016		16						50
GMRB51202018		18						50
GMRB51202020		20						50
GMRB512020166		16					6	50
GMRB512020186		18						50
GMRB512020206		20						50
GMRB512020256		25						50
GMRB51203008	R1.5	8	3	3	2.9	14°	4	50
GMRB51203010		10						50
GMRB51203012		12						50
GMRB51203016		16						50
GMRB51203020		20						50
GMRB5120301606		16					6	60
GMRB5120301806		18						60
GMRB5120302006		20						60
GMRB5120302506		25						60

2-Flute Rib Process Ball End Mill



EDP NO.	R	H	ℓ	D	d2	y	d	L
GMRB512030160675	R1.5	16	3	3	2.9	14°	6	75
GMRB512030180675		18						75
GMRB512030200675		20						75
GMRB512030250675		25						75
GMRB512030300675		30						75
GMRB5120401606	R2	16	4	4	3.8	14°	6	60
GMRB5120401806		18						60
GMRB5120402006		20						60
GMRB5120402506		25						60
GMRB512040160675		16						75
GMRB512040180675		18						75
GMRB512040200675		20						75
GMRB512040250675		25						75
GMRB512040300675		30						75
GMRB512040350675		35						75

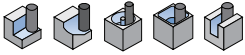
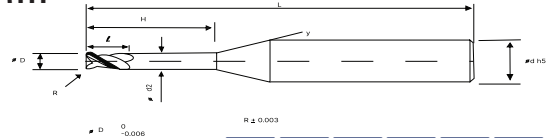
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel -HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
○		●	●	●	●				●	○

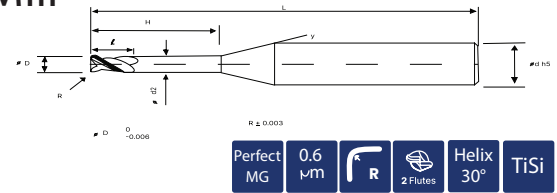
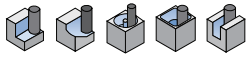
Click here for INDEX

2-Flute Rib Process Corner Radius End Mill



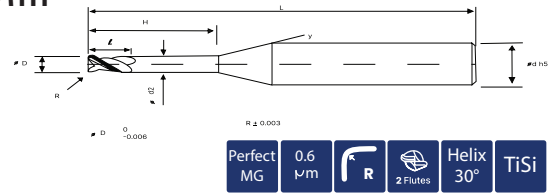
EDP NO.	D	R	H	ℓ	d2	y	d	L
GMRR51200200201	0.2	0.02	1	0.2	0.18	12°	4	50
GMRR512002002015			1.5					50
GMRR5200200202			2					50
GMRR51200200203			3					50
GMRR51200200501		0.05	1					50
GMRR51200200515			1.5					50
GMRR51200200502			2					50
GMRR51200200503			3					50
GMRR51200300201	0.3	0.02	1	0.3	0.28	12°	4	50
GMRR512003002015			1.5					50
GMRR51200300202			2					50
GMRR51200300203			3					50
GMRR51200300204			4					50
GMRR51200300501		0.05	1					50
GMRR512003005015			1.5					50
GMRR51200300502			2					50
GMRR51200300503			3					50
GMRR51200300504			4					50
GMRR51200400201	0.4	0.02	1	0.4	0.37	12°	4	50
GMRR512004002015			1.5					50
GMRR51200400202			2					50
GMRR51200400203			3					50
GMRR51200400204			4					50
GMRR51200400205			5					50
GMRR51200400206			6					50
GMRR51200400501		0.05	1					50
GMRR512004005015			1.5					50
GMRR51200400502			2					50
GMRR51200400503			3					50
GMRR51200400504			4					50
GMRR51200400505			5					50
GMRR51200400506			6					50
GMRR5120040101		0.1	1					50
GMRR515200401015			1.5					50
GMRR51200401002			2					50
GMRR51200401003			3					50
GMRR51200401004			4					50
GMRR51200401005			5					50
GMRR51200401006			6					50
GMRR5120050202	0.5	0.02	2	0.5	0.46	12°	4	50
GMRR5120050203			3					50
GMRR5120050204			4					50
GMRR5120050205			5					50

2-Flute Rib Process Corner Radius End Mill



EDP NO.	D	R	H	ℓ	d2	Y	d	L
GMRR51200500206	0.5	0.02	6	0.5	0.46	12°	4	50
GMRR51200500208			8					50
GMRR51200500210			10					50
GMRR51200500502		0.05	2					50
GMRR51200500503			3					50
GMRR51200500504			4					50
GMRR51200500505			5					50
GMRR51200500506			6					50
GMRR51200500508			8					50
GMRR51200500510			10					50
GMRR5120050102		0.1	2					50
GMRR5120050103			3					50
GMRR5120050104			4					50
GMRR5120050105			5					50
GMRR5120050106			6					50
GMRR5120050108			8					50
GMRR5120050110			10					50
GMRR51200600202	0.6	0.02	2	0.6	0.56	12°	4	50
GMRR51200600203			3					50
GMRR51200600204			4					50
GMRR51200600205			5					50
GMRR51200600206			6					50
GMRR51200600208			8					50
GMRR51200600210			10					50
GMRR51200600502		0.05	2					50
GMRR51200600503			3					50
GMRR51200600504			4					50
GMRR51200600505			5					50
GMRR51200600506			6					50
GMRR51200600508			8					50
GMRR51200600510			10					50
GMRR5120060102		0.1	2					50
GMRR5120060103			3					50
GMRR5120060104			4					50
GMRR5120060105			5					50
GMRR5120060106			6					50
GMRR5120060108			8					50
GMRR5120060110			10					50
GMRR5120060202		0.2	2					50
GMRR5120060203			3					50
GMRR5120060204			4					50
GMRR5120060205			5					50
GMRR5120060206			6					50
GMRR5120060208			8					50
GMRR5120060210			10					50

2-Flute Rib Process Corner Radius End Mill



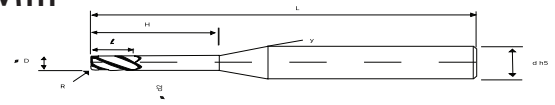
EDP NO.	D	R	H	ℓ	d2	y	d	L
GMRR51200800202	0.8	0.02	2	0.8	0.76	12°	4	50
GMRR51200800203			3					50
GMRR51200800204			4					50
GMRR51200800205			5					50
GMRR51200800206			6					50
GMRR51200800208			8					50
GMRR51200800210			10					50
GMRR51200800502		0.05	2					50
GMRR51200800503			3					50
GMRR51200800504			4					50
GMRR51200800505			5					50
GMRR51200800506			6					50
GMRR51200800508			8					50
GMRR51200800510			10					50
GMRR5120080102		0.1	2					50
GMRR5120080103			3					50
GMRR5120080104			4					50
GMRR5120080105			5					50
GMRR5120080106			6					50
GMRR5120080108			8					50
GMRR5120080110			10					50
GMRR5120080202		0.2	2					50
GMRR5120080203			3					50
GMRR5120080204			4					50
GMRR5120080205			5					50
GMRR5120080206			6					50
GMRR5120080208			8					50
GMRR5120080210			10					50

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel -HB225	Alloy Steel HB225 -325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
○		●	●	●	●				●	○

4-Flute Rib Process Corner Radius End Mill



• D 0 -0,01 R ± 0,003



EDP NO.	D	R	H	ℓ	d2	y	d	L
GMRR5140100104	1	0.1	4	1.5	0.95	14°	4	50
GMRR5140100106			6					50
GMRR5140100108			8					50
GMRR5140100110			10					50
GMRR5140100112			12					50
GMRR5140100114			14					50
GMRR5140100116			16					50
GMRR5140100118			18					50
GMRR5140100120			20					50
GMRR5140100204		0.2	4					50
GMRR5140100206			6					50
GMRR5140100208			8					50
GMRR5140100210			10					50
GMRR5140100212			12					50
GMRR5140100214			14					50
GMRR5140100216			16					50
GMRR5140100218			18					50
GMRR5140100220			20					50
GMRR5140150106	1.5	0.1	6	2.3	1.45	14°	4	50
GMRR5140150108			8					50
GMRR5140150110			10					50
GMRR5140150112			12					50
GMRR5140150114			14					50
GMRR5140150116			16					50
GMRR5140150118			18					50
GMRR5140150120			20					50
GMRR540150206		0.2	6					50
GMRR5140150208			8					50
GMRR5140150210			10					50
GMRR5140150212			12					50
GMRR5140150214			14					50
GMRR5140150216			16					50
GMRR5140150218			18					50
GMRR5140150220			20					50
GMRR5140200106	2	0.1	6	3	1.94	14°	4	50
GMRR5140200108			8					50
GMRR5140200110			10					50
GMRR5140200112			12					50
GMRR5140200114			14					50
GMRR5140200116			16					50
GMRR5140200118			18					50
GMRR5140200120			20					50

HX

HG

GM

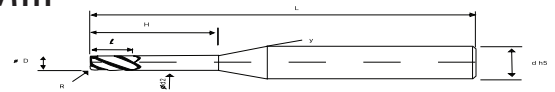
Ug
M

Ug
Al

CX

NX

4-Flute Rib Process Corner Radius End Mill

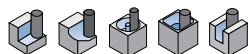
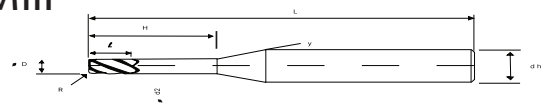


± D 0.01 R ± 0.003



EDP NO.	D	R	H	L	d2	y	d	L
GMRR5140200206	2	0.2	6	3	1.94	14°	4	50
GMRR5140200208			8					50
GMRR5140200210			10					50
GMRR5140200212			12					50
GMRR5140200214			14					50
GMRR5140200216			16					50
GMRR5140200218			18					50
GMRR5140200220			20					50
GMRR5140200506		0.5	6					50
GMRR5140200508			8					50
GMRR5140200510			10					50
GMRR5140200512			12					50
GMRR5140200514			14					50
GMRR5140200516			16					50
GMRR5140200518			18					50
GMRR5140200520			20					50
GMRR5140300110	3	0.1	10	4.5	2.9	14°	4	50
GMRR5140300112			12					50
GMRR5140300114			14					50
GMRR5140300116			16					50
GMRR5140300118			18					50
GMRR5140300120			20					50
GMRR5140300210		0.2	10					50
GMRR5140300212			12					50
GMRR5140300214			14					50
GMRR5140300216			16					50
GMRR5140300218			18					50
GMRR5140300220			20					50
GMRR5140300510		0.5	10					50
GMRR5140300512			12					50
GMRR5140300514			14					50
GMRR5140300516			16					50
GMRR5140300518			18					50
GMRR5140300520			20					50
GMRR514030021206		0.2	12				6	60
GMRR514030021406			14					60
GMRR514030021606			16					60
GMRR514030021806			18					60
GMRR514030022006			20					60
GMRR514030022506			25					60

4-Flute Rib Process Corner Radius End Mill



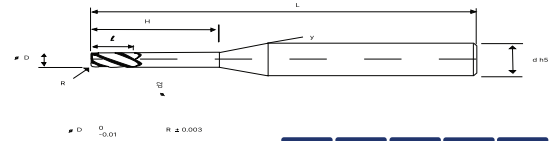
EDP NO.	D	R	H	ℓ	d2	y	d	L
GMRR514030051206	3	0.5	12	4.5	2.9	14°	6	60
GMRR514030051406			14					60
GMRR514030051606			16					60
GMRR514030051806			18					60
GMRR514030052006			20					60
GMRR514030052506			25					60
GMRR51403002120675		0.2	12					75
GMRR51403002140675			14					75
GMRR51403002160675			16					75
GMRR51403002180675			18					75
GMRR51403002200675			20					75
GMRR51403002250675			25					75
GMRR51403002300675			30					75
GMRR51403005120675		0.5	12					75
GMRR51403005140675			14					75
GMRR51403005160675			16					75
GMRR51403005180675			18					75
GMRR51403005200675			20					75
GMRR51403005250675			25					75
GMRR51403005300675			30					75
GMRR514040021606	4	0.2	16	6	3.8	14°	6	60
GMRR514040022006			20					60
GMRR514040022506			25					60
GMRR514040051606		0.5	16					60
GMRR514040052006			20					60
GMRR514040052506			25					60
GMRR51404002160675		0.2	16					75
GMRR51404002200675			20					75
GMRR51404002250675			25					75
GMRR51404002300675			30					75
GMRR51404002350675			35					75
GMRR51404005160675		0.5	16					75
GMRR51404005200675			20					75
GMRR51404005250675			25					75
GMRR51404005300675			30					75
GMRR51404005350675			35					75

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62	●	●	●	●				●	○

4-Flute Square End Mill



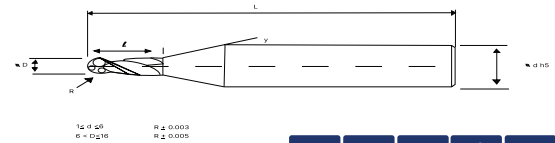
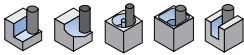
EDP NO.	D	ℓ	y	d	L
GME504010	1	3	12°	4	50
GME504015	1.5	4	12°	4	50
GME504020	2	6	10°	4	50
GME504025	2.5	8	10°	4	50
GME504030	3	8	10°	4	50
GME504040	4	11	-	4	50
GME50404075	4	15	-	4	75
GME504040100	4	15	-	4	100
GME504050	5	13	10°	6	50
GME50405075	5	18	10°	6	75
GME504060	6	15	-	6	50
GME50406060	6	15	-	6	60
GME50406075	6	20	-	6	75
GME504060100	6	24	-	6	100
GME504080	8	20	-	68	80
GME50408075	8	25	-	8	75
GME504080100	8	32	-	8	100
GME504100	10	25	-	10	75
GME504100100	10	40	-	10	100
GME504120	12	30	-	12	75
GME504120100	12	45	-	12	100
GME504160	16	45	-	16	100
GME50416150	16	65	-	16	150
GME504200	20	45	-	20	100
GM504200150	20	75	-	20	150

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
○		●	●	●	●				●	○

2-Flute Ball Nose End Mill



EDP NO.	R	D	ℓ	γ	d	L
GMB502010	R0.5	1	2	12°	4	50
GMB502015	R0.75	1.5	3	12°	4	50
GMB502020	R1	2	4	10°	4	50
GMB502030	R1.5	3	6	10°	4	50
GMB502040	R2	4	8	-	4	50
GMB50204075	R2	4	8	-	4	75
GMB502050	R2.5	5	10	10°	6	50
GMB50205060	R2.5	5	10	10°	6	60
GMB50205075	R2.5	5	10	10°	6	75
GMB502050100	R2.5	5	10	10°	6	100
GMB502060	R3	6	12	-	6	50
GMB50206060	R3	6	12	-	6	60
GMB50206075	R3	6	12	-	6	75
GMB502060100	R3	6	12	-	6	100
GMB502080	R4	8	16	-	8	60
GMB50208075	R4	8	16	-	8	75
GMB502080100	R4	8	16	-	8	100
GMB502100	R5	10	20	-	10	75
GMB502100100	R5	10	20	-	10	100
GMB502120	R8	12	24	-	12	75
GMB502120100	R6	12	24	-	12	100
GMB502160	R8	16	32	-	16	100
GMB50216050	R8	16	32	-	16	150

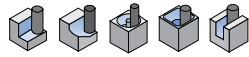
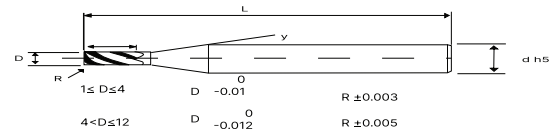
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61-HRc55	SKD61-HRc62	●	●	●	●				●	○

Click here for INDEX

4-Flute Corner Radius End Mill



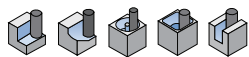
EDP NO.	D	R	ℓ	y	d	L
GMR604010005	1	0.05	3	12°	4	50
GMR604010001		0.1	3			50
GMR604010002		0.2	3			50
GMR60401501	1.5	0.1	4	12°	4	50
GMR60401502		0.2	4			50
GMR60402001	2	0.1	6	10°	4	50
GMR60402002		0.2	6			50
GMR60402005		0.5	6			50
GMR60403001	3	0.1	8	10°	4	50
GMR60403002		0.2	8			50
GMR60403005		0.5	8			50
GMR60404002	4	0.2	10	-	4	50
GMR60404005		0.5	10			50
GMR60404010		1	10			50
GMR60406002	6	0.2	15	-	6	50
GMR6040600275		0.2	18			75
GMR60406002100		0.2	20			100
GMR60406005		0.5	15			50
GMR6040600575		0.5	18			75
GMR60406005100		0.5	20			100
GMR60406010		1	15			50
GMR6040601075		1	18			75
GMR60406010100		1	20			100
GMR60408005	8	0.5	20	-	8	60
GMR6040800575		0.5	25			75
GMR60408005100		0.5	25			100
GMR60408010		1	20			60
GMR6040801075		1	25			75
GMR60408010100		1	25			100
GMR6041005	10	0.5	25	-	10	75
GMR6041005100		0.5	30			100
GMR60410010		1	25			75
GMR60410010100		1	30			100
GMR60412005	12	0.5	30	-	12	75
GMR60412005100		0.5	36			100
GMR60412010		1	30			75
GMR60412010100		1	36			100

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
○		●	●	●	●				●	○

End Mill for Mould Steel



$D \leq 12$
 $12 < D$

$D \begin{smallmatrix} 0 \\ -0.012 \\ 0 \end{smallmatrix}$
 $D \begin{smallmatrix} 0 \\ -0.02 \\ 0 \end{smallmatrix}$

Perfect MG 0.6 μm 4 Flutes Helix 45° TiSi

EDP NO.	D	ℓ	d	L
GMXE504060	6	20	6	50
GMXE504080	8	25	8	60
GMXE504080100	8	40	8	100
GMXE504100	10	36	10	75
GMXE50410040	10	40	10	100
GMXE50410050	10	50	10	100
GMXE504120	12	35	12	75
GMXE504120100	12	50	12	100
GMXE504160	16	50	16	100

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62	●	●	●	●				●	○

Click here for INDEX

U_gM_L Efficient Series

Recommended Machining Hardness

≤ HRC48



0.6µm **Ultra-Fine Crystalline Grain** Substrate Engineered with a premium 0.6µm ultra-fine crystalline grain carbide substrate, delivering excellent toughness, cutting stability, and reliable machining performance



TiAlN Black Coating Technology The **advanced TiAlN black coating** minimizes surface friction, significantly reducing cutting resistance and thermal load while improving tool life and machining efficiency.



Optimized for Steel, Stainless Steel, Cast Iron machining. The specialized “**U-groove geometry**” enables efficient chip evacuation and excellent material removal performance in both roughing and finishing operations.



High Efficiency Milling Cutter



$D \leq 12$
 $12 < D$

$D \begin{matrix} 0 \\ -0.012 \end{matrix}$
 $D \begin{matrix} 0 \\ -0.02 \end{matrix}$

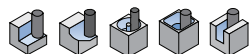
Perfect
MG

0.6
µm

4 Flutes

Helix
45°

TiAlN



EDP NO.	D	ℓ	d	L	Z
UMSE404030	3	8	4	50	4
UMSE404040	4	11	4	50	4
UMSE40404075	4	15	4	75	4
UMSE404040100	4	16	4	100	4
UMSE404050	5	13	6	50	4
UMSE404060	6	15	6	50	4
UMSE40406075	6	25	6	75	4
UMSE404060100	6	30	6	100	4
UMSE404080	8	20	8	60	4
UMSE40408075	8	30	8	75	4
UMSE404080100	8	35	8	100	4
UMSE404100	10	25	10	75	4
UMSE40410030	10	30	10	75	4
UMSE404100100	10	40	10	100	4
UMSE404120	12	30	12	75	4
UMSE404120100	12	45	12	100	4
UMSE404140	14	45	14	100	4
UMSE404160	16	45	16	100	4
UMSE404200	20	45	20	100	4

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62	●	●	●	●				○	○

UgAl

Efficient Series for Aluminum



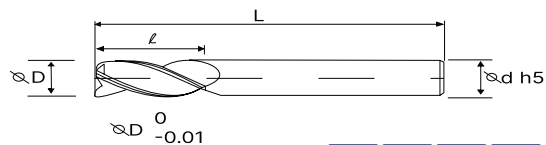
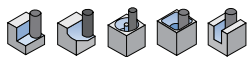
0.6µm **Ultra-Fine Crystalline Grain** Substrate Precision-engineered with a 0.6µm ultra-fine crystalline grain carbide substrate, providing exceptional edge strength and machining stability for aluminum applications.



High-Efficiency Flute Geometry **Features a large-helix Geometry design** combined with optimized multi-clearance angles on the side and bottom cutting edges, ensuring smooth chip evacuation, reduced cutting forces, and superior surface finish during high-speed aluminum machining.



Efficient Aluminum Milling Cutter



EDP NO.	D	l	d	L	Z
UMAL403010	1	3	4	50	3
UMAL403015	1.5	4.5	4	50	3
UMAL403020	2	6	4	50	3
UMAL403025	2.5	7.5	4	50	3
UMAL403030	3	9	4	50	3
UMAL403040	4	12	4	50	3
UMAL40304075	4	16	4	75	3
UMAL403040100	4	16	4	100	3
UMAL403050	5	15	6	50	3
UMAL403060	6	18	6	50	3
UMAL40306075	6	24	6	75	3
UMAL403060100	6	24	6	100	3
UMAL403080	8	24	8	60	3
UMAL40308075	8	32	8	75	3
UMAL403080100	8	32	8	100	3
UMAL403100	10	30	10	75	3
UMAL403100100	10	40	10	100	3
UMAL403120	12	35	12	75	3
UMAL403120100	12	45	12	100	3
UMAL403140	14	45	14	100	3
UMAL403160	16	45	16	100	3
UMAL403200	20	45	20	100	3

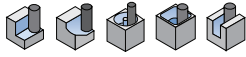
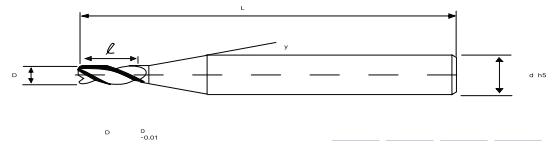
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61-HRC55	SKD61-HRC62					●		●		

[Click here for INDEX](#)

Mirror-Finish Aluminum End Mill



EDP NO.	D	l	Y	d	L
EAL303010	1	3	12°	4	50
EAL303015	1.5	4.5	12°	4	50
EAL303020	2	6	10°	4	50
EAL303030	3	9	10°	4	50
EAL303040	4	12	-	4	50
EAL30304075	4	16	-	4	75
EAL303040100	4	16	-	4	100
EAL303510	5	15	10°	6	50
EAL30305075	5	18	10°	6	75
EAL303050100	5	20	10°	6	100
EAL303060	6	18	-	6	50
EAL30306075	6	25	-	6	75
EAL303060100	6	30	-	6	100
EAL303080	8	24	-	8	60
EAL30308075	8	30	-	8	75
EAL303080100	8	35	-	8	100
EAL303100	10	30	-	10	75
EAL303100100	10	40	-	10	100
EAL303120	12	36	-	12	75
EAL303120100	12	45	-	12	100
EAL303140	14	45	-	14	100
EAL303160	16	45	-	16	100
EAL303200	20	45	-	20	100

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel -HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
						●		●		

CX

Copper and Aluminum Series

Recommended Machining Non-Ferrous Metals



0.2µm Ultra-Fine Micro-Grain Substrate Engineered to delivering excellent stability and enabling consistent high-speed machining performance.



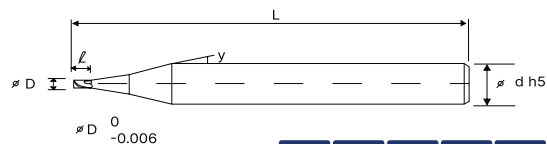
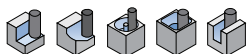
Advanced Aurora [Ultra-Thin Coating Technology Features](#) a specially developed ultra-thin Aurora coating, designed to precisely control micro-coating thickness, ensuring uniform performance and superior batch-to-batch consistency during production.



Optimized for Non-Ferrous High-Precision Applications, Ideal for high-precision machining of connector molds, copper electrodes, and 7-series aluminum alloys, delivering excellent surface finish, reduced tool wear, and stable cutting performance in demanding non-ferrous materials.



2-Flute Micro Diameter End Mill



EDP NO.	D	ℓ	y	d	L
CXE5020005	0.05	0.1	13°	4	50
CXE5020006	0.06	0.12	13°	4	50
CXE5020007	0.07	0.14	13°	4	50
CXE5020008	0.08	0.16	13°	4	50
CXE5020009	0.09	0.18	13°	4	50
CXE502005	0.1	0.2	13°	4	50
CXE5020015	0.15	0.3	13°	4	50
CXE502002	0.2	0.4	13°	4	50
CXE5020025	0.25	0.5	13°	4	50
CXE502003	0.3	0.6	13°	4	50
CXE5020035	0.35	0.7	13°	4	50
CXE502004	0.4	0.8	13°	4	50
CXE5020045	0.45	0.9	13°	4	50
CXE502005	0.5	1	13°	4	50
CXE5020055	0.55	1.1	13°	4	50
CXE502006	0.6	1.2	13°	4	50
CXE5020065	0.65	1.3	13°	4	50
CXE502007	0.7	1.4	13°	4	50
CXE5020075	0.75	1.5	13°	4	50
CXE502008	0.8	1.6	13°	4	50
CXE5020085	0.85	1.7	13°	4	50
CXE502009	0.9	1.8	13°	4	50

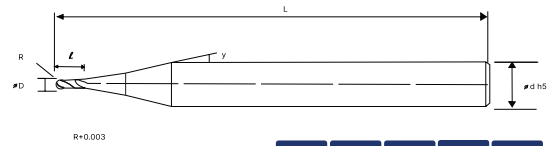
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61-HRc55	SKD61-HRc62									
						●	○	●		

[Click here for INDEX](#)

2-Flute Micro Diameter Ball End Mill



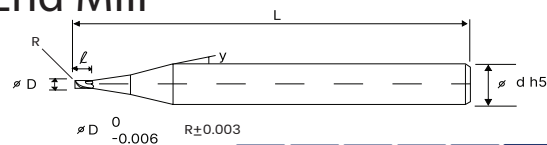
EDP NO.	R	ℓ	D	y	d	L
CXB502001	R0.05	0.2	0.1	13°	4	50
CXB502015	R0.075	0.3	0.15	13°	4	50
CXB502002	R0.1	0.4	0.2	13°	4	50
CXB502003	R0.15	0.6	0.3	13°	4	50
CXB502004	R0.2	0.8	0.4	13°	4	50
CXB6502005	R0.25	1	0.5	13°	4	50
CXB502006	R0.3	1.2	0.6	13°	4	50
CXB502007	R0.35	1.4	0.7	13°	4	50
CXB502008	R0.4	1.6	0.8	13°	4	50
CXB502009	R0.45	1.8	0.9	13°	4	50

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62					●	○	●		

2-Flute Micro Diameter Corner Radius End Mill



EDP NO.	D	R	ℓ	y	d	L
CXB502002002	0.2	0.02	0.4	13°	4	50
CXB502002005		0.05				50
CXB502003002	0.3	0.02	0.6	13°	4	50
CXB502003005		0.05				50
CXB502004002	0.4	0.02	0.8	13°	4	50
CXB502004005		0.5				50
CXB50200401		0.1				50
CXB502006002	0.6	0.02	1.0	13°	4	50
CXB502006005		0.05				50
CXB50200601		0.1				50
CXB502005002	0.5	0.02	1.2	13°	4	50
CXB502005005		0.05				50
CXB50200501		0.1				50
CXB50200502		0.2				50
CXB502008002	0.8	0.02	1.6	13°	4	50
CXB502008005		0.05				50
CXB502008001		0.1				50
CXB50200802		0.2				50

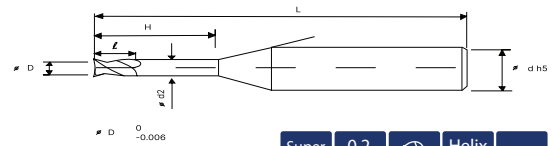
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
						●	○	●		

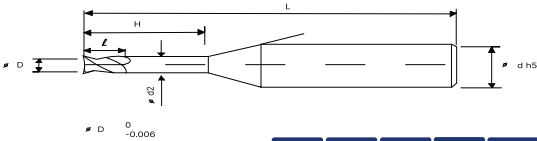
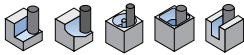
Click here for INDEX

2-Flute Rib Process Square End Mill



EDP NO.	D	H	ℓ	d2	y	d	L
CXRE512001003	0.1	0.3	0.1	0.085	12°	4	50
CXRE512001005		0.5					50
CXRE512001008		0.8					50
CXRE51200101		1					50
CXRE5120015005	0.15	0.5	0.15	0.13	12°	4	50
CXRE512001501		1					50
CXRE51200201	0.2	1	0.2	0.18	12°	4	50
CXRE512002015		1.5					50
CXRE51200202		2					50
CXRE51200203		3					50
CXRE51200204	0.3	4	0.3	0.28	12°	4	50
CXRE51200301		1					50
CXRE512003015		1.5					50
CXRE51200302		2					50
CXRE51200303		3					50
CXRE51200304	0.4	4	0.4	0.37	12°	4	50
CXRE51200305		5					50
CXRE512004015		1.5					50
CXRE51200402	0.5	2	0.5	0.46	12°	4	50
CXRE51200403		3					50
CXRE51200404		4					50
CXRE51200405		5					50
CXRE51200406	0.6	6	0.6	0.56	12°	4	50
CXRE51200502		2					50
CXRE51200503		3					50
CXRE51200504		4					50
CXRE51200505		5					50
CXRE51200506		6					50
CXRE51200508	0.7	8	0.7	0.66	12°	4	50
CXRE51200510		10					50
CXRE51200602		2					50
CXRE51200603		3					50
CXRE51200604	0.8	4	0.8	0.76	12°	4	50
CXRE51200605		5					50
CXRE51200606		6					50
CXRE51200608		8					50
CXRE51200610		10					50
CXRE51200702	0.9	2	0.9	0.86	12°	4	50
CXRE51200703		3					50
CXRE51200704		4					50
CXRE51200705		5					50
CXRE51200706		6					50
CXRE51200708		8					50
CXRE51200710		10					50

2-Flute Rib Process Square End Mill



Super UMG

0.2 μm

2 Flutes

Helix 30°

AU

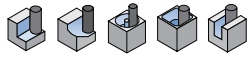
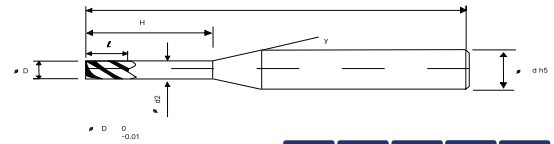
EDP NO.	D	H	ℓ	d2	y	d	L
CXRE51200802	0.8	2	0.8	0.76	12°	4	50
CXRE51200803		3					50
CXRE51200804		4					50
CXRE51200805		5					50
CXRE51200806		6					50
CXRE51200808		8					50
CXRE51200810		10					50

Applicable Working Material

H		P			K	N			M	S
Hardened Steel		Carbon Steel -HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
						●	○	●		

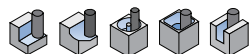
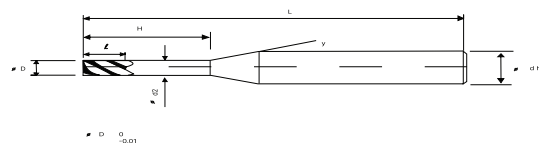
○:GOOD ●:EXCELLENT

4-Flute Rib Process Square End Mill



EDP NO.	D	H	ℓ	d2	y	d	L
CXRE51401004	1	4	1.5	0.95	14°	4	50
CXRE51401005		5					50
CXRE51401006		6					50
CXRE51401008		8					50
CXRE51401010		10					50
CXRE51401012		12					50
CXRE51401014		14					50
CXRE51401016		16					50
CXRE51401018		18					50
CXRE51401020		20					50
CXRE51401506	1.5	6	2.3	1.45	14°	4	50
CXRE51401508		8					50
CXRE51401510		10					50
CXRE51401512		12					50
CXRE51401514		14					50
CXRE51401516		16					50
CXRE51401518		18					50
CXRE51401520		20					50
CXRE51402006	2	6	3	1.94	14°	4	50
CXRE51402008		8					50
CXRE51402010		10					50
CXRE51402012		12					50
CXRE51402014		14					50
CXRE51402016		16					50
CXRE51402018		18					50
CXRE51402020		20					50
CXRE51403010	3	10	4.5	2.9	14°	4	50
CXRE51403012		12					50
CXRE51403014		14					50
CXRE51403016		16					50
CXRE51403018		18					50
CXRE51403020		20					50
CXRE5140301606		16				6	60
CXRE5140301806		18					60
CXRE5140302006		20					60
CXRE5140302506		25					60
CXRE514030160675		16					75
CXRE514030180675		18					75
CXRE514030200675		20					75
CXRE514030250675		25					75
CXRE514030300675		30					75
CXRE514030350675		35					75

4-Flute Rib Process Square End Mill



Super
UMG

0.2
μm

4 Flutes

Helix
35°

AU

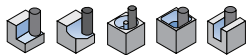
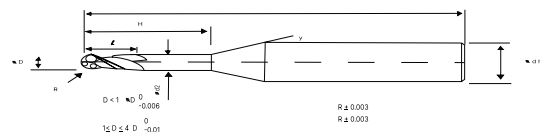
EDP NO.	D	H	ℓ	d2	y	d	L
CXRE5140401606	4	16	6	3.8	14°	6	60
CXRE5140401806		18					60
CXRE5140402006		20					60
CXRE5140402506		25					60
CXRE514040160675		16					75
CXRE514040180675		18					75
CXRE514040200675		20					75
CXRE514040250675		25					75
CXRE514040300675		30					75
CXRE514040350675		35					75

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel -HB225	Alloy Steel HB225 -325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
						●	○	●		

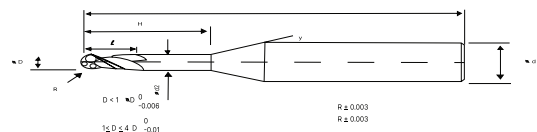
2-Flute Rib Process Ball End Mill



Super UMG	0.2 µm	2 Flutes	Helix 40°	AU
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EDP NO.	R	H	ℓ	D	d2	y	d	L
CXRB512001003	R0.05	0.3	0.1	0.1	0.085	12°	4	50
CXRB512001005		0.5						50
CXRB512001008		0.8						50
CXRB51200101		1						50
CXRB5120015005	R0.075	0.5	0.15	0.15	0.13	12°	4	50
CXRB512001501		1						50
CXRB51200201	R0.1	1	0.2	0.2	0.18	12°	4	50
CXRB512002015		1.5						50
CXRB51200202		2						50
CXRB51200203		3						50
CXRB51200301	R0.15	1	0.3	0.3	0.28	12°	4	50
CXRB512003015		1.5						50
CXRB51200302		2						50
CXRB51200303		3						50
CXRB51200304		4						50
CXRB51200305		5						50
CXRB512004015	R0.2	1.5	0.4	0.4	0.37	12°	4	50
CXRB51200402		2						50
CXRB51200403		3						50
CXRB51200404		4						50
CXRB51200405		5						50
CXRB51200406		6						50
CXRB51200502	R0.25	2	0.5	0.5	0.46	12°	4	50
CXRB51200503		3						50
CXRB51200504		4						50
CXRB51200505		5						50
CXRB51200506		6						50
CXRB51200508		8						50
CXRB51200602	R0.3	2	0.6	0.6	0.56	12°	4	50
CXRB51200603		3						50
CXRB51200604		4						50
CXRB51200605		5						50
CXRB51200606		6						50
CXRB51200608		8						50
CXRB51200610	R0.4	10	0.8	0.8	0.76	12°	4	50
CXRB51200702		2						50
CXRB51200703		3						50
CXRB51200704		4						50
CXRB51200705		5						50
CXRB51200706		6						50
CXRB51200708	R0.4	8	0.8	0.8	0.76	12°	4	50
CXRB51200710		10						50

2-Flute Rib Process Ball End Mill



EDP NO.	R	H	ℓ	D	d2	y	d	L
CXRB51201003	R0.5	3	1	1	0.95	14°	4	50
CXRB51201004		4						50
CXRB51201005		5						50
CXRB51201006		6						50
CXRB51201008		8						50
CXRB51201010		10						50
CXRB51201012		12						50
CXRB51201014		14						50
CXRB51201016		15						50
CXRB51201018		18						50
CXRB51201020		20						50
CXRB51201504	R0.75	4	1.5	1.5	1.45	14°	4	50
CXRB51201505		5						50
CXRB51201506		6						50
CXRB51201508		8						50
CXRB51201510		10						50
CXRB51201512		12						50
CXRB51201516		16						50
CXRB51201518		18						50
CXRB51201520		20						50
CXRB51202006	R1	6	2	2	1.94	14°	4	50
CXRB51202008		8						50
CXRB51202010		10						50
CXRB51202012		12						50
CXRB51202014		14						50
CXRB51202016		16						50
CXRB51202018		18						50
CXRB51202020		20						50
CXRB5120201606		16					6	50
CXRB5120201806		18						50
CXRB5120202006		20						50
CXRB5120202506		25						50
CXRB51203008	R1.5	8	3	3	2.9	14°	4	50
CXRB51203010		10						50
CXRB51203012		12						50
CXRB51203016		16						50
CXRB51203020		20						50
CXRB5120301606		16					6	60
CXRB5120301806		18						60
CXRB5120302006		20						60
CXRB5120302506		25						60

HX

HG

GM

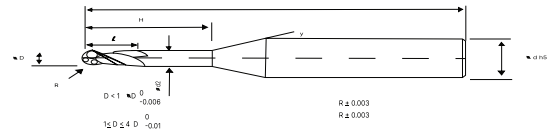
Ug
M

Ug
Al

CX

NX

2-Flute Rib Process Ball End Mill



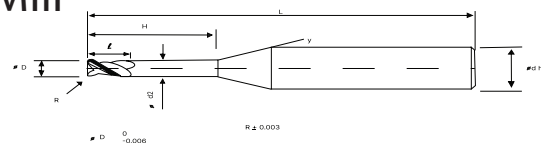
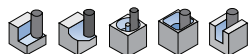
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CXRB512030180675		18						75
CXRB512030200675		20						75
CXRB512030250675		25						75
CXRB512030300675		30						75
CXRB5120401606	R2	16	4	4	3.8	14°	6	60
CXRB5120401806		18						60
CXRB5120402006		20						60
CXRB5120402506		25						60
CXRB512040160675		16						75
CXRB512040180675		18						75
CXRB512040200675		20						75
CXRB512040250675		25						75
CXRB512040300675		30						75
CXRB512040350675		35						75

Applicable Working Material

○:GOOD ●:EXCELLENT

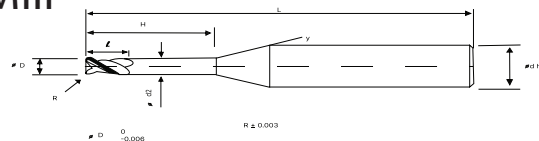
H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
						●	○	●		

2-Flute Rib Process Corner Radius End Mill



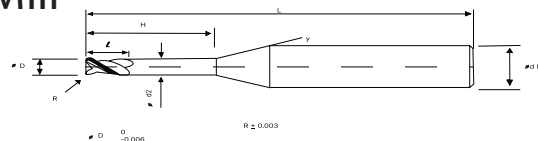
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CXRR512002002015			1.5					50
CXRR51200200202			2					50
CXRR51200200203			3					50
CXRR51200200501		0.05	1					50
CXRR51200200515			1.5					50
CXRR51200200502			2					50
CXRR51200200503			3					50
CXRR51200300201	0.3	0.02	1	0.3	0.28	12°	4	50
CXRR512003002015			1.5					50
CXRR51200300202			2					50
CXRR51200300203			3					50
CXRR51200300204			4					50
CXRR51200300501		0.05	1					50
CXRR512003005015			1.5					50
CXRR51200300502			2					50
CXRR51200300503			3					50
CXRR51200300504			4					50
CXRR51200400201	0.4	0.02	1	0.4	0.37	12°	4	50
CXRR512004002015			1.5					50
CXRR51200400202			2					50
CXRR51200400203			3					50
CXRR51200400204			4					50
CXRR51200400205			5					50
CXRR51200400206			6					50
CXRR51200400501		0.05	1					50
CXRR512004005015			1.5					50
CXRR51200400502			2					50
CXRR51200400503			3					50
CXRR51200400504			4					50
CXRR51200400505			5					50
CXRR51200400506			6					50
CXRR5120040101		0.1	1					50
CXRR51200401015			1.5					50
CXRR51200401002			2					50
CXRR51200401003			3					50
CXRR51200401004			4					50
CXRR51200401005			5					50
CXRR51200401006			6					50
CXRR5120050202	0.5	0.02	2	0.5	0.46	12°	4	50
CXRR5120050203			3					50
CXRR5120050204			4					50
CXRR5120050205			5					50

2-Flute Rib Process Corner Radius End Mill



EDP NO.	D	R	H	ℓ	d2	Y	d	L
CXRR51200500206	0.5	0.02	6	0.5	0.46	12°	4	50
CXRR51200500208			8					50
CXRR51200500210			10					50
CXRR51200500502		0.05	2					50
CXRR51200500503			3					50
CXRR51200500504			4					50
CXRR51200500505			5					50
CXRR51200500506			6					50
CXRR51200500508			8					50
CXRR51200500510			10					50
CXRR5120050102		0.1	2					50
CXRR5120050103			3					50
CXRR5120050104			4					50
CXRR5120050105			5					50
CXRR5120050106			6					50
CXRR5120050108			8					50
CXRR5120050110			10					50
CXRR51200600202	0.6	0.02	2	0.6	0.56	12°	4	50
CXRR51200600203			3					50
CXRR51200600204			4					50
CXRR51200600205			5					50
CXRR51200600206			6					50
CXRR51200600208			8					50
CXRR51200600210			10					50
CXRR51200600502		0.05	2					50
CXRR51200600503			3					50
CXRR51200600504			4					50
CXRR51200600505			5					50
CXRR51200600506			6					50
CXRR51200600508			8					50
CXRR51200600510			10					50
CXRR5120060102		0.1	2					50
CXRR5120060103			3					50
CXRR5120060104			4					50
CXRR5120060105			5					50
CXRR5120060106			6					50
CXRR5120060108			8					50
CXRR5120060110			10					50
CXRR5120060202		0.2	2					50
CXRR5120060203			3					50
CXRR5120060204			4					50
CXRR5120060205			5					50
CXRR5120060206			6					50
CXRR5120060208			8					50
CXRR5120060210			10					50

2-Flute Rib Process Corner Radius End Mill



EDP NO.	D	R	H	ℓ	d2	y	d	L
CXRR51200800202	0.8	0.02	2	0.8	0.76	12°	4	50
CXRR51200800203			3					50
CXRR51200800204			4					50
CXRR51200800205			5					50
CXRR51200800206			6					50
CXRR51200800208			8					50
CXRR51200800210			10					50
CXRR51200800502		0.05	2					50
CXRR51200800503			3					50
CXRR51200800504			4					50
CXRR51200800505			5					50
CXRR51200800506			6					50
CXRR51200800508			8					50
CXRR51200800510			10					50
CXRR5120080102		0.1	2					50
CXRR5120080103			3					50
CXRR5120080104			4					50
CXRR5120080105			5					50
CXRR5120080106			6					50
CXRR5120080108			8					50
CXRR5120080110			10					50
CXRR5120080202		0.2	2					50
CXRR5120080203			3					50
CXRR5120080204			4					50
CXRR5120080205			5					50
CXRR5120080206			6					50
CXRR5120080208			8					50
CXRR5120080210			10					50

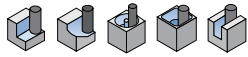
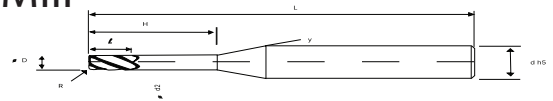
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62					●	○	●		

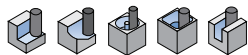
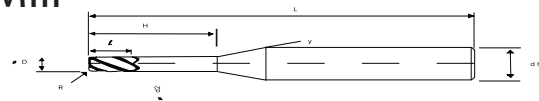
Click here for INDEX

4-Flute Rib Process Corner Radius End Mill



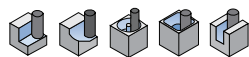
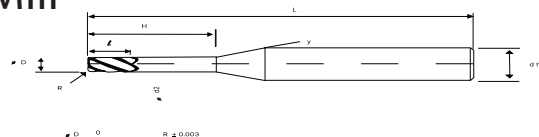
EDP NO.	D	R	H	ℓ	d2	y	d	L
CXRR5140100104	1	0.1	4	1.5	0.95	14°	4	50
CXRR5140100106			6					50
CXRR5140100108			8					50
CXRR5140100110			10					50
CXRR5140100112			12					50
CXRR5140100114			14					50
CXRR5140100116			16					50
CXRR5140100118			18					50
CXRR5140100120			20					50
CXRR5140100204		0.2	4					50
CXRR5140100206			6					50
CXRR5140100208			8					50
CXRR5140100210			10					50
CXRR5140100212			12					50
CXRR5140100214			14					50
CXRR5140100216			16					50
CXRR5140100218			18					50
CXRR5140100220			20					50
CXRR5140150106	1.5	0.1	6	2.3	1.45	14°	4	50
CXRR5140150108			8					50
CXRR5140150110			10					50
CXRR5140150112			12					50
CXRR5140150114			14					50
CXRR5140150116			16					50
CXRR5140150118			18					50
CXRR5140150120			20					50
CXRR540150206		0.2	6					50
CXRR5140150208			8					50
CXRR5140150210			10					50
CXRR5140150212			12					50
CXRR5140150214			14					50
CXRR5140150216			16					50
CXRR5140150218			18					50
CXRR5140150220			20					50
CXRR5140200106	2	0.1	6	3	1.94	14°	4	50
CXRR5140200108			8					50
CXRR5140200110			10					50
CXRR5140200112			12					50
CXRR5140200114			14					50
CXRR5140200116			16					50
CXRR5140200118			18					50
CXRR5140200120			20					50

4-Flute Rib Process Corner Radius End Mill



EDP NO.	D	R	H	L	d2	y	d	L
CXRR5140200206	2	0.2	6	3	1.94	14°	4	50
CXRR5140200208			8					50
CXRR5140200210			10					50
CXRR5140200212			12					50
CXRR5140200214			14					50
CXRR5140200216			16					50
CXRR5140200218			18					50
CXRR5140200220			20					50
CXRR5140200506		0.5	6					50
CXRR5140200508			8					50
CXRR5140200510			10					50
CXRR5140200512			12					50
CXRR5140200514			14					50
CXRR5140200516			16					50
CXRR5140200518			18					50
CXRR5140200520			20					50
CXRR5140300110	3	0.1	10	4.5	2.9	14°	4	50
CXRR5140300112			12					50
CXRR5140300114			14					50
CXRR5140300116			16					50
CXRR5140300118			18					50
CXRR5140300120			20					50
CXRR5140300210		0.2	10					50
CXRR5140300212			12					50
CXRR5140300214			14					50
CXRR5140300216			16					50
CXRR5140300218			18					50
CXRR5140300220			20					50
CXRR5140300510		0.5	10					50
CXRR5140300512			12					50
CXRR5140300514			14					50
CXRR5140300516			16					50
CXRR5140300518			18					50
CXRR5140300520			20					50
CXRR514030021206		0.2	12				6	60
CXRR514030021406			14					60
CXRR514030021606			16					60
CXRR514030021806			18					60
CXRR514030022006			20					60
CXRR514030022506			25					60

4-Flute Rib Process Corner Radius End Mill



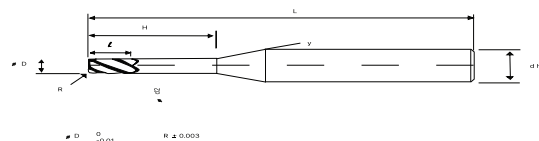
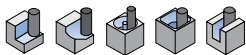
EDP NO.	D	R	H	ℓ	d2	y	d	L
CXRR514030051206	3	0.5	12	4.5	2.9	14°	6	60
CXRR514030051406			14					60
CXRR514030051606			16					60
CXRR514030051806			18					60
CXRR514030052006			20					60
CXRR514030052506			25					60
CXRR51403002120675		0.2	12					75
CXRR51403002140675			14					75
CXRR51403002160675			16					75
CXRR51403002180675			18					75
CXRR51403002200675			20					75
CXRR51403002250675			25					75
CXRR51403002300675		0.5	30					75
CXRR51403005120675			12					75
CXRR51403005140675			14					75
CXRR51403005160675			16					75
CXRR51403005180675			18					75
CXRR51403005200675			20					75
CXRR51403005250675			25					75
CXRR51403005300675			30					75
CXRR514040021606	4	0.2	16	6	3.8	14°	6	60
CXRR514040022006			20					60
CXRR514040022506			25					60
CXRR514040051606		0.5	16					60
CXRR514040052006			20					60
CXRR514040052506			25					60
CXRR51404002160675		0.2	16					75
CXRR51404002200675			20					75
CXRR51404002250675			25					75
CXRR51404002300675			30					75
CXRR51404002350675			35					75
CXRR51404005160675		0.5	16					75
CXRR51404005200675			20					75
CXRR51404005250675			25					75
CXRR51404005300675			30					75
CXRR51404005350675			35					75

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62					●	○	●		

4-Flute Square End Mill



EDP NO.	D	ℓ	y	d	L
CXE504010	1	3	12°	4	50
CXE504015	1.5	4	12°	4	50
CXE504020	2	6	10°	4	50
CXE504025	2.5	8	10°	4	50
CXE504030	3	8	10°	4	50
CXE504040	4	11	-	4	50
CXE50404075	4	15	-	4	75
CXE504040100	4	15	-	4	100
CXE504050	5	13	10°	6	50
CXE50405075	5	18	10°	6	75
CXE504060	6	15	-	6	50
CXE50406060	6	15	-	6	60
CXE50406075	6	20	-	6	75
CXE504060100	6	24	-	6	100
CXE504080	8	20	-	68	80
CXE50408075	8	25	-	8	75
CXE504080100	8	32	-	8	100
CXE504100	10	25	-	10	75
CXE504100100	10	40	-	10	100
CXE504120	12	30	-	12	75
CXE504120100	12	45	-	12	100
CXE504160	16	45	-	16	100
CX50416150	16	65	-	16	150
CX504200	20	45	-	20	100
CX504200150	20	75	-	20	150

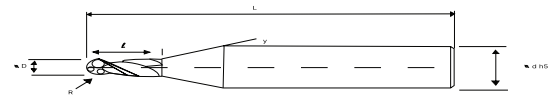
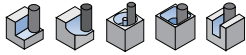
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61-HRC55	SKD61-HRC62					●	○	●		

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2-Flute Ball End Mill



16-9 50R
6-0.016

R 2 0.003
R 2 0.005

Super
UMG

0.2
µm

2 Flutes

Helix
40°

AU

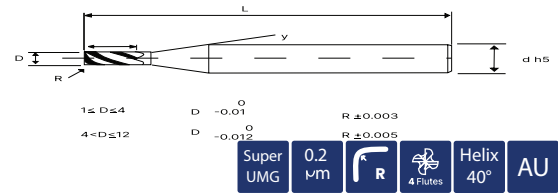
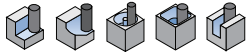
EDP NO.	R	D	ℓ	y	d	L
CXB502010	R0.5	1	2	12°	4	50
CXB502015	R0.75	1.5	3	12°	4	50
CXB502020	R1	2	4	10°	4	50
CXB502030	R1.5	3	6	10°	4	50
CXB502040	R2	4	8	-	4	50
CXB50204075	R2	4	8	-	4	75
CXB502050	R2.5	5	10	10°	6	50
CXB50205060	R2.5	5	10	10°	6	60
CXB50205075	R2.5	5	10	10°	6	75
CXB502050100	R2.5	5	10	10°	6	100
CXB502060	R3	6	12	-	6	50
CXB50206060	R3	6	12	-	6	60
CXB50206075	R3	6	12	-	6	75
CXB502060100	R3	6	12	-	6	100
CXB502080	R4	8	16	-	8	60
CXB50208075	R4	8	16	-	8	75
CXB502080100	R4	8	16	-	8	100
CXB502100	R5	10	20	-	10	75
CXB502100100	R5	0	20	-	10	100
CXB502120	R8	12	24	-	12	75
CXB502120100	R6	12	24	-	12	100
CXB502160	R8	16	32	-	16	100
CXB50216050	R8	16	32	-	16	150

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
						●	○	●		

4-Flute Corner Radius End Mill



EDP NO.	D	R	ℓ	y	d	L
CXR604010005	1	0.05	3	12°	4	50
CXR604010001		0.1	3			50
CXR604010002		0.2	3			50
CXR604015001	1.5	0.1	4	12°	4	50
CXR604015002		0.2	4			50
CXR604020001	2	0.1	6	10°	4	50
CXR604020002		0.2	6			50
CXR604020005		0.5	6			50
CXR604030001	3	0.1	8	10°	4	50
CXR604030002		0.2	8			50
CXR604030005		0.5	8			50
CXR604040002	4	0.2	10	-	4	50
CXR604040005		0.5	10			50
CXR604040010		1	10			50
CXR604060002	6	0.2	15	-	6	50
CXR6040600275		0.2	18			75
CXR60406002100		0.2	20			100
CXR604060005		0.5	15			50
CXR6040600575		0.5	18			75
CXR60406005100		0.5	20			100
CXR604060010		1	15			50
CXR60406001075		1	18			75
CXR604060010100		1	20			100
CXR604080005	8	0.5	20	-	8	60
CXR6040800575		0.5	25			75
CXR60408005100		0.5	25			100
CXR604080010		1	20			60
CXR60408001075		1	25			75
CXR604080010100		1	25			100
CXR60410005	10	0.5	25	-	10	75
CXR6041005100		0.5	30			100
CXR604100010		1	25			75
CXR604100010100		1	30			100
CXR604120005	12	0.5	30	-	12	75
CXR60412005100		0.5	36			100
CXR604120010		1	30			75
CXR604120010100		1	36			100

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62					●	○	●		

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NX

Graphite Processing Series



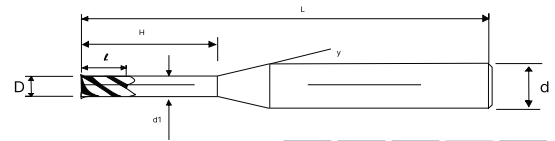
0.6µm **Ultra-Fine Crystalline Grain** Substrate Engineered For Machining Graphite, Medical Grade Zirconia, Advanced Non-Ferrous delivering excellent Wear Resistances, cutting stability, and reliable machining performance.



CVD Diamond Coating with High Density and ultra-High Melting Point, Delivering Exceptional Thermal Stability and wear resistance minimizes surface friction, significantly reducing cutting resistance and thermal load while improving tool life and machining efficiency.



Graphite Rib Process Square End Mill



Perfect MG	0.6 µm	4 Flutes	Helix 40°	Diamond
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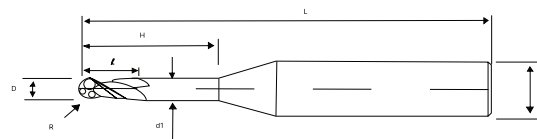
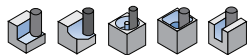
EDP NO.	D	ℓ	H	d1	d	L
NXRE61400504	0.5	1.5	4	0.45	4	50
NXRE61400506	0.5	1.5	6	0.45	4	50
NXRE61400604	0.6	1.8	4	0.55	4	50
NXRE61400606	0.6	1.8	6	0.55	4	50
NXRE61400806	0.8	2.4	6	0.75	4	50
NXRE61400808	0.8	2.4	8	0.75	4	50
NXRE61401006	1.0	3	6	0.95	4	60
NXRE61401010	1.0	3	10	0.95	4	60
NXRE61401015	1.0	3	15	0.95	4	60
NXRE61401508	1.5	4.5	8	1.45	4	60
NXRE61401510	1.5	4.5	10	1.45	4	60
NXRE61401515	1.5	4.5	15	1.45	4	60
NXRE61402010	2.0	6	10	1.95	4	60
NXRE61402016	2.0	6	16	1.95	4	60
NXRE61402020	2.0	6	20	1.95	6	75
NXRE61402030	2.0	6	30	1.95	6	75
NXRE61403015	3.0	9	15	2.8	6	75
NXRE61403030	3.0	9	30	2.8	6	75
NXRE61404016	4.0	12	16	3.7	6	75
NXRE61404030	4.0	12	30	3.7	6	75

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
						●	●	○		

Graphite Rib Process Ball End Mill



Perfect MG	0.6 µm	2 Flutes	Helix 40°	Diamond
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EDP NO.	D	R	ℓ	H	d1	d	L
NXRB61200504	0.5	R0.25	1	4	0.45	4	50
NXRB61200506	0.5	R0.25	1	6	0.45	4	50
NXRB61200604	0.6	R0.3	1.2	4	0.55	4	50
NXRB61200606	0.6	R0.3	1.2	6	0.55	4	50
NXRB61200806	0.8	R0.4	1.6	6	0.75	4	50
NXRB61200808	0.8	R0.4	1.6	8	0.75	4	50
NXRB61201006	1.0	R0.5	3	6	0.95	4	60
NXRB61201010	1.0	R0.5	3	10	0.95	4	60
NXRB61201015	1.0	R0.5	3	15	0.95	4	60
NXRB61201020	1.0	R0.5	3	20	0.95	4	60
NXRB61201508	1.5	R0.75	3	8	1.45	4	60
NXRB61201512	1.5	R0.75	3	12	1.45	4	60
NXRB61201515	1.5	R0.75	3	15	1.45	4	60
NXRB61201520	1.5	R0.75	3	20	1.45	4	60
NXRB61202010	2.0	R1.0	4	10	1.9	4	60
NXRB61202016	2.0	R1.0	4	16	1.9	4	60
NXRB61202020	2.0	R1.0	4	20	1.9	4	60
NXRB61203015	3.0	R1.5	6	15	2.8	6	75
NXRB61203030	3.0	R1.5	6	30	2.8	6	75
NXRB61204020	4.0	R2.0	8	20	3.7	6	75
NXRB61204030	4.0	R2.0	8	30	3.7	6	75

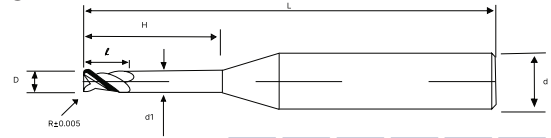
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62									
						●	●	○		

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Graphite Rib Process Corner Radius End Mill



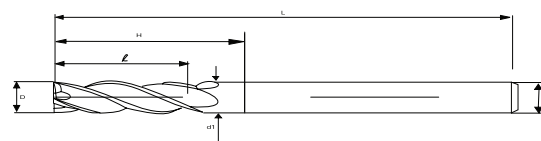
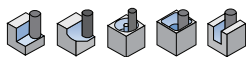
EDP NO.	D	R	H	ℓ	d1	d	L
NXRR6120100106	1.0	R0.1	6	3	0.95	4	60
NXRR6120100108	1.0	R0.1	8	3	0.95	4	60
NXRR6120100110	1.0	R0.1	10	3	0.95	4	60
NXRR6120100112	1.0	R0.1	12	3	0.95	4	60
NXRR6120150106	1.5	R0.1	6	4.5	1.45	4	60
NXRR6120150110	1.5	R0.1	10	4.5	1.45	4	60
NXRR6120150116	1.5	R0.1	16	4.5	1.45	4	60
NXRR6120150120	1.5	R0.1	20	4.5	1.45	4	60
NXRR6120200108	2.0	R0.1	8	6	1.92	4	60
NXRR6120200112	2.0	R0.1	12	6	1.92	4	60
NXRR6120200116	2.0	R0.1	16	6	1.92	4	60
NXRR6120200120	2.0	R0.1	20	6	1.92	4	60
NXRR6120300209	3.0	R0.2	9	9	2.8	4	60
NXRR6120300215	3.0	R0.2	15	9	2.8	4	60
NXRR6120300220	3.0	R0.2	20	9	2.8	4	60
NXRR6120300230	3.0	R0.2	30	9	2.8	4	60
NXRR6120300509	3.0	R0.5	9	9	2.8	4	60
NXRR6120300515	3.0	R0.5	15	9	2.8	4	60
NXRR6120300520	3.0	R0.5	20	9	2.8	4	60
NXRR6120300530	3.0	R0.5	30	9	2.8	4	60
NXRR6120400215	4.0	R0.2	15	12	3.7	6	75
NXRR6120400220	4.0	R0.2	20	12	3.7	6	75
NXRR6120400225	4.0	R0.2	25	12	3.7	6	75
NXRR6120400230	4.0	R0.2	30	12	3.7	6	75
NXRR6120400515	4.0	R0.5	15	12	3.7	6	75
NXRR6120400520	4.0	R0.5	20	12	3.7	6	75
NXRR6120400525	4.0	R0.5	25	12	3.7	6	75
NXRR6120400530	4.0	R0.5	30	12	3.7	6	75

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225 -HB225	Alloy Steel HB225 -325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
						●	●	○		

Graphite End Mill



Perfect MG	0.6 μm	4 Flutes	Helix 35°	Diamond
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EPD NO.	D	L	H	d1	d	L
NXE604030	3.0	9	20	2.8	3	60
NXE604040	4.0	12	25	3.7	4	60
NXE604060	6.0	25	35	5.6	6	75
NXE604080	8.0	25	35	7.6	8	75
NXE604100	10.0	35	50	9.6	10	100
NXE604120	12.0	50	65	11.4	12	100
NXE604160	16.0	60	80	15.6	16	150
NXE60403075	3.0	12	30	2.8	3	75
NXE60404075	4.0	12	30	3.7	4	75
NXE604030100	3.0	9	30	2.8	3	100
NXE604040100	4.0	12	30	3.7	4	100
NXE604060100	6.0	25	40	5.6	6	100
NXE604080100	8.0	30	40	7.5	8	100
NXE604060150	6.0	25	40	5.6	6	150
NXE604080150	8.0	50	70	7.5	8	150
NXE604100150	10.0	50	70	9.6	10	150
NXE604120150	12.0	50	70	11.6	12	150

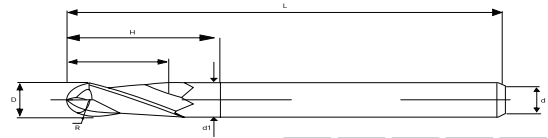
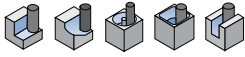
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225-325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
						●	●	○		

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Graphite Ball End Mill



Perfect MG	0.6 μm	2 Flutes	Helix 35°	Diamond
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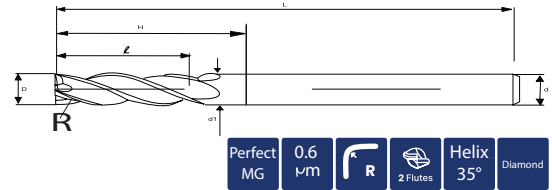
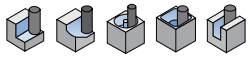
EDP NO.	D	R	ℓ	H	d1	d	L
NXB602030	3.0	R1.5	6	20	2.8	3	60
NXB602040	4.0	R2.0	8	25	3.7	4	60
NXB602060	6.0	R3.0	15	35	5.6	6	75
NXB602080	8.0	R4.0	20	30	7.6	8	75
NXB602100	10.0	R5.0	25	50	9.4	10	100
NXB602120	12.0	R6.0	25	50	11.4	12	100
NXB602160	16.0	R8.0	35	60	15.6	16	150
NXB60203075	3.0	R1.5	6	30	2.8	3	75
NXB60204075	4.0	R2.0	8	25	3.7	4	75
NXB602030100	3.0	R1.5	6	30	2.8	3	100
NXB602040100	4.0	R2.0	8	30	3.7	4	100
NXB602060100	6.0	R3.0	15	40	5.6	6	100
NXB602080100	8.0	R4.0	25	40	7.5	8	100
NXB602060150	6.0	R3.0	15	40	5.6	6	150
NXB602080150	8.0	R4.0	25	50	7.5	8	150
NXB602100150	10.0	R5.0	25	60	9.4	10	150
NXB602120150	12.0	R6.0	25	60	11.6	12	150

Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel -HB225	Alloy Steel HB225 -325	Prehardened Steel HRc30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRc55	SKD61 -HRc62									
						●	●	○		

Graphite Corner Radius End Mill



EDP NO.	D	R	H	l	d1	d	L
NXR60403002	3.0	R0.2	20	9	9	2.8	60
NXR60403005	3.0	R0.5	20	9	9	2.8	60
NXR60404002	4.0	R0.2	25	12	12	3.7	60
NXR60404005	4.0	R0.5	25	12	12	3.7	60
NXR60406002	6.0	R0.2	35	20	20	5.6	75
NXR60406005	6.0	R0.5	35	20	20	5.6	75
NXR60406010	6.0	R1.0	35	20	20	5.6	75
NXR60408005	8.0	R0.5	35	25	25	7.6	75
NXR60408010	8.0	R1.0	35	25	25	7.6	75
NXR60410005	10.0	R0.5	50	35	35	9.6	100
NXR60410010	10.0	R1.0	50	35	35	9.6	100
NXR60412005	12.0	R0.5	50	35	35	11.4	100
NXR60412010	12.0	R1.0	50	35	35	11.4	100
NXR60416005	16.0	R0.5	80	60	60	15.6	150
NXR60416010	16.0	R1.0	80	60	60	15.6	150
NXR6040300575	3.0	R0.5	30	9	9	2.8	75
NXR6040400575	4.0	R0.5	30	12	12	3.7	75
NXR60403005100	3.0	R0.5	30	9	9	2.8	100
NXR60404005100	4.0	R0.5	30	12	12	3.7	100
NXR60406002100	6.0	R0.2	40	25	25	5.6	100
NXR60406005100	6.0	R0.5	40	25	25	5.6	100
NXR60406010100	6.0	R1.0	40	25	25	5.6	100
NXR60408005100	8.0	R0.5	40	30	30	7.5	100
NXR60408010100	8.0	R1.0	40	30	30	7.5	100
NXR60406002150	6.0	R0.2	50	35	35	5.6	150
NXR60406005150	6.0	R0.5	50	35	35	5.6	150
NXR60406010150	6.0	R1.0	50	35	35	5.6	150
NXR60408005150	8.0	R0.5	60	40	40	7.5	150
NXR60408010150	8.0	R1.0	60	40	40	7.5	150
NXR6041005150	10.0	R0.5	60	40	40	9.4	150
NXR60410010150	10.0	R1.0	60	40	40	9.4	150
NXR60412005150	12.0	R0.5	70	50	50	11.6	150
NXR60412010150	12.0	R1.0	70	50	50	11.6	150

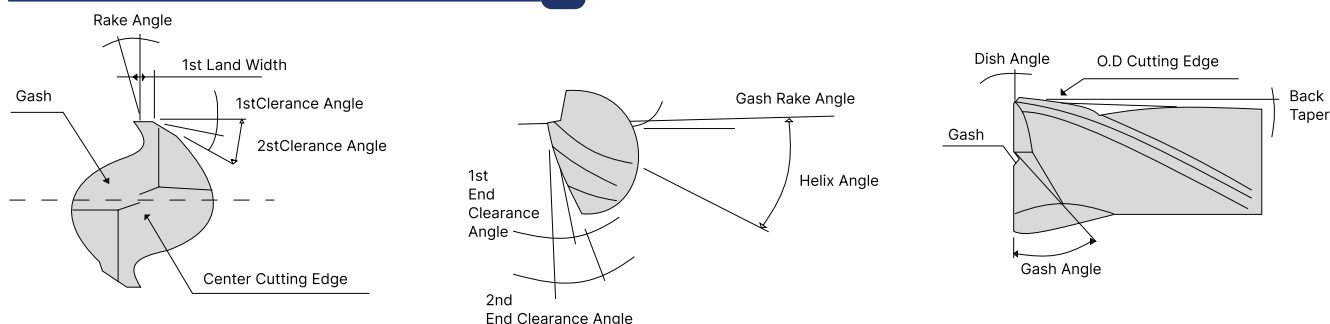
Applicable Working Material

○:GOOD ●:EXCELLENT

H		P			K	N			M	S
Hardened Steel		Carbon Steel HB225	Alloy Steel HB225 -325	Prehardened Steel HRC30-50	Cast Iron -FCD500	Copper	Graphite	Aluminum	Stainless Steel	Heat Resistant Alloy
SKD61 -HRC55	SKD61 -HRC62					●	●	○		

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Nomenclature Of Endmill



Application Range Of Grade

Workpiece	Grade
Carbon Steel ,Alloy Steels, Tool Steel, Metal Steel	Micro Grain Carbide P30
Cast Iron, Ductile	Micro Grain Carbide K10-K20
Heat Treatment Steel(HRc 40-60)	Ultrafinest Carbide
Aluminium,Nonferrous Material	Micro Grain Carbide K10

Formula Of End Milling

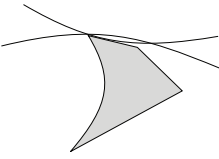
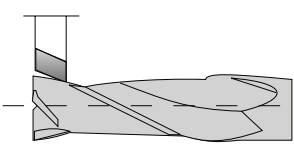
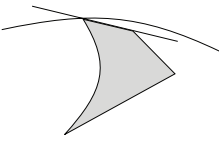
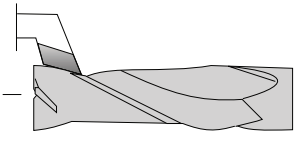
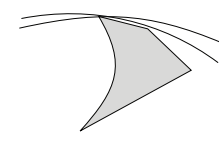
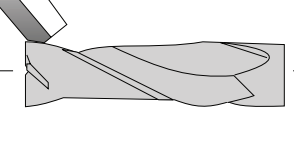
1.Cutting Speed	$v = \frac{\pi \times D \times N}{1000} \text{ (m/min)}$	V : Cutting Speed D : Diameter Of End Mill N : End Mill Rvaluation	(m/min) (mm) (RPM)
2.Feed per Tooth	$fz = \frac{F}{Z \times N} \text{ (mm/tooth)}$	fz : Feed per tooth F : Table Feed rate Z : No. of teeth N : End mill revaluation	(m/tooth) (tooth) (RPM)
3.Table Feed Rate	$F = fz \times Z \times N$	fz : Feed per tooth F : Table Feed rate Z : No. of teeth N : End mill revaluation	(m/min) (mm/tooth) (tooth) (RPM)
4.Cutting Time	$Tc = \frac{L}{F}$	Tc : Cutting F : Table feed rate L : Length of cut (workpiece Length+ Diameter of endmill+a)	(min) (mm/min) (mm)

For Regrinding

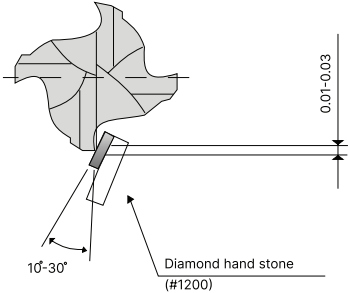
Regrinding Range

Application Range	Cutter Dia	Amount Of Flank Wear
Finish Machining	~ $\varnothing 10$	0.05-0.1
	11~ $\varnothing 30$	0.1-0.25
	31~ $\varnothing 50$	0.2-0.35
Rough Machining	~ $\varnothing 10$	0.08-0.15
	11~ $\varnothing 30$	0.15-0.35
	31~ $\varnothing 50$	0.3-0.45

Regrinding Method of Relief

		① Concave method · In case when precise outer Diameter dimension is required. · In case of aluminium machining
		② Flat method · Excellent machinability - Applicable to ball end mill and taper end mill. · Secondary clearance angle work is required. - When Diameter is large.
		③ Eccentric method · Excellent toughness and surface roughness. · Secondary clearance angle work is not required.

Honing

	1. Recommend honing for machining mold metal and high Hardness Workpiece. -The amount of honing shall be less than that of feed per blade. 2. When using end mill without honing, machine for 10 to 30 seconds at feed rate of less than 0.01 mm/blade and then machine at normal feed rate. 3. Honing is not required for machining aluminium and non-ferrous metal.
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Trouble Shooting for End Milling

Problem	Cause	Solution
(1) Rupture	· High feed · High slotting volume · High protrusion volume · Worn out of flute · Longer cutting length	· Reduce feed · Reduce slotting volume · Reduce protrusion volume · Regrind at the beginning · Reduce cutting length
(2) Wear / Burning	· High speed · Small rake angle · High Hardness of material	· Reduce speed, Supply enough oil · Correct to proper rake angle · Supply Dry > soluble > Non-water soluble oil and do surface treatment"
(3) Chattering	· Improper cutting condition · Lack of Strength in machinery and chuck · Poorly fixed material · High protrusion volume · Large clearance of rake angle	· Adjust cutting and feed speed · Replace machinery and chuck · Contain a material firmly · Reduce protrusion volume · Reduce clearance of rake angle
(4) Defective of cutting edge	· Hige feed · Small rake angle · Chattering occurs · Poorly sealed material · High slotting volume · High protrusion volume · Lack of Strength in machinery	· Reduce feed · Adjust angle properly · Reduce Chattering by lowing the number of turning · Contain a material firmly · Reduce slotting volume · Reduce protrusion volume · Replace machinery
(5) Bad Cutability	· Worn out of cutting edge · Improper endmill · Small rake angle	· Regrind at the beginning · Replace proper endmill · Correct to proper rake angle
(6) Poor chip emission	· Low injection pressure of the oil · Small chip pocket · Worn out of cutting edge · High slotting volume	· Increase oil volume and pressure · Use fewer flute endmill or Reduce feed · Regrind at the beginning · Reduce slotting volume
(7) Burr on surface	· High feed · Low speed · Worn out of cutting edge · High slotting volume	· Reduce feed · Speed up · Regrind at the beginning · Reduce slotting volume
(8) Incorrect dimension	· Incorrect machinery or chuck · Incorrect rigidity of machinery or chuck · longer cutting length · Fewer number of flutes	· Correct machinery or chuck · Replace machinery or chuck · Reduce cutting length · Replace to larger number of flutes endmill
(9) Fusion	· Lack of oil or affination between tool and material	· Supply Dry > soluble > Non-water soluble oil · For Alloy Steels, use active type non-water soluble oil

Workpiece materials

Classification, MG

MG - Introduction

Cutting speed v_c (m/min)

The foundation for MG is a classification of workpiece materials based on their type rather than their relative machinability and consequently it contains workpiece materials like composites. It is comprehensive enough, but still easy to identify which MG a particular material belongs to.

Each MG has a specific material standard in a specific condition assigned as reference to allow easy adjustment of cutting data for any actual material compared to any Seco reference material see page(s) FoI

As example the reference materials EN C45E for MG P4 and EN 42 CrMo 4 for both MG P5 and MG H5 see further details in the following tables.

Steels and Alloys Steels

MG	Description	Properties	Reference	$k_{c1.1}$	m_c
P1	Free-cutting steels	$360 < R_m < 880$	11 SMn30 $R_m = 385 \text{ N/mm}^2$	1500	0,14
P2	Low-alloy ferritic steels, $C < 0.25\% \text{wt}$ Low-alloy weldable general structural steels	$320 < R_m < 600$	S235JRG2 $R_m = 420 \text{ N/mm}^2$	1600	0,23
P3	Ferritic & ferritic/pearlitic steels, $C < 0.25\% \text{wt}$ Weldable general structural steels Case-hardening steels	$430 < R_m < 610$	16MnCr5 $R_m = 550 \text{ N/mm}^2$	1800	0,14
P4	Low-alloy general structural steels, $0.25\% < C < 0.67\% \text{wt}$ Low-alloy Quench & Temper steels	$520 < R_m < 1200$	C45E $R_m = 660 \text{ N/mm}^2$	2000	0,15
P5	Structural steels, $0.25\% < C < 0.67\% \text{wt}$ Quench & Temper steels	$550 < R_m < 1200$	42 CrMo 4 $R_m = 700 \text{ N/mm}^2$	2020	0,18
P6	Low-alloy through-hardening steels, $C > 0.67\% \text{wt}$ Low-alloy spring and bearing steels	$520 < R_m < 1200$	C100S $R_m = 600 \text{ N/mm}^2$	2100	0,17
P7	Through-hardening steels, $C > 0.67\% \text{wt}$ Spring and bearing steels	$600 < R_m < 1200$	100 Cr 6 $R_m = 650 \text{ N/mm}^2$	2160	0,17
P8	Tool steels High Speed Steels (HSS)	$600 < R_m < 1200$	X40 CrMoV51 $R_m = 700 \text{ N/mm}^2$	2400	0,20
P11	Ferritic & martensitic stainless steels	$415 < R_m < 1200$	X20 Cr 13 $R_m = 675 \text{ N/mm}^2$	2000	0,15
P12	Maraging and precipitation-hardening stainless steels	$500 < R_m < 1200$	X 5 CrNiCuNb 16,4 $R_m = 1100 \text{ N/mm}^2$	2100	0,17

Ferritic and martensitic stainless steels, austenitic and duplex stainless steels

MG	Description	Properties	Reference	$k_{c1.1}$	m_c
M1	Free-cutting austenitic stainless steels		X 10 CrNiS 18 9	1700	0,14
M2	Low-alloy austenitic stainless steels		X 5 CrNi 18 10	1920	0,18
M3	Medium-alloy austenitic stainless steels		X 2 CrNiMo 18 14 3	2070	0,17
M4	High-alloy austenitic and duplex stainless steels		X2CrNiMoN 22 5 3	2230	0,16
M5	Difficult high-alloy austenitic and duplex stainless steels		X 2 CrNiMoN 25 7 4	2510	0,13

Workpiece materials

Classification, MG

Cast irons

MG	Description	Properties	Reference	$k_{cl,1}$	m_c
K1	Grey cast irons (GCI)		EN-GJL-250	930	0,32
K2	Compacted graphite irons (CGI)		EN-GJV-400	1000	0,35
K3	Malleable cast irons (MCI)		EN-GJMB-550-4	1050	0,37
K4	Nodular cast irons (SGI)		EN-GJS-500-7	1160	0,37
K5	Austempered ductile irons (ADI)		EN-GJS-1000-5		
K6	Austenitic lamellar cast irons		EN-GJLA-XNiCuCr15-6-2		
K7	Austenitic nodular cast irons		EN-GJSA-XNiMn23-4		

Non-ferrous materials

MG	Description	Properties	Reference	$k_{cl,1}$	m_c
N1	Aluminium alloys, Si < 9%		AW-7075		
N2	Aluminium alloys, 9% < Si < 16%		AC-44200 Si = 12%		
N3	Aluminium alloys, Si > 16%		AlSi17Cu5		
N11	Copper alloys		CW614N	740	0,26

Superalloys and titanium

MG	Description	Properties	Reference	$k_{cl,1}$	m_c
S1	Iron-based superalloys		Discalloy		
S2	Cobalt-based superalloys		Stellite 21		
S3	Nickel-based superalloys		Inconel 718	2530	0,21
S11	Titanium, low alloyed, (a)		Ti		
S12	Titanium, medium alloyed, (a+2)		TiAl6V4		
S13	Titanium, high alloyed, (near 2 and 2)		Ti10V2Fe3Al	1500	0,24

Workpiece materials

Classification, MG

Hard materials

MG	Description	Properties	Reference	$k_{\text{cl},1}$	m_{c}
H3	Case-hardened steels	58 < HRC < 62	16MnCr5 60 HRC	2070	0,14
H5	Quenched & Tempered steels	38 < HRC < 56	42 CrMo4 50 HRC	2320	0,18
H7	Quenched & Tempered steels Bearing steels	56 < HRC < 64	100 Cr6 60 HRC	2480	0,17
H8	Tool steels High Speed Steels (HSS)	38 < HRC < 64	X40 CrMoV51 50 HRC	2750	0,20
H11	Martensitic stainless steels	38 < HRC < 50	X20 Cr 13 45 HRC	2300	0,15
H12	Maraged and precipitation-hardened stainless steels	1200 < R _m < 1650	X 5 CrNiCuNb 16 4 R _m = 1450 N/mm2	2410	0,17
H21	Manganese steels	23 < HRC < 64	X120 Mn 12 50 HRC		
H31	White cast irons	50 < HRC < 64	EN-GJN-HV600(XCr11) 55 HRC		

Other difficult materials

MG	Description	Properties	Reference	$k_{\text{cl},1}$	m_{c}
PM1	Low-alloy PM-materials		F-0008 Fe-0.7C		
PM2	Medium-alloy PM-materials		FLC-4608 Fe2Cu1.8Ni 0.5Mo0.2Mn0.8C		
PM3	High-alloy PM-materials Exhaust valve seat materials, etc.				
HF1	Hardfacing alloys Welded or plasma-deposited iron-based alloys				
HF2	Hardfacing alloys Welded or plasma-deposited cobalt- and nickel-based alloys				
CC1	Sintered tungsten carbide		G50		

Workpiece materials

Classification, MG

Plastics and Composites

MG	Description	Properties	Reference	$k_{s1.1}$	m_c
TS1	Thermosetting carbon-fibre composites		Urea formaldehyde (UF)		
TS2	Thermosetting glass-fibre composites		T300 T700T800 HTA-S IMA-Epoxy (M21)...		
TS3	Thermosetting aramide-fibre composites		Epoxy - HX..(42..)/E glass (7781...)...		
TS4	Thermoplastic polymers		Kevlar 49		
TP1	Thermoplastic carbon-fibre composites		Polycarbonate (PC)		
TP2	Thermoplastic glass-fibre composites		PPS/PEEK-T300.,		
TP3	Thermoplastic aramide-fibre composites		PPS/PEEK-E-glass or A-glass...		
TP4	Thermosetting polymers				

Graphite

MG	Description	Properties	Reference	$k_{s1.1}$	m_c
GR1	Graphite		R8500		

Workpiece materials

Classification, MG

MG

MG	EN	EN-Nr	W.-Nr	DIN	AFNOR	BS	UNI	JIS	SS	UNS
P1	11 SMn 30	1.0715	1.0715	9 SMn 28	S250	230 M 07	CF 9 SMn 28	SUM 22	1912	G12130
	11 SMnPb 30	1.0718	1.0718	9 SMnPb 28	S 250 Pb		CF 9 SMnPb 28	SUM 22 L	1914	G12134
	10S20	1.0721	1.0721	10S20	10 F1	210 M 15	CF10S20			
			1.0722	10SPb 20	10 PbF 2		CF10SPb 20			
	15 SMn 13	1.0725	1.0723	15S20		210A15		SUM 32	1922	
	35 S20	1.0726	1.0726	35S20	35 MF 4	212 M 36			1957	G11400
	46 S20	1.0727	1.0727	46S20	45 MF 4	212 M 44			1973	G11460
P2	11 SMn 37	1.0736	1.0736	9 SMn 36	S300	240 M 07	CF 9 SMn 36			G12150
	11 SMn 37	1.0736	1.0736	9 SMn 36	S300	240 M 07	CF 9 SMn 36			G12150
	S235JR	1.0037	1.0037	St 37-2	E24-2		Fe 360 B	STKM12C	1311	
	S235JRG2	1.0038	1.0116	St 37-3	E 24-3, E 24-4	4360-40 C	Fe 360 D FF		1312,1313	
	S275J2G3	1.0144	1.0144	St 44-3 N	E 28-3, E 28-4	4360-43 C	Fe430DFF	SM 41 C	1412,1414	
	C10	1.0301	1.0301	C10	34C10, XC10	045 M 10	C10	S10C		G10100
			1.0401	C15	37C12, XC18	080 M 15	C 15, C 16		1350	G10170
	C22	1.0402	1.0402	C22	C20	050 A 20	C 20, C 21		1450	G10200
	S355JR	1.0570	1.0570	St 52-3	E 36-3, E 36-4	4360-50 C	Fe 510 B	SM 50 YA	2172,2132	
	C15R	1.1141	1.1141	Ck 15	XC15, XC18	080 M 15	C 15, C 16	S15C, S15CK	1370	G10170
P3			1.1158	Ck25	XC25	060 A 25	C25	S25C		G10250
			1.2162	21 MnCr5	20 NC5			SCR 420 H		
	16 Mo 3	1.5415	1.5415	15 Mo 3	15D3	1501-240	16 Mo 3		2912	
			1.5423	16 Mo 5		1503-245-420	16 Mo 5	SB 450 M		G45200
	14 NiCr 14	1.5752	1.5752	14 NiCr 14	12 NC 15	655 M 13		SNC 815(H)		G33106
			1.5919	15 CrNi 6	16NC6	S107	16 CrNi 4			
	18 NiCrMo 7 6	1.6587	1.6587	18 CrNiMo 7 6	18NCD6	820 A16	18 NiCrMo 7			
	16MnCr5	1.7131	1.7131	16MnCr5	16MC5	527 M 17	16MnCr5	SCR 415	2511	G51170
	16 MnCr5 5	1.7139	1.7139	16 MnCr5 5						
	20MnCr5	1.7147	1.7147	20 MnCr5	20 MC5		20 MnCr5	SMnC420 (H)		G51200
P4	20 MnCr5 5	1.7149	1.7149	20 MnCr5 5	20 MnCr5 5			SMnC 21 H		
	13CrMo4 5	1.7335	1.7335	13CrMo44	15 CD 3.5	1501-620 Gr. 27	14CrMo4 5		2216	
			1.7337	16CrMo4 4	15 CD 4.5	1501-620 Gr. 27	14CrMo4 5		2216	
	10CrMo910	1.7380	1.7380	10CrMo910	10 CD 9.10	1501-622 Gr. 31	12CrMo910		2218	J21890
	C35		1.0501	C35	55C35	060 A 35	C35		1550	G10350
	E335	1.0503	1.0503	C45	65C45	80M46	C45	S45C	1650	G10430
	C40		1.0511	C40	60C40	080 M 40	C40	S40C		
	E360	1.0070	1.0535	St 70-2	A 70-2		Fe 690		1655	
	C60	1.0601	1.0601	C60	CC 55	080 A 62	C60			G10600
			1.1157	40 Mn4	35 M 5	150 M 36				G10390
P5	G 28 Mn6	1.1165	1.1165	30 Mn5		120 M 36		SMn 1 H, SCMn 2		G13300
	C35E	1.1181	1.1181	Ck 35	XC 38 H1	080 M 36	C35	S35C	1572	G10340
	C45E	1.1191	1.1191	Ck45	XC42	080 M 46	C45	S45C	1672	G10420
	C60E	1.1221	1.1221	Ck 60	XC60	080 A 62	C60	S58C	1665,1678	G10640
			1.1740	C60W	Y3 55			SK7		
	55 SiCr7	1.7100	1.0904	55 Si 7	55 S 7	250 A 53	55 Si 8		2085,2090	
			1.2330	35 CrMo4	34 CD 4	708 A 37	35 CrMo4		2234	T51620
			1.2542	45WCrV7		BS1	45 WCrV 8 KU		2710	T41901
		1.2714	1.2714	56NiCrMoV7		BH 224-5	56 NiCrMoV7-KU	SKT4		T61206
			1.5121	46 MnSi 4						
P6			1.5710	36 NiCr 6	35 NC6	640 A 35		SNC 236		
			1.5736	36 NiCr 10	35 NC 11		35 NiCr 9	SNC 631 (H)		
	36 CrNiMo 4		1.6511	36 CrNiMo 4	40 NCD 3	816 M 40	38 NiCrMo 4 (KB)			G98400
	34 CrNiMo 6	1.6582	1.6582	34 CrNiMo 6	35 NCD 6	817 M 40	35 NiCrMo 6 (KW)	SNCM 447	2541	G43400
	34 Or 4	1.7033	1.7033	34Cr4	32C4	530 A 32	34 Cr4(KB)	SCR 430 (H)		G51320
	41 Or 4	1.7035	1.7035	41 Cr4	42 C4	530 M 40	41 Cr4	SCR 440 (H)		G51400
	25 CrMo4	1.7218	1.7218	25 CrMo4	25 CD 4 S	708 M 25	25 CrMo4(KB)	SCM 425	2225	G41300
	42 CrMo4	1.7225	1.7225	42CrMo4	42 CD 4	708 M 40	42 CrMo4	SCM 440 (H)	2244	G41400
	42 CrMo4	1.7225	1.7225	42CrMo4	42 CD 4	708 M 40	42 CrMo4	SCM 440 (H)	2244	G41400
			1.7361	32CrMo12	30 CD 12	722 M 24	32 CrMo12		2240	
P6	50 CrV4	1.8159	1.8159	50 CrV4	50 CV4	735 A 50	51 CrV4	SUP 10	2230	H61500
	41 CrAlMo 7 10	1.8509	1.8509	41 CrAlMo 7	40 CAD 6.12	905 M 39	41 CrAlMo 7	SACM 645	2940	K24065
	C67S	1.1231	1.1231	Ck67	XC68	060 A 67	C70		1770	G10700
	C100S	1.1274	1.1274	Ck 101		060 A 96		SUP 4	1870	G10950
	C105U	1.1545	1.1545	C105W1	Y1 105		C 100 KU		1880	
			1.1645	C105W2	Y1 105		C 100 KU	SK3		
			1.1663	C125W	Y2120		C 120 KU	SK2		

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Workpiece materials

Classification, MG

MG

U.N.E./I.H.A.	AISI/ASTM	GOST	CSN	Misc. Brands	Condition	Structure
	1213				Annealed	
	12 L13				Annealed	
	1108				Annealed	
	11 L08				Annealed	
					Annealed	
	1140	40			Annealed	
	1146				Annealed	
	1215				Annealed	
	12 L14				Annealed	
		16D			Annealed	
	A573 Grade 58	18kp	11378		Annealed	
	A573 Grade 70	St14kP	11 448		Annealed	
	1010	10			Annealed	
F.1110	1015	15			Annealed	
	1020,1023	20	12 024		Annealed	
		17G1S	11 523		Annealed	
F.1511	1015	15			Annealed	
F.1120	1025	25			Annealed	
					Annealed	
	A204 Grade A		15 020		Annealed	
	4520				Annealed	
	3310,9314	20X2H4A	16420		Annealed	
	4320		16220		Annealed	
					Annealed	
F.1516	5115	12KHN2	14220		Annealed	
		18HG			Annealed	
	5120	20KH	14 221		Annealed	
	5120 H	20KH			Annealed	
	A182-F11, A182-F12	12KHM	15121		Annealed	
	A387 Grade 12 Cl. 2				Annealed	
F.155	A182-F22	12KH8	15313		Annealed	
F.1130	1035	35	12 040		Annealed	
F.5110	1045	45	12 050		Annealed	
	1040	40	12 041		Annealed	
F.1150	1055	55			Annealed	
	1060	60	12 061		Annealed	
	1039	40G			Annealed	
	1330	30G2			Annealed	
F.1135	1035	35			Annealed	
F.1140	1045	45	12 050		Annealed	
F.1150	1064	60			Annealed	
	1060	60			Annealed	
F.144	9255	55S2			Annealed	
F.1250	4135	35KHM			Annealed	
F.5241	S1	5KHV2S			Annealed	
	L6	5KHNV			Annealed	
	5045				Annealed	
	3135				Quenched & Tempered	
	3435				Annealed	
	9840				Quenched & Tempered	
F.1280	4340	38H2N2MA	16 343		Annealed	
	5132	35KH			Quenched & Tempered	
	5140	40H	14140		Quenched & Tempered	
F.1251	4130	20KHM	15130		Quenched & Tempered	
F.1252	4142,4140	38HM	15142		Annealed	
F.1252	4142,4140	38HM	15142		Quenched & Tempered	
					Quenched & Tempered	
F.143	6150	50KHFA	15 260		Quenched & Tempered	
F.1740	A355 Cl. A				Annealed	
F.5103	1070	70			Annealed	
F.5117	1095				Annealed	
F.5118	W1	U10A			Annealed	
		U10			Annealed	
	W1	U13			Annealed	

Workpiece materials

Classification, MG

MG

MG	EN	EN-Nr	W.-Nr	DIN	AFNOR	BS	UNI	JIS	SS	UNS
P7	107 CrV3	1.2210	1.2210	115 CrV 3	100 C 3	Y	107 CrV 3 KU	Y	Y	T61202
			1.2510	100MnCrW4	90 MWCV 5	BO1	95 MnWCr5KU	SKS3	SKS3	T31501
	90 MnCrV8	1.2842	1.2842	90 MnCrV 8	90 MV 8	BO 2	90 MnVCr8KU			T31502
	100 Cr6	1.3505	1.3505	100 Cr6	100 C 6	534 A 99	100 Cr6	SUJ2	SUJ2	G51986
P8	X210CM2	1.2080	1.2080	X 210 CM2	Z200C12	BD3	X 210 CM3 KU	SKD1	SKD1	T30403
			1.2343	X 38 CrMoV 5 1	Z38 CDV5	BH 11	X 37 CrMoV 5 1 KU	SKD6	SKD6	T20811
	X40 CrMoV 5 1	1.2344	1.2344	X40 CrMoV 51	Z40 CDV5	BH13	X40 CrMo 51 1 KU	SKD61	SKD61	T20813
	X100 CrMoV 5	1.2363	1.2363	X100 CrMoV 51	Z100 CDV5	BA 2	X100 CrMoV 51 KU	SKD12	SKD12	T30102
			1.2365	X 32 CrMoV 3 3	32 DCV28	BH10	30 CrMoV 12 27 KU	SKD7	SKD7	T20810
			1.2436	X210CrW12			X215CrW121 KU	SKD2	SKD2	
			1.2601	X165 CrMoV 12			X165 CrMoW12KU			
			1.2713	55NiCrMoV6	55 NCDV 7			SKT4	SKT4	T61206
	H5 6-5-2-5	1.3243	1.3243	S 6-5-2-5	Z85 WDKCV 06-05-04-02		H5 6-5-2-5	SKH 55	SKH 55	
	H5 2-10-1-8	1.3247	1.3247	S 2-10-1-8	Z 110 DKCWV 09-08-04	BM 42	H5 2-9-1-8	SKH 51	SKH 51	T11342
	H5 18-1-2-5	1.3255	1.3255	S 18-1-2-5	Z80 WDKCV 18-05-04-01	BT4	H5 18-1-1-5	SKH 3	SKH 3	T12004
	H5 6-5-2	1.3343	1.3343	S 6-5-2	Z 85 WDCV 06-05-04-02	BM2	H5 6-5-2	SKH 9, SKH 51	SKH 9, SKH 51	T11302
P11	H5 2-9-2	1.3348	1.3348	S 2-9-2	Z 100 DCWV 09-04-02-02		H5 2-9-2	SKH 58	SKH 58	T11307
	H5 18-0-1	1.3355	1.3355	S 18-0-1	Z80 WCV 18-04-01	BT1	H5 18-0-1	SKH 2	SKH 2	T12001
	X 6 Cr 13	1.4000	1.4000	X 6 Cr 13	Z6C12	403 S 17	X 6 Cr 13	SUS 403	SUS 403	S41008
	X12 CM3	1.4006	1.4006	X10 CM3	Z 10 C 13	410 S 21	X12 CM3	SUS 410	SUS 410	S41000
	X6Cr17	1.4016	1.4016	X6CM7	Z8C17	430 S 15	X8Cr17	SUS 430	SUS 430	S43000
	X20 Cr 13	1.4021	1.4021	X20 Cr 13	Z20C13	420 S 37	X20 Cr 13	SUS 420 J 1	SUS 420 J 1	S42000
	X39 Cr 13	1.4031	1.4031	X40 Cr 13	Z40C14	420 S 45	X40 Cr 14	SUS 420	SUS 420	S40280
	X70 CrMo 15	1.4109	1.4109	X65 CrMo 14	Z70D14			SUS 440 A	SUS 440 A	S44002
	X90 CrMoV 18	1.4112	1.4112	X90 CrMoV 18	Z2CND1805	409 S 19	X CrTi 12	SUS 440 B	SUS 440 B	S44003
	X105 CrMo 17	1.4125	1.4125	X105 CrMo 17	Z100 CD 17		X105 CrMo 17	SUS 440 C	SUS 440 C	S44004
P12	X 3 CrNiMo 13 3	1.4313	1.4313	X 5 CrNi 134	Z5CN13.4	425 C 11	X 6 CrNi 13 04	SCS5	SCS5	S41500
	X18CrN28	1.4749	1.4749	X18CrN 28	Z18C25					S44600
	X 6 NiCrTiMoV25 15	1.4534	1.4534	X 3 CrNiMoAl 13 8 2						S13800
	X 4 CrNiCuNb 164	1.4540	1.4540	X 4 CrNiCuNb 16 4						S15500
		1.4540	1.4540	X 4 CrNiCuNb 16 4	Z4CNUNb16.4M					S15500
	X4 CrNiCuNb 164	1.4540	1.4540	X 4 CrNiCuNb 16 4						S15500
	X 5 CrNiCuNb 16 4	1.4542	1.4542	X 5 CrNiCuNb 16 4				SUS 630	SUS 630	S17400
	X 5 CrNiCuNb 17 4	1.4548	1.4542	X 5 CrNiCuNb 17 4	Z6CNU17.4			SCS 24, SUS 630	SCS 24, SUS 630	S17400
	X 7 CrNiAl 17 7	1.4564	1.4564	X 7 CrNiAl 17 7	Z 9 CAN 17.7	301 S 81	X 7 CrNiAl 17 7	SUS 631	SUS 631	S17700
	X 2 NiCoMoTi 18 12 4	1.6356	1.6356	X 2 NiCoMoTi 18 12 4						K93160
	X 2 NiCoMoTi 189 5	1.6358	1.6358	X 2 NiCoMoTi 18 9 5	Z2NKD 19-09					K93120
	X2NiCoMo189 5	1.6358	1.6358	X 2 NiCoMoTi 18 9 5	Z2NKD 19-09					K93120
	X2NiCoMo188 5	1.6359	1.6359	X2NiCoMo18 8 5		5162				K92890
	X2NiCoMo188 5	1.6359	1.6359	X2NiCoMo18 8 5		5162				K92890
	X 10 CrNiS 18 9	1.4305	1.4305	X 10 CrNiS 18 9	Z 10 CNF 18.09	303 S 31	X 10 CrNi 18 09	SUS 303	SUS 303	S30300
M1	X 2 CrNi 19 11	1.4306	1.4306	X 2 CrNi 19 11	Z2CN18.10	304 S 12	X 3 Cr Ni 18 11	SUS 304 L	SUS 304 L	S30403
	X5 CrNi 18 10	1.4301	1.4301	X 5 CrNi 18 10	Z6CN18.09	304 S 31	X 5 CrNi 18 11	SUS 304	SUS 304	S30400
M2	X5CrNiMo 17 12 2	1.4401	1.4401	X 5 CrNiMo 17 12 2	Z3CND 17.11.1	316 S 31	X 5 CrNiMo 17 12	SUS 316	SUS 316	S31600
	X 6 CrNiNb 18 10	1.4550	1.4550	X 6 CrNiNb 18 10	Z6CNNb18.10	347 S 31	X 6 CrNiNb 18 11	SUS 347	SUS 347	S34700
	X 9 CrNi 18 8	1.4310	1.4310	X 12 CrNi 17 7	Z 12 CN 17.07	301 S 21	X 12 CrNi 17 07	SUS 301	SUS 301	S30100
	X12 CrNi 18 8	1.4300	1.4300	X 12 CrNi 18 8	Z 12 CN 18	302 S 25		SUS 302	SUS 302	S30200
M3	X2CrNiMo 18 14 3	1.4435	1.4435	X 2 CrNiMo 18 14 3	Z2CND 17.13	316 S 12	X 2 CrNiMo 17 13 2	SCS 16, SUS 316 L	SCS 16, SUS 316 L	S31603
	X2CrNiMoN 17 13 3	1.4429	1.4429	X 2 CrNiMoN 17 13 3	Z2CND17.13AZ	316 S 62	X 2 CrNiMoN 17 13 3	SUS 316 LN	SUS 316 LN	S31653
	X2 CrNiN 1810	1.4311	1.4311	X 2 CrNiN 19 11	Z2CN18.10AZ	304 S 62	X 2 CrNiN 18 11	SUS 304 LN	SUS 304 LN	S30453
	X 3 CrNiMo 1812 3	1.4466	1.4466	X 5 CrNi 1815		317 S 16	X 5 CrNi 18 15	SUS 317	SUS 317	S31700
M4	X 9 CrNiSiNCE 21 112	1.4835	1.4893	X 9 CrNiSiNCE 2111 2		310 S 31				S30815
	X12 CrNi 25 21	1.4335	1.4335	X12 CrNi 25 21	Z12CN 25.20	310 S 24	X 6 CrNi 26 20	SUH 310, SUS 310 S	SUH 310, SUH 310 S	S31008
	X 2 CrNiMoN 22 5 3	1.4462	1.4462	X 2 CrNiMoN 22 5	Z 2 CND 22.05 Az	332 S 15	X 2 CrNiMoN 22 5			S31803
	X2 CrNiMoSi 19 5	1.4424	1.4417	X 2 CrNiMoSi 19 5	Z 2 CND 18.05.03					S31500
M5	X2NiCrMoCu 25 20 5	1.4539	1.4539	X2NiCrMoCu 2520 5	Z2NCDU 2520	904 S 13				N08904
	X 3 CrNiMo 27 5 2	1.4460	1.4460	X 4 CrNiMo 27 5 2	Z 3 CND 25.7 Az		X 3 CrNiMo 27 5 2	SUS 329 J 1	SUS 329 J 1	S32900
	X 5 CrNiCuNb 16 4	1.4980	1.4943	X4 NiCrTi 2515	Z6NCTDV25.15	HR 51		SUH 660	SUH 660	S66286
	X1 CrNiMoN 20 18 7	1.4547	1.4529	X1 CrNiMoN 2018 7	Z1 CNDU 20.18.05 Az		X1 CrNiMoN 2018 7			S31254
M5	X 1 CrNiMoN 25 22 8	1.4652	1.4652	X 2 CrNiMoN 2522 7						S32654
	X 10 NiCrAlTi 32 20	1.4876	1.4876	X 10 NiCrAlTi 32 20	Z 10 NC 32.21			NCF 800	NCF 800	N08800
	X 2 CrNiMoN 25 7 4	1.4410	1.4410	X 2 CrNiMoN 25 7 4	Z 3 CND 25.07 Az		X 2 CrNiMoN 25 7 4			S32750

Workpiece materials

Classification, MG

MG

MG	EN	EN-Nr	W.-Nr	DIN	AFNOR	BS	UNI	JIS	SS	UNS
K1	EN-GJL-150	0.6150	0.6150	GG-15	Ft 15 D	Grade 150	G15	FC 150	01 15-00	F11601
	EN-GJL-200	0.6200	0.6200	GG-20	Ft20 D	Grade 220	G20	FC 200	01 20-00	F12101
	EN-GJL-250	0.6250	0.6250	GG-25	Ft25D	Grade 260	G25	FC 250	01 25-00	F12401
	EN-GJL-350	0.6350	0.6350	GG-35	Ft 35 D	Grade 350	G35	FC 350	01 35-00	F13502
	EN-GJL-215			GG-220 HB					0219	
K2	EN-GJV-300			GJV-300						
	EN-GJV-350			GJV-350						
	EN-GJV-400			GJV-400						
	EN-GJV-450			GJV-450						
	EN-GJV-500			GJV-500						
K3	EN-GJMB-550-4	0.8155		GTS-55-04	P 540/5	P 540/5	P 55-04	PCMP55-04	08 54-00	F24130
K4	EN-GJS-350-22	0.7033	0.7033	GGG-35.3	FGS 370-17	Grade 350/22		FCD 350-22L	07 17-15	
	EN-GJS-400-15	0.7040	0.7040	GGG-40	FGS 400-12	Grade 420/12	GS 400-12	FCD 400-18L	07 17-02	F32800
	EN-GJS-400-18	0.7043	0.7043	GGG-40.3	FGS 370-17	Grade 370/17	GSO42/17		07 17-12	F32800
	EN-GJS-500-7	0.7050	0.7050	GGG-50	FGS 500-7	Grade 500/7	GS 500-7	FCD 500-7	0727-02	F33800
	EN-GJS-600-3	0.7060	0.7060	GGG-60	FGS 600-3	Grade 600/3	GS 600-3	FCD 600-3	07 32-03	F34100
K5	EN-GJS-700-2	0.7070	0.7070	GGG-70	FGS 700-2	Grade 700/2	GS 700-2	FCD 700-2	07 37-01	F34800
										ADI grade 5
	EN-GJS-1000-5			GJS-1000-5						ADI grade 2
	EN-GJS-1200-2			GJS-1200-2						ADI grade 3
	EN-GJS-1400-1			GJS-1400-1						ADI grade 4
K6	EN-GJLA-XNiCr 20-2	0.6660	0.6660	GGL-NiCr20 2	FGL Ni20 Cr2	Grade F2			0523-00	F41002
	EN-GJLA-XNiCr 30-3	0.6676	0.6676	GGL-NiCr30 3	FGL Ni30 Cr3	Grade F3				F41004
	EN-GJLA-XNiCuCr 15-6-2	0.6655	0.6655	GGL-NiCuCr 15 6 2	FGLNi15Cu6 Cr2	Grade F1				F41000
K7	EN-GJSA-XNiMn 13-7	0.7652	0.7652	GGG-NiMn13 7	FGS Ni13 Mn7	Grade S6			07 72-00	
	EN-GJSA-XNiCr 20-2	0.7660	0.7660	GGG-NiCr20 2	FGS Ni20 Cr2	Grade S2				F43000
	EN-GJSA-XNiMn 23-4	0.7673	0.7673	GGG-NiMn 234	FGS Ni23 Mn4	Grade S2M				F43010
	EN-GJSA-XNiCr 30-3	0.7676	0.7676	GGG-NiCr30 3	FGS Ni30 Cr3	Grade S3				F43003
	EN-GJSA-XNi 35	0.7683	0.7683	GGG-Ni 35	FGS Ni35					F43006
N1	AW-1050A	AI99.5	3.0255	AI99.5	A-5/1050A	1B		(A1050)	4007	AA1050A
	AW-2011	AlCuBiPb	3.1655	AlCuBiPb	A-U5PbBi/2011	FC1		A2011	4355	AA2011
	AW-2014	AlCuSiMn	3.1255	AlCuSiMn	A-U4SG/2014	H15			4338	AA2014
	AW-5005	AlMgI	3.3315	AlMgI	A-G0.6	N41			4106	AA5005
	AW-6060	AlMgSi0.5	3.3206	AlMgSi0.5	A-G5/6060	(H0)			4103	AA6060
	AW-6063	AlMgSi0.7	3.3210	AlMgSi0.7	A-GSUC/6061	(H10)		(A6063)	4104,4107	AA6005
	AW-3103	AlMnI	3.0515	AlMnI		N3			4054	AA3103
	AW-3003	AlMnICu	3.0517	AlMnICu	A-M1/3003			A3003		AA3003
	AW-7020	AlZn4.5Mg1	3.4335	AlZn4.5Mg1	A-Z5G/7020	H17			4425	AA7020
	AW-7075		3.4365	AlZnMgCu1.5	A-Z5GU/7075	2L95/2L96		A7075		AA7075
	AC-42000		3.2341	G-AlSi5Mg	A-S7G	LM25	3599	AC4C	4244	
	AC-46200	AlSi8Cu3(Si)	3.2161	G-AlSi8Cu3					4251	A13800
	MG-P-63	MgAl6Zn	3.5612	G-MgAl6Zn	G-A6-Z1	MAG-E-121				M11600
	MG-P-61	MgAl8Zn	3.5812	G-MgAl8Zn	(G-A7-Z1)					
	MN65120	MgSe3Zn2Zr1	3.5103	G-MgSe3Zn2Zr1	ZRE1	MAG6-TE				M12330
N2	AC-43400	AlSi10Mg(Fe)	3.2381	G-AlSi10Mg	A-S10G	LM9			4253	A13600
	AC-44200	AlSi12	3.2382	GD-AlSi12						
	AW-6082	AlMgSiI	3.2315	AlMgSiI	A-SGM0.7/6082	H30			4212	AA6082
N3		AlSi17Cu5						ADC14		
N11	CC331G		2.0940.01	CuAHOfFe	CuAHOfFe	AB1			5710	C95200
	CC333G		2.0975.01	CuAHONi	CuAl10Ni5Fe5	AB2			5716	C95500
		CuNi10Fe1Mn	2.0872	CuNi10Fe1Mn	CuNi10Fe1Mn	CN102			5667	C70600
				CuNi10Zn45						
		CW408J	2.0790	CuNi18Zn19Pb	CuNi18Zn19Pb1					C76300
	CW352H		2.1176	CuPbIOsn	CuSn10Pb10	LB2			5640	C93700
	CC480K		2.1050.01	CuSnIO	CuSnIO	CT1			5443	C90700
			2.1087	CuSnIOZn					5458	C90500
	CW452K	CuSn6	2.1020	CuSn6	CuSn6	PB103		C5191	5428	C51900
	CW502L	CuZn15	2.0240	CuZn15	CuZn15	CZ102		C2300	5112	C23000
	CW706R	CuZn28Sn1	2.0470	CuZn28Sn1	CuZn29Sn1				5220	C44300
	CW508L	CuZn37	2.0321	CuZn37	CuZn37	CZ108			5150	C27200
	CW717R	CuZn38Sn1	2.0530	CuZn38Sn1						C46400
	CW614N	CuZn39Pb3	2.0401	CuZn39Pb3	CuZn39Pb3	CZ121			5170	C38500
	CW612N	CuZn40Pb2	2.0402	CuZn40Pb2	CuZn39Pb2	CZ120			5168	C37800
	CW622N	CuZn44Pb2	2.0410	CuZn44Pb2		CZ104			5272	C68700

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MG	EN	EN-Nr	W.-Nr	DIN	AFNOR	BS	UNI	JIS	SS	UNS
S1										
S2										
S3	NiMo30	2.4810	2.4810							N10002
	NiMo16Cr15W	2.4819	2.4819							N10276
	NiCr19Fe19Nb5Mo3	2.4668	2.4668							N07718
		2.4669	2.4669							N07750
	NiCr20TiAl	2.4631	2.4631							N07080
	NiCr19Co18Mo4Ti3Al3									N07500
	NiCr20Co13Mo4Ti3Al	2.4654	2.4654							N07001
S11		3.7024	3.7024							
S12										R54620
S12	TiAl6V4	3.7164	3.7164							R56320
S13				TiV10Fe2Al3						R56400
H3	16MnCr5	1.7131	1.7131	16MnCr5	16MC5	527 M 17	16MnCr5	SCR 415	2511	G51170
H5	C67S	1.1231	1.1231	CK67	XC68	060 A 67	C70		1770	G10700
	C75S	1.1248	1.1248	CK75	XC75	060 A 78	C75		1774,1778	G10780
	C100S	1.1274	1.1274	CK 101		060 A 96		SUP 4	1870	G10950
	C105U	1.1545	1.1545	C105W1	Y1 105		C 100 KU		1880	
		1.2550	1.2550	60WCrV7	55 WC 20		55WCrV8KU			
	55 Cr3	1.7176	1.7176	55 Cr3	55C3	527 A 60	55 Cr3	SUP 9 (A)	2253	G51550
	42 CrMo 4	1.7225	1.7225	42 CrMo 4	42 CD 4	708 M 40	42 CrMo 4	SCM 440 (H)	2244	G41400
H7	107 CrV3	1.2210	1.2210	115 CrV 3	100C 3		107 CrV 3 KU			T61202
		1.2510	1.2510	100 MnCrW4	90 MWCV 5	BO1	95 MnWCr5KU	SKS3	2140	T31501
	90 MnCrV8	1.2842	1.2842	90 MnCrV8	90 MV 8	BO 2	90 MnVCr8KU			T31502
	100 Cr6	1.3505	1.3505	100 Cr6	100 C 6	534 A 99	100 Cr6	SUJ2	2258	G51986
H8	X40 CrMoV 51	1.2344	1.2344	X40 CrMoV 51	Z40 CDV5	BH13	X 40 CrMo 51 1 KU	SKD61	2242	T20813
	X100 CrMoV 5	1.2363	1.2363	X100 CrMoV 51	Z100 CDV5	BA 2	X100 CrMoV 51 KU	SKD12	2260	T30102
	X155 CrVMo 121	1.2379	1.2379	X155 CrVMo 12 1	Z160 CDV12	BD2	X155 CrVMo 121 KU	SKD11		T30402
		1.2436	1.2436	X210CrW12			X215CrW121 KU	SKD2	2312	
		1.2601	1.2601	X165 CrMoV 12			X165 CrMoW12KU		2310	
		1.2713	1.2713	55 NiCrMoV6	55 NCDV 7			SKT4		T61206
	HS 6-5-2-5	1.3243	1.3243	S 6-5-2-5	Z85 WDKCV 06-05-05-04-02		HS 6-5-2-5	SKH 55	2723	
	HS 2-10-1-8	1.3247	1.3247	S 2-10-1-8	Z 110 DKCWV 09-08-	BM 42	HS 2-9-1-8	SKH 51		T11342
H11	HS 18-0-1	1.3355	1.3355	S 18-0-1	Z80 WCV 18-04-01	BT1	HS 18-0-1	SKH 2		T12001
	X20 Cr 13	1.4021	1.4021	X20 Cr 13	Z20C13	420 S 37	X20 Cr 13	SUS 420 J 1	2303	S42000
	X70 CrMo 15	1.4109	1.4109	X 65 CrMo 14	Z70D14			SUS 440 A		S44002
	X90 CrMoV 18	1.4112	1.4112	X90 CrMoV 18	Z2CND18 05	409 S 19	XCrti 12	SUS 440 B	2327	S44003
	X105 CrMo 17	1.4125	1.4125	X105 CrMo 17	Z100 CD 17		X105 CrMo 17	SUS 440 C		S44004
H12	X4 CrNiCuNb 16 4	1.4540	1.4540	X 4 CrNiCuNb 16 4						S15500
	X 5 CrNiCuNb 16 4	1.4542	1.4542	X 5 CrNiCuNb 16 4				SUS 630		S17400
	X 5 CrNiCuNb 16 4	1.4542	1.4542	X 5 CrNiCuNb 16 4				SUS 630		S17400
	X 7 CrNiAl 17 7	1.4568	1.4568	X 7 CrNiAl 17 7	Z 9 CAN 17.7	301 S 81	X 7 CrNiAl 17 7	SUS 631	2388	S17700
	X 8 CrNiMoAl 15 7 5	1.4574	1.4574	X 8 CrNiMoAl 15 7 5						S15700
	X 6 NiCrTiMoV25 15	1.4943	1.4943	X4 NiCrTi 25 15	Z6NCTDV25.15	HR 51		SUH 660	2570	S66286
	X2NiCoMo18 8 5	1.6359	1.6359	X2NiCoMo18 8 5		S162				K92890
	X 2 NiCoMoTi 18 9 5	1.6358	1.6358	X 2 NiCoMoTi 18 9 5	Z2NKD19-09					K93120
	X 2 NiCoMoTi 18 9 5	1.6358	1.6358	X 2 NiCoMoTi 18 9 5	Z2NKD 19-09					K93120
	X 2 NiCoMoTi 18 12 4	1.6356	1.6356	X 2 NiCoMoTi 18 12 4						K93160
H21	X120Mn12	1.3401	1.3401	X120 Mn12	Z120 M 12	BW10		SC MnH 1	2183	
H31	EN-GJN-HV520	0.9620	0.9620	G-X330 NiCr4 2	FB Ni4 Cr2 BC	Grade 2 A			05 12-00	F45001
	EN-GJN-HV550	0.9625	0.9625	G-X260 NiCr4 2	FB Ni4 Cr2 HC	Grade 2 B			05 13-00	F45000
	EN-GJN-HV600(XCr11)	0.9630	0.9630	G-X300 CrNiSi 9 5 2	FB Cr9 Ni5	Grade 2 C, D, E			04 57-00	F45003

Workpiece materials

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U.N.E./I.H.A.	AISI/ASTM	GOST	CSN	Misc. Brands	Condition	Structure
				Discalloy	Precipitation hardened	
				Haynes 25		
				Stellite 21		
				Hastelloy C		
		KHN65MV		Hastelloy C-276		
				IN 100		
				Inconel 718		
				Inconel X-750	Solution annealed	
				Nimonic 80A		
				Rene 41		
				Udimet 500		
				Waspalloy		
				Ti	Commercially pure	Ti(α)
	AMS 4919			Ti 6-2-4-2	Annealed	Ti (α)
	AMS 4943			Ti 3Al-2.5V (grd 9)	Annealed	Ti (α+ 2)
	AMS 4920, Grade 5	VT6		Ti 6Al-4V	Annealed	Ti (α+ 2)
	AMS 4986			Ti 10V-2Fe-3Al	Annealed	Ti(2)
F.1516	5115	12KHN2	14 220		Case hardened	
F.5103	1070	70			Quenched & Tempered	
F.5107	1078,1080	75			Quenched & Tempered	
F.5117	1095				Quenched & Tempered	
F.5118	W1	U10A			Quenched & Tempered	
	S1	5KHV25F			Quenched & Tempered	
	5155				Quenched & Tempered	
F.1252	4142,4140	38HM	15142		Quenched & Tempered	
F.520L	L2	11KHF			Quenched & Tempered	
F.5220	01	9KHVG			Quenched & Tempered	
	02	9G2F			Quenched & Tempered	
F.5230	52100	SHKH15	14109		Quenched & Tempered	
F.5318	H13	4KH5MF15			Quenched & Tempered	
F.5227	A2	9KH5VF			Quenched & Tempered	
F.5211	D2	KH12MF			Quenched & Tempered	
F.5213		KH12			Quenched & Tempered	
		KH12MF			Quenched & Tempered	
F.520.S	L6	5KHNM			Quenched & Tempered	
F.5613	M35	R6M5K5			Quenched & Tempered	
	M42	R2AM9K5			Quenched & Tempered	
	T1	R18			Quenched & Tempered	
F.5261	420	20KH13	17 022		Quenched & Tempered	Martensitic
	440 A				Quenched & Tempered	Martensitic
	440 B	95KH18			Quenched & Tempered	Martensitic
	440 C	95KH18			Quenched & Tempered	Martensitic
	XM-12			15-5 PH	H900	Martensitic
	SAE 630			17-4 PH	H1025	Martensitic
	SAE 630			17-4 PH	H900	Martensitic
	AMS 5528	09KH17N7YU1		17-7 PH	TH1050	Martensitic
	632			PH 15-7 Mo	TH1050	Martensitic
	660			A286	Precipitation hardened	Austenitic
	AMS 6512			Marage 250	Precipitation hardened	Martensitic
	AMS 6521			Marage 300	Precipitation hardened	Martensitic
	AMS 6521			Marage 300	Precipitation hardened	Martensitic
	AMS 6515			Marage 350	Precipitation hardened	Martensitic
	A128 Grade A			Hadfield		
	A532 IB (NiCr-LC)			Ni-Hard 2		White cast iron
	A532 IA(NiCr-HC)			Ni-Hard 1		White cast iron
	A532 ID (Ni-HiCr)			Ni-Hard 4		White cast iron

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+91 4479665707



sales@procarbtools.com



Procarb Tools India Private Limited
#409, F1, Sivaprakasam Nagar Main Road,
Ambattur - Puzhal Main Road Surapet,
Chennai - 600066. Tamilnadu, India.