

# 2

# ENDMILL SERIES >



# 2







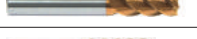

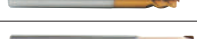





















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# Endmills for high hardened steel

ZAMUS STAR SERIES

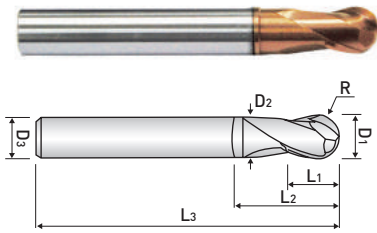


EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
DA702 ...series		STUB CUT LENGTH with EXTENDED NECK	INCH	•	121
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DB712 ...series		REGULAR LENGTH, BALL NOSE	METRIC	•	159
DB703 ...series		BALL NOSE for FINISHING MOLD & DIE	METRIC	•	160
DB734 ...series		TAPER NECK for FINISHING MOLD & DIE	METRIC	•	161
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ZE704 ...series		STUB CUT LENGTH, with EXTENDED NECK	METRIC	•	163
ZE724(6) ...series		FINISHING for MOLD & DIE	METRIC	•	164
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NEXT &gt;&gt;

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
ZR704 ...series		STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	•	172
ZR714 ...series		45° HELIX FINISHING MOLD & DIE	METRIC	•	175
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# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, STUB CUT LENGTH, BALL NOSE with EXTENDED NECK

- Designed to machine high hardened materials up to HRC70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating
- Excellent workpiece finishes

## DA702 ...series



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
DA702001	1/32	1/64	1/32	1/16	2	.029	1/4
DA702002	1/16	1/32	1/16	1/8	2	.059	1/4
DA702003	3/32	3/64	3/32	3/16	2	.090	1/4
DA702004	1/8	1/16	1/8	1/4	2-1/2	.121	1/4
DA702006	3/16	3/32	3/16	3/8	3	.184	1/4
DA702008	1/4	1/8	1/4	1/2	3-1/2	.246	1/4
DA702010	5/16	5/32	5/16	5/8	4	.309	5/16
DA702012	3/8	3/16	3/8	3/4	4	.371	3/8
DA702016	1/2	1/4	1/2	1	4-1/2	.496	1/2

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SOM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

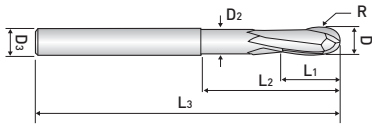
○:General Application ◎:The most suitable Application

### ■ Tolerance

Diameter	Tolerance(Inch)	Shank Dia.
up to 1/4	±0.002	h6
over 1/4	±0.004	

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, 12° HELIX STUB CUT LENGTH, BALL NOSE with EXTENDED NECK

- Designed for high hardened materials up to HRC70
- Suitable for high speed machining

## ZB702A ...series



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZB702A012093	3/16	3/32	.265	.650	2	.184	3/16
ZB702A012093L	3/16	3/32	.265	1.3	4	.184	3/16
ZB702A016125	1/4	1/8	.350	.800	3	.245	1/4
ZB702A016125L	1/4	1/8	.350	1.6	6	.245	1/4
ZB702A024187	3/8	3/16	.460	1.27	3	.368	3/8
ZB702A024187L	3/8	3/16	.460	2.1	6	.368	3/8
ZB702A032250	1/2	1/4	.625	1.39	4	.490	1/2
ZB702A032250L	1/2	1/4	.625	2.3	6	.490	1/2
ZB702A040312	5/8	5/16	.750	1.66	4	.610	5/8
ZB702A040312L	5/8	5/16	.750	2.6	6	.610	5/8

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

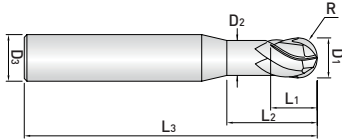
○:General Application ◎:The most suitable Application

### ■ Tolerance

Diameter	Radius(Inch)	Shank Dia.
up to 1/4	±0.002	h6
over 1/4	±0.004	

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 3 FLUTE, STUB CUT LENGTH, BALL NOSE, for FINISHING

- Designed to machine high hardened materials up to HRC70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating
- Excellent workpiece finishes

## DA703 ...series



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
DA703002	1/16	1/32	1/16	1/8	2	.059	1/4
DA703003	3/32	3/64	3/32	3/16	2	.090	1/4
DA703004	1/8	1/16	1/8	1/4	2	.121	1/4
DA703006	3/16	3/32	3/16	3/8	2	.184	1/4
DA703008	1/4	1/8	1/4	1/2	2-1/4	.246	1/4
DA703010	5/16	5/32	5/16	5/8	2-1/2	.309	5/16
DA703012	3/8	3/16	3/8	3/4	3	.371	3/8
DA703016	1/2	1/4	1/2	1	3	.496	1/2

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SOM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

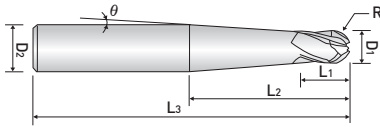
○:General Application ◎:The most suitable Application

### ■ Tolerance

Diameter	Radius(Inch)	Shank Dia.
up to 1/4	±0.002	h6
over 1/4	±0.004	

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, BALL NOSE, FINISHING for DIE & MOLD

- Designed to machine high hardened materials up to HRc70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Excellent workpiece finishes

## DA734 ...series



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	θ	D <sub>2</sub>
DA734004	1/8	1/16	1/8	1.57	3	2.5	1/4
DA734005	5/32	5/64	5/32	1.25	3	2.5	1/4
DA734006	3/16	3/32	3/16	.92	3	2.5	1/4
DA734008	1/4	1/8	1/4	1.70	4	2.5	3/8
DA734010	5/16	5/32	5/16	1.04	4	2.5	3/8
DA734012	3/8	3/16	3/8	1.82	5	2.5	1/2
DA734016	1/2	1/4	1/2	1.95	5	-	1/2

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SOM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	○	◎	◎	○				

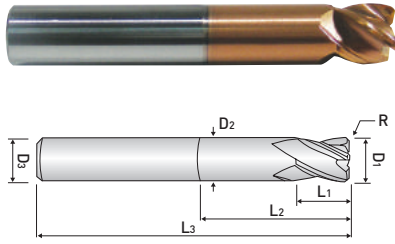
○:General Application ◎:The most suitable Application

### ■ Tolerance

Radius(Inch)	Shank Dia.
±0,004	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, CORNER RADIUS VARIABLE HELIX

- The impacting debut of new type endmill for high hardened steels up to HRC70 and high speed machining up to 200m/min
- High precision and excellent surface due to each 4F variable helix geometry
- Longer tool life over 50% as reducing chatter and resonance

## ZS204A ...series



ULTRA FINE

HELIX

φ1/8~φ1/4

φ5/16~φ1/2

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EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZS204A008010	1/8	.010	5/32	3/4	1-1/2	.115	1/8
ZS204A008015	1/8	.015	5/32	3/4	1-1/2	.115	1/8
ZS204A012010	3/16	.010	1/4	1	2	.175	3/16
ZS204A012015	3/16	.015	1/4	1	2	.175	3/16
ZS204A016020	1/4	.020	5/16	1	2-1/2	.230	1/4
ZS204A016060	1/4	.060	5/16	1	2-1/2	.230	1/4
ZS204A016060L	1/4	.060	5/16	1-1/2	3	.230	1/4
ZS204A020020	5/16	.020	3/8	1	2-1/2	.288	5/16
ZS204A020060	5/16	.060	3/8	1	2-1/2	.288	5/16
ZS204A024030	3/8	.030	7/16	1	2-1/2	.345	3/8
ZS204A024080	3/8	.080	7/16	1	2-1/2	.345	3/8
ZS204A024080L	3/8	.080	7/16	2	3-1/2	.345	3/8
ZS204A028030	7/16	.030	1/2	1-1/8	3	.403	7/16
ZS204A028080	7/16	.080	1/2	1-1/8	3	.403	7/16
ZS204A032030	1/2	.030	9/16	1-1/4	3	.460	1/2
ZS204A032060	1/2	.060	9/16	1-1/4	3	.460	1/2
ZS204A032090	1/2	.090	9/16	1-1/4	3	.460	1/2
ZS204A032090L	1/2	.090	9/16	2-1/4	4	.460	1/2

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

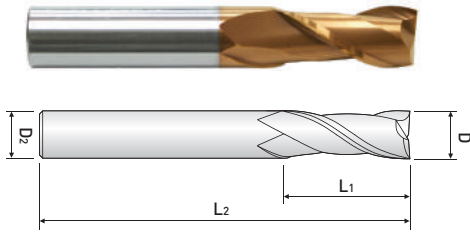
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia.(inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, 35° HELIX, REGULAR LENGTH

- Designed to machine high hardened materials up to HRc70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZE712A ....series



EDP. No.	D	C.L	OAL	SH.Dia.
ZE712A004	1/16	3/16	1-1/2	1/8
ZE712A008	1/8	1/2	1-1/2	1/8
ZE712A012	3/16	5/8	2	3/16
ZE712A016	1/4	3/4	2-1/2	1/4
ZE712A020	5/16	13/16	2-1/2	5/16
ZE712A024	3/8	1	2-1/2	3/8
ZE712A032	1/2	1	3	1/2

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
	○	○	◎	◎	○				

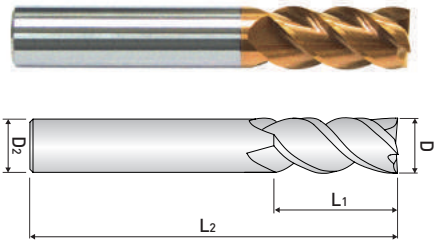
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, 45° HELIX, REGULAR LENGTH

- Designed to machine high hardened materials up to HRc70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZE714A ....series



ULTRA FINE



HELIX



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EDP. No.	D	C.L	OAL	SH.Dia.
ZE714A004	1/16	3/16	1-1/2	1/8
ZE714A008	1/8	1/2	1-1/2	1/8
ZE714A012	3/16	5/8	2	3/16
ZE714A016	1/4	3/4	2-1/2	1/4
ZE714A020	5/16	13/16	2-1/2	5/16
ZE714A024	3/8	1	2-1/2	3/8
ZE714A032	1/2	1	3	1/2

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SOM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
	○	○	◎	◎	○				

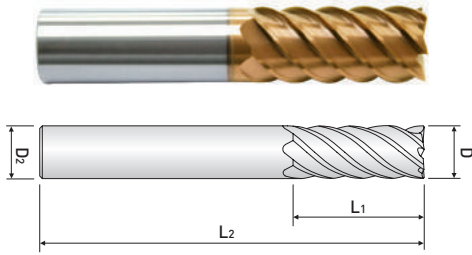
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 6 FLUTE, 50° HELIX REGULAR LENGTH

- Designed to machine high hardened materials up to HRc70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZE716A ....series



ULTRA FINE



HELIX



p.949

EDP. No.	D	C.L	OAL	SH.Dia.
ZE716A016	1/4	1/2	2-1/4	1/4
ZE716A020	5/16	3/4	2-1/2	5/16
ZE716A024	3/8	7/8	2-7/8	3/8
ZE716A032	1/2	1	3-1/4	1/2
ZE716A040	5/8	1-1/4	3-5/8	5/8
ZE716A048	3/4	1-1/2	4-1/8	3/4

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
	○	○	◎	◎	○				

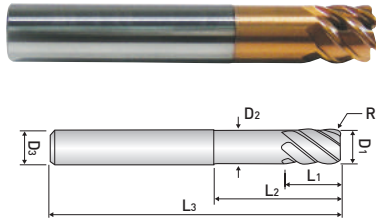
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 6 FLUTE, 45° HELIX STUB CUT LENGT, CORNER RADIUS with EXTENDED NECK

- Applied various corner "R" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR706A .....series



ULTRA FINE



HELIX



φ1/8~φ1/4



φ5/16~φ1/2



p.949

EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZR706A01220	3/16	.020	.265	.650	2	.184	1/4
ZR706A01230	3/16	.030	.265	.650	2	.184	1/4
ZR706A01220L	3/16	.020	.265	1.3	4	.184	1/4
ZR706A01230L	3/16	.030	.265	1.3	4	.184	1/4
ZR706A01620	1/4	.020	.350	.800	3	.245	1/4
ZR706A01630	1/4	.030	.350	.800	3	.245	1/4
ZR706A01620L	1/4	.020	.350	1.6	6	.245	1/4
ZR706A01630L	1/4	.030	.350	1.6	6	.245	1/4
ZR706A02020	5/16	.020	.400	1.130	3	.306	5/16
ZR706A02020	5/16	.030	.400	1.130	3	.306	5/16
ZR706A02030L	5/16	.020	.400	1.8	6	.306	5/16
ZR706A02030L	5/16	.030	.400	1.8	6	.306	5/16
ZR706A02420	3/8	.020	.460	1.270	3	.368	3/8
ZR706A02430	3/8	.030	.460	1.270	3	.368	3/8
ZR706A02420L	3/8	.020	.460	2.1	6	.368	3/8
ZR706A02430L	3/8	.030	.460	2.1	6	.368	3/8
ZR706A03230S**	1/2	.030	.625	1.390	3	.490	1/2
ZR706A03230	1/2	.030	.625	1.390	4	.490	1/2
ZR706A03260	1/2	.060	.625	1.390	4	.490	1/2
ZR706A03230L	1/2	.030	.625	2.3	6	.490	1/2
ZR706A03260L	1/2	.060	.625	2.3	6	.490	1/2

\*\* : Available while supplies last

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

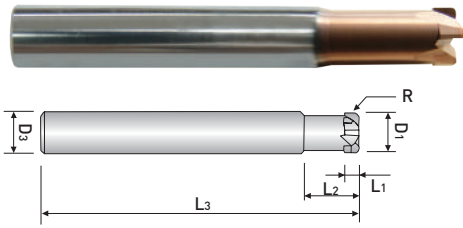
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
±0.004	h6

※:Items can be changed for quality improvement without notice.

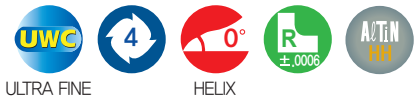
# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, STUB CUT LENGTH, with EXTENDED NECK

- Designed to machine high hardened material by using newly developed raw-material and new coating
- Applying straight flute design on the tool to minimize the corner radius breakage
- Applying backdraft type on the tool to maximize the reducing chatter and preventing deflection

## ZSPM4A ...series



EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
ZSPM4A008	1/8	1/32	.063	3/8	2-1/4	1/4
ZSPM4A012	3/16	1/16	.094	9/16	2-1/4	1/4
ZSPM4A016	1/4	1/16	.10	1/2	2-1/4	1/4
ZSPM4A016L	1/4	1/16	.10	1	3	1/4
ZSPM4A020	5/16	3/32	.13	5/8	2-1/2	5/16
ZSPM4A020L	5/16	3/32	.13	1-1/4	3	5/16
ZSPM4A024	3/8	3/32	.15	3/4	3	3/8
ZSPM4A024L	3/8	3/32	.15	1-1/2	4	3/8
ZSPM4A032	1/2	1/8	.20	1	3	1/2
ZSPM4A032L	1/2	1/8	.20	2	5	1/2

Endmills for high hardened steel - Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

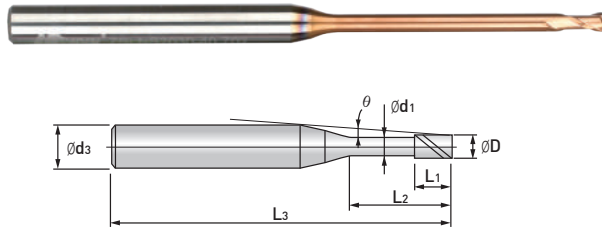
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length

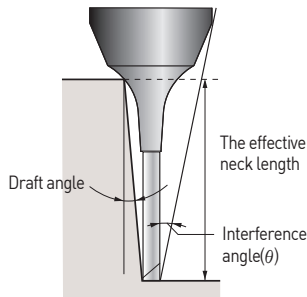
## ZSLNS20....-.. series



EDP. No.	Dimension(mm)							Effective Neck Length				
	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°
ZSLNS2001-0.3	0.1	0.3	0.15	0.08	45	4	11.6	0.4	0.4	0.5	0.5	0.5
ZSLNS2001-0.5		0.5						0.6	0.7	0.7	0.7	0.8
ZSLNS2001-1		1						1.2	1.2	1.2	1.3	1.4
ZSLNS2002-0.5	0.2	0.5	0.3	0.17	50	4	11.3	1.2	1.3	1.5	1.7	2.0
ZSLNS2002-1		1						1.7	1.9	2.2	2.4	2.7
ZSLNS2002-1.5		1.5						2.3	2.5	2.8	3.0	3.4
ZSLNS2003-1	0.3	1	0.45	0.27	50	4	10.8	1.7	1.9	2.2	2.4	2.7
ZSLNS2003-1.5		1.5						2.3	2.5	2.8	3.0	3.4
ZSLNS2003-2		2						2.8	3.1	3.4	3.6	4.1
ZSLNS2003-2.5		2.5						3.4	3.7	4.0	4.3	4.7
ZSLNS2003-3		3						3.9	4.3	4.6	4.9	5.4
ZSLNS2004-1	0.4	1	0.6	0.37	50	4	10.7	1.7	1.9	2.2	2.4	2.7
ZSLNS2004-1.5		1.5						2.3	2.5	2.8	3.0	3.4
ZSLNS2004-2		2						2.8	3.1	3.4	3.6	4.1
ZSLNS2004-2.5		2.5						3.4	3.7	4.0	4.3	4.7
ZSLNS2004-3		3						3.9	4.3	4.6	4.9	5.4
ZSLNS2004-3.5		3.5						4.5	4.9	5.2	5.5	6.0
ZSLNS2004-4		4						5.0	5.4	5.8	6.1	6.6
ZSLNS2004-5		5						6.1	6.6	6.9	7.3	7.8
ZSLNS2004-6		6						7.1	7.7	8.1	8.4	9.0
ZSLNS2005-1	0.5	1	0.75	0.47	50	4	10.7	1.7	1.9	2.2	2.4	2.7
ZSLNS2005-1.5		1.5						2.3	2.5	2.8	3.0	3.4
ZSLNS2005-2		2						2.8	3.1	3.4	3.6	4.1
ZSLNS2005-2.5		2.5						3.4	3.7	4.0	4.3	4.7
ZSLNS2005-3		3						3.9	4.3	4.6	4.9	5.4
ZSLNS2005-4		4						4.5	4.9	5.2	5.5	6.0
ZSLNS2005-5		5						5.0	5.4	5.8	6.1	6.6
ZSLNS2005-6		6						6.1	6.6	6.9	7.3	7.8
ZSLNS2005-8		8						7.0	7.7	8.1	8.4	9.0
ZSLNS2006-2	0.6	2	0.9	0.57	50	4	9.6	2.8	3.1	3.4	3.6	4.1
ZSLNS2006-4		4						5.0	5.4	5.8	6.1	6.6
ZSLNS2006-6		6						6.9	7.2	7.7	8.1	8.4
ZSLNS2006-8		8						8.1	8.9	9.9	10.3	10.7
ZSLNS2006-10		10						9.3	9.9	10.3	10.7	11.4
ZSLNS2006-10		10					5.4	11.5	12.1	12.6	13.0	13.7

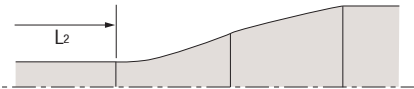
NEXT &gt;&gt;&gt;

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L<sub>2</sub>.
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta$ ;" and should also be referred to



※ The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length



ULTRA FINE



HELIX



p.968

## ZSLNS20....-.. series

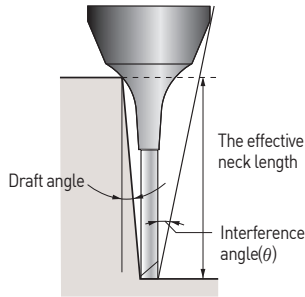
EDP. No.	Dimension(mm)							Effective Neck Length				
	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°
ZSLNS2007-2	0.7	2	1.05	0.67	50	4	9.6	2.8	3.1	3.4	3.6	4.1
ZSLNS2007-4		4					8.0	5.0	5.4	5.8	6.1	6.6
ZSLNS2007-6		6					6.9	7.2	7.7	8.1	8.4	9.0
ZSLNS2007-8		8					6.0	9.3	9.9	10.3	10.7	11.4
ZSLNS2007-10		10					5.3	11.5	12.1	12.6	13.0	13.7
ZSLNS2008-4	0.8	4	1.2	0.77	50	4	7.9	5.0	5.4	5.8	6.1	6.6
ZSLNS2008-6		6					6.8	7.2	7.7	8.1	8.4	9.0
ZSLNS2008-8		8					5.9	9.3	9.9	10.3	10.7	11.4
ZSLNS2008-10		10					5.2	11.5	12.1	12.6	13.0	13.7
ZSLNS2008-12		12			4.7		13.6	14.2	14.8	15.2	16.0	
ZSLNS2009-6	0.9	6	1.35	0.86	50	4	6.7	7.2	7.7	8.1	8.4	9.1
ZSLNS2009-8		8					5.8	9.4	9.9	10.4	10.7	11.4
ZSLNS2009-10		10					5.1	11.5	12.1	12.6	13.0	13.7
ZSLNS2009-12		12					4.6	13.6	14.3	14.8	15.2	16.0
ZSLNS2010-2	1	2	1.5	0.96	50	4	9.4	2.9	3.2	3.4	3.7	4.1
ZSLNS2010-4		4					7.7	5.1	5.5	5.8	6.1	6.6
ZSLNS2010-6		6					6.6	7.2	7.7	8.1	8.4	9.1
ZSLNS2010-8		8					5.7	9.4	9.9	10.4	10.7	11.4
ZSLNS2010-10		10					5.0	11.5	12.1	12.6	13.0	13.7
ZSLNS2010-12		12			4.5		13.6	14.3	14.8	15.2	16.0	
ZSLNS2010-14		14			4.1		15.7	16.4	17.0	17.4	18.7	
ZSLNS2010-16		16			3.8		17.8	18.6	19.1	19.6	21.3	
ZSLNS2010-20		20			3.2		22.0	22.8	23.5	24.0	26.6	
ZSLNS2012-6		1.2			6		1.8	1.15	50	4	6.3	7.3
ZSLNS2012-8	8		5.5	9.4	9.9	10.4					10.8	11.4
ZSLNS2012-10	10		4.8	11.5	12.1	12.6					13.0	13.7
ZSLNS2012-12	12		4.3	13.6	14.3	14.8					15.2	16.0
ZSLNS2012-16	16		3.6	17.8	18.6	19.2			19.7		21.3	
ZSLNS2014-6	1.4	6	2.1	1.34	50	4	6.1	7.3	7.8	8.1	8.5	9.1
ZSLNS2014-8		8					5.3	9.4	10.0	10.4	10.8	11.5
ZSLNS2014-10		10					4.6	11.6	12.1	12.6	13.0	13.8
ZSLNS2014-12		12			4.1		13.7	14.3	14.8	15.3	16.1	
ZSLNS2014-14		14			3.7		15.8	16.5	17.0	17.5	18.7	
ZSLNS2014-16		16			3.4		17.9	18.6	19.2	19.7	21.4	

X No application  
- No interference

※ These tools are manufactured based on order received

NEXT >>>

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L<sub>2</sub>
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta$ ;" and should also be referred to



※ The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length



## ZSLNS20....-.. series

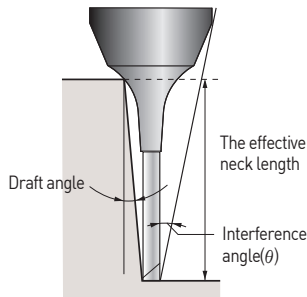
EDP. No.	Dimension(mm)						Effective Neck Length					
	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°
ZSLNS2015-4	1.5	4	2.25	1.44	50	4	7.2	5.2	5.5	5.9	6.2	6.7
ZSLNS2015-6		6					6.0	7.3	7.8	8.1	8.5	9.1
ZSLNS2015-8		8					5.1	9.4	10.0	10.4	10.8	11.5
ZSLNS2015-10		10					4.5	11.6	12.1	12.6	13.0	13.8
ZSLNS2015-12		12					4.0	13.7	14.3	14.8	15.3	16.1
ZSLNS2015-14		14			3.6		15.8	16.5	17.0	17.5	18.7	
ZSLNS2015-16		16			3.3		17.9	18.6	19.2	19.7	-	
ZSLNS2015-18		18			3.0		20.0	20.7	21.3	21.9	-	
ZSLNS2015-20		20			2.8		22.0	22.9	23.5	24.1	-	
ZSLNS2015-25		25			2.4		27.3	28.1	28.8	30.0	-	
ZSLNS2016-6	1.6	6	2.4	1.54	50	4	5.9	7.3	7.8	8.1	8.5	9.1
ZSLNS2016-8		8					5.0	9.4	10.0	10.4	10.8	11.5
ZSLNS2016-10		10					4.4	11.6	12.1	12.6	13.0	13.8
ZSLNS2016-12		12					3.9	13.7	14.3	14.8	15.3	16.1
ZSLNS2016-14		14			3.5		15.8	16.5	17.0	17.5	18.7	
ZSLNS2016-16		16			3.2		17.9	18.6	19.2	19.7	21.4	
ZSLNS2016-18		18			2.9		20.0	20.7	21.3	21.9	-	
ZSLNS2016-20		20			2.7		22.0	22.9	23.5	24.1	-	
ZSLNS2018-6	1.8	6	2.7	1.73	50	4	5.6	7.4	7.8	8.2	8.5	9.1
ZSLNS2018-8		8					4.8	9.5	10.0	10.4	10.8	11.5
ZSLNS2018-10		10					4.2	11.6	12.2	12.6	13.0	13.8
ZSLNS2018-12		12					3.7	13.7	14.3	14.8	15.3	16.1
ZSLNS2018-14		14			3.3		15.8	16.5	17.0	17.5	18.8	
ZSLNS2018-16		16			3.0		17.9	18.6	19.2	19.7	-	
ZSLNS2018-18		18			2.7		20.0	20.7	21.3	21.9	-	
ZSLNS2018-20		20			2.5		22.1	22.9	23.5	24.1	-	
ZSLNS2020-4	2	4	3	1.92	50	4	6.5	5.3	5.6	5.9	6.2	6.7
ZSLNS2020-6		6					5.3	7.4	7.8	8.2	8.5	9.1
ZSLNS2020-8		8					4.5	9.5	10.0	10.4	10.8	11.5
ZSLNS2020-10		10			3.9		11.6	12.2	12.7	13.1	13.8	
ZSLNS2020-12		12			3.4		13.7	14.3	14.9	15.3	16.1	
ZSLNS2020-14		14			3.1		15.8	16.5	17.0	17.5	18.8	

X No application  
- No interference

※ These tools are manufactured based on order received

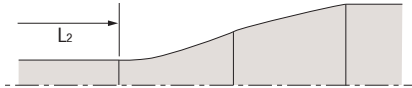
NEXT >>>

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L<sub>2</sub>
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θ<sub>2</sub>," and should also be referred to



※ The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length



## ZSLNS20....-.. series

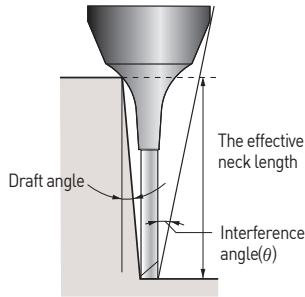
EDP. No.	Dimension(mm)							Effective Neck Length				
	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	θ	0.5°	1°	1.5°	2°	3°
ZSLNS2020-16	2	16	3	1.92	55	4	2.8	17.9	18.6	19.2	19.7	-
ZSLNS2020-18		18			60		2.6	20.0	20.8	21.4	21.9	-
ZSLNS2020-20		20			65		2.4	22.1	22.9	23.5	24.1	-
ZSLNS2020-25		25			70		2.0	27.3	28.2	28.9	-	-
ZSLNS2020-30		30			32.5		33.4	34.4	-	-		
ZSLNS2025-8	2.5	8	3.75	2.4	50	4	3.7	9.6	10.1	10.5	10.9	11.5
ZSLNS2025-10		10			55		3.1	11.7	12.2	12.7	13.1	13.8
ZSLNS2025-12		12			60		2.7	13.8	14.4	14.9	15.3	-
ZSLNS2025-14		14			65		2.4	15.9	16.5	17.1	17.5	-
ZSLNS2025-16		16			70		2.2	18.0	18.7	19.2	19.7	-
ZSLNS2025-18		18			60		2.0	20.1	20.8	21.4	-	-
ZSLNS2025-20		20			65		1.8	22.1	22.9	23.5	-	-
ZSLNS2025-25		25			70		1.5	27.3	28.2	-	-	-
ZSLNS2025-30		30			32.6		33.5	-	-	-		
ZSLNS2030-8		3			8		4.5	2.88	55	6	5.6	9.6
ZSLNS2030-10	10		60	5.0	11.7	12.3			12.7		13.1	13.8
ZSLNS2030-12	12		65	4.5	13.8	14.4			14.9		15.4	16.3
ZSLNS2030-14	14		70	4.1	15.9	16.6			17.1		17.6	18.9
ZSLNS2030-16	16		75	3.7	18.0	18.7			19.3		19.8	21.6
ZSLNS2030-18	18		80	3.4	20.1	20.8			21.4		21.9	24.2
ZSLNS2030-20	20		85	3.2	22.2	23.0			23.6		24.2	26.9
ZSLNS2030-25	25		90	2.7	27.4	28.2			28.9		30.2	-
ZSLNS2030-30	30		32.6	33.5	34.5	36.2			-			
ZSLNS2030-35	35		37.7	38.7	40.2	42.2			-			
ZSLNS2030-40	40		42.9	43.9	45.9	-			-			

X No application  
- No interference

※ These tools are manufactured based on order received

NEXT >>>

# Endmills for high hardened steel *Zamus Star Series*



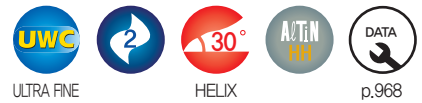
## 2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L2
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta_2$ ," and should also be referred to



※ The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length

## ZSLNS20....-.. series



EDP. No.	Dimension(mm)							Effective Neck Length				
	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°
ZSLNS2040-12	4	12	6	3.85	60	6	3.4	13.9	14.5	15.0	15.4	16.3
ZSLNS2040-16		16					2.8	18.1	18.8	19.3	19.8	-
ZSLNS2040-20		20					2.3	22.3	23.0	23.6	24.3	-
ZSLNS2040-25		25					2.0	27.4	28.3	28.9	-	-
ZSLNS2040-30		30					1.7	32.6	33.5	34.6	-	-
ZSLNS2040-35		35					1.5	37.8	38.8	-	-	-
ZSLNS2040-40		40					1.3	42.9	44.0	-	-	-
ZSLNS2040-45		45					1.2	48.1	49.4	-	-	-
ZSLNS2040-50		50					1.1	53.2	54.8	-	-	-
ZSLNS2050-16	5	16	7.5	4.85	60	6	1.5	18.1	18.8	-	-	-
ZSLNS2050-20		20					1.3	22.3	23.0	-	-	-
ZSLNS2050-25		25					1.1	27.4	28.3	-	-	-
ZSLNS2050-30		30					0.9	32.6	-	-	-	-
ZSLNS2050-35		35					0.8	37.8	-	-	-	-
ZSLNS2050-40		40					0.7	42.9	-	-	-	-
ZSLNS2050-45		45					0.6	48.1	-	-	-	-
ZSLNS2050-50		50					0.6	53.2	-	-	-	-

X No application  
- No interference

※ These tools are manufactured based on order received

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

○:General Application ◎:The most suitable Application

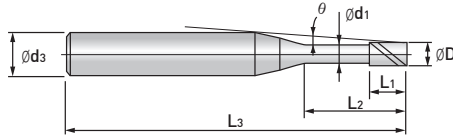
### ■ Tolerance

Diameter	Mill Dia.(mm)	Shank Dia.
0.1 ~ 0.5	0 ~ -0.012	h5
0.6 ~ 4	0 ~ -0.015	

※:Items can be changed for quality improvement without notice.

Endmills for high hardened steel – Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*



The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length

## ZSLNS40....-.. series



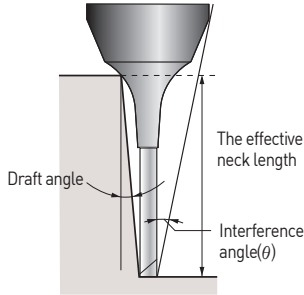
EDP. No.	Dimension(mm)							Effective Neck Length				
	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	θ	0.5°	1°	1.5°	2°	3°
ZSLNS4010-4	1	4	1.5	0.96	50	4	7.7	5.1	5.5	5.8	6.1	6.6
ZSLNS4010-6		6						7.2	7.7	8.1	8.4	9.1
ZSLNS4010-8		8						9.4	9.9	10.4	10.7	11.4
ZSLNS4010-10		10						11.5	12.1	12.6	13.0	13.7
ZSLNS4015-4	1.5	4	2.25	1.44	50	4	7.2	5.2	5.5	5.9	6.2	6.7
ZSLNS4015-6		6						7.3	7.8	8.1	8.5	9.1
ZSLNS4015-8		8						9.4	10.0	10.4	10.8	11.5
ZSLNS4015-10		10						11.6	12.1	12.6	13.0	13.8
ZSLNS4015-12		12			13.7			14.3	14.8	15.3	16.1	
ZSLNS4015-14		14			15.8			16.5	17.0	17.5	18.7	
ZSLNS4015-16		16			17.9			18.6	19.2	19.7	-	
ZSLNS4015-18		18			20.0			20.7	21.3	21.9	-	
ZSLNS4015-20		20			22.0			22.9	23.5	24.1	-	
ZSLNS4015-25		25			27.3			28.1	28.8	30.0	-	
ZSLNS4020-4	2	4	3	1.92	50	4	6.5	5.3	5.6	5.9	6.2	6.7
ZSLNS4020-6		6						7.4	7.8	8.2	8.5	9.1
ZSLNS4020-8		8						9.5	10.0	10.4	10.8	11.5
ZSLNS4020-10		10						11.6	12.2	12.7	13.1	13.8
ZSLNS4020-12		12			13.7			14.3	14.9	15.3	16.1	
ZSLNS4020-14		14			15.8			16.5	17.0	17.5	18.8	
ZSLNS4020-16		16			17.9			18.6	19.2	19.7	-	
ZSLNS4020-18		18			20.0			20.8	21.4	21.9	-	
ZSLNS4020-20		20			22.1			22.9	23.5	24.1	-	
ZSLNS4020-25		25			27.3			28.2	28.9	-	-	
ZSLNS4020-30		30			32.5			33.4	34.4	-	-	
ZSLNS4025-8		2.5			8			3.75	2.4	50	4	3.7
ZSLNS4025-10	10		11.7	12.2	12.7	13.1	13.8					
ZSLNS4025-12	12		13.8	14.4	14.9	15.3	-					
ZSLNS4025-14	14		15.9	16.5	17.1	17.5	-					
ZSLNS4025-16	16		18.0	18.7	19.2	19.7	-					
ZSLNS4025-18	18		20.1	20.8	21.4	-	-					
ZSLNS4025-20	20		22.1	22.9	23.5	-	-					
ZSLNS4025-25	25		27.3	28.2	-	-	-					
ZSLNS4025-30	30		32.6	33.5	-	-	-					

X No application  
- No interference

※ These tools are manufactured based on order received

NEXT >>>

# Endmills for high hardened steel Zamus Star Series

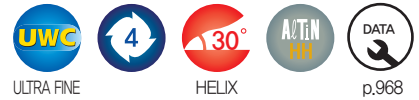


## 4 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L2.
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta_2$ ," and should also be referred to



※ The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length



## ZSLNS40....-.. series

EDP. No.	Dimension(mm)							Effective Neck Length				
	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°
ZSLNS4030-8	3	8	4.5	2.88	55	6	5.6	9.6	10.1	10.5	10.9	11.5
ZSLNS4030-10		10					5.0	11.7	12.3	12.7	13.1	13.8
ZSLNS4030-12		12					4.5	13.8	14.4	14.9	15.4	16.3
ZSLNS4030-14		14					4.1	15.9	16.6	17.1	17.6	18.9
ZSLNS4030-16		16					3.7	18.0	18.7	19.3	19.8	21.6
ZSLNS4030-18		18					3.4	20.1	20.8	21.4	21.9	24.2
ZSLNS4030-20		20			3.2		22.2	23.0	23.6	24.2	26.9	
ZSLNS4030-25		25			2.7		27.4	28.2	28.9	30.2	-	
ZSLNS4030-30		30			2.4		32.6	33.5	34.5	36.2	-	
ZSLNS4030-35		35			2.1		37.7	38.7	40.2	42.2	-	
ZSLNS4030-40		40			1.9		42.9	43.9	45.9	-	-	
ZSLNS4040-12		4			12		6	3.85	60	6	3.4	13.9
ZSLNS4040-16	16		2.8	18.1	18.8	19.3					19.8	-
ZSLNS4040-20	20		2.3	22.3	23.0	23.6			24.3		-	
ZSLNS4040-25	25		2.0	27.4	28.3	28.9			-		-	
ZSLNS4040-30	30		1.7	32.6	33.5	34.6			-		-	
ZSLNS4040-35	35		1.5	37.8	38.8	-			-		-	
ZSLNS4040-40	40		1.3	42.9	44.0	-			-		-	
ZSLNS4040-45	45		1.2	48.1	49.4	-			-		-	
ZSLNS4040-50	50		1.1	53.2	54.8	-			-		-	
ZSLNS4050-16	5		16	7.5	4.85	60			6		1.5	18.1
ZSLNS4050-20		20	1.3				22.3	23.0		-	-	-
ZSLNS4050-25		25	1.1			27.4	28.3	-		-	-	
ZSLNS4050-30		30	0.9			32.6	-	-		-	-	
ZSLNS4050-35		35	0.8			37.8	-	-		-	-	
ZSLNS4050-40		40	0.7			42.9	-	-		-	-	
ZSLNS4050-40		40	0.7			42.9	-	-		-	-	
ZSLNS4050-50		50	0.6			53.2	-	-		-	-	

X No application  
- No interference

※ These tools are manufactured based on order received

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SOM, SK...) HB225~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

○:General Application ◎:The most suitable Application

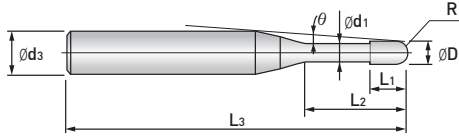
### ■ Tolerance

Diameter	Mill Dia.(mm)	Shank Dia.
0.1 ~ 0.5	0 ~ -0.012	h5
0.6 ~ 4	0 ~ -0.015	

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Endmills for high hardened steel – Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*



The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length

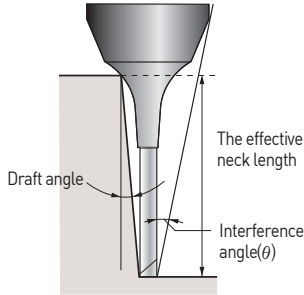
## ZSLNB..... series



EDP. No.	Dimension(mm)							Effective Neck Length					
	R	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	θ	0.5°	1°	1.5°	2°	3°
ZSLNB2001-0.2	0.05	0.1	0.2	0.08	0.08	45	4	11.8	0.3	0.3	0.3	0.4	0.4
ZSLNB2001-0.3			0.3						0.4	0.4	0.5	0.5	0.5
ZSLNB2001-0.5			0.5						0.7	0.7	0.7	0.7	0.8
ZSLNB2002-0.5	0.1	0.2	0.5	0.15	0.17	50	4	11.5	1.2	1.3	1.5	1.6	2.0
ZSLNB2002-1			1						1.7	1.9	2.1	2.3	2.7
ZSLNB2002-1.5			1.5						2.3	2.5	2.8	3.0	3.4
ZSLNB2002-2			2						2.8	3.1	3.4	3.6	4.1
ZSLNB2002-2.5			2.5						3.4	3.7	4.0	4.2	4.7
ZSLNB2002-3.0			3						3.9	4.3	4.6	4.9	5.4
ZSLNB2003-1			0.15						0.3	1	0.25	0.27	50
ZSLNB2003-1.5	1.5	2.3		2.5	2.7	3.0	3.4						
ZSLNB2003-2	2	2.8		3.1	3.4	3.6	4.0						
ZSLNB2003-2.5	2.5	3.4		3.7	4.0	4.2	4.7						
ZSLNB2003-3	3	3.9		4.3	4.6	4.8	5.3						
ZSLNB2004-1	0.2	0.4	1	0.3	0.37	50	4	11.0	1.7	1.9	2.1	2.3	2.7
ZSLNB2004-1.5			1.5						2.3	2.5	2.7	2.9	3.4
ZSLNB2004-2			2						2.8	3.1	3.4	3.6	4.0
ZSLNB2004-2.5			2.5						3.4	3.7	4.0	4.2	4.7
ZSLNB2004-3			3						3.9	4.3	4.6	4.8	5.3
ZSLNB2004-3.5			3.5						4.5	4.8	5.2	5.4	6.0
ZSLNB2004-4			4						5.0	5.4	5.7	6.0	6.6
ZSLNB2004-4.5	4.5	5.6	6.0	6.3	6.6	7.2							
ZSLNB2005-1	0.25	0.5	1	0.35	0.47	50	4	11.0	1.7	1.9	2.1	2.3	2.6
ZSLNB2005-2			2						2.8	3.1	3.3	3.6	4.0
ZSLNB2005-3			3						3.9	4.3	4.6	4.8	5.3
ZSLNB2005-4			4						5.0	5.4	5.7	6.0	6.6
ZSLNB2005-5			5						6.1	6.5	6.9	7.2	7.8
ZSLNB2005-6			6						7.1	7.6	8.0	8.4	9.0
ZSLNB2005-7			7						8.2	8.7	9.1	9.5	10.1
ZSLNB2005-8			8						9.3	9.9	10.3	10.7	11.4

NEXT >>>

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L2
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta_2$ ," and should also be referred to



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## ZSLNB..... series

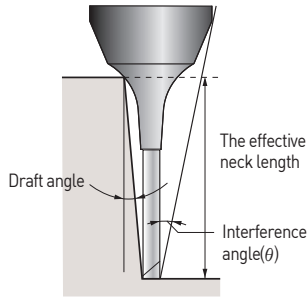


EDP. No.	Dimension(mm)								Effective Neck Length				
	R	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°
ZSLNB2006-1	0.3	0.6	1	0.4	0.57	50	4	11.0	1.7	1.9	2.1	2.3	2.6
ZSLNB2006-2			2					9.9	2.8	3.1	3.3	3.6	4.0
ZSLNB2006-3			3					9.0	3.9	4.3	4.5	4.8	5.3
ZSLNB2006-4			4					8.3	5.0	5.4	5.7	6.0	6.6
ZSLNB2006-5			5					7.6	6.1	6.5	6.9	7.2	7.8
ZSLNB2006-6			6					7.1	7.2	7.6	8.0	8.4	9.0
ZSLNB2006-7			7					6.6	8.3	8.8	9.2	9.5	10.2
ZSLNB2006-8			8					6.2	9.3	9.9	10.3	10.7	11.4
ZSLNB2006-9			9					5.8	10.4	10.9	11.4	11.8	12.5
ZSLNB2006-10			10					5.5	11.4	12.0	12.5	12.9	13.7
ZSLNB2006-12			12					5.0	13.6	14.2	14.7	15.2	16.0
ZSLNB2008-2			0.4					0.8	2	0.5	0.77	50	4
ZSLNB2008-4	4	8.2		5.0	5.4	5.7	6.0		6.5				
ZSLNB2008-5	5	7.5		6.1	6.5	6.9	7.2		7.8				
ZSLNB2008-6	6	7.0		7.2	7.6	8.0	8.4		9.0				
ZSLNB2008-8	8	6.1		9.3	9.8	10.3	10.7		11.3				
ZSLNB2008-10	10	5.4		11.4	12.0	12.5	12.9		13.7				
ZSLNB2010-2	0.5	1	2	0.8	0.96	50	4	9.9	2.9	3.1	3.3	3.5	4.0
ZSLNB2010-3			3					8.9	4.0	4.3	4.5	4.8	5.3
ZSLNB2010-4			4					8.1	5.0	5.4	5.7	6.0	6.5
ZSLNB2010-5			5					7.4	6.1	6.5	6.9	7.2	7.8
ZSLNB2010-6			6					6.8	7.2	7.7	8.0	8.4	9.0
ZSLNB2010-7			7					6.3	8.3	8.8	9.2	9.5	10.2
ZSLNB2010-8			8			5.9		9.3	9.9	10.3	10.7	11.3	
ZSLNB2010-9			9			5.5		10.4	11.0	11.4	11.8	12.5	
ZSLNB2010-10			10			5.2		11.5	12.0	12.5	12.9	13.7	
ZSLNB2010-12			12			4.6		13.6	14.2	14.7	15.2	15.9	
ZSLNB2010-14			14			4.2		15.7	16.4	16.9	17.4	18.5	
ZSLNB2010-16			16			3.8		17.8	18.5	19.1	19.6	21.2	
ZSLNB2010-18	18	3.5	19.9	20.7	21.3	21.8	23.8						
ZSLNB2010-20	20	3.3	22.0	22.8	23.4	24.0	26.5						
ZSLNB2012-4	0.6	1.2	4	1.1	1.15	50	4	7.9	5.1	5.4	5.7	6.0	6.5
ZSLNB2012-6			6					6.6	7.2	7.7	8.0	8.4	9.0
ZSLNB2012-8			8					5.7	9.4	9.9	10.3	10.7	11.3
ZSLNB2012-10			10			5.0		11.5	12.1	12.5	12.9	13.7	
ZSLNB2012-12			12			4.5		13.6	14.2	14.7	15.2	15.9	

NEXT >>>

Endmills for high hardened steel – Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L2
- Please refer to the effective neck length for the various draft angles
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ULTRA FINE



HELIX



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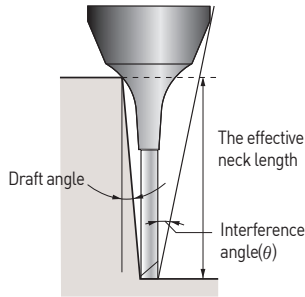
## ZSLNB..... series

EDP. No.	Dimension(mm)								Effective Neck Length				
	R	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	θ	0.5°	1°	1.5°	2°	3°
ZSLNB2014-8	0.7	1.4	8	1.3	1.34	50	4	5.5	9.4	9.9	10.3	10.7	11.3
ZSLNB2014-12			12			55		4.3	13.6	14.2	14.7	15.2	15.9
ZSLNB2014-16			16			55		3.5	17.8	18.5	19.1	19.6	21.2
ZSLNB2015-4	0.75	1.5	4	1.35	1.44	50	4	7.7	5.1	5.4	5.7	6.0	6.5
ZSLNB2015-6			6					6.4	7.3	7.7	8.0	8.4	9.0
ZSLNB2015-8			8					5.4	9.4	9.9	10.3	10.7	11.3
ZSLNB2015-10			10			4.7		11.5	12.1	12.5	12.9	13.7	
ZSLNB2015-12			12			4.2		13.6	14.2	14.7	15.2	15.9	
ZSLNB2015-14			14			3.8		15.7	16.4	16.9	17.4	18.5	
ZSLNB2015-16			16			3.4		17.8	18.5	19.1	19.6	21.1	
ZSLNB2015-20			20			2.9		22.0	22.8	23.4	24.0	-	
ZSLNB2016-8			0.8			1.6		8	1.4	1.54	50	4	5.3
ZSLNB2016-10	10	4.6		11.5	12.1		12.5	12.9			13.7		
ZSLNB2016-12	12	4.1		13.6	14.2		14.7	15.2			15.9		
ZSLNB2016-16	16	3.3		17.8	18.5		19.1	19.6			21.1		
ZSLNB2016-20	20	2.8		22.0	22.8		23.4	24.0			-		
ZSLNB2018-8	0.9	1.8	8	1.6	1.73	50	4	5.1	9.4	9.9	10.3	10.7	11.3
ZSLNB2018-12			12			3.9		13.7	14.3	14.7	15.2	15.9	
ZSLNB2018-16			16			3.1		17.9	18.6	19.1	19.6	21.1	
ZSLNB2018-20			20			2.6		22.0	22.8	23.4	24.0	-	
ZSLNB2020-3	1	2	3	1.7	1.92	50	4	8.3	4.1	4.4	4.6	4.8	5.2
ZSLNB2020-4			4					7.3	5.2	5.5	5.8	6.0	6.5
ZSLNB2020-6			6					5.8	7.3	7.7	8.1	8.4	9.0
ZSLNB2020-8			8	4.9		9.5		9.9	10.3	10.7	11.3		
ZSLNB2020-10			10	4.2		11.6		12.1	12.6	12.9	13.6		
ZSLNB2020-12			12	3.7		13.7		14.3	14.8	15.2	15.9		
ZSLNB2020-14			14	3.2		15.8		16.4	16.9	17.4	18.5		
ZSLNB2020-16			16	2.9		17.9		18.6	19.1	19.6	-		
ZSLNB2020-18			18	2.7		20.0		20.7	21.3	21.8	-		
ZSLNB2020-20			20	2.4		22.1		22.8	23.4	24.0	-		
ZSLNB2020-22			22	2.3		24.1		24.9	25.6	26.3	-		
ZSLNB2020-25			25	2.0		27.3		28.1	28.8	-	-		
ZSLNB2020-30			30	1.7		32.4		33.4	34.2	-	-		

X No application  
- No interference

NEXT >>>

# Endmills for high hardened steel *Zamus Star Series*



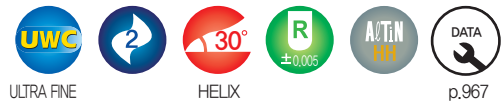
## 2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L2.
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta_2$ ," and should also be referred to



※ The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length

## ZSLNB..... series



EDP. No.	Dimension(mm)								Effective Neck Length									
	R	D	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°					
ZSLNB2020-35	1	2	35	3	1.92	75	4	1.5	37.6	38.6	-	-	-					
ZSLNB2020-40			40			80		1.4	42.8	43.8	-	-	-					
ZSLNB2025-10	1.25	2.5	10	4	2.4	50	4	3.4	11.6	12.1	12.6	13	13.6					
ZSLNB2025-16			16			55		2.3	17.9	18.6	19.1	19.6	-					
ZSLNB2025-20			20			60		1.9	22.1	22.8	23.5	-	-					
ZSLNB2030-8	1.5	3	8	4	2.88	55	6	6.2	9.6	10.0	10.4	10.7	11.3					
ZSLNB2030-10			10					5.5	11.7	12.2	12.6	13.0	13.6					
ZSLNB2030-13			13					4.6	14.8	15.4	15.9	16.3	17.1					
ZSLNB2030-16			16			4.0		18.0	18.6	19.1	19.6	21.1						
ZSLNB2030-18			18			3.6		20.0	20.7	21.3	21.8	23.7						
ZSLNB2030-20			20			3.4		22.1	22.9	23.5	24.0	26.4						
ZSLNB2030-25			25			2.8		27.3	28.2	28.8	29.9	-						
ZSLNB2030-30			30			2.5		32.5	33.4	34.3	35.9	-						
ZSLNB2030-35			35			2.2		37.7	38.7	40.0	41.9	-						
ZSLNB2040-10			2			4		10	5	3.9	55	6	4.5	11.6	12.1	12.5	12.9	13.5
ZSLNB2040-13								13					3.6	14.7	15.3	15.8	16.2	17.0
ZSLNB2040-16								16					3.1	17.9	18.5	19.1	19.5	20.9
ZSLNB2040-20	20	2.5		22.1	22.8		23.4	23.9			-							
ZSLNB2040-25	25	2.1		27.3	28.1		28.8	29.8			-							
ZSLNB2040-30	30	1.8		32.4	33.4		34.2	-			-							
ZSLNB2040-35	35	1.6		37.6	38.6		39.9	-			-							
ZSLNB2040-40	40	1.4		42.8	43.8		-	-			-							
ZSLNB2040-45	45	1.2		47.9	49.1		-	-			-							
ZSLNB2040-50	50	1.1		53.1	54.5		-	-			-							
ZSLNB2050-20	2.5	5	20	6	4.9	65	6	1.4	22.0	22.8	-	-	-					
ZSLNB2050-25			25			70		1.2	27.2	28.1	-	-	-					
ZSLNB2050-30			30			75		1.0	32.4	-	-	-	-					
ZSLNB2050-35			35			80		0.8	42.8	-	-	-	-					
ZSLNB2050-40			40			90		0.7	42.8	-	-	-	-					

- - No interference

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

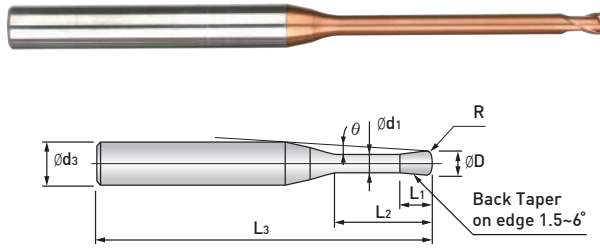
○:General Application ◎:The most suitable Application

### ■ Tolerance

Radius (mm)	Shank Dia.
±0,005	h5

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length

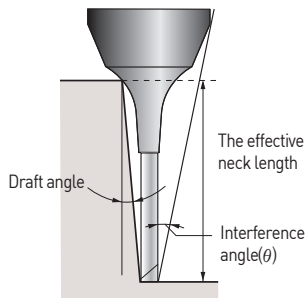
## ZSLNR..... series



EDP. No.	Dimension(mm)							Effective Neck Length					
	D	R	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	θ	0.5°	1°	1.5°	2°	3°
ZSLNR2002-0.5-005	0.2	0.05	0.5	0.15	0.17	50	4	11.4	0.9	1.0	1.0	1.1	1.2
ZSLNR2002-1-005			1						1.6	1.7	1.9	2.0	2.3
ZSLNR2002-1.5-005			1.5						2.1	2.3	2.5	2.7	3.0
ZSLNR2002-2-005			2						2.8	3.1	3.4	3.6	4.1
ZSLNR2003-1-005	0.3	0.05	1	0.25	0.27	50	4	10.8	1.4	1.5	1.6	1.7	1.9
ZSLNR2003-1.5-005			1.5						2.1	2.3	2.5	2.7	3.0
ZSLNR2003-2-005			2						2.7	2.9	3.1	3.3	3.6
ZSLNR2003-2.5-005			2.5						3.2	3.5	3.7	3.9	4.3
ZSLNR2003-3-005			3						3.9	4.3	4.6	4.9	5.4
ZSLNR2004-1-005	0.4	0.05	1	0.3	0.37	50	4	10.8	1.4	1.5	1.6	1.7	1.9
ZSLNR2004-1.5-005			1.5						2.0	2.1	2.2	2.3	2.5
ZSLNR2004-2-005			2						2.7	2.9	3.1	3.3	3.6
ZSLNR2004-2.5-005			2.5						3.2	3.5	3.7	3.9	4.3
ZSLNR2004-3-005			3						3.8	4.0	4.3	4.5	4.9
ZSLNR2004-3.5-005			3.5						4.3	4.6	4.9	5.1	5.5
ZSLNR2004-4-005		4	5.0						5.4	5.8	6.1	6.6	
ZSLNR2004-2-01		0.1	2						2.7	2.9	3.1	3.3	3.6
ZSLNR2004-3-01			3						3.8	4.0	4.3	4.5	4.9
ZSLNR2004-4-01			4						5.0	5.4	5.8	6.1	6.6
	4		5.0	5.4	5.8	6.1	6.6						
ZSLNR2005-1-005	0.5	0.05	1	0.35	0.47	50	4	10.8	1.4	1.5	1.6	1.7	1.9
ZSLNR2005-2-005			2						2.5	2.6	2.8	2.9	3.1
ZSLNR2005-3-005			3						3.8	4.0	4.3	4.5	4.9
ZSLNR2005-4-005			4						4.8	5.2	5.4	5.7	6.1
ZSLNR2005-5-005			5						6.1	6.6	6.9	7.3	7.8
ZSLNR2005-6-005			6						7.0	7.2	7.7	8.1	8.4
ZSLNR2005-1-01		0.1	1						1.4	1.5	1.6	1.7	1.9
ZSLNR2005-2-01			2						2.5	2.6	2.8	2.9	3.1
ZSLNR2005-3-01			3						3.8	4.0	4.3	4.5	4.9
			3						3.8	4.0	4.3	4.5	4.9

NEXT &gt;&gt;&gt;

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L<sub>2</sub>.
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta_2$ ," and should also be referred to



※ The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length



ULTRA FINE



HELIX



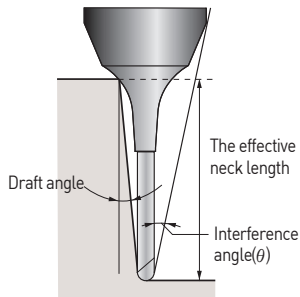
p.958~960

## ZSLNR..... series

EDP. No.	Dimension(mm)								Effective Neck Length				
	D	R	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	$\theta$	0.5°	1°	1.5°	2°	3°
ZSLNR2005-4-01	0.5	0.1	4	0.35	0.47	50	4	8.2	4.8	5.2	5.4	5.7	6.1
ZSLNR2005-5-01			5					7.6	6.1	6.5	6.9	7.2	7.8
ZSLNR2005-6-01			6					7.1	7.2	7.7	8.1	8.4	9.0
ZSLNR2006-2-01	0.6	0.1	2	0.4	0.57	50	4	9.7	2.5	2.6	2.8	2.9	3.1
ZSLNR2006-4-01			4					8.1	4.8	5.2	5.4	5.7	6.1
ZSLNR2006-6-01			6					7.0	7.2	7.7	8.1	8.4	9.0
ZSLNR2006-8-01			8					6.1	9.3	9.9	10.3	10.7	11.4
ZSLNR2006-10-01			10					5.5	11.5	12.1	12.5	13.0	13.7
ZSLNR2008-4-01	0.8	0.1	4	0.5	0.77	50	4	8.0	4.8	5.2	5.4	5.7	6.1
ZSLNR2008-6-01			6					6.8	7.0	7.4	7.7	7.9	8.4
ZSLNR2008-8-01			8					5.9	9.3	9.9	10.3	10.7	11.4
ZSLNR2008-12-01		12	4.7			13.6		14.2	14.7	15.2	16.0		
ZSLNR2008-4-02		0.2	4			8.0		4.8	5.1	5.4	5.6	6.1	
ZSLNR2008-6-02			6			6.9		7.0	7.3	7.7	7.9	8.4	
ZSLNR2010-4-01	1	0.1	4	0.8	0.94	50	4	7.7	4.7	4.9	5.1	5.2	5.5
ZSLNR2010-6-01			6					6.6	7.1	7.4	7.7	8.0	8.5
ZSLNR2010-8-01			8					5.7	9.2	9.6	9.9	10.2	10.8
ZSLNR2010-10-01			10					5.1	11.6	12.1	12.6	13.0	13.7
ZSLNR2010-12-01			12			4.5		13.7	14.3	14.8	15.3	16.0	
ZSLNR2010-16-01			16			3.8		17.9	18.6	19.2	19.7	21.3	
ZSLNR2010-20-01			20			3.2		22.0	22.8	23.5	24.0	26.7	
ZSLNR2010-4-02			0.2			4		7.8	4.7	4.9	5.1	5.2	5.5
ZSLNR2010-6-02		6		6.6	7.1	7.4		7.7	8.0	8.5			
ZSLNR2010-8-02		8		5.8	9.2	9.6		9.9	10.2	10.8			
ZSLNR2010-10-02		10		5.1	11.6	12.1		12.6	13.0	13.7			
ZSLNR2010-12-02		12		4.6	13.7	14.3		14.8	15.2	16.0			
ZSLNR2010-16-02		16		3.8	17.9	18.6		19.2	19.7	21.3			
ZSLNR2010-20-02		20		3.2	22.0	22.8		23.5	24.0	26.6			

NEXT >>>

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L<sub>2</sub>.
- Please refer to the effective neck length for the various draft angles.
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θ<sub>z</sub>," and should also be referred to



※ The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length



ULTRA FINE



HELIX



p.958~960

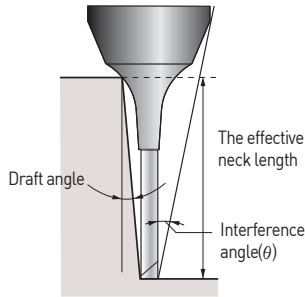
## ZSLNR..... series

EDP. No.	Dimension(mm)								Effective Neck Length								
	D	R	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	θ	0.5°	1°	1.5°	2°	3°				
ZSLNR2010-6-03	1	0.3	6	0.8	0.94	50	4	6.7	7.1	7.4	7.7	8.0	8.4				
ZSLNR2010-10-03			10					5.1	11.5	12.1	12.6	13.0	13.7				
ZSLNR2010-16-03			16			3.8		17.9	18.6	19.1	19.6	21.3					
ZSLNR2010-20-03			20			3.2		22.0	22.8	23.5	24.0	26.6					
ZSLNR2015-4-01	1.5	0.1	4	1.35	1.42	50	4	7.2	4.8	4.9	5.1	5.3	5.5				
ZSLNR2015-8-01			8					5.2	9.2	9.6	10.0	10.3	10.8				
ZSLNR2015-12-01			12			4.0		13.4	13.9	14.3	14.7	16.1					
ZSLNR2015-15-01			15			3.5		16.9	17.6	18.1	18.6	20.1					
ZSLNR2015-20-01		20	2.8			22.1		22.9	23.5	24.1	-						
ZSLNR2015-4-02		0.2	4			50		7.3	4.7	4.9	5.1	5.3	5.5				
ZSLNR2015-8-02			8					5.2	9.2	9.6	10.0	10.3	10.8				
ZSLNR2015-12-02			12					4.1	13.4	13.9	14.3	14.7	16.1				
ZSLNR2015-15-02			15					3.5	16.9	17.5	18.1	18.6	20.0				
ZSLNR2015-20-02		20	2.8			22.1		22.9	23.5	24.1	-						
ZSLNR2015-8-03		0.3	8			50		5.2	9.2	9.6	10.0	10.3	10.8				
ZSLNR2015-15-03			15					3.5	16.9	17.5	18.1	18.6	20.0				
ZSLNR2015-20-03			20					2.8	22.1	22.9	23.5	24.0	-				
ZSLNR2020-6-02			2					0.2	6	1.7	1.92	50	4	5.4	6.8	7.1	7.3
ZSLNR2020-8-02		8				4.6			8.9					9.2	9.4	9.7	10.8
ZSLNR2020-12-02		12				3.5			13.4			13.9		14.3	14.7	16.1	
ZSLNR2020-16-02	16	2.8		17.6	18.1	18.6	19.3		-								
ZSLNR2020-20-02	20	2.4		22.1	22.9	23.5	24.1		-								
ZSLNR2020-25-02	25	2.0		27.3	28.2	28.8	-		-								
ZSLNR2020-30-02	30	1.7		32.5	33.4	34.4	-		-								
ZSLNR2020-8-03	0.3	8		50	4.6	8.9	9.2		9.4			9.7		10.7			
ZSLNR2020-16-03		16			2.8	17.6	18.1	18.6	19.3			-					
ZSLNR2020-20-03		20			2.4	22.1	22.9	23.5	24.0			-					
ZSLNR2020-6-05		0.5			6	50	5.5	6.8	7.1			7.3		7.4	8.0		
ZSLNR2020-8-05	8			4.7	8.9		9.2	9.4	9.6			10.7					

- No interference

NEXT >>

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, LONG NECK

- If the workpiece has draft angle, the interference length will be longer than the L<sub>2</sub>.
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θ<sub>2</sub>," and should also be referred to



※ The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length

## ZSLNR..... series



EDP. No.	Dimension(mm)								Effective Neck Length				
	D	R	L <sub>2</sub>	L <sub>1</sub>	d <sub>1</sub>	L <sub>3</sub>	d <sub>3</sub>	θ	0.5°	1°	1.5°	2°	3°
ZSLNR2020-12-05	2	0.5	12	1.7	1.92	55	4	3.5	13.4	13.9	14.3	14.6	16.0
ZSLNR2020-16-05			16					2.9	17.6	18.1	18.6	19.2	-
ZSLNR2020-20-05			20					2.4	22.1	22.9	23.5	24.0	-
ZSLNR2020-25-05			25					2.0	27.3	28.1	28.8	-	-
ZSLNR2020-30-05		30	1.7			32.5		33.4	34.3	-	-		
ZSLNR2020-8-08		0.8	8			50		4.8	8.9	9.2	9.4	9.6	10.6
ZSLNR2020-16-08			16			55		2.9	17.6	18.1	18.6	19.2	-
ZSLNR2020-20-08			20			60		2.4	22.1	22.8	23.5	24.0	-
ZSLNR2030-8-02	3		0.2	8	2.5	2.86	55	6	5.7	9.0	9.3	9.5	9.9
ZSLNR2030-12-02		12		4.5					13.1	13.5	14.0	14.7	16.2
ZSLNR2030-16-02		16		3.8					17.7	18.2	18.7	19.5	21.6
ZSLNR2030-20-02		20		3.2					21.8	22.4	23.1	24.2	26.9
ZSLNR2030-30-02		30	2.4	32.6			33.5		34.5	36.2	-		
ZSLNR2030-35-02		35	2.1	37.7			38.7		40.2	42.2	-		
ZSLNR2030-8-03		0.3	8	55			5.7		9.0	9.3	9.5	9.9	10.9
ZSLNR2030-16-03			16	60			3.8		17.7	18.2	18.7	19.4	21.5
ZSLNR2030-20-03			20	65			3.2		21.8	22.4	23.1	24.2	26.8
ZSLNR2030-30-03			30	75			2.4		32.6	33.5	34.5	36.2	-
ZSLNR2030-8-05		0.5	8	55			5.8		9.0	9.3	9.5	9.8	10.8
ZSLNR2030-12-05			12	60			4.6		13.1	13.5	13.9	14.6	16.2
ZSLNR2030-16-05			16	3.8			17.7		18.2	18.7	19.4	21.5	
ZSLNR2030-20-05			20	3.2			21.8		22.4	23.1	24.2	26.8	
ZSLNR2030-30-05			30	2.4			32.6		33.5	34.5	36.1	-	
ZSLNR2030-35-05			35	2.1			37.7		38.7	40.2	42.1	-	

- No interference

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

○:General Application ◎:The most suitable Application

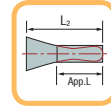
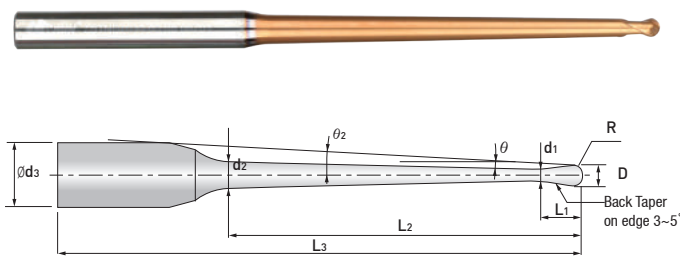
### ■ Tolerance

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

※:Items can be changed for quality improvement without notice.

Endmills for high hardened steel – Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*



The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length

※ R2 or higher is not applied to Back draft type.

## ZSTNB20..... series



p.952~955

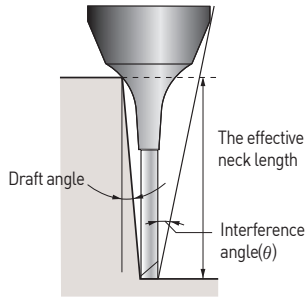
EDP. No.	Dimension(mm)									Effective Neck Length						
	R	D	L <sub>2</sub>	θ	L <sub>1</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	d <sub>3</sub>	App. L	θ <sub>2</sub>	0.5°	1°	1.5°	2°	3°
ZSTNB2002-1-04	0.1	0.2	1	0.4	0.15	0.17	0.18	50	4	1.35	10.9	1.5	1.7	1.8	2.0	2.3
ZSTNB2002-1.5-04			1.5	0.4			0.19			1.77	10.4	2.0	2.2	2.4	2.6	2.9
ZSTNB2002-2-09			2	0.9			0.23			1.10	10.1	x	2.8	3.1	3.4	3.9
ZSTNB2002-2.5-09			2.5	0.9			0.24			1.10	9.6	x	3.3	3.7	4.0	4.5
ZSTNB2003-2-04	0.15	0.3	2	0.4	0.25	0.28	0.29	50	4	2.19	10.0	2.5	2.8	3.0	3.2	3.5
ZSTNB2003-3-09			3	0.9			0.36			1.20	9.3	x	3.8	4.2	4.5	5.1
ZSTNB2003-4-09			4	0.9			0.39			1.20	8.6	x	4.8	5.3	5.7	6.3
ZSTNB2004-2-04	0.2	0.4	2	0.4	0.3	0.37	0.39	50	4	2.20	10.0	2.5	2.8	3.0	3.2	3.5
ZSTNB2004-3-04			3	0.4			0.41			2.44	9.1	3.6	3.9	4.1	4.4	4.8
ZSTNB2004-4-04			4	0.4			0.42			2.44	8.4	4.7	5.2	5.6	5.9	6.5
ZSTNB2004-4-09			4	0.9			0.49			1.25	8.5	x	4.8	5.3	5.7	6.3
ZSTNB2004-5-04			5	0.4			0.44			2.44	7.8	5.7	6.3	6.7	7.1	7.7
ZSTNB2004-5-09			5	0.9			0.52			1.25	7.9	x	5.9	6.4	6.8	7.5
ZSTNB2005-4-04	0.25	0.5	4	0.4	0.35	0.47	0.52	50	4	2.49	8.4	4.6	5.0	5.3	5.5	5.9
ZSTNB2005-8-09			8	0.9			0.71			1.30	6.5	x	8.9	9.6	10.1	10.9
ZSTNB2005-12-09			12				0.84			1.30	5.3	x	13.0	13.9	14.5	15.4
ZSTNB20054-2-04	0.27	0.54	2	0.4	0.37	0.52	0.54	50	4	1.80	10.0	2.3	2.5	2.7	2.8	3.0
ZSTNB20054-4-04			4				0.57			1.80	8.4	4.5	4.9	5.2	5.5	5.9
ZSTNB20054-5-04			5				0.59			1.80	7.8	5.5	6.0	6.3	6.6	7.1
ZSTNB20054-6-04			6				0.60			1.80	7.2	6.7	7.3	7.8	8.2	8.8
ZSTNB20054-6.5-04			6.5				0.61			1.80	7.0	7.2	7.9	8.3	8.7	9.4
ZSTNB20054-7-04			7				0.61			1.80	6.8	7.7	8.4	8.9	9.3	10.0
ZSTNB2006-2-04	0.3	0.6	2	0.4	0.4	0.57	0.59	50	4	2.17	10.0	2.4	2.5	2.7	2.8	3.0
ZSTNB2006-4-04			4				0.62			2.54	8.4	4.6	5.0	5.2	5.5	5.9
ZSTNB2006-6-04			6				0.65			2.54	7.2	6.8	7.4	7.8	8.2	8.8
ZSTNB2006-6-09			6	0.9			0.75			1.35	7.3	x	6.9	7.5	7.9	8.6
ZSTNB2006-8-09			8	0.81			1.35			6.4	x	8.9	9.6	10.1	10.9	
ZSTNB2006-10-04			10	0.4			0.70			2.54	5.6	10.8	11.7	12.2	12.7	13.5
ZSTNB2006-10-09			10	0.9			0.87			1.35	5.7	x	11.0	11.8	12.3	13.2
ZSTNB2006-12-09			12	0.9			0.93			1.35	5.2	x	13.0	13.9	14.5	15.4
ZSTNB2006-15-04			15	0.4			0.77			2.54	4.4	15.9	17.0	17.6	18.2	19.2
ZSTNB2006-15-09			15	0.9			1.03			1.35	4.5	x	16.1	17.1	17.7	18.8

X No application  
- No interference

NEXT >>>

※ These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



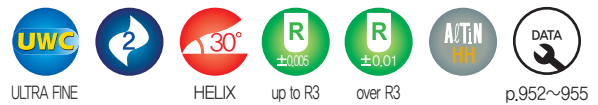
## 2 FLUTE, TAPER NECK BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the L<sub>2</sub>.
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θ<sub>2</sub>," and should also be referred to



※ The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSTNB20..... series



EDP. No.	Dimension(mm)										Effective Neck Length					
	R	D	L <sub>2</sub>	θ	L <sub>1</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	d <sub>3</sub>	App. L	θ <sub>2</sub>	0.5°	1°	1.5°	2°	3°
ZSTNB2008-4-04	0.4	0.8	4	0.4	0.5	0.77	0.82	50	4	2.64	8.3	4.6	4.9	5.2	5.5	5.9
ZSTNB2008-6-04			6				0.85			2.64	7.1	6.6	7.1	7.5	7.7	8.3
ZSTNB2008-8-09			8	1.01			1.45	6.3		x	8.9	9.6	10.1	10.9		
ZSTNB2008-12-09			12	1.13			1.45	5.0		x	13.0	13.9	14.5	15.4		
ZSTNB2008-16-09			16	1.26			1.45	4.2		x	17.1	18.1	18.8	19.9		
ZSTNB2009-4-04	0.45	0.9	4	0.4	0.6	0.86	0.91	50	4	3.46	8.2	4.5	4.7	4.9	5.1	5.4
ZSTNB2009-8-04			8				0.96	3.46		6.1	8.7	9.3	9.7	10.0	10.6	
ZSTNB2009-12-04			12				1.02	3.46		4.8	12.9	13.8	14.4	14.9	15.7	
ZSTNB2009-16-04			16				1.08	3.46		4.0	17.0	18.0	18.7	19.3	20.5	
ZSTNB2009-18-04			18				1.10	3.46		3.7	19.1	20.1	20.9	21.5	23.1	
ZSTNB2009-20-04			20				1.13	3.46		3.4	21.1	22.2	23.0	23.6	25.6	
ZSTNB2009-22-04			22				1.16	3.46		3.2	23.1	24.3	25.1	25.8	28.2	
ZSTNB2009-24-04			24				1.19	3.46		3.0	25.2	26.4	27.2	27.9	-	
ZSTNB2010-6-04	0.5	1	6	0.4	0.8	0.94	1.01	50	6	5.09	8.3	6.8	7.2	7.5	7.8	8.3
ZSTNB2010-8-04			8				1.04	5.09		7.5	8.8	9.3	9.7	10.0	10.6	
ZSTNB2010-10-04			10				1.07	5.09		6.8	11.0	11.7	12.3	12.7	13.5	
ZSTNB2010-10-09			10	1.23			2.70	6.9		x	11.2	11.9	12.4	13.2		
ZSTNB2010-15-09			15	1.39			2.70	5.7		x	16.2	17.1	17.8	18.8		
ZSTNB2010-20-04			20	1.21			5.09	4.7		21.2	22.3	23.0	23.6	25.7		
ZSTNB2010-20-09			20	1.54			2.70	4.8		x	21.3	22.4	23.1	24.6		
ZSTNB2010-25-09			25	1.70			2.70	4.2		x	26.4	27.6	28.4	30.8		
ZSTNB2010-30-04			30	1.35			5.09	3.6		31.3	32.7	33.6	34.8	38.5		
ZSTNB2010-30-09			30	1.86			2.70	3.7		x	31.4	32.8	33.7	36.9		
ZSTNB2010-35-09			35	2.02			2.70	3.3		x	36.5	38.0	39.0	43.1		
ZSTNB2010-40-09			40	2.17			2.70	3.0		x	41.6	43.2	44.4	-		
ZSTNB2010-50-09			50	2.49			2.70	2.5		x	51.7	53.5	55.5	-		
ZSTNB2010-60-09			60	2.80			2.70	2.2		x	61.8	63.8	66.6	-		
ZSTNB2010-70-09			70	3.11			2.70	1.9		x	71.9	74.0	-	-		
ZSTNB2015-8-04	0.75	1.5	8	0.4	1.35	1.42	1.51	55	6	7.07	7.3	8.9	9.4	9.7	10.0	10.6
ZSTNB2015-10-04			10				1.54			7.07	6.6	10.9	11.5	11.9	12.2	12.9

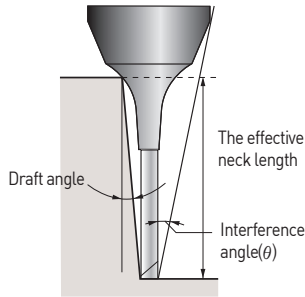
X No application  
- No interference

NEXT >>>

※ These tools are manufactured based on order received.

Endmills for high hardened steel – Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*

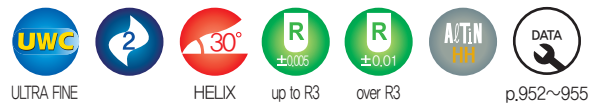


## 2 FLUTE, TAPER NECK BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the L<sub>2</sub>.
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θ<sub>2</sub>," and should also be referred to



※ The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.



## ZSTNB20..... series

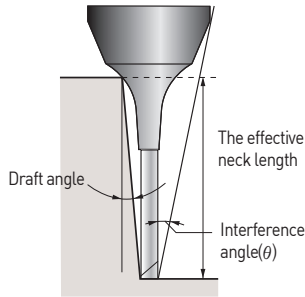
EDP. No.	Dimension(mm)										Effective Neck Length										
	R	D	L <sub>2</sub>	θ	L <sub>1</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	d <sub>3</sub>	App. L	θ <sub>2</sub>	0.5°	1°	1.5°	2°	3°					
ZSTNB2015-12-04	0.75	1.5	12	0.4	1.35	1.42	1.57	55	6	7.07	6.0	13.0	13.6	14.0	14.4	15.4					
ZSTNB2015-15-09			15				1.85	60		3.89	5.4	x	16.4	17.2	17.8	18.8					
ZSTNB2015-20-09			20	2.01			65	3.89		4.5	x	21.4	22.4	23.2	24.7						
ZSTNB2015-30-09			30	2.32			75	3.89		3.4	x	31.5	32.9	33.7	37.0						
ZSTNB2018-4-04	0.9	1.8	4	0.4	1.6	1.73	1.76	50	6	4.38	9.2	4.6	4.8	4.9	5.1	5.4					
ZSTNB2018-8-04			8				1.82			60	6.61	7.1	8.6	9.0	9.2	9.4	10.2				
ZSTNB2018-12-04			12				1.88	55		6.61	5.8	12.9	13.5	14.0	14.4	15.4					
ZSTNB2018-16-04			16				1.93	60		6.61	4.9	17.0	17.7	18.3	18.7	20.5					
ZSTNB2018-20-04			20				1.99	65		6.61	4.3	21.2	22.3	23.0	23.6	25.6					
ZSTNB2018-24-04			24				2.04			6.61	3.8	25.3	26.5	27.3	27.9	30.8					
ZSTNB2018-28-04			28				2.10	70		6.61	3.4	29.4	30.6	31.5	32.4	35.9					
ZSTNB2018-32-04			32				2.15			6.61	3.0	33.4	34.8	35.7	37.1	-					
ZSTNB2018-36-04			36				2.21	75		6.61	2.8	37.5	38.9	39.9	41.7	-					
ZSTNB2018-38-04			38				2.24			6.61	2.7	39.5	41.0	42.0	44.0	-					
ZSTNB2018-40-04			40				2.27	80		6.61	2.6	41.5	43.1	44.2	46.3	-					
ZSTNB2020-8-04			1				2	8		0.4	1.7	1.92	2.01	50	6	7.42	7.0	8.7	9.0	9.2	9.5
ZSTNB2020-12-04	12	2.06		55	7.42	5.7		13.0	13.6				14.0	14.4		15.4					
ZSTNB2020-16-04	16	2.12		60	7.42	4.8		17.0	17.7				18.3	18.7		20.5					
ZSTNB2020-20-04	20	2.18		65	7.42	4.1		21.3	22.3				23.0	23.6		25.6					
ZSTNB2020-20-09	20	2.50			4.24	4.2		x	21.4	22.4			23.2	24.6							
ZSTNB2020-25-09	25	2.65		70	4.24	3.6		x	26.5	27.7			28.5	30.8							
ZSTNB2020-30-04	30	2.32			7.42	3.1		31.4	32.7	33.6			34.8	38.5							
ZSTNB2020-30-09	30	2.81		75	4.24	3.2		x	31.6	32.9			33.7	36.9							
ZSTNB2020-35-09	35	2.97			4.24	2.8		x	36.6	38.0			39.0	-							
ZSTNB2020-40-04	40	2.46		80	7.42	2.5		41.5	43.1	44.2			46.3	-							
ZSTNB2020-40-09	40	3.12			4.24	2.6		x	41.7	43.2			44.5	-							
ZSTNB2020-50-09	50	3.44		90	4.24	2.1		x	51.8	53.5			55.5	-							
ZSTNB2020-60-09	60	3.75			4.24	1.8		x	61.9	63.8			-	-							
ZSTNB2020-70-09	70	4.07		110	4.24	1.6		x	72.0	74.1			-	-							
ZSTNB2030-8-04	1.5	3		8	0.4	2.5		2.86	2.94	50			6	8.50		6.3	8.8	9.1	9.3	9.5	10.3
ZSTNB2030-16-04				16					3.05	55				12.52		4.1	17.2	17.8	18.3	18.7	20.6

X No application  
- No interference

NEXT >>>

※ These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



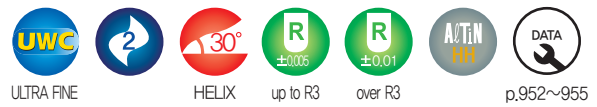
## 2 FLUTE, TAPER NECK BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the L<sub>2</sub>.
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle  $\theta_2$ ," and should also be referred to



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## ZSTNB20..... series



EDP. No.	Dimension(mm)										Effective Neck Length					
	R	D	L <sub>2</sub>	$\theta$	L <sub>1</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	d <sub>3</sub>	App. L	$\theta_2$	0.5°	1°	1.5°	2°	3°
ZSTNB2030-20-04	1.5	3	20	0.4	2.5	2.86	3.10	60	6	12.52	3.4	21.2	22.0	22.6	23.3	25.7
ZSTNB2030-30-04			30				3.24	70		12.52	2.5	31.6	32.8	33.7	34.9	-
ZSTNB2030-30-09			30	3.72			70	6.95	2.6	x	31.8	33.0	33.8	-		
ZSTNB2030-40-04			40	3.38			80	12.52	2.0	41.7	43.2	44.3	-	-		
ZSTNB2030-40-09			40	4.04			80	6.95	2.0	x	41.9	43.3	-	-		
ZSTNB2030-50-09			50	4.35			90	6.95	1.7	x	52.0	53.6	-	-		
ZSTNB2030-60-09			60	4.67			100	6.95	1.4	x	62.1	-	-	-		
ZSTNB2030-70-09			70	4.98			110	6.95	1.2	x	72.1	-	-	-		
ZSTNB2040-20-10	2	4	20	1	8	3.86	4.28	70	8	12.01	5.0	20.5	21.6	22.3	22.8	23.5
ZSTNB2040-30-10			30				4.63	80		12.01	3.51	22.0	31.6	32.5	33.2	34.16
ZSTNB2040-40-10			40				4.98	90		12.01	2.7	22.0	42.0	43.4	44.3	-
ZSTNB2040-50-10			50				5.33	100		12.01	2.2	22.0	52.0	53.6	54.7	-
ZSTNB2040-60-10			60				5.68	110		12.01	1.9	22.0	62.0	63.8	-	-
ZSTNB2050-30-10	2.5	5	30	1	10	4.86	5.56	80	8	14.01	2.8	25.5	31.7	32.6	33.2	-
ZSTNB2050-40-10			40				5.91	90		14.01	2.1	25.5	41.7	42.8	43.5	-
ZSTNB2050-60-10			60				6.61	110		14.01	1.5	25.5	62.1	-	-	-
ZSTNB2060-30-10	3	6	30	1	12	5.86	6.49	80	8	16.01	1.9	29.0	31.8	32.6	-	-
ZSTNB2060-40-10			40				6.84	90		16.01	1.5	29.0	41.8	-	-	-
ZSTNB2060-50-10			50				7.19	100		16.01	1.2	29.0	51.8	-	-	-
ZSTNB2060-60-10			60				7.54	110	16.01	1.9	29.0	62.2	63.9	-	-	
ZSTNB2060-70-10			70				7.89	120	16.01	1.7	29.0	72.2	74.1	-	-	
ZSTNB2060-80-10			80				8.23	130	16.01	1.5	29.0	82.2	-	-	-	
ZSTNB2080-50-10	4	8	50	1	14	7.86	9.12	110	10	18.01	1.2	32.0	51.9	-	-	-
ZSTNB2080-60-10			60				9.47	120		18.01	1.0	32.0	-	-	-	-
ZSTNB2080-70-10			70				9.82	130	18.01	0.9	32.0	-	-	-	-	
ZSTNB2080-80-10			80				10.16	140	18.01	1.5	32.0	82.3	-	-	-	
ZSTNB2100-60-10	5	10	60	1	18	9.86	11.33	130	12	22.01	1.1	39.0	62.1	-	-	-
ZSTNB2100-75-10			75				11.85	140		22.01	0.9	39.0	-	-	-	-

X No application  
- No interference

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

○:General Application ◎:The most suitable Application

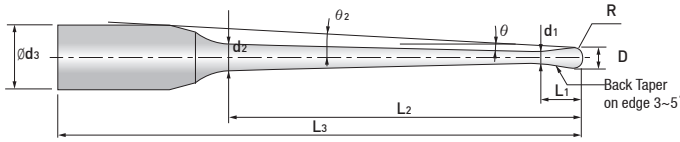
### ■ Tolerance

Diameter	Radius	Shank Dia.
up to 6	±0.005	h6
over 6	±0.01	

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel — Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*



The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length

※R2 or higher is not applied to Back draft type.

## ZSTNB30... series



p.952~955

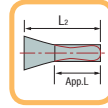
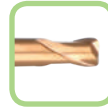
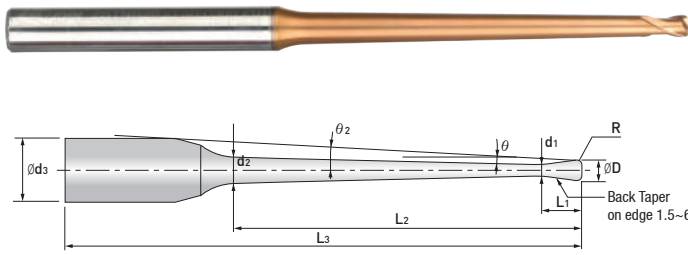
EDP. No.	Dimension(mm)										Effective Neck Length										
	R	D	L <sub>2</sub>	θ	L <sub>1</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	d <sub>3</sub>	App.L	θ <sub>2</sub>	0.5°	1°	1.5°	2°	3°					
ZSTNB3020-8-04	1	2	8	0.4	1.7	1.92	2.01	50	6	7.42	7.0	8.7	9.0	9.2	9.5	10.2					
ZSTNB3020-12-04			12				2.06	55		7.42	5.7	13.0	13.6	14.0	14.4	15.4					
ZSTNB3020-16-04			16				2.12	60		7.42	4.8	17.0	17.7	18.3	18.7	20.5					
ZSTNB3020-20-04			20				2.18	65		7.42	4.1	21.3	22.3	23.0	23.6	25.6					
ZSTNB3020-20-09			20				2.50			4.24	4.2	x	21.4	22.4	23.2	24.6					
ZSTNB3020-25-09			25				2.65	4.24		3.6	x	26.5	27.7	28.5	30.8						
ZSTNB3020-30-04			30	0.4			2.32	70		7.42	3.1	31.4	32.7	33.6	34.8	38.5					
ZSTNB3020-30-09			30	0.9			2.81			4.24	3.2	x	31.6	32.9	33.7	36.9					
ZSTNB3020-35-09			35	0.9			2.97	75		4.24	2.8	x	36.6	38.0	39.0	-					
ZSTNB3020-40-04			40	0.4			2.46	80		7.42	2.5	41.5	43.1	44.2	46.3	-					
ZSTNB3020-40-09			40	0.9			3.12	80		4.24	2.6	x	41.7	43.2	44.5	-					
ZSTNB3020-50-09			50	0.9			3.44	90		4.24	2.1	x	51.8	53.5	55.5	-					
ZSTNB3020-60-09			60	0.9			3.75	100		4.24	1.8	x	61.9	63.8	-	-					
ZSTNB3020-70-09			70	0.9			4.07	110		4.24	1.6	x	72.0	74.1	-	-					
ZSTNB3030-8-04	1.5	3	8	0.4	2.5	2.86	2.94	50	6	8.50	6.3	8.8	9.1	9.3	9.5	10.3					
ZSTNB3030-16-04			16				3.05	55		12.52	4.1	17.2	17.8	18.3	18.7	20.6					
ZSTNB3030-20-04			20				3.10	60		12.52	3.4	21.2	22.0	22.6	23.3	25.7					
ZSTNB3030-30-04			30				3.24	70		12.52	2.5	31.6	32.8	33.7	34.9	-					
ZSTNB3030-30-09			30				3.72			6.95	2.6	x	31.8	33.0	33.8	-					
ZSTNB3030-40-04			40				0.4	3.38		80	12.52	2.0	41.7	43.2	44.3	-	-				
ZSTNB3030-40-09			40	0.9			4.04	6.95			2.0	x	41.9	43.3	-	-					
ZSTNB3030-50-09			50	0.9			4.35	90		6.95	1.7	x	52.0	53.6	-	-					
ZSTNB3030-60-09			60	0.9			4.67	100		6.95	1.4	x	62.1	-	-	-					
ZSTNB3030-70-09			70	0.9			4.98	110		6.95	1.2	x	72.1	-	-	-					
ZSTNB3040-20-10			2	4			20	1		8	3.86	4.28	70	8	12.01	5.0	20.5	21.6	22.3	22.8	23.5
ZSTNB3040-30-10							30					4.63	80		12.01	3.6	22.0	31.6	32.5	33.2	34.1
ZSTNB3040-40-10							40					4.98	90		12.01	2.7	22.0	42.0	43.4	44.3	-
ZSTNB3040-50-10							50					5.33	100		12.01	2.2	22.0	52.0	53.6	54.7	-
ZSTNB3040-60-10	60	5.68			110	12.01	1.9		22.0			62.0	63.8		-	-					
ZSTNB3050-30-10	2.5	5			30	1	10		4.86			5.56	80		8	14.01	2.8	25.5	31.7	32.6	33.2
ZSTNB3050-40-10			40	5.91	90			14.01		2.1	25.5	41.7	42.8	43.5		-					
ZSTNB3050-60-10			60	6.61	110			12.52		1.5	25.5	62.1	-	-		-					

X No application  
- No interference

NEXT >>>

※ These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length

※R2 or higher is not applied to Back draft type.

## ZSTNR..... series



p.956~957

EDP. No.	Dimension(mm)										Effective Neck Length												
	D	R	L <sub>2</sub>	θ	L <sub>1</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	d <sub>3</sub>	App.L	θ <sub>2</sub>	0.5°	1°	1.5°	2°	3°							
ZSTNR2002-2-09005	0.2	0.05	2	0.9	0.15	0.17	0.23	50	4	1.10	10.0	x	2.8	3.1	3.4	3.9							
ZSTNR2004-4-09005	0.4	0.05	4	0.9	0.3	0.37	0.49	50	4	1.25	8.4	x	4.9	5.3	5.7	6.3							
ZSTNR2004-5-09005			5	0.9			0.52			7.8	x	5.9	6.4	6.8	7.5								
ZSTNR2004-4-0901		0.1	4	0.9			0.49			8.5	x	4.9	5.3	5.7	6.3								
ZSTNR2004-5-0901			5	0.9			0.52			7.9	x	5.9	6.4	6.8	7.5								
ZSTNR2005-5-0901	0.5	0.1	5	0.9	0.35	0.47	0.62	50	4	1.30	7.8	x	5.9	6.4	6.8	7.5							
ZSTNR2005-8-0901			8	0.9			0.71			6.4	x	9.0	9.7	10.2	11.0								
ZSTNR2005-10-0901			10	0.9			0.77			55	1.30	5.8	x	11.0	11.8	12.4	13.2						
ZSTNR2006-12-0901	0.6	0.1	12	0.9	0.4	0.57	0.93	55	4	1.35	5.1	x	13.0	13.9	14.5	15.5							
ZSTNR2006-15-0901			15	0.9			1.03			4.5	x	16.1	17.1	17.8	18.8								
ZSTNR2008-6-0402	0.8	0.2	6	0.4	0.5	0.77	0.85	50	4	2.64	7.0	6.6	7.1	7.5	7.8	8.3							
ZSTNR2008-12-0902			12	0.9			1.13			55	1.45	5.0	x	13.0	13.9	14.5	15.5						
ZSTNR2010-8-0402	1	0.2	8	0.4	0.8	0.94	1.04	55	6	5.09	7.4	8.8	9.3	9.7	10.1	10.6							
ZSTNR2010-10-0902			10	0.9			1.23			6.8	x	11.2	11.9	12.4	13.3								
ZSTNR2010-15-0902			15	0.9			1.39			60	2.70	5.6	x	16.3	17.2	17.8	18.8						
ZSTNR2010-20-0902			20	0.9			1.54			65	2.70	4.8	x	21.3	22.4	23.2	24.7						
ZSTNR2010-25-0902			25	0.9			1.70			70	2.70	4.1	x	26.4	27.6	28.5	30.9						
ZSTNR2010-30-0902			30	0.9			1.86			75	2.70	3.7	x	31.5	32.8	33.7	37.0						
ZSTNR2010-35-0902			35	0.9			2.02			80	2.70	3.3	x	36.5	38.0	39.0	43.2						
ZSTNR2010-8-0403		0.3	8	0.4	0.8	0.94	1.04	55	6	2.70	7.4	8.8	9.3	9.7	10.0	10.6							
ZSTNR2010-15-0903			15	0.9			1.39			60	2.70	5.6	x	16.3	17.2	17.8	18.8						
ZSTNR2010-25-0903			25	0.9			1.70			70	2.70	4.2	x	26.4	27.6	28.5	30.8						
ZSTNR2010-30-0903			30	0.9			1.86			75	2.70	3.7	x	31.5	32.8	33.7	37.0						
ZSTNR2015-10-0402			1.5	0.2			10			0.4	1.35	1.42	1.54	55	6	7.07	6.4	11.0	11.5	11.9	12.3	13.0	
ZSTNR2015-15-0902							15			0.9			1.85			60	7.07	5.3	x	16.4	17.3	17.9	18.9
ZSTNR2015-20-0902							20			0.9			2.01			65	3.89	4.5	x	21.5	22.5	23.2	24.9
ZSTNR2015-25-0902	25	0.9			2.16	70	3.89	3.9	x	26.6			27.7			28.5	31.0						
ZSTNR2015-30-0902	30	0.9			2.32	75	3.89	3.4	x	31.6			32.9			33.8	37.1						
ZSTNR2015-10-0403	0.3	10			0.4	1.54	55	3.89	6.4	11.0			11.5			11.9	12.3	13.0					

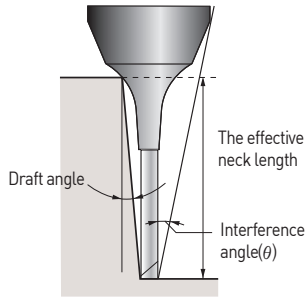
X No application  
- No interference

NEXT >>>

※ These tools are manufactured based on order received.

Endmills for high hardened steel – Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, TAPER NECK BACK DRAFT TYPE

- If the workpiece has draft angle, the interference length will be longer than the L<sub>2</sub>.
- Please refer to the effective neck length for the various draft angles
- In addition, the angle at which the tool will interfere with the workpiece is shown as the "interference angle θ<sub>2</sub>," and should also be referred to



※ The effective neck length shown is not an exact value and to avoid contact with the workpiece, we recommend the user control the precise value of this length.

## ZSTNR..... series



p.956~957

Endmills for high hardened steel - Zamus Star Series

EDP. No.	Dimension(mm)										Effective Neck Length										
	D	R	L <sub>2</sub>	θ	L <sub>1</sub>	d <sub>1</sub>	d <sub>2</sub>	L <sub>3</sub>	d <sub>3</sub>	App. L	θ <sub>2</sub>	0.5°	1°	1.5°	2°	3°					
ZSTNR2015-20-0903	1.5	0.3	20	0.9	1.35	1.42	2.01	65	6	3.89	4.5	x	21.5	22.5	23.2	24.8					
ZSTNR2015-25-0903			25				2.16	70			3.9	x	26.5	27.7	28.5	31.0					
ZSTNR2015-30-0903			30				2.32	75			3.4	x	31.6	32.9	33.8	37.1					
ZSTNR2020-30-0902	2	0.2	30	0.9	1.7	1.92	2.81	70	6	7.42	3.1	x	31.6	32.9	33.8	37.2					
ZSTNR2020-40-0902			40				3.12	80			2.5	x	41.8	43.3	44.6	-					
ZSTNR2020-50-0902			50				3.44	90			2.1	x	51.9	53.6	55.7	-					
ZSTNR2020-12-0403		0.3	12	0.4			2.06	55			5.5	13.0	13.6	14.1	14.5	15.6					
ZSTNR2020-20-0903			20	0.9			2.50	65			4.1	x	21.5	22.5	23.2	24.9					
ZSTNR2020-30-0903			30	0.9			2.81	70			3.1	x	31.6	32.9	33.8	37.1					
ZSTNR2020-40-0903			40	0.9			3.12	80			2.5	x	41.7	43.3	44.6	-					
ZSTNR2020-50-0903			50	0.9			3.44	90			2.1	x	51.8	53.6	55.7	-					
ZSTNR2020-8-0405			0.5	8			0.4	2.01			50	6.8	8.7	9.0	9.3	9.5	10.4				
ZSTNR2020-12-0405		12		0.4			2.06	55			5.6	13.0	13.6	14.1	14.4	15.5					
ZSTNR2020-16-0405		16		0.4			2.12	60			4.7	17.0	17.8	18.3	18.7	20.7					
ZSTNR2020-20-0905		20		0.9			2.50	65			4.2	x	21.5	22.5	23.2	24.8					
ZSTNR2020-25-0905		25		0.9			2.65	65			3.6	x	26.6	27.7	28.5	30.9					
ZSTNR2020-30-0905		30		0.9			2.81	70			3.1	x	31.6	32.9	33.8	37.1					
ZSTNR2020-40-0905		3	0.2	40			0.9	2.5			2.86	4.04	80	6	6.95	2.0	x	42.0	43.4	-	-
ZSTNR2030-50-0902				50								4.35	90			1.6	x	52.1	53.7	-	-
ZSTNR2030-60-0902				60								4.67	100			1.4	x	62.2	-	-	-
ZSTNR2030-40-0903			0.3	40								0.9	4.04			80	2.0	x	42.0	43.4	-
ZSTNR2030-50-0903	50			0.9	4.35	90			1.7	x		52.1	53.7			-	-				
ZSTNR2030-60-0903	60			0.9	4.67	100			1.4	x		62.2	-			-	-				
ZSTNR2030-40-0905	0.5	40	0.9	4.04	80	2.0	x	42.0	43.4	-	-										
ZSTNR2030-50-0905		50	0.9	4.35	90	1.7	x	52.1	53.7	-	-										
ZSTNR2030-60-0905		60	0.9	4.67	100	1.4	x	62.1	-	-	-										

X No application  
- No interference

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

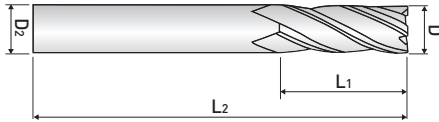
○:General Application ◎:The most suitable Application

### ■ Tolerance

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

※Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, LONG CUT LENGTH BROKEN INDEX

- High precision and excellent surface due to each 4F unequal index geometry
- Longer tool life over 50% as reducing chatter and resonance

## ZS124 ...series



ULTRA FINE



ULTRA FINE



HELIX



p.961

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZS124 020	2	5	45	4
ZS124 030	3	8	45	6
ZS124 040	4	10	45	6
ZS124 060	6	16	50	6
ZS124 080	8	20	60	8
ZS124 100	10	25	75	10
ZS124 120	12	35	85	12

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

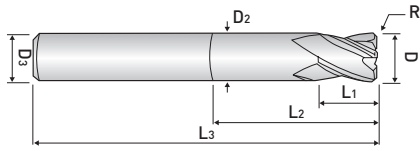
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, CORNER RADIUS BROKEN INDEX

- The impacting debut of new type endmill for high hardened steels up to HRc70 and high speed machining up to 200m/min
- High precision and excellent surface due to each 4F unequal index geometry
- Longer tool life over 50% as reducing chatter and resonance

## ZS1(2)04 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZS104010	1	-	1.5	4	45	0.9	4
ZS204010		0.05					
ZS104020	2	-	3	6	45	1.9	4
ZS204020		0.05					
ZS104030	3	-	4	7	45	2.9	6
ZS204030		0.1					
ZS104040	4	-	5	9	45	3.8	6
ZS204040		0.1					
ZS104060	6	-	7	14	50	5.8	6
ZS204060		0.2					
ZS104080	8	-	9	18	60	7.8	8
ZS204080		0.2					
ZS104100	10	-	12	25	75	9.7	10
ZS204100		0.2					
ZS104120	12	-	15	30	75	11.7	12
ZS204120		0.3					

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
	○	○	◎	◎	○				

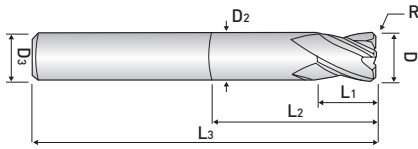
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, CORNER RADIUS BROKEN INDEX

- The impacting debut of new type endmill for high hardened steels up to HRc70 and high speed machining up to 200m/min
- High precision and excellent surface due to each 4F unequal index geometry
- Longer tool life over 50% as reducing chatter and resonance

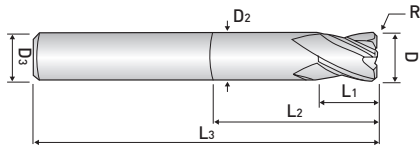
## ZS204 .....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	
ZS20402000507	2	0.05	2.5	7	50	1.9	4	
ZS2040200107		0.1						
ZS2040300109	3	0.1	4	9	55	2.9	6	
ZS2040300209		0.2						
ZS2040300309		0.3		12				
ZS2040300312								16
ZS2040300316								
ZS2040400212	4	0.2	5	12	55	3.8	6	
ZS2040400312		0.3		16				
ZS2040400316				0.5				20
ZS2040400320		12						
ZS2040400512		16						
ZS2040400516		20						
ZS2040400520		12						
ZS2040401012		1						
ZS2040500116	5	0.1	6	16	60	4.8	6	
ZS2040500216		0.2						
ZS2040500316		0.3						
ZS2040500516		0.5						
ZS2040501016		1						
ZS2040600120	6	0.1	7	20	60	5.8	6	
ZS2040600220		0.2						
ZS2040600320		0.3						
ZS2040600520		0.5						
ZS2040601020		1						
ZS2040601520		1.5						

NEXT &gt;&gt;&gt;

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, CORNER RADIUS BROKEN INDEX

- The impacting debut of new type endmill for high hardened steels up to HRc70 and high speed machining up to 200m/min
- High precision and excellent surface due to each 4F unequal index geometry
- Longer tool life over 50% as reducing chatter and resonance

## ZS204 .....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZS2040800125	8	0.1	9	25	60	7.8	8
ZS2040800225		0.2					
ZS2040800325		0.3					
ZS2040800525		0.5					
ZS2040801025		1					
ZS2040801525		1.5					
ZS2040802025		2					
ZS2041000232	10	0.2	11	32	75	9.7	10
ZS2041000332		0.3					
ZS2041000532		0.5					
ZS2041001032		1					
ZS2041001532		1.5					
ZS2041002032		2					
ZS2041200238	12	0.2	12	38	75	11.7	12
ZS2041200338		0.3					
ZS2041200538		0.5					
ZS2041201038		1					
ZS2041201538		1.5					
ZS2041202038		2					

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	○	◎	◎	○				

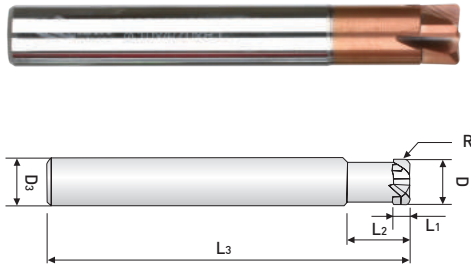
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, STUB CUT LENGTH, with EXTENDED NECK

- Designed to machine high hardened material by using newly developed raw-material and new coating
- Applying straight flute design on the tool to minimize the corner radius breakage
- Applying back draft type on the tool to maximize the reducing chatter and preventing deflection

## ZSPM4...-.. series



ULTRA FINE



HELIX



p.961~962

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
ZSPM4030-05	3	0.5	1.2	8	50	6
ZSPM4040-05	4	0.5	1.5	10	50	6
ZSPM4060-05	6	0.5	2.5	12	60	6
ZSPM4060-10		1				
ZSPM4060-15		1.5				
ZSPM4060-15L					90	
ZSPM4080-10	8	1	3.5	16	60	8
ZSPM4080-20		2				
ZSPM4080-20L						
ZSPM4100-10	10	1	4	20	70	10
ZSPM4100-20		2				
ZSPM4100-20L						
ZSPM4120-20	12	2	5	25	80	12
ZSPM4120-30		3				
ZSPM4120-30L						

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

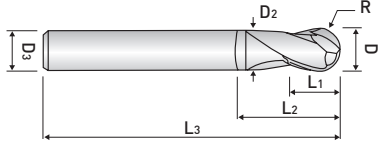
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, STUB CUT LENGTH, BALL NOSE with EXTENDED NECK

- Designed to machine high hardened materials up to HRc 70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating
- Excellent workpiece finishes

## DB702 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
DB702001	0.1	0.05	0.15	-	40	-	4
DB702002	0.2	0.1	0.3	-	40	-	4
DB702003	0.3	0.15	0.5	-	40	-	4
DB702004	0.4	0.2	0.6	-	40	-	4
DB702005	0.5	0.25	0.7	-	40	-	4
DB702006	0.6	0.3	0.9	-	40	-	4
DB702007	0.7	0.35	1.1	-	40	-	4
DB702008	0.8	0.4	1.2	-	40	-	4
DB702009	0.9	0.45	1.4	-	40	-	4
DB702010S4	1	0.5	1.5	-	45	-	4
DB702010				3	50	0.95	6
DB702015S4	1.5	0.75	2	-	45	-	4
DB702015	1.5	0.75	2	4	50	1.45	6
DB702020S4	2	1	2.5	-	45	-	4
DB702020				5	50	1.9	6
DB702025	2.5	1.25	3	7	50	2.45	6
DB702030S4	3	1.5	4	-	45	-	4
DB702030S				10	50	2.9	6
DB702030					60		
DB702031					70		
DB702040S4	4	2	5	-	45	-	4
DB702040S				10	50	3.9	6
DB702040					60		
DB702041					70		
DB702050	5	2.5	6	12	60	4.9	6
DB702060	6	3	7	12	60	5.9	6
DB702061					90		
DB702080	8	4	9	15	70	7.9	8
DB702081					100		
DB702100	10	5	11	25	75	9.9	10
DB702101					100		
DB702120	12	6	12	25	80	11.9	12
DB702121					110		

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
	○	○	◎	◎	○				

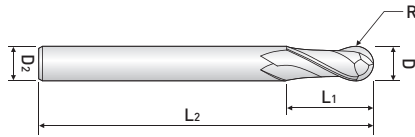
○:General Application ◎:The most suitable Application

### ■ Tolerance

Radius (mm)		Shank Dia.	
up to R3	±0,005		h6
over R3	±0,01		

※Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, REGULAR LENGTH, BALL NOSE

- Designed to machine high hardened material up to HRc 70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating
- Excellent workpiece finishes

## DB712 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	
DB712010S	1	0.5	1.5	40	6	
DB712010S4			2.5	50	4	
DB712010					6	
DB712012	1.2	0.6	3	50	6	
DB712015S	1.5	0.75	2.5	40	6	
DB712015S4			4	50	4	
DB712015					6	
DB712020S	2	1	3	40	6	
DB712020S4			5	50	4	
DB712020					6	
DB712025	2.5	1.25	7	60	6	
DB712030S	3	1.5	4.5	50	6	
DB712030S4			8	60	4	
DB712030					6	
DB712040S	4	2	6	50	6	
DB712040			8	70		
DB712050S	5	2.5	7.5	50	6	
DB712050			10	80		
DB712060S	6	3	9	50	6	
DB712060			12	90		
DB712080S	8	4	12	50	8	
DB712081			14	100		
DB712100S	10	5	15	60	10	
DB712100			18	100		
DB712120S	12	6	18	60	12	
DB712120			22	110		

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
	○	○	◎	◎	○				

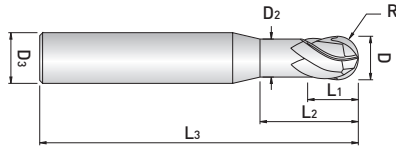
○:General Application ◎:The most suitable Application

### ■ Tolerance

Radius (mm)		Shank Dia.	
up to R3	±0,005		h6
over R3	±0,01		

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 3 FLUTE, BALL NOSE for FINISHING MOLD & DIE

- Designed to machine high hardened materials up to HRC 70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating
- Excellent workpiece finishes

## DB703 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
DB703020	2	1	2.5	5	50	1.9	6
DB703025	2.5	1.25	3	7	50	2.4	6
DB703030S	3	1.5	4	10	50	2.9	6
DB703030					60		
DB703031					70		
DB703040S	4	2	5	10	50	3.7	6
DB703040					60		
DB703041					70		
DB703050	5	2.5	6	12	60	4.7	6
DB703060	6	3	7	12	60	5.6	6
DB703061					90	5.9	
DB703080	8	4	9	15	70	7.4	8
DB703081					100	7.9	
DB703100					10	5	
DB703101	100	9.9					
DB703120	12	6	12	25	80	11.4	12
DB703121					110	11.9	

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

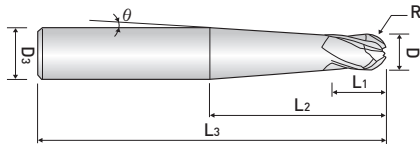
○:General Application ◎:The most suitable Application

### ■ Tolerance

Radius (mm)		Shank Dia. h6
up to R3	±0,005	
over R3	±0,01	

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, TAPER NECK, FINISHING MOLD & DIE

- Designed to machine high hardened material up to HRC 70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating
- Excellent workpiece finishes

## DB734 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	θ	D <sub>3</sub>
DB734020-2.5	2	1	2	25	60	2.5	4
DB734020-3.5				18		3.5	
DB734025-2.5	2.5	1.25	3	20	60	2.5	4
DB734025-3.0				17		3	
DB734030-2.0	3	1.5	3	46	70	2	6
DB734030-2.5				37		2.5	
DB734040-2.0	4	2.0	4	33	70	2	6
DB734040-2.5				27		2.5	
DB734050-2.5	5	2.5	5	16	70	2.5	6
DB734060-1.5	6	3.0	6	44	100	1.5	8
DB734060-2.5				29		2.5	
DB734080-1.5	8	4.0	8	46	100	1.5	10
DB734080-2.5				31		2.5	
DB734100-1.5	10	5.0	10	48	110	1.5	12
DB734100-2.5				33		2.5	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

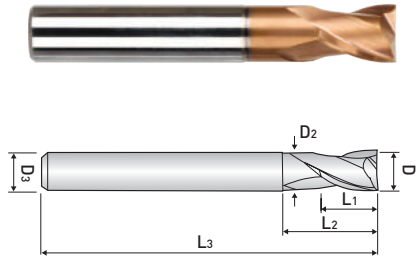
○:General Application ◎:The most suitable Application

### ■ Tolerance

Radius (mm)	Shank Dia.
±0,01	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, STUB CUT LENGTH, with EXTENDED NECK

- Designed to machine high hardened materials up to HRC 70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating



## ZE702 ...series

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZE702001	0.1	0.2	-	40	-	4
ZE702002	0.2	0.4	-	40	-	4
ZE702003	0.3	0.5	-	40	-	4
ZE702004	0.4	0.7	-	40	-	4
ZE702005	0.5	1	-	40	-	4
ZE702006	0.6	1.2	-	40	-	4
ZE702007	0.7	1.4	-	40	-	4
ZE702008	0.8	1.6	-	40	-	4
ZE702009	0.9	2	-	40	-	4
ZE702010S4	1	1.5	-	40	-	4
ZE702010						6
ZE702015	1.5	2.2	-	40	-	6
ZE702020S4	2	3	6	40	1.9	4
ZE702020						6
ZE702025	2.5	4	6	40	2.4	6
ZE702030	3	4	7	45	2.9	6
ZE702035	3.5	6	9	45	3.3	6
ZE702040	4	6	9	45	3.8	6
ZE702045	4.5	6	10	45	4.3	6
ZE702050	5	6	11	50	4.8	6
ZE702060	6	7	14	50	5.8	6
ZE702080	8	9	18	60	7.8	8
ZE702100	10	12	25	75	9.7	10
ZE702120	12	15	30	75	11.7	12
ZE702160	16	18	38	90	15.7	16
ZE702200	20	24	45	100	19.7	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

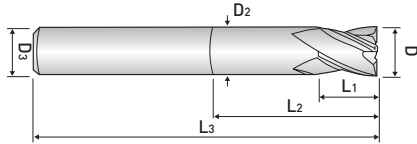
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	

※ These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, STUB CUT LENGTH, with EXTENDED NECK

- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZE704 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZE704010S4	1	1.5	-	40	-	4
ZE704010						6
ZE704015	1.5	2.2	-	40	-	6
ZE704020S4	2	3	6	40	1.9	4
ZE704020						6
ZE704025	2.5	4	6	40	2.4	6
ZE704030	3	4	7	45	2.9	6
ZE704035	3.5	5	9	45	3.3	6
ZE704040	4	5	9	45	3.8	6
ZE704045	4.5	6	10	45	4.3	6
ZE704050	5	6	11	50	4.8	6
ZE704060	6	7	14	50	5.8	6
ZE704080	8	9	18	60	7.8	8
ZE704100	10	12	25	75	9.7	10
ZE704120	12	15	30	75	11.7	12
ZE704160	16	18	38	90	15.7	16
ZE704200	20	24	45	100	19.7	20

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

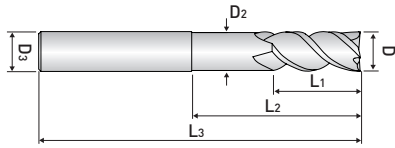
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	

※ These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



## 4 & 6 FLUTE, FINISHING for MOLD & DIE

- Designed to machine high hardened materials up to HRC 70.
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating.
- Corner radius(below 0.05) against chipping in high speed machining.

## ZE724(6) ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	Z
ZE724010	1	1.5	5	45	0.95	6	4
ZE724015	1.5	2.2	6	45	1.45	6	4
ZE724020	2	3	8	45	1.9	6	4
ZE724030	3	4	9	50	2.9	6	4
ZE724040	4	5	12	50	3.8	6	4
ZE724050	5	6	15	50	4.8	6	4
ZE726060	6	7	20	60	5.8	6	6
ZE726080	8	9	25	70	7.8	8	6
ZE726100	10	12	32	75	9.7	10	6
ZE726120	12	15	38	80	11.7	12	6

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

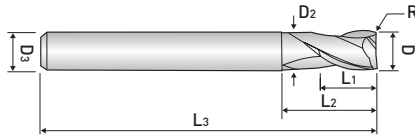
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.015	
over 6	0 ~ -0.002	

※ These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR702 .....series

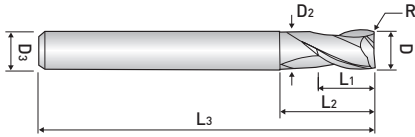


EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZR702 010 005 03 S4	1	0.05	1.5	3	50	0.95	4
ZR702 010 005 04 S4				4			
ZR702 010 005 06 S4				6			
ZR702 010 005 08 S4				8			
ZR702 010 005 10 S4				10			
ZR702 010 01 03 S4		0.1		3			
ZR702 010 01 04 S4				4			
ZR702 010 01 06 S4				6			
ZR702 010 01 08 S4				8			
ZR702 010 01 10 S4				10			
ZR702 010 02 03 S4		0.2		3			
ZR702 010 02 04 S4				4			
ZR702 010 02 06 S4				6			
ZR702 010 02 08 S4				8			
ZR702 010 02 10 S4				10			
ZR702 010 03 03 S4	0.3	3					
ZR702 010 03 04 S4		4					
ZR702 010 03 06 S4		6					
ZR702 010 03 08 S4		8					
ZR702 010 03 10 S4		10					
ZR702 010 01 04	1	0.1	1.5	4	50	0.95	6
ZR702 010 01 06				6			
ZR702 010 02 04		0.2		4			
ZR702 010 02 06				6			
ZR702 010 02 10				10			
ZR702 010 02 12				12			
ZR702 012 02 08	1.2	0.2	2	8	50	1.15	6
ZR702 012 02 12				12			
ZR702 015 005 04 S4	1.5	0.05	2.5	4	50	1.45	4
ZR702 015 005 06 S4				6			
ZR702 015 005 08 S4				8			
ZR702 015 005 10 S4				10			
ZR702 015 005 12 S4				12			
ZR702 015 01 04 S4		0.1		4			
ZR702 015 01 06 S4				6			
ZR702 015 01 08 S4				8			
ZR702 015 01 10 S4				10			
ZR702 015 01 12 S4				12			

NEXT &gt;&gt;&gt;

Endmills for high hardened steel – Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR702 .....series



ULTRA FINE



HELIX

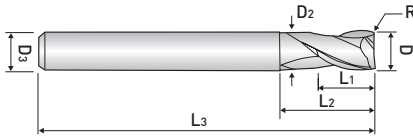
up to  $\phi 6$ over  $\phi 6$ 

p.965~966

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZR702 015 02 04 S4	1.5	0.2	2.5	4	50	1.45	4
ZR702 015 02 06 S4				6			
ZR702 015 02 08 S4				8			
ZR702 015 02 10 S4				10			
ZR702 015 02 12 S4				12			
ZR702 015 03 04 S4	1.5	0.3	2.5	4	50	1.45	4
ZR702 015 03 06 S4				6			
ZR702 015 03 08 S4				8			
ZR702 015 03 10 S4				10			
ZR702 015 03 12 S4				12			
ZR702 015 05 04 S4	1.5	0.5	2.5	4	50	1.45	4
ZR702 015 05 06 S4				6			
ZR702 015 05 08 S4				8			
ZR702 015 05 10 S4				10			
ZR702 015 05 12 S4				12			
ZR702 015 02 04	1.5	0.2	2.5	4	50	1.45	6
ZR702 015 02 06				6			
ZR702 015 02 08				8			
ZR702 015 02 10				10			
ZR702 015 02 15				15			
ZR702 020 01 06 S4	2	0.1	3	6	50	1.9	4
ZR702 020 01 08 S4				8			
ZR702 020 01 10 S4				10			
ZR702 020 01 12 S4				12			
ZR702 020 01 16 S4				16			
ZR702 020 01 20 S4				20			
ZR702 020 02 06 S4		0.2	3	6	50	1.9	4
ZR702 020 02 08 S4				8			
ZR702 020 02 10 S4				10			
ZR702 020 02 12 S4				12			
ZR702 020 02 16 S4				16			
ZR702 020 02 20 S4				20			
ZR702 020 03 06 S4		0.3	3	6	50	1.9	4
ZR702 020 03 08 S4	8						
ZR702 020 03 10 S4	10						
ZR702 020 03 12 S4	12						
ZR702 020 03 16 S4	16						
ZR702 020 03 20 S4	20						

NEXT &gt;&gt;

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR702 .....series

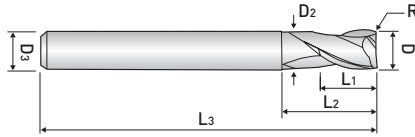


EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>												
ZR702 020 05 06 S4	2	0.5	3	6	50	1.9	4												
ZR702 020 05 08 S4				8															
ZR702 020 05 10 S4				10															
ZR702 020 05 12 S4				12															
ZR702 020 05 16 S4				16															
ZR702 020 05 20 S4				20															
ZR702 020 01 08	2	0.1	3	8	50	1.9	6												
ZR702 020 01 12				12															
ZR702 020 02 06				0.2				6											
ZR702 020 02 09		9																	
ZR702 020 02 16		16																	
ZR702 020 03 06		0.3		3				6	50	1.9	6								
ZR702 020 05 06								6											
ZR702 020 05 09								9											
ZR702 020 05 12		0.5		3				12				50	1.9	6					
ZR702 020 05 16								16											
ZR702 025 02 08 S4								2.5							0.2	3.5	8	50	2.4
ZR702 025 02 10 S4		10																	
ZR702 025 02 12 S4	12																		
ZR702 025 02 16 S4	16																		
ZR702 025 03 08 S4	0.3	3.5	8	50	2.4	4													
ZR702 025 03 10 S4			10																
ZR702 025 03 12 S4			12																
ZR702 025 03 16 S4			16																
ZR702 025 05 08 S4			0.5				3.5		8	50	2.4				4				
ZR702 025 05 10 S4									10										
ZR702 025 05 12 S4	12																		
ZR702 025 05 16 S4	16																		
ZR702 030 01 08	3	0.1						4.5	8			55	2.9	6					
ZR702 030 01 10									10										
ZR702 030 01 12			12																
ZR702 030 01 16			16																
ZR702 030 01 20			20																
ZR702 030 02 08			0.2	4.5	8	55	2.9		6										
ZR702 030 02 09		9																	
ZR702 030 02 10		10																	

다음페이지에 계속 >>

Endmills for high hardened steel – Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR702 .....series

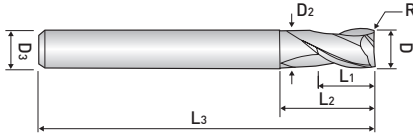


EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>		
ZR702 030 02 12	3	0.2	4.5	12	55	2.9	6		
ZR702 030 02 16				16					
ZR702 030 02 20				20					
ZR702 030 03 08		0.3		0.3	8			55	
ZR702 030 03 09					9				
ZR702 030 03 10					10				
ZR702 030 03 12					12				
ZR702 030 03 14					14				
ZR702 030 03 16					16				
ZR702 030 03 20		20		60					
ZR702 030 05 08		0.5		0.5	8			55	
ZR702 030 05 09					9				
ZR702 030 05 10					10				
ZR702 030 05 12					12				
ZR702 030 05 16					16				
ZR702 030 05 20					20				60
ZR702 030 10 08		1.0		1.0	8			55	
ZR702 030 10 10					10				
ZR702 030 10 12	12								
ZR702 030 10 16	16								
ZR702 030 10 20	20		60						
ZR702 030 10 25	25		60						
ZR702 040 01 10	4	0.1	6	10	55	3.8	6		
ZR702 040 01 12				12					
ZR702 040 01 16				16					
ZR702 040 01 20				20				60	
ZR702 040 01 25				25				60	
ZR702 040 02 10				0.2				0.2	10
ZR702 040 02 12		12							
ZR702 040 02 16		16							
ZR702 040 02 20		20			60				
ZR702 040 02 25		25			60				
ZR702 040 03 10		0.3			0.3				10
ZR702 040 03 12				12					
ZR702 040 03 16				16					
ZR702 040 03 20				20				60	
ZR702 040 03 25				25				60	

NEXT >>>

Endmills for high hardened steel – Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR702 .....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>			
ZR702 040 05 10	4	0.5	6	10	55	3.8	6			
ZR702 040 05 12				12						
ZR702 040 05 16				16						
ZR702 040 05 20				20						
ZR702 040 05 25				25						
ZR702 040 05 30				30						
ZR702 040 10 10		1.0		1.0	10			70		
ZR702 040 10 12					12				55	
ZR702 040 10 16					16					
ZR702 040 10 20					20					60
ZR702 040 10 25					25					
ZR702 040 10 30					30					
ZR702 050 03 18	5	0.3	8	18	60	4.8	6			
ZR702 060 02 20	6	0.2	9	20	60	5.8	6			
ZR702 060 03 20		0.3								
ZR702 060 05 20		0.5								
ZR702 060 10 20		1.0								
ZR702 060 15 20		1.5								
ZR702 060 20 20		2.0								
ZR702 080 02 25	8	0.2	12	25	60	7.8	8			
ZR702 080 03 25		0.3								
ZR702 080 05 25		0.5								
ZR702 080 10 25		1.0								
ZR702 080 15 25		1.5								
ZR702 100 02 32		10						0.2	15	32
ZR702 100 03 32	0.3									
ZR702 100 05 32	0.5									
ZR702 100 10 32	1.0									
ZR702 100 15 32	1.5									
ZR702 100 20 32	2.0									
ZR702 120 03 38	12	0.3	18	38	80	11.7	12			
ZR702 120 05 38		0.5								
ZR702 120 10 38		1.0								
ZR702 120 15 38		1.5								
ZR702 120 20 38		2.0								

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

○:General Application ◎:The most suitable Application

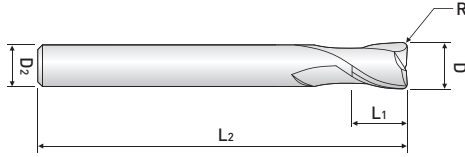
■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	
over 6	0 ~ -0.015	

※Items can be changed for quality improvement without notice.

Endmills for high hardened steel – Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, LONG SHANK, CORNER RADIUS

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR732 .....series



ULTRA FINE



HELIX

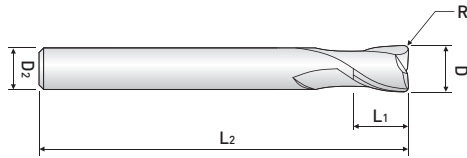
up to  $\phi 6$ over  $\phi 6$ 

p.965~966

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZR732 010 01	1	0.1	2	50	6
ZR732 010 02		0.2			
ZR732 010 03		0.3			
ZR732 015 01	1.5	0.1	3	50	6
ZR732 015 02		0.2			
ZR732 015 03		0.3			
ZR732 015 05		0.5			
ZR732 020 01	2	0.1	5	50	6
ZR732 020 02		0.2			
ZR732 020 03		0.3			
ZR732 020 05		0.5			
ZR732 025 01	2.5	0.1	7	60	6
ZR732 025 02		0.2			
ZR732 025 03		0.3			
ZR732 025 05		0.5			
ZR732 030 01	3	0.1	8	60	6
ZR732 030 02		0.2			
ZR732 030 03		0.3			
ZR732 030 05		0.5			
ZR732 040 01	4	0.1	10	70	6
ZR732 040 02		0.2			
ZR732 040 03		0.3			
ZR732 040 05		0.5			
ZR732 040 10		1.0			

NEXT &gt;&gt;&gt;

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, LONG SHANK, CORNER RADIUS

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR732 .....series



ULTRA FINE



HELIX

up to  $\phi 6$ over  $\phi 6$ 

p.965~966

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZR732 050 01	5	0.1	13	80	6
ZR732 050 02		0.2			
ZR732 050 03		0.3			
ZR732 050 05		0.5			
ZR732 050 10		1.0			
ZR732 060 01	6	0.1	15	90	6
ZR732 060 02		0.2			
ZR732 060 03		0.3			
ZR732 060 05		0.5			
ZR732 060 10		1.0			
ZR732 080 01	8	0.1	20	100	8
ZR732 080 02		0.2			
ZR732 080 03		0.3			
ZR732 080 05		0.5			
ZR732 080 10		1.0			
ZR732 080 20		2.0			
ZR732 100 02	10	0.2	25	100	10
ZR732 100 03		0.3			
ZR732 100 05		0.5			
ZR732 100 10		1.0			
ZR732 100 20		2.0			
ZR732 120 02	12	0.2	30	110	12
ZR732 120 03		0.3			
ZR732 120 05		0.5			
ZR732 120 10		1.0			
ZR732 120 20		2.0			

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

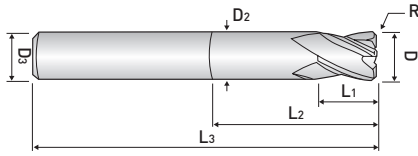
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	h6
over 6	0 ~ -0.015	

※Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR704 .....series

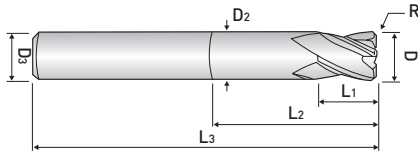


Endmills for high hardened steel – Zamus Star Series

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZR704 010 01 03 S4	1	0.1	2	3	50	0.95	4
ZR704 010 01 04 S4				4			
ZR704 010 01 06 S4				6			
ZR704 010 02 03 S4		0.2		3			
ZR704 010 02 04 S4				4			
ZR704 010 02 06 S4				6			
ZR704 010 03 03 S4		0.3		3			
ZR704 010 03 04 S4				4			
ZR704 010 03 06 S4				6			
ZR704 015 01 04 S4	1.5	0.1	2.5	4	50	1.45	4
ZR704 015 01 06 S4				6			
ZR704 015 02 04 S4		0.2		4			
ZR704 015 02 06 S4				6			
ZR704 015 03 04 S4				4			
ZR704 015 03 06 S4	6						
ZR704 020 01 06 S4	2	0.1	3	6	50	1.9	4
ZR704 020 01 08 S4				8			
ZR704 020 02 06 S4		0.2		6			
ZR704 020 02 08 S4				8			
ZR704 020 03 06 S4				6			
ZR704 020 03 08 S4		0.3		8			
ZR704 020 05 06 S4				6			
ZR704 020 05 08 S4	8						
ZR704 020 02 08	2	0.2	3	8	50	1.9	6
ZR704 020 02 10				10			
ZR704 020 02 12				12			
ZR704 025 01 06 S4	2.5	0.1	3.5	6	50	2.4	4
ZR704 030 01 08	3	0.1	4	8	55	2.9	6
ZR704 030 01 10				10			
ZR704 030 01 12				12			
ZR704 030 01 16				16			
ZR704 030 01 20				20			
ZR704 030 02 08		0.2		8	55		
ZR704 030 02 10				10			
ZR704 030 02 12				12			
ZR704 030 02 16				16			
ZR704 030 02 20				20			

NEXT &gt;&gt;&gt;

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR704 .....series



ULTRA FINE



HELIX

up to  $\phi 6$ over  $\phi 6$ 

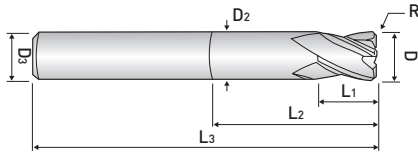
p.966

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>								
ZR704 030 03 08	3	0.3	4	8	55	2.9	6								
ZR704 030 03 09				9											
ZR704 030 03 10				10											
ZR704 030 03 12				12											
ZR704 030 03 16				16											
ZR704 030 03 20		20		60											
ZR704 030 05 08		0.5		8	6			8	55	2.9	6				
ZR704 030 05 09				9											
ZR704 030 05 10				10											
ZR704 030 05 12				12											
ZR704 030 05 16	16														
ZR704 030 05 20	20	60													
ZR704 030 10 08	1.0	8	6	8		55	2.9	6							
ZR704 030 10 10		10													
ZR704 030 10 12		12													
ZR704 030 10 16		16													
ZR704 030 10 20		20		60											
ZR704 040 01 10	4	0.1		6	10	55			3.8	6					
ZR704 040 01 12					12										
ZR704 040 01 16					16										
ZR704 040 01 20					20										
ZR704 040 01 25					25						60				
ZR704 040 02 10		0.2	10		55	10	55	3.8			6				
ZR704 040 02 12			12												
ZR704 040 02 16			16												
ZR704 040 02 20			20												
ZR704 040 02 25			25			60									
ZR704 040 03 10		0.3	10		55	10	55					3.8	6		
ZR704 040 03 12			12												
ZR704 040 03 16			16												
ZR704 040 03 20			20												
ZR704 040 03 25			25			60									
ZR704 040 05 10		0.5	10		55	10	55							3.8	6
ZR704 040 05 12			12												
ZR704 040 05 16			16												
ZR704 040 05 20			20												
ZR704 040 05 25			25			60									

NEXT &gt;&gt;

Endmills for high hardened steel – Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR704 .....series



ULTRA FINE

HELIX

up to  $\phi 6$ over  $\phi 6$ 

p.966

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZR704 040 10 10	4	1.0	6	10	55	3.8	6
ZR704 040 10 12				12			
ZR704 040 10 16				16			
ZR704 040 10 20				20	60		
ZR704 040 10 25				25			
ZR704 060 02 20	6	0.2	9	20	60	5.8	6
ZR704 060 03 20		0.3					
ZR704 060 05 20		0.5					
ZR704 060 10 20		1.0					
ZR704 060 15 20		1.5					
ZR704 060 20 20		2.0					
ZR704 080 02 25	8	0.2	12	25	60	7.8	8
ZR704 080 03 25		0.3					
ZR704 080 05 25		0.5					
ZR704 080 10 25		1.0					
ZR704 080 15 25		1.5					
ZR704 080 20 25		2.0					
ZR704 100 02 32	10	0.2	15	32	70	9.7	10
ZR704 100 03 32		0.3					
ZR704 100 05 32		0.5					
ZR704 100 10 32		1.0					
ZR704 100 15 32		1.5					
ZR704 100 20 32		2.0					
ZR704 120 03 38	12	0.3	18	38	80	11.7	12
ZR704 120 05 38		0.5					
ZR704 120 10 38		1.0					
ZR704 120 15 38		1.5					
ZR704 120 20 38		2.0					

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

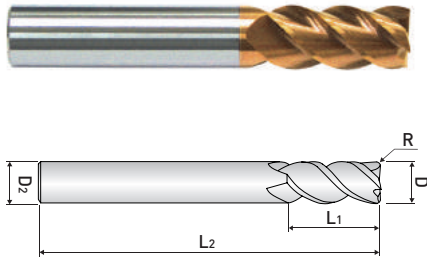
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to $\phi 6$	0 ~ -0.012	
over 6	0 ~ -0.015	

※ These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, 45° HELIX FINISHING MOLD & DIE

- Designed to machine high hardened material up to HRC 70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating
- Possible to reduce machining cycle time by 2 x D finishing performance

## ZR714..... series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZR7140303	3	0.3	8	50	6
ZR7140305		0.5			
ZR7140403	4	0.3	11	50	6
ZR7140405		0.5			
ZR7140410		1.0			
ZR7140603	6	0.3	15	60	6
ZR7140605		0.5			
ZR7140610		1.0			
ZR7140803	8	0.3	20	60	8
ZR7140805		0.5			
ZR7140810		1.0			
ZR7140815		1.5			
ZR7140820		2.0			
ZR7141003	10	0.3	25	70	10
ZR7141005		0.5			
ZR7141010		1.0			
ZR7141015		1.5			
ZR7141020		2.0			
ZR7141025		2.5			
ZR7141030		3.0			
ZR7141203	12	0.3	30	80	12
ZR7141205		0.5			
ZR7141210		1.0			
ZR7141215		1.5			
ZR7141220		2.0			
ZR7141225		2.5			
ZR7141230		3.0			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

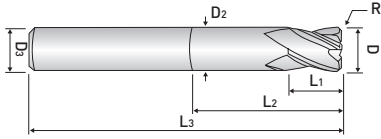
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up tp 6	0 ~ -0.012	h6
over 6	0 ~ -0.015	

※ These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with LONG SHANK

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR724 .....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZR7240600520	6	0.5	9	20	90	5.8	6
ZR7240601020		1.0					
ZR7240800525	8	0.5	12	25	100	7.7	8
ZR7240801025		1.0					
ZR7241000532	10	0.5	15	32	100	9.7	10
ZR7241001032		1.0					
ZR7241002032		2.0					
ZR7241200538	12	0.5	18	38	110	11.7	12
ZR7241201038		1.0					
ZR7241202038		2.0					

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

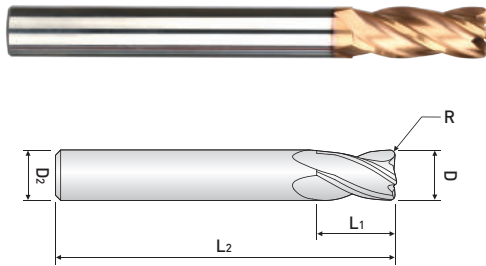
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	h6
over 6	0 ~ -0.015	

※: These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, LONG SHANK, CORNER RADIUS

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR734..... series

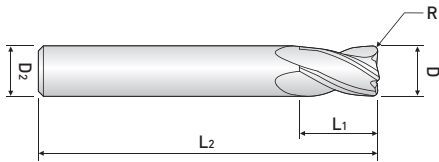


EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZR734 010 01	1	0.1	2	50	6
ZR734 010 02		0.2			
ZR734 010 03		0.3			
ZR734 015 01	1.5	0.1	3	50	6
ZR734 015 02		0.2			
ZR734 015 03		0.3			
ZR734 015 05		0.5			
ZR734 020 01	2	0.1	5	50	6
ZR734 020 02		0.2			
ZR734 020 03		0.3			
ZR734 020 05		0.5			
ZR734 025 01	2.5	0.1	7	60	6
ZR734 025 02		0.2			
ZR734 025 03		0.3			
ZR734 025 05		0.5			
ZR734 030 01	3	0.1	8	60	6
ZR734 030 02		0.2			
ZR734 030 03		0.3			
ZR734 030 05		0.5			
ZR734 040 01	4	0.1	10	70	6
ZR734 040 02		0.2			
ZR734 040 03		0.3			
ZR734 040 05		0.5			
ZR734 040 10		1.0			

NEXT &gt;&gt;&gt;

Endmills for high hardened steel – Zamus Star Series

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, LONG SHANK, CORNER RADIUS

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR734..... series



ULTRA FINE



HELIX

up to  $\phi 6$ over  $\phi 6$ 

p.966

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZR734 050 01	5	0.1	13	80	6
ZR734 050 02		0.2			
ZR734 050 03		0.3			
ZR734 050 05		0.5			
ZR734 050 10		1.0			
ZR734 060 01	6	0.1	15	90	6
ZR734 060 02		0.2			
ZR734 060 03		0.3			
ZR734 060 05		0.5			
ZR734 060 10		1.0			
ZR734 080 01	8	0.1	20	100	8
ZR734 080 02		0.2			
ZR734 080 03		0.3			
ZR734 080 05		0.5			
ZR734 080 10		1.0			
ZR734 080 20		2.0			
ZR734 100 02	10	0.2	25	100	10
ZR734 100 03		0.3			
ZR734 100 05		0.5			
ZR734 100 10		1.0			
ZR734 100 20		2.0			
ZR734 120 02	12	0.2	30	110	12
ZR734 120 03		0.3			
ZR734 120 05		0.5			
ZR734 120 10		1.0			
ZR734 120 20		2.0			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

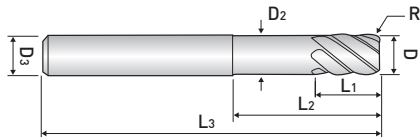
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	h6
over 6	0 ~ -0.015	

※ These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



## 6 FLUTE, 45° HELIX STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR706 .....series



ULTRA FINE



HELIX

up to  $\phi 6$ over  $\phi 6$ 

p.967

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZR7060600314	6	0.3	6	14	50	5.8	6
ZR7060600514		0.5					
ZR7060800524	8	0.5	8	24	60	7.8	8
ZR7060801024		1.0					
ZR7061000530	10	0.5	10	30	70	9.8	10
ZR7061001030		1.0					
ZR7061200530	12	0.5	12	30	75	11.8	12
ZR7061201030		1.0					

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

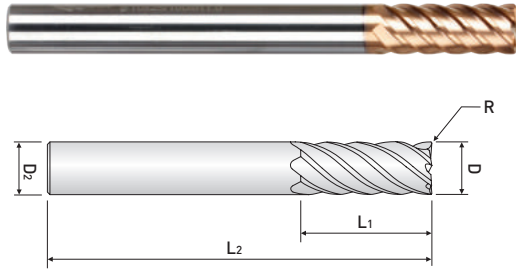
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



## 6 FLUTE, 45° HELIX, LONG SHANK, CORNER RADIUS

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZR736 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZR736 060 05	6	0.5	15	90	6
ZR736 060 10		1.0			
ZR736 080 05	8	0.5	20	100	8
ZR736 080 10		1.0			
ZR736 100 05	10	0.5	25	100	10
ZR736 100 10		1.0			
ZR736 120 05	12	0.5	30	110	12
ZR736 120 10		1.0			

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	○	◎	◎	○				

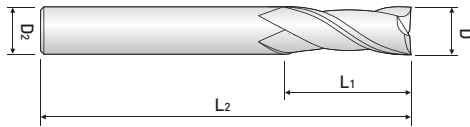
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



## 2 FLUTE, 35° HELIX REGULAR LENGTH

- Applied various corner "Radius" and effected length
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZE712 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE712010-02	1.0	2	40	6
ZE712010		3		
ZE712010-04		4		
ZE712012	1.2	3	40	6
ZE712015	1.5	4	40	6
ZE712015-06		6		
ZE712015-08		8		
ZE712020	2.0	5	40	6
ZE712020-08		8		
ZE712020-10		10	50	
ZE712025	2.5	6	40	6
ZE712030	3.0	8	45	6
ZE712030-10		10	50	
ZE712030-12		12		
ZE712035	3.5	10	45	6
ZE712040	4.0	10	45	6
ZE712040-12		12	50	
ZE712040-16		16	60	
ZE712045	4.5	11	45	6
ZE712050	5.0	13	50	6
ZE712055	5.5	13	50	6
ZE712060	6.0	13	50	6
ZE712060-15		15	60	
ZE712065	6.5	16	60	8
ZE712070	7.0	18	60	8
ZE712080	8.0	19	60	8
ZE712100	10.0	22	70	10
ZE712100-25		25		
ZE712120	12.0	26	75	12
ZE712120-30		30	80	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

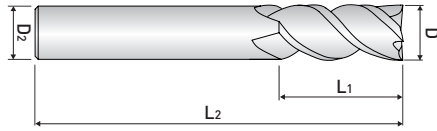
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Endmills for high hardened steel *Zamus Star Series*



## 4 FLUTE, 45° HELIX, REGULAR LENGTH

- Designed to machine high hardened materials up to HRC 70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZE714 ...series



ULTRA FINE



HELIX



p.965

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE714010	1.0	2.5	40	6
ZE714012	1.2	3	40	6
ZE714015	1.5	4	40	6
ZE714020	2.0	5	40	6
ZE714025	2.5	6	40	6
ZE714030	3.0	8	45	6
ZE714035	3.5	9	45	6
ZE714040	4.0	10	45	6
ZE714050	5.0	13	50	6
ZE714060	6.0	13	50	6
ZE714060-15		15	60	
ZE714080	8.0	19	60	8
ZE714100	10.0	22	70	10
ZE714100-25		25		
ZE714120	12.0	26	75	12
ZE714120-30		30	80	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○	○	◎	◎	○				

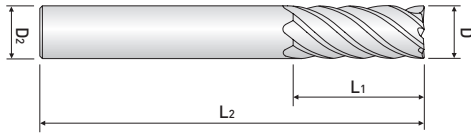
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※Items can be changed for quality improvement without notice.

# Endmills for high hardened steel *Zamus Star Series*



## 6 FLUTE, 50° HELIX REGULAR LENGTH

- Designed to machine high hardened materials up to HRC 70
- Suitable for dry cutting & high speed cutting due to newly developed raw-material and new coating

## ZE716 ...series



ULTRA FINE



HELIX



p.967

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE716060	6	13	50	6
ZE716080	8	18	60	8
ZE716100	10	22	70	10
ZE716120	12	26	75	12
ZE716160	16	35	90	16
ZE716200	20	44	100	20

Endmills for high hardened steel – Zamus Star Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○	◎	◎	○				

○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

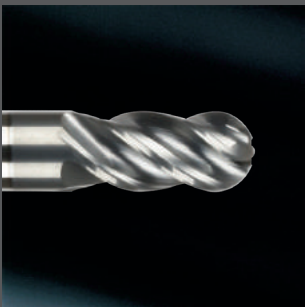
※:Items can be changed for quality improvement without notice.



# Endmills for Stainless Steel




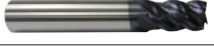




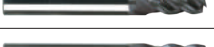



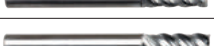

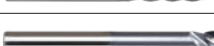









NEO CLASSIC X-STAR SERIES(~HRc45)

ENDMILL  
SERIES












## Endmills for stainless steel\_ Neo Classic X-STAR Series

**WIDIN**

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
XE504A ... series		REGULAR LENGTH, VARIABLE HELIX	INCH	•	187
XR404A ... series		SHORT LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	•	188
XR504A ... series		REGULAR LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	•	189
XR514A ... series		REGULAR LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	•	190
XR524A ... series		LONG REACH, CORNER RADIUS, VARIABLE HELIX	INCH	•	192
XXE504A ... series		REGULAR LENGTH, VARIABLE HELIX	INCH	•	193
XXE524A ... series		STUB CUT with LONG REACH, VARIABLE HELIX	INCH	•	194
XXE534A ... series		STUB CUT with EXTENDED NECK, VARIABLE HELIX	INCH	•	195
XXB504A ... series		REGULAR LENGTH, BALL NOSE, VARIABLE HELIX	INCH	•	196
XXB524A ... series		STUB CUT with LONG REACH, BALL NOSE, VARIABLE HELIX	INCH	•	197
XXR404A ... series		SHORT LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	•	198
XXR514A ... series		REGULAR LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	•	199
XXR524A ... series		STUB CUT with LONG REACH, CORNER RADIUS, VARIABLE HELIX	INCH	•	200
XXR534A ... series		STUB CUT with EXTENDED NECK, CORNER RADIUS, VARIABLE HELIX	INCH	•	201
XE505A ... series		STUB CUT LENGTH, VARIABLE HELIX	INCH	•	202
XE515A ... series		REGULAR CUT LENGTH, VARIABLE HELIX	INCH	•	203
XR505A ... series		STUB CUT LENGTH, CORNER RADIUS	INCH	•	204
XR515A ... series		REGULAR CUT LENGTH, CORNER RADIUS, VARIABLE HELIX	INCH	•	205
XR525A ... series		REGULAR CUT LENGTH with EXTENDED NECK, CORNER RADIUS	INCH	•	206
XR535A ... series		REGULAR CUT LENGTH with LONG EXTENDED NECK, CORNER RADIUS	INCH	•	207
XE505 ... series		REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	•	208
XE515 ... series		LONG CUT LENGTH	METRIC	•	209
XR505 ... series		REGULAR CUT LENGTH, CORNER RADIUS, VARIABLE HELIX	METRIC	•	210
XXB504 ... series		REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	•	211
XCE504 ... series		REGULAR CUT LENGTH, VARIABLE HELIX	METRIC	•	212
XE304 ... series		REGULAR LENGTH	METRIC	•	213
XM304 ... series		ENDMILL FOR COMPLEX AUTOMATIC LATHE - VARIABLE HELIX TYPE	METRIC	•	214
XCC504 ... series		REGULAR CUT LENGTH, CORNER CHAMFER, VARIABLE HELIX	METRIC	•	215

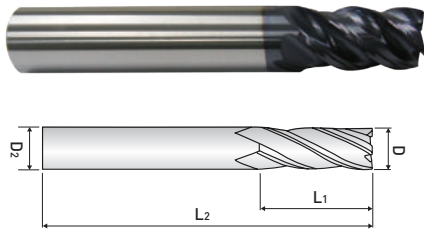
NEXT &gt;&gt;&gt;

## Endmills for stainless steel\_ Neo Classic X-STAR Series

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
XCR504 ... series		REGULAR CUT LENGTH, CORNER RADIUS, VARIABLE HELIX	METRIC	•	216
XCE503 ... series		REGULAR LENGTH	METRIC	•	217
XCC503 ... series		REGULAR LENGTH	METRIC	•	218
XCR503 ... series		REGULAR LENGTH	METRIC	•	219
XE504 ... series		REGULAR LENGTH	METRIC	•	220
XR504 ... series		REGULAR LENGTH	METRIC	•	221
XE514 ... series		STUB CUT LENGTH with EXTENDED NECK	METRIC	•	222
XE524 ... series		STUB CUT LENGTH with EXTENDED LONG NECK	METRIC	•	223
XR514 ... series		REGULAR LENGTH	METRIC	•	224

# Endmills for stainless steel

## Neo Classic X-STAR Series



### 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XE504A ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XE504A008	1/8	3/8	1-1/2	1/8
XE504A010	5/32	7/16	2	3/16
XE504A012	3/16	7/16	2	3/16
XE504A014	7/32	7/16	2-1/2	1/4
XE504A016	1/4	1/2	2-1/2	1/4
XE504A017	1/4	3/4	2-1/2	1/4
XE504A018	9/32	5/8	2-1/2	5/16
XE504A020	5/16	13/16	2-1/2	5/16
XE504A022	11/32	13/16	2-1/2	3/8
XE504A024	3/8	7/8	2-1/2	3/8
XE504A026	13/32	15/16	2-3/4	7/16
XE504A028	7/16	1	2-3/4	7/16
XE504A030	15/32	1	3	1/2
XE504A032	1/2	1	3	1/2
XE504A033	1/2	1-1/4	3-1/4	1/2
XE504A036	9/16	1-1/8	3-1/2	9/16
XE504A040	5/8	1-1/4	3-1/2	5/8
XE504A048	3/4	1-1/2	4	3/4
XE504A064	1	1-1/2	4	1

※ Flat shank is available upon request

ex) XE504A032F : Flat shank

#### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○			○				◎

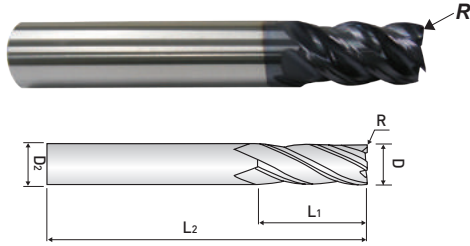
○:General Application ◎:The most suitable Application

#### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 to 1/4	0 ~ -0.0012	-0.001 ~ -0.003
from 1/4 to 3/8	0 ~ -0.0016	
from 3/8 to 1	0 ~ -0.002	-0.001 ~ -0.004

※ These tools are manufactured based on order received.

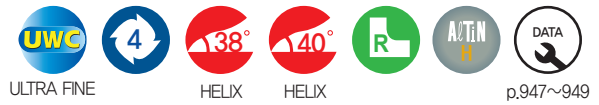
# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, SHORT LENGTH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XR404A ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XR404A008	1/8	.015	1/4	1-1/2	1/8
XR404A010	5/32	.015	5/16	2	3/16
XR404A012	3/16	.015	3/8	2	3/16
XR404A014	7/32	.020	3/8	2	1/4
XR404A016	1/4	.020	7/16	2	1/4
XR404A020	5/16	.020	1/2	2	5/16
XR404A024	3/8	.020	5/8	2	3/8
XR404A028	7/16	.020	5/8	2-1/2	7/16
XR404A032	1/2	.030	5/8	2-1/2	1/2
XR404A040	5/8	.040	3/4	3	5/8
XR404A048	3/4	.040	1	3	3/4

※ Flat shank is available upon request

ex) XR404A032F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○			○				◎

○:General Application ◎:The most suitable Application

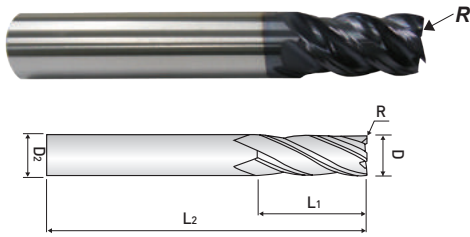
### ■ Tolerance

	Mill Dia. (Inch)	Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -0.0016	
over 3/8 up to 1	0 ~ -0.002	-.0001 ~ -.0004

※ These tools are manufactured based on order received.

# Endmills for stainless steel

## Neo Classic X-STAR Series



### 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XR504A ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XR504A008	1/8	.015	3/8	1-1/2	1/8
XR504A012	3/16	.015	7/16	2	3/16
XR504A016	1/4	.020	1/2	2-1/2	1/4
XR504A017	1/4	.020	3/4	2-1/2	1/4
XR504A020	5/16	.020	13/16	2-1/2	5/16
XR504A024	3/8	.020	7/8	2-1/2	3/8
XR504A028	7/16	.020	1	2-3/4	7/16
XR504A032	1/2	.030	1	3	1/2
XR504A033	1/2	.030	1-1/4	3-1/4	1/2
XR504A036	9/16	.030	1-1/8	3-1/2	9/16
XR504A040	5/8	.040	1-1/4	3-1/2	5/8
XR504A048	3/4	.040	1-1/2	4	3/4
XR504A064	1	.040	1-1/2	4	1

※ Flat shank is available upon request

ex) XR504A032F : Flat shank

Endmills for stainless steel – Neo Classic X-STAR Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○			○				◎

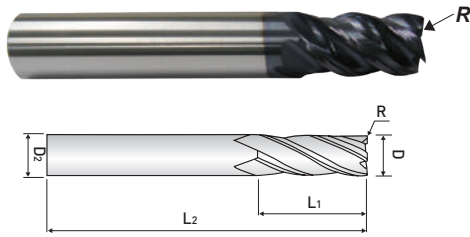
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.	
	from 1/8 up to 1/4	0 ~ -0.0012
over 1/4 up to 3/8	0 ~ -0.0016	
over 3/8 up to 1	0 ~ -0.002	-0.001 ~ -0.004

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, SHORT LENGTH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XR514A ... series



ULTRA FINE



HELIX



HELIX



±.001



AUTIN II

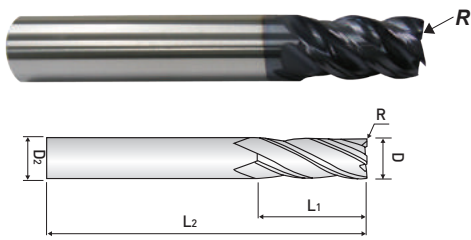


p.947~949

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XR514A008010	1/8	.010	3/8	2-1/2	1/8
XR514A008015		.015			
XR514A012010	3/16	.010	7/16	2	3/16
XR514A012015		.015			
XR514A012030		.030			
XR514A016010	1/4	.010	1/2	2-1/2	1/4
XR514A016015		.015			
XR514A016030		.030			
XR514A017010		.010	3/4		
XR514A017015		.015			
XR514A017030		.030			
XR514A020015	5/16	.015	13/16	2-1/2	5/16
XR514A020030		.030			
XR514A024010	3/8	.010	7/8	2-1/2	3/8
XR514A024015		.015			
XR514A024030		.030			
XR514A024045		.045			
XR514A024060		.060			
XR514A028015	7/16	.015	1	2-3/4	7/16
XR514A028030		.030			
XR514A032010	1/2	.010	1	3	12
XR514A032015		.015			
XR514A032030		.030			
XR514A032045		.045			
XR514A032060		.060			
XR514A032090		.090			
XR514A032125		.125			

NEXT &gt;&gt;&gt;

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, SHORT LENGTH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XR514A ... series



ULTRA FINE



HELIX



HELIX



±.001



AUTIN II



p.947~949

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XR514A033010	1/2	.010	1-1/4	3-1/4	1/2
XR514A033015		.015			
XR514A033030		.030			
XR514A033045		.045			
XR514A033060		.060			
XR514A033090		.090			
XR514A033125		.125			
XR514A036030	9/16	.030	1-1/8	3-1/2	9/16
XR514A040030	5/8	.030	1-1/4	3-1/2	5/8
XR514A040045		.045			
XR514A040060		.060			
XR514A040090		.090			
XR514A040125		.125			
XR514A048030	3/4	.030	1-1/2	4	3/4
XR514A048045		.045			
XR514A048060		.060			
XR514A048090		.090			
XR514A048125		.125			
XR514A064030	1	.030	1-1/2	4	1
XR514A064045		.045			
XR514A064060		.060			
XR514A064090		.090			
XR514A064125		.125			

※ Flat shank is available upon request

ex) XR514A032010F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○			○				◎

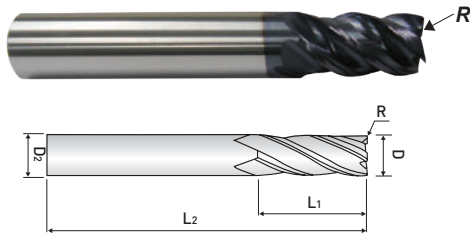
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012
over 1/4 up to 3/8	0 ~ -0.0016
over 3/8 up to 1	0 ~ -0.002

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, LONG REACH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XR524A ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XR524A016	1/4	.020	1/2	4	1/4
XR524A020	5/16	.020	13/16	4	5/16
XR524A024	3/8	.020	7/8	5	3/8
XR524A028	7/16	.020	1	6	7/16
XR524A032	1/2	.030	1	6	1/2
XR524A036	9/16	.030	1-1/8	6	9/16
XR524A040	5/8	.040	1-1/4	6	5/8
XR524A048	3/4	.040	1-1/2	6	3/4
XR524A064	1	.040	1-1/2	6	1

※ Flat shank is available upon request

ex) XR524A032F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○			○				◎

○:General Application ◎:The most suitable Application

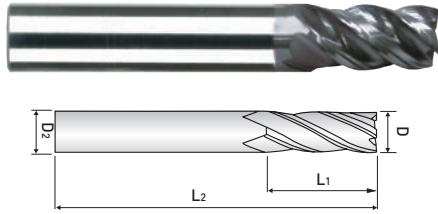
### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012
over 1/4 up to 3/8	0 ~ -0.0016
over 3/8 up to 1	0 ~ -0.002

※ These tools are manufactured based on order received.

# Endmills for stainless steel

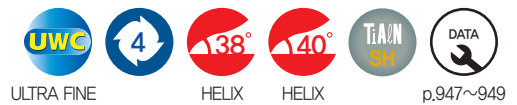
## Neo Classic X-STAR Series



### 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XXE504A ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXE504A008	1/8	3/8	1-1/2	1/8
XXE504A010	5/32	7/16	2	3/16
XXE504A012	3/16	7/16	2	3/16
XXE504A016	1/4	1/2	2-1/2	1/4
XXE504A017	1/4	3/4	2-1/2	1/4
XXE504A020	5/16	13/16	2-1/2	5/16
XXE504A024	3/8	7/8	2-1/2	3/8
XXE504A028	7/16	1	2-3/4	7/16
XXE504A032	1/2	1	3	1/2
XXE504A033	1/2	1-1/4	3-1/4	1/2
XXE504A036	9/16	1-1/8	3-1/2	9/16
XXE504A040	5/8	1-1/4	3-1/2	5/8
XXE504A048	3/4	1-1/2	4	3/4
XXE504A064	1	1-1/2	4	1

※ Flat shank is available upon request

ex) XXE504A032F : Flat shank

Endmills for stainless steel – Neo Classic X-STAR Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○			○				◎

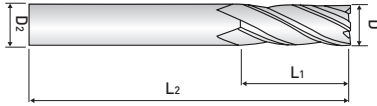
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.	
	from 1/8 up to 1/4	0 ~ -0.0012
over 1/4 up to 3/8	0 ~ -0.0016	-0.001 ~ -0.004
over 3/8 up to 1	0 ~ -0.002	-0.001 ~ -0.004

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, STUB CUT with LONG REACH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high L2 tensile stainless steel, inconel and titanium

## XXE524A ...series



ULTRA FINE

HELIX

HELIX

p.947~949

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXE524A016	1/4	3/8	4	1/4
XXE524A024	3/8	1/2	4	3/8
XXE524A032	1/2	5/8	5	1/2
XXE524A033	1/2	5/8	6	1/2
XXE524A040	5/8	3/4	5	5/8
XXE524A041	5/8	3/4	6	5/8
XXE524A048	3/4	1	5	3/4
XXE524A049	3/4	1	6	3/4

※ Flat shank is available upon request

ex) XXE524A032F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○			○				◎

○:General Application ◎:The most suitable Application

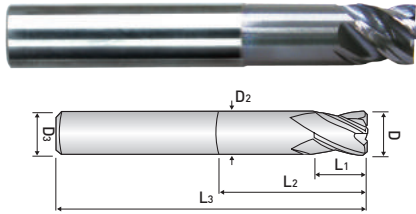
### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -0.0016	
over 3/8 up to 1	0 ~ -0.002	-.0001 ~ -.0004

※ These tools are manufactured based on order received.

# Endmills for stainless steel

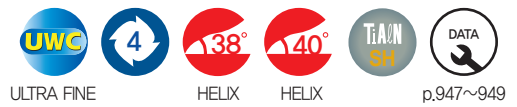
Neo Classic X-STAR Series



## 4 FLUTE, STUB CUT LENGTH with EXTENDED NECK, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium

## XXE534A ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
XXE534A016	1/4	3/8	1-1/4	4	.240	1/4
XXE534A024	3/8	1/2	1-7/8	4	.365	3/8
XXE534A032	1/2	5/8	2-1/4	4	.490	1/2
XXE534A040	5/8	3/4	2-1/4	4-1/8	.615	5/8
XXE534A048	3/4	1	2-1/4	4-1/4	.740	3/4
XXE534A064	1	1-1/8	2-1/4	4-1/2	.990	1

※ Flat shank is available upon request

ex) XXE534A032F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○			○				◎

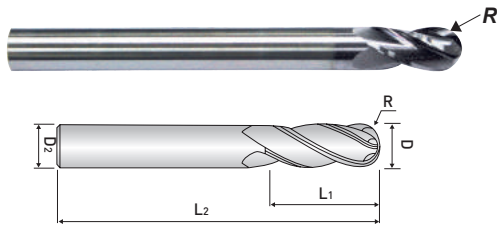
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012	-0.001 ~ -0.003
over 1/4 up to 3/8	0 ~ -0.0016	
over 3/8 up to 1	0 ~ -0.002	-0.001 ~ -0.004

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, REGULAR LENGTH, BALL NOSE VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium

## XXB504A ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXB504A008	1/8	1/16	1/2	2	1/8
XXB504A012	3/16	3/32	5/8	2-1/4	3/16
XXB504A016	1/4	1/8	3/4	2-1/2	1/4
XXB504A020	5/16	5/32	3/4	2-1/2	5/16
XXB504A024	3/8	3/16	7/8	2-1/2	3/8
XXB504A032	1/2	1/4	1	3	1/2
XXB504A033	1/2	1/4	1-1/4	3-1/4	1/2
XXB504A040	5/8	5/16	1-1/4	3-1/2	5/8
XXB504A048	3/4	3/8	1-1/2	4	3/4
XXB504A064	1	1/2	1-1/2	4	1

※ Flat shank is available upon request

ex) XXB504A032F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○			○				◎

○:General Application ◎:The most suitable Application

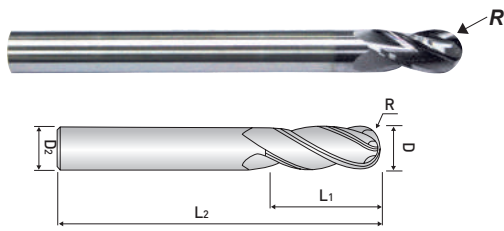
### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -0.0016	
over 3/8 up to 1	0 ~ -0.002	

※ These tools are manufactured based on order received.

# Endmills for stainless steel

## Neo Classic X-STAR Series



### 4 FLUTE, STUB CUT with LONG REACH, BALL NOSE VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium

## XXB524A ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXB524A016	1/4	1/8	3/8	4	1/4
XXB524A024	3/8	3/16	1/2	4	3/8
XXB524A032	1/2	1/4	5/8	5	1/2
XXB524A041	5/8	5/16	3/4	6	5/8
XXB524A049	3/4	3/8	1	6	3/4

※ Flat shank is available upon request

ex) XXB524A032F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○			○				◎

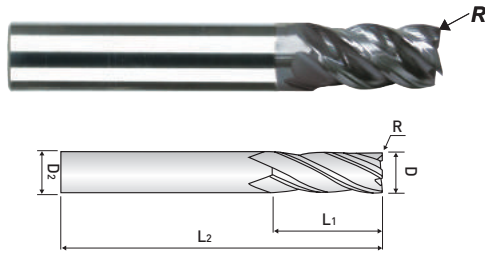
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012
over 1/4 up to 3/8	0 ~ -0.0016
over 3/8 up to 1	0 ~ -0.002

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, SHORT LENGTH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium

## XXR404A ...series



ULTRA FINE



HELIX



HELIX



p.947~949

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXR404A008	1/8	.015	1/4	1-1/2	1/8
XXR404A010	5/32	.015	5/16	2	3/16
XXR404A012	3/16	.015	3/8	2	3/16
XXR404A016	1/4	.020	7/16	2	1/4
XXR404A020	5/16	.020	1/2	2	5/16
XXR404A024	3/8	.020	5/8	2	3/8
XXR404A032	1/2	.030	5/8	2-1/2	1/2
XXR404A040	5/8	.030	3/4	3	5/8
XXR404A048	3/4	.030	1	3	3/4

※ Flat shank is available upon request

ex) XXR404A032F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○			○				◎

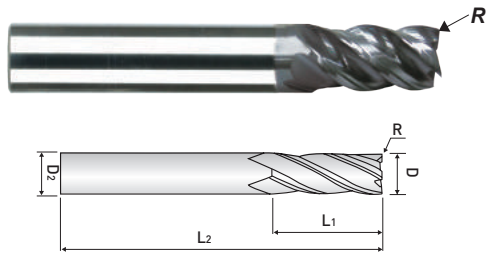
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -0.0016	
over 3/8 up to 1	0 ~ -0.002	-.0001 ~ -.0004

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, REGULAR LENGTH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium

## XXR514A .....series



ULTRA FINE



HELIX



HELIX

R  
±0.01TAIYAN  
SHIDATA  
p.947~949

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXR514A008015	1/8	.015	3/8	1-1/2	1/8
XXR514A012015	3/16	.015	7/16	2	3/16
XXR514A016015	1/4	.015	1/2	2-1/2	1/4
XXR514A016030		.030			
XXR514A017015		.015			
XXR514A017030		.030			
XXR514A020015	5/16	.015	13/16	2-1/2	5/16
XXR514A024015	3/8	.015	7/8	2-1/2	3/8
XXR514A024030		.030			
XXR514A032030	1/2	.030	1	3	1/2
XXR514A032045		.045			
XXR514A032060		.060			
XXR514A032125		.125			
XXR514A033015	1/2	.015	1-1/4	3-1/4	1/2
XXR514A033030		.030			
XXR514A033045		.045			
XXR514A033060		.060			
XXR514A033125		.125			
XXR514A040030	5/8	.030	1-1/4	3-1/2	5/8
XXR514A040060		.060			
XXR514A048030	3/4	.030	1-1/2	4	3/4
XXR514A048060		.060			
XXR514A064030	1	.030	1-1/2	4	1
XXR514A064060		.060			

※ Flat shank is available upon request

ex) XXR514A032030F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○			○				◎

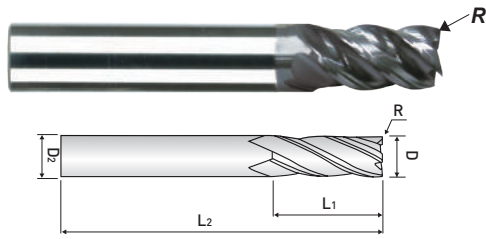
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012
over 1/4 up to 3/8	0 ~ -0.0016
over 3/8 up to 1	0 ~ -0.002

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, STUB CUT with LONG REACH, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium

## XXR524A ...series



ULTRA FINE



HELIX



HELIX



p.947~949

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXR524A016	1/4	.015	3/8	4	1/4
XXR524A024	3/8	.020	1/2	4	3/8
XXR524A032	1/2	.030	5/8	5	1/2
XXR524A033	1/2	.030	5/8	6	1/2
XXR524A040	5/8	.030	3/4	5	5/8
XXR524A041	5/8	.030	3/4	6	5/8
XXR524A048	3/4	.030	1	5	3/4
XXR524A049	3/4	.030	1	6	3/4

※ Flat shank is available upon request

ex) XXR524A032F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○			○				◎

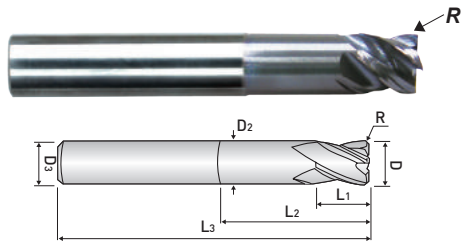
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -0.0016	
over 3/8 up to 1	0 ~ -0.002	-.0001 ~ -.0004

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, STUB CUT with EXTENDED NECK, CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium

## XXR534A ...series



ULTRA FINE



HELIX



HELIX



p.947~949

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
XXR534A016	1/4	.015	3/8	1-1/4	4	.240	1/4
XXR534A024	3/8	.020	1/2	1-7/8	4	.365	3/8
XXR534A032	1/2	.020	5/8	2-1/4	4	.490	1/2
XXR534A040	5/8	.030	3/4	2-1/4	4-1/8	.615	5/8
XXR534A048	3/4	.030	1	2-1/4	4-1/4	.740	3/4
XXR534A064	1	.030	1-1/8	2-1/4	4-1/2	.990	1

※ Flat shank is available upon request

ex) XXR534A032F : Flat shank

Endmills for stainless steel — Neo Classic X-STAR Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○			○				◎

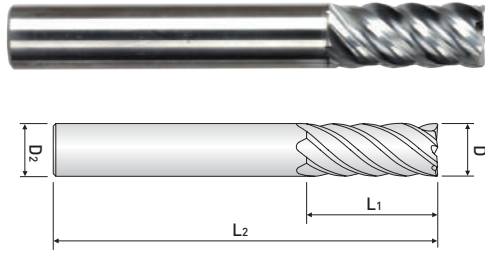
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012
over 1/4 up to 3/8	0 ~ -0.0016
over 3/8 up to 1	0 ~ -0.002

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 5 FLUTES, STUB CUT LENGTH, VARIABLE HELIX

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity
- Reduced Vibration Harmonics

## XE505A ... series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XE505 A 016	1/4	3/8	2	1/4
XE505 A 020	5/16	7/16	2	5/16
XE505 A 024	3/8	1/2	2	3/8
XE505 A 028	7/16	9/16	2-1/2	7/16
XE505 A 032	1/2	5/8	2-1/2	1/2
XE505 A 040	5/8	3/4	3	5/8
XE505 A 048	3/4	1	3	3/4
XE505 A 064	1	1	4	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○			○				◎

○:General Application ◎:The most suitable Application

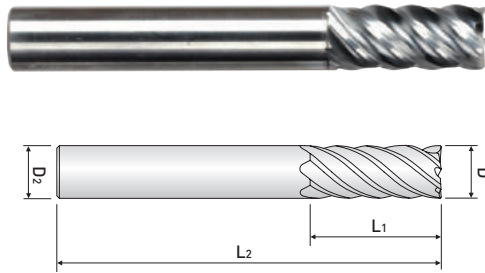
### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -0.0016	
over 3/8 up to 1	0 ~ -0.002	

※ These tools are manufactured based on order received.

# Endmills for stainless steel

## Neo Classic X-STAR Series



### 5 FLUTES, REGULAR CUT LENGTH, VARIABLE HELIX

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity
- Reduced Vibration Harmonics

## XE515A ... series



p.947~949

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XE515 A 016	1/4	5/8	2-1/2	1/4
XE515 A 018	9/32	5/8	2-1/2	5/16
XE515 A 020	5/16	13/16	2-1/2	5/16
XE515 A 022	11/32	13/16	2-1/2	3/8
XE515 A 024	3/8	7/8	2-1/2	3/8
XE515 A 026	13/32	7/8	2-3/4	7/16
XE515 A 028	7/16	1	2-3/4	7/16
XE515 A 030	15/32	1	3	1/2
XE515 A 032	1/2	1-1/4	3	1/2
XE515 A 036	9/16	1-1/4	3-1/2	9/16
XE515 A 040	5/8	1-1/4	3-1/2	5/8
XE515 A 048	3/4	1-1/2	4	3/4
XE515 A 064	1	1-1/2	4	1

Endmills for stainless steel – Neo Classic X-STAR Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○			○				◎

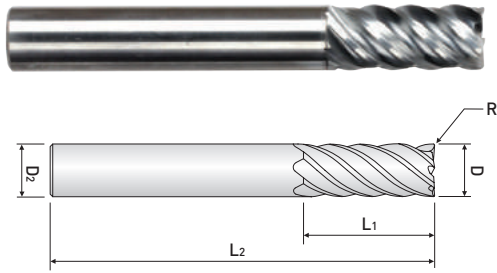
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012	-0.001 ~ -0.003
over 1/4 up to 3/8	0 ~ -0.0016	
over 3/8 up to 1	0 ~ -0.002	-0.001 ~ -0.004

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 5 FLUTES, STUB CUT LENGTH CORNER RADIUS, VARIABLE HELIX

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity. Reduced Vibration Harmonics

## XR505A ... series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XR505 A 016 015	1/4	.015	3/8	2	1/4
XR505 A 016 030		.030			
XR505 A 020 015	5/16	.015	7/16	2	5/16
XR505 A 020 030		.030			
XR505 A 024 015	3/8	.015	1/2	2	3/8
XR505 A 024 030		.030			
XR505 A 028 015	7/16	.015	9/16	2-1/2	7/16
XR505 A 028 030		.030			
XR505 A 032 015	1/2	.015	5/8	2-1/2	1/2
XR505 A 032 030		.030			
XR505 A 040 015	5/8	.015	3/4	3	5/8
XR505 A 040 030		.030			
XR505 A 040 045		.045			
XR505 A 048 015	3/4	.015	1	3	3/4
XR505 A 048 030		.030			
XR505 A 048 045		.045			
XR505 A 064 015	1	.015	1-1/2	4	1
XR505 A 064 030		.030			
XR505 A 064 045		.045			
XR505 A 064 060		.060			
XR505 A 064 090		.090			
XR505 A 064 125		.125			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○			○				◎

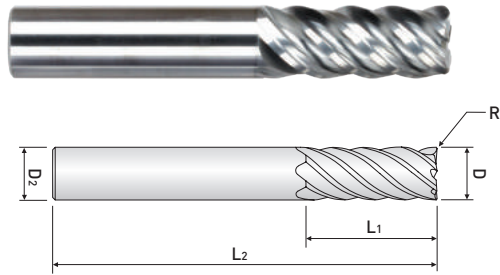
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012
over 1/4 up to 3/8	0 ~ -0.0016
over 3/8 up to 1	0 ~ -0.002

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 5 FLUTES, REGULAR CUT LENGTH CORNER RADIUS, VARIABLE HELIX

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity. Reduced Vibration Harmonics

## XR515A ... series



p.947~949

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XR515 A 016 015	1/4	.015	5/8	2-1/2	1/4
XR515 A 016 030		.030			
XR515 A 018 015	9/32	.015	5/8	2-1/2	5/16
XR515 A 018 030		.030			
XR515 A 020 015	5/16	.015	13/16	2-1/2	5/16
XR515 A 020 030		.030			
XR515 A 022 015	11/32	.015	13/16	2-1/2	3/8
XR515 A 022 030		.030			
XR515 A 024 015	3/8	.015	7/8	2-1/2	3/8
XR515 A 024 030		.030			
XR515 A 026 015	13/32	.015	7/8	2-3/4	7/16
XR515 A 026 030		.030			
XR515 A 028 015	7/16	.015	1	2-3/4	7/16
XR515 A 028 030		.030			
XR515 A 030 015	15/32	.015	1	3	1/2
XR515 A 030 030		.030			
XR515 A 032 015	1/2	.015	1-1/4	3	1/2
XR515 A 032 030		.030			
XR515 A 032 045		.045			
XR515 A 032 060		.060			
XR515 A 032 090		.090			
XR515 A 032 125		.125			
XR515 A 036 015	9/16	.015	1-1/4	3-1/2	9/16
XR515 A 036 030		.030			
XR515 A 040 015	5/8	.015	1-1/4	3-1/2	5/8
XR515 A 040 030		.030			
XR515 A 040 045		.045			
XR515 A 040 060		.060			
XR515 A 040 090		.090			
XR515 A 040 125		.125			
XR515 A 048 015	3/4	.015	1-1/2	4	3/4
XR515 A 048 030		.030			
XR515 A 048 045		.045			
XR515 A 048 060		.060			
XR515 A 048 060		.090			
XR515 A 048 125		.125			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○			○				◎

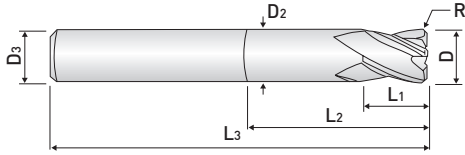
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012
over 1/4 up to 3/8	0 ~ -0.0016
over 3/8 up to 1	0 ~ -0.002

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 5 FLUTES, REGULAR CUT LENGTH WITH EXTENDED NECK

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity
- Reduced Vibration Harmonics

## XR525A ... series



p.947~949

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
XR525 A 016 015	1/4	.015	3 / 4	2-1/8	4	.242	1/4
XR525 A 016 030		.030					
XR525 A 020 015	5/16	.015	1	2-1/8	4	.305	5/16
XR525 A 020 030		.030					
XR525 A 024 015	3/8	.015	1	2-1/8	4	.367	3/8
XR525 A 024 030		.030					
XR525 A 028 015	7/16	.015	1-1/4	2-1/8	4	.430	7/16
XR525 A 028 030		.030					
XR525 A 032 015	1/2	.015	1-1/4	2-1/8	4	.492	1/2
XR525 A 032 030		.030					
XR525 A 032 015L		.015	1-3/8	3-1/8	5		
XR525 A 032 030L		.030					
XR525 A 040 015	5/8	.015	1-1/2	2-1/8	4	.617	5/8
XR525 A 040 030		.030					
XR525 A 040 045		.045	1-3/4	3-1/8	5		
XR525 A 040 015L		.015					
XR525 A 040 030L		.030					
XR525 A 040 045L		.045					
XR525 A 048 015	3/4	.015	1-7/8	3	5	.742	3/4
XR525 A 048 030		.030					
XR525 A 048 045		.045					
XR525 A 064 015	1	.015	2-1/4	3	5	.992	1
XR525 A 064 030		.030					
XR525 A 064 045		.045					

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○			○				◎

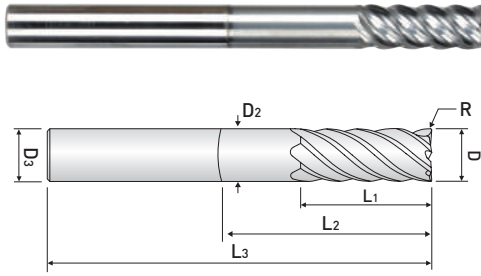
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)		Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -0.0016	
over 3/8 up to 1	0 ~ -0.002	-.0001 ~ -.0004

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 5 FLUTE, REGULAR CUT LENGTH WITH LONG EXTENDED NECK, CORNER RADIUS

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity. Reduced Vibration Harmonics.

## XR535A ...series



p.947~949

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
XR535 A 024 015	3/8	.015	1-1/4	3-3/8	6	.367	3/8
XR535 A 024 030		.030					
XR535 A 028 015	7/16	.015	1-1/2	3-3/8	6	.430	7/16
XR535 A 028 030		.030					
XR535 A 032 015	1/2	.015	1-1/2	4-1/8	6	.492	1/2
XR535 A 032 030		.030					
XR535 A 040 015	5/8	.015	2	4	6	.617	5/8
XR535 A 040 030		.030					
XR535 A 040 045		.045					
XR535 A 048 015	3/4	.015	2-1/4	4	6	.742	3/4
XR535 A 048 030		.030					
XR535 A 048 045		.045					
XR535 A 064 015	1	.015	3	4	6	.992	1
XR535 A 064 030		.030					
XR535 A 064 045		.045					

Endmills for stainless steel – Neo Classic X-STAR Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○			○				◎

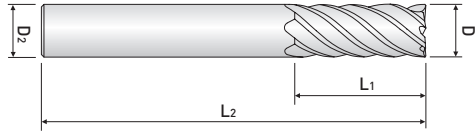
○:General Application ◎:The most suitable Application

### ■ Tolerance

	Mill Dia. (inch)	Shank Dia.
from 1/8 up to 1/4	0 ~ -0.0012	-.0001 ~ -.0003
over 1/4 up to 3/8	0 ~ -0.0016	
over 3/8 up to 1	0 ~ -0.002	-.0001 ~ -.0004

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 5 FLUTE, REGULAR CUT LENGTH, VARIABLE HELIX

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity
- Reduced Vibration Harmonics

## XE505 ... series



ULTRA FINE



HELIX



HELIX



HELIX



p.969~971

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XE505 060	6	13	57	6
XE505 080	8	19	63	8
XE505 100	10	22	72	10
XE505 120	12	26	83	12
XE505 140	14	26	83	14
XE505 160	16	32	92	16
XE505 180	18	32	92	18
XE505 200	20	38	104	20
XE505 250	25	38	104	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○			○				◎

○:General Application ◎:The most suitable Application

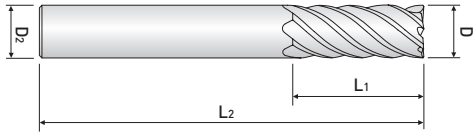
### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 8	0 ~ -0,04	h6
over 8	0 ~ -0,05	

※ These tools are manufactured based on order received.

# Endmills for stainless steel

Neo Classic X-STAR Series



## 5 FLUTES, LONG CUT LENGTH

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity
- Reduced Vibration Harmonics

## XE515 ... series



ULTRA FINE



HELIX



p.969~971

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XE515 060	6	25	75	6
XE515 080	8	30	75	8
XE515 100	10	45	100	10
XE515 120	12	75	150	12
XE515 160	16	75	150	16
XE515 200	20	75	150	20

Endmills for stainless steel – Neo Classic X-STAR Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○			○				◎

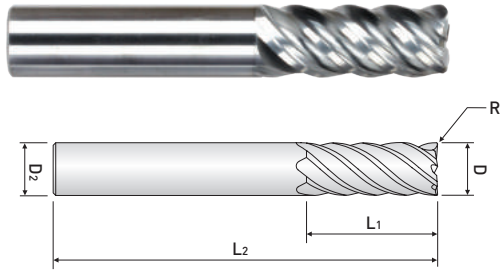
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 8	0 ~ -0,04	h6
over 8	0 ~ -0,05	

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 5 FLUTES, REGULAR CUT LENGTH CORNER RADIUS, VARIABLE HELIX

- Maintains Cutting Edge Strength & Sharpness for Improved Tool Life
- Strong Cutting Edges Allowing for Increased depths of cut at Elevated Cutting Speeds & Feeds
- Higher Feeds and Speeds for increased Productivity  
Reduced Vibration Harmonics

## XR505 ... series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XR505 06 050	6	0.5	13	57	6
XR505 08 050	8	0.5	19	63	8
XR505 10 050	10	0.5	22	72	10
XR505 12 075	12	0.75	26	83	12
XR505 14 075	14	0.75	26	83	14
XR505 14 075 S16				92	16
XR505 16 100	16	1.0	32	92	16
XR505 18 100	18	1.0	32	92	18
XR505 18 100 S20				104	20
XR505 20 100	20	1.0	38	104	20
XR505 25 100	25	1.0	38	104	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○			○				◎

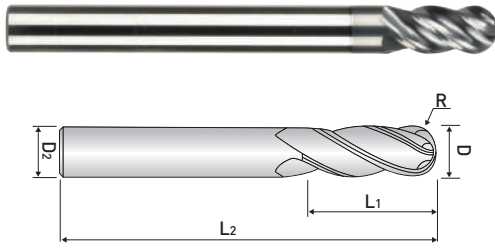
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 8	0 ~ -0,04	
over 8	0 ~ -0,05	

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, REGULAR LENGTH, BALL NOSE, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium

## XXB504 ...series



p.969~971

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XXB504040	4	2	8	70	4
XXB504060	6	3	12	90	6
XXB504080	8	4	15	100	8
XXB504100	10	5	20	100	10
XXB504120	12	6	25	110	12

※ Flat shank is available upon request

ex) XXB504100F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○			○				◎

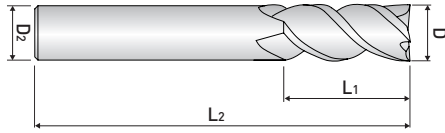
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX - DOUBLE CORE

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Reinforced bending moment because of double core geometry

## XCE504 ...series



ULTRA FINE



HELIX



HELIX



p.969~971

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XCE504060	6	15	50	6
XCE504080	8	20	60	8
XCE504100	10	25	70	10
XCE504120	12	30	75	12
XCE504160	16	40	90	16
XCE504200	20	45	100	20
XCE504250	25	50	120	25

※ Flat shank is available upon request

ex) XCE504100F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

○:General Application ◎:The most suitable Application

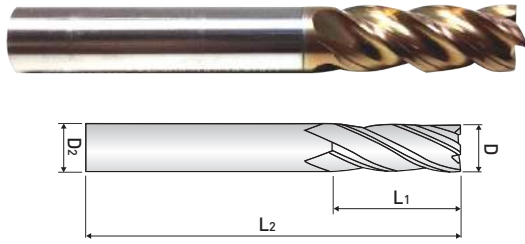
### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Endmills for stainless steel

## Neo Classic X-STAR Series



### 4 FLUTE, REGULAR LENGTH

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance
- Strengthened cutting edge geometry designed for excellent performance on high-temp alloys, high tensile stainless steel, inconel and titanium

## XE304 ...series



FINE GRAIN



HELIX



HELIX



p.969~971

EDP. No.	D	C.L	OAL	SH. Dia.
XE304 030	3	10	50	6
XE304 040	4	12	50	6
XE304 050	5	15	50	6
XE304 060	6	15	57	6
XE304 070	7	20	63	8
XE304 080	8	20	63	8
XE304 090	9	25	72	10
XE304 100	10	25	72	10
XE304 110	11	30	80	12
XE304 120	12	30	80	12
XE304 130	13	35	80	12
XE304 140	14	35	80	12
XE304 160	16	42	100	16
XE304 180	18	45	100	16
XE304 200	20	48	105	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

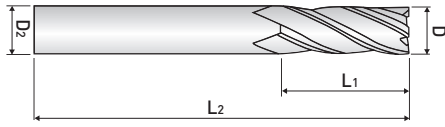
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTES, VARIABLE HELIX ENDMILL FOR A COMPLEX AUTOMATIC LATHE (X-STAR MINI)

- Minimize resonance phenomenon with Variable helix
- Suitable for a low hardness machine (automatic lathe) with unique design

## XM304 ...series



FINE GRAIN



HELIX



HELIX



p.969~971

EDP. No.	D	C.L	OAL	SH. Dia.
XM304 030	3	5	35	3
XM304 040	4	6	40	4
XM304 050	5	8	40	5
XM304 060	6	10	45	6
XM304 070	7	12	45	7
XM304 080	8	12	45	8
XM304 090	9	15	50	9
XM304 100	10	15	50	10

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○	◎	◎	○				◎

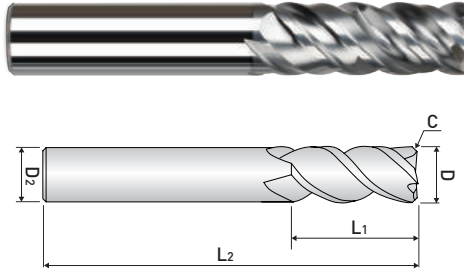
○: General Application ◎: The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
  - The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
  - Reinforced bending moment because of double core geometry
- \* corner chamfer type

## XCC504 ...series



EDP. No.	D	C	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XCC504060	6	0.075	15	50	6
XCC504080	8	0.1	20	60	8
XCC504100	10	0.125	25	70	10
XCC504120	12	0.15	30	75	12
XCC504160	16	0.2	40	90	16
XCC504200	20	0.3	45	100	20
XCC504250	25	0.3	50	120	25

※ Flat shank is available upon request

ex) XCC504100F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○	◎	◎	○				◎

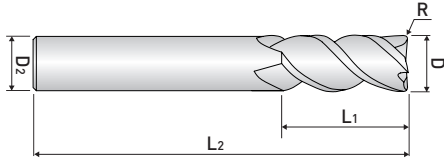
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, REGULAR LENGTH, CORNER RADIUS VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Reinforced bending moment because of double core geometry

## XCR504 ...series



p.969~971

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XCR5040602	6	0.2	15	50	6
XCR5040605		0.5			
XCR5040610		1			
XCR5040805	8	0.5	20	60	8
XCR5040810		1			
XCR5041005	10	0.5	25	70	10
XCR5041010		1			
XCR5041205	12	0.5	30	75	12
XCR5041210		1			
XCR5041605	16	0.5	40	90	16
XCR5041610		1			
XCR5042005	20	0.5	45	100	20
XCR5042010		1			
XCR5042505	25	0.5	50	120	25
XCR5042510		1			

※ Flat shank is available upon request

ex) XCR5041005F : Flat shank

Endmills for stainless steel - Neo Classic X-STAR Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○	◎	◎	○				◎

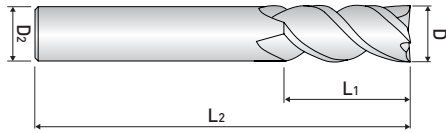
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 3 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Reinforced bending moment because of double core geometry

## XCE503 ...series



p.969~971

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XCE503020	2	6	50	6
XCE503025	2.5	8	50	6
XCE503030	3	10	50	6
XCE503035	3.5	10	50	6
XCE503040	4	12	50	6
XCE503045	4.5	14	50	6
XCE503050	5	15	50	6
XCE503055	5.5	15	50	6
XCE503060	6	15	50	6
XCE503080	8	20	60	8
XCE503100	10	25	70	10
XCE503120	12	30	75	12
XCE503160	16	40	90	16
XCE503200	20	45	100	20
XCE503250	25	50	120	25

※ Flat shank is available upon request

ex) XCE503100F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

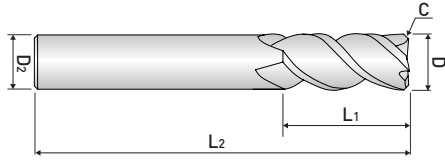
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 3 FLUTE, REGULAR LENGTH

- High precision and excellent surface due to each 4F variable helix geometry
  - The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
  - Reinforced bending moment because of double core geometry
- \* corner chamfer type

## XCC503 ...series



EDP. No.	D	C	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XCC503020	2	0.025	6	50	6
XCC503025	2.5	0.025	8	50	6
XCC503030	3	0.035	10	50	6
XCC503035	3.5	0.035	10	50	6
XCC503040	4	0.045	12	50	6
XCC503045	4.5	0.045	14	50	6
XCC503050	5	0.055	15	50	6
XCC503055	5.5	0.055	15	50	6
XCC503060	6	0.075	15	50	6
XCC503080	8	0.1	20	60	8
XCC503100	10	0.125	25	70	10
XCC503120	12	0.150	30	75	12
XCC503160	16	0.200	40	90	16
XCC503200	20	0.250	45	100	20
XCC503250	25	0.300	50	120	25

※ Flat shank is available upon request

ex) XCC503100F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

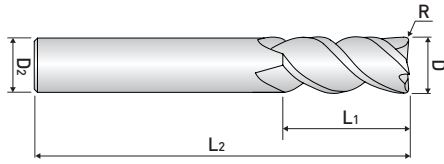
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 3 FLUTE, REGULAR LENGTH CORNER RADIUS, DOUBLE CORE

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Reinforced bending moment because of double core geometry

## XCR503 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XCR5030502	5	0.2	15	50	6
XCR5030602	6	0.2	15	50	6
XCR5030605		0.5			
XCR5030610		1			
XCR5030805	8	0.5	20	60	8
XCR5030810		1			
XCR5031005	10	0.5	25	70	10
XCR5031010		1			
XCR5031205	12	0.5	30	75	12
XCR5031210		1			
XCR5031605	16	0.5	40	90	16
XCR5031610		1			
XCR5032005	20	0.5	45	100	20
XCR5032010		1			
XCR5032505	25	0.5	50	120	25
XCR5032510		1			

※ Flat shank is available upon request

ex) XCR5031010F : Flat shank

Endmills for stainless steel – Neo Classic X-STAR Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

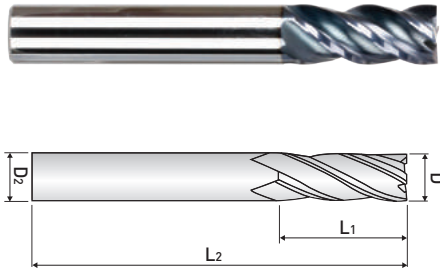
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.02	h6

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, REGULAR LENGTH, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XE504 ...series



p.969~971

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XE504010	1	2.5	45	4
XE504020	2	5	45	4
XE504030	3	8	50	6
XE504040	4	11	50	6
XE504050	5	13	50	6
XE504060	6	13	50	6
XE504070	7	16	60	8
XE504080	8	19	60	8
XE504090	9	19	70	10
XE504100	10	22	70	10
XE504110	11	22	75	12
XE504120	12	26	75	12
XE504130	13	26	80	12
XE504140	14	26	80	14
XE504160	16	32	90	16
XE504180	18	32	100	18
XE504200	20	38	100	20
XE504250	25	45	120	25

※ Flat shank is available upon request

ex) XE504100F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○	◎	◎	○				◎

○:General Application ◎:The most suitable Application

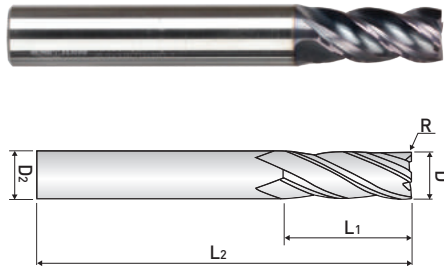
### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 12	0 ~ -0.02	h6
over 12	0 ~ -0.03	

※ These tools are manufactured based on order received.

# Endmills for stainless steel

## Neo Classic X-STAR Series



### 4 FLUTE, REGULAR LENGTH, CORNER RADIUS VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XR504 ...series



ULTRA FINE

HELIX

HELIX

p.969~971

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XR504020	2	0.1	5	45	4
XR504030	3	0.1	8	50	6
XR504040	4	0.2	11	50	6
XR504050	5	0.2	13	50	6
XR504060	6	0.2	13	50	6
XR504070	7	0.2	16	60	8
XR504080	8	0.2	19	60	8
XR504090	9	0.2	19	70	10
XR504100	10	0.3	22	70	10
XR504110	11	0.3	22	75	12
XR504120	12	0.3	26	75	12
XR504130	13	0.3	26	80	12
XR504140	14	0.3	26	80	14
XR504160	16	0.3	32	90	16
XR504180	18	0.3	32	100	18
XR504200	20	0.3	38	100	20
XR504250	25	0.3	45	120	25

※ Flat shank is available upon request

ex) XR504100F : Flat shank

Endmills for stainless steel – Neo Classic X-STAR Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

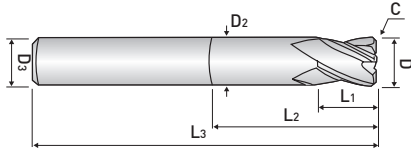
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 12	0 ~ -0.02	h6
over 12	0 ~ -0.03	

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, STUB CUT LENGTH with EXTENDED NECK, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
  - The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
  - Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel
- \* corner chamfer type

## XE514 ...series



p.969~971

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
XE514010	1	2	10	45	0.8	4
XE514020	2	3	12	45	1.8	4
XE514030	3	4	14	50	2.8	6
XE514040	4	5	16	50	3.8	6
XE514050	5	6	18	50	4.8	6
XE514060	6	7	20	50	5.8	6
XE514080	8	9	26	60	7.8	8
XE514100	10	11	31	70	9.8	10
XE514120	12	13	37	75	11.8	12
XE514160	16	17	43	90	15.8	16
XE514200	20	21	53	100	19.8	20

※ Flat shank is available upon request

ex) XE514100F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

○:General Application ◎:The most suitable Application

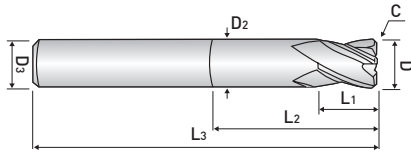
### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 12	0 ~ -0.02	h6
over 12	0 ~ -0.03	

※ These tools are manufactured based on order received.

# Endmills for stainless steel

## Neo Classic X-STAR Series



### 4 FLUTE, STUB CUT LENGTH with EXTENDED LONG NECK

- High precision and excellent surface due to each 4F variable helix geometry
  - The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
  - Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel
- \* corner chamfer type

## XE524 ...series



p.969~971

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
XE524060	6	7	33	70	5.8	6
XE524080	8	9	43	80	7.8	8
XE524100	10	11	43	84	9.8	10
XE524120	12	13	51	97	11.8	12
XE524160	16	17	66	115	15.8	16

※ Flat shank is available upon request

ex) XE524100F : Flat shank

Endmills for stainless steel — Neo Classic X-STAR Series

#### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

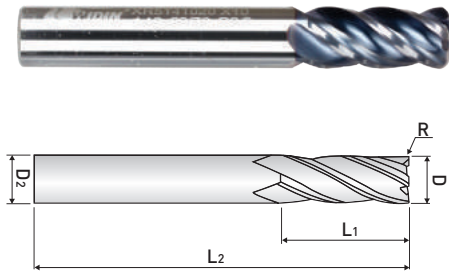
○:General Application ◎:The most suitable Application

#### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 12	0 ~ -0.02	
over 12	0 ~ -0.03	

※ These tools are manufactured based on order received.

# Endmills for stainless steel *Neo Classic X-STAR Series*



## 4 FLUTE, REGULAR LENGTH CORNER RADIUS, VARIABLE HELIX

- High precision and excellent surface due to each 4F variable helix geometry
- The unique patented design decrease chatter and resonance, can achieve an Axial Depth 1XD
- Applied various corner radius.
- Sharp cutting edge geometry designed for excellent performance on mild mold steel and stainless steel

## XR514 ...series



p.969~971

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
XR5140201	2	0.1	5	45	4
XR5140202		0.2			
XR5140302	3	0.2	8	50	6
XR5140303		0.3			
XR5140305		0.5			
XR5140403	4	0.3	10	50	6
XR5140405		0.5			
XR5140410		1.0			
XR5140505	5	0.5	13	50	6
XR5140510		1.0			
XR5140605	6	0.5	13	50	6
XR5140610		1.0			
XR5140615		1.5			
XR5140805	8	0.5	19	60	8
XR5140810		1.0			
XR5140815		1.5			
XR5140820		2.0			
XR5141005	10	0.5	22	70	10
XR5141010		1.0			
XR5141015		1.5			
XR5141020		2.0			
XR5141205	12	0.5	26	75	12
XR5141210		1.0			
XR5141215		1.5			
XR5141220		2.0			
XR5141230		3.0			
XR5141615	16	1.5	32	90	16
XR5141620		2.0			
XR5141630		3.0			
XR5142030	20	3.0	38	100	20
XR5142040		4.0			
XR5142050		5.0			

※ Flat shank is available upon request

ex) XR5141010 : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○	◎	◎	○				◎

○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia. h6
Diameter	Tolerance	
up to 12	0 ~ -0.02	
over 12	0 ~ -0.03	

※ These tools are manufactured based on order received.






# Endmills for high speed & general cutting

ZAMUS CLASSIC SERIES(~HRc55)



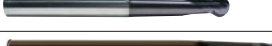































## Endmills for high speed &amp; general cutting \_ ZAMUS CLASSIC SERIES


























**WIDIN**

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
DA412 ...series		15° HELIX STUB CUT LENGTH with EXTENDED NECK	INCH	•	230
DA512 ...series		LONG LENGTH, BALL NOSE	INCH	•	231
DA514 ...series		LONG LENGTH, BALL NOSE	INCH	•	232
DA522 ...series		LONG LENGTH, BALL NOSE with EXTENDED NECK	INCH	•	233
MD502 ...series		MINIATURE, BALL NOSE	INCH	•	234
DA542 ...series		BALL NOSE with TAPER NECK	INCH	•	235
DA552 ...series		BALL NOSE with PENCIL NECK	INCH	•	236
ZA502 ...series		REGULAR LENGTH	INCH	•	237
ZA522 ...series		LONG LENGTH	INCH	•	238
MZ502 ...series		MINIATURE	INCH	•	239
ZA504 ...series		REGULAR LENGTH	INCH	•	240
ZA524 ...series		LONG LENGTH	INCH	•	241
ZA506&8 ...series		45° HELIX, LONG LENGTH	INCH	•	242
ZA526&8 ...series		45° HELIX, EXTRA LONG LENGTH	INCH	•	243
ZR502A ...series		STUB LENGTH, CORNER RADIUS	INCH	•	244
ZR522A ...series		LONG LENGTH, CORNER RADIUS	INCH	•	245
ZR532A ...series		LONG LENGTH, CORNER RADIUS	INCH	•	246
ZR504A ...series		STUB LENGTH, CORNER RADIUS	INCH	•	247
ZR524A ...series		REGULAR LENGTH, CORNER RADIUS	INCH	•	248
ZR534A ...series		LONG LENGTH, CORNER RADIUS	INCH	•	249
ZR506(8)A ...series		50° HELIX, LONG LENGTH, CORNER RADIUS	INCH	•	250
FA50 ...series		ROUGHING LONG LENGTH	INCH	•	251
DB402 ...series		SHORT LENGTH, BALL NOSE	METRIC	•	252
DB412 ...series		15° HELIX STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	METRIC	•	253
DB512 ...series		LONG LENGTH, BALL NOSE	METRIC	•	254
DB514 ...series		LONG LENGTH, BALL NOSE	METRIC	•	255

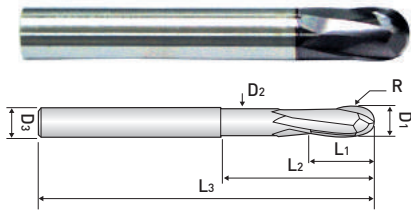
NEXT &gt;&gt;&gt;

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
DB502 ...series		STUB CUT LENGTH, BALL NOSE with EXTENDED NECK	METRIC	•	256
DB522 ...series		EXTENDED NECK-LONG SHANK	METRIC	•	257
DB532 ...series		MMC-SPHERE TYPE	METRIC	•	258
DB534 ...series		MMC-SPHERE TYPE	METRIC	•	259
DB54(5)2 ...series		BALL NOSE with TAPER NECK	METRIC	•	260
ZE502 ...series		REGULAR LENGTH	METRIC	•	261
ZE504 ...series		REGULAR LENGTH	METRIC	•	262
ZE503 ...series		REGULAR LENGTH	METRIC	•	263
ZE506 ...series		REGULAR & LONG LENGTH	METRIC	•	264
ZM502 ...series		MEDIUM LENGTH	METRIC	•	265
ZM504 ...series		MEDIUM LENGTH	METRIC	•	266
ZM522 ...series		MEDIUM CUT, LONG SHANK TYPE	METRIC	•	267
ZM524 ...series		MEDIUM CUT, LONG SHANK TYPE	METRIC	•	268
ZE522 ...series		LONG LENGTH	METRIC	•	269
ZE524 ...series		LONG LENGTH	METRIC	•	270
ZE534 ...series		EXTRA LONG LENGTH	METRIC	•	271
ZE512 ...series		35° HELIX REGULAR LENGTH	METRIC	•	272
ZE514 ...series		45° HELIX REGULAR LENGTH	METRIC	•	273
ZE516 ...series		50° HELIX REGULAR LENGTH	METRIC	•	274
ZR502 ...series		STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	•	275
ZR504 ...series		STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK	METRIC	•	276
ZR512 ...series		REGULAR LENGTH, CORNER RADIUS	METRIC	•	277
ZR514 ...series		REGULAR LENGTH, CORNER RADIUS	METRIC	•	278
ZR522 ...series		LONG LENGTH, CORNER RADIUS	METRIC	•	279
ZR524 ...series		LONG LENGTH, CORNER RADIUS	METRIC	•	280
TPRB604A-05 ...series		30° TAPER RIB BALL, SHORT LENGTH	INCH	•	281
TPRB604A-10 ...series		1° TAPER RIB BALL, SHORT LENGTH	INCH	•	282
TPRB604A-15 ...series		1° 30' TAPER RIB BALL, SHORT LENGTH	INCH	•	283
TPRB604A-20 ...series		2° TAPER RIB BALL, SHORT LENGTH	INCH	•	284
TPRB604A-30 ...series		3° TAPER RIB BALL, SHORT LENGTH	INCH	•	285
TPRB624A-05 ...series		30° TAPER RIB BALL, LONG LENGTH	INCH	•	286
TPRB624A-10 ...series		1° TAPER RIB BALL, LONG LENGTH	INCH	•	287

NEXT &gt;&gt;&gt;

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
TPRB624A-15 ...series		1° 30' TAPER RIB BALL, LONG LENGTH	INCH	•	288
TPRB624A-20 ...series		2° TAPER RIB BALL, LONG LENGTH	INCH	•	289
TPRB624A-30 ...series		3° TAPER RIB BALL, LONG LENGTH	INCH	•	290
TPRE604A-05 ...series		30' TAPER RIB, SHORT LENGTH	INCH	•	291
TPRE604A-10 ...series		1° TAPER RIB, SHORT LENGTH	INCH	•	292
TPRE604A-15 ...series		1° 30' TAPER RIB, SHORT LENGTH	INCH	•	293
TPRE604A-20 ...series		2° TAPER RIB, SHORT LENGTH	INCH	•	294
TPRE604A-30 ...series		3° TAPER RIB, SHORT LENGTH	INCH	•	295
TPRB4 ...-050 series		30' TAPER BALL, RIB PROCESSING	METRIC	•	296
TPRB4 ...-075 series		45' TAPER BALL, RIB PROCESSING	METRIC	•	297
TPRB4 ...-100 series		1° TAPER BALL, RIB PROCESSING	METRIC	•	299
TPRB4 ...-150 series		1° 30' TAPER BALL, RIB PROCESSING	METRIC	•	300
TPRB4 ...-200 series		2° TAPER BALL, RIB PROCESSING	METRIC	•	302
TPRE4 ...-050 series		30' TAPER BALL, RIB PROCESSING	METRIC	•	304
TPRE4 ...-075 series		45' TAPER, RIB PROCESSING	METRIC	•	306
TPRE4 ...-100 series		1° TAPER, RIB PROCESSING	METRIC	•	308
TPRE4 ...-150 series		1° 30' TAPER, RIB PROCESSING	METRIC	•	310
TPRE4 ...-200 series		2° TAPER, RIB PROCESSING	METRIC	•	312
TPRE4 ...-300 series		3° TAPER BALL, RIB PROCESSING	METRIC	•	314
TE503 ...series		TAPER END MILL	METRIC	•	315
TB503 ...series		TAPER BALL END MILL	METRIC	•	316
TB504 ...series		TAPER BALL END MILL	METRIC	•	317
ZF60 ...series		ROUGHING END MILL	METRIC	•	318
ZF61 ...series		ROUGHING END MILL - FINE PITCH	METRIC	•	319
PK503 ...series		Z - AXIS ROUGHING END MILL	METRIC	•	320

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, 15° HELIX STUB CUT LENGTH, BALL NOSE with EXTENDED NECK

- Designed for high hardened materials up to HRC62
- Suitable for high speed machining

## DA412 ...series



ULTRA FINE



HELIX



p.933~934

EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
DA412001	1/32	1/64	1/32	1/16	2	.029	1/4
DA412002	1/16	1/32	1/16	1/8	2	.059	1/4
DA412003	3/32	3/64	3/32	3/16	2	.090	1/4
DA412004	1/8	1/16	1/8	1/4	2-1/2	.121	1/4
DA412006	3/16	3/32	3/16	3/8	3	.184	1/4
DA412008	1/4	1/8	1/4	1/2	3-1/2	.246	1/4
DA412010	5/16	5/32	5/16	5/8	4	.309	5/16
DA412012	3/8	3/16	3/8	3/4	4	.371	3/8
DA412012L	3/8	3/16	1	1-3/8	6	.371	3/8
DA412016	1/2	1/4	1/2	1	4-1/2	.496	1/2
DA412016L	1/2	1/4	1	1-1/2	6	.496	1/2

Endmills for high speed &amp; general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

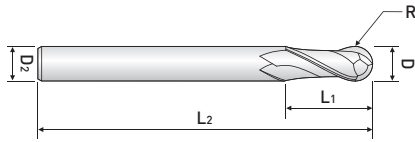
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Suitable for copy milling

## DA512 ...series



ULTRA FINE



HELIX



p.934~935

EDP. No.	D	R	C.L	OAL	SH.Dia.
DA512001	1/32	1/64	1/32	2-1/2	1/4
DA512002	1/16	1/32	1/16	2-1/2	1/4
DA512003	3/32	3/64	3/32	2-1/2	1/4
DA512004	1/8	1/16	5/16	2-3/8	1/8
DA512006	3/16	3/32	3/8	3-1/8	3/16
DA512008	1/4	1/8	1/2	3-1/2	1/4
DA512010	5/16	5/32	9/16	4	5/16
DA512012	3/8	3/16	3/4	4	3/8
DA512016	1/2	1/4	7/8	4-1/4	1/2
DA512020	5/8	5/16	1-1/4	5-1/2	5/8
DA512024	3/4	3/8	1-1/2	6-1/4	3/4
DA512032	1	1/2	2	7-1/8	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

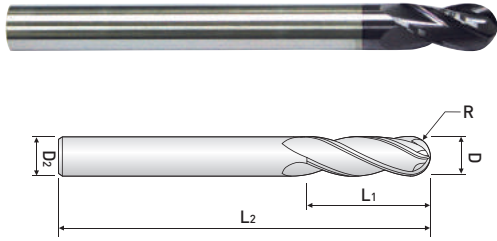
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## DA514 ...series



ULTRA FINE



HELIX



p.935~936

EDP. No.	D	R	C.L	OAL	SH.Dia.
DA514002	1/16	1/32	1/16	2-1/2	1/4
DA514003	3/32	3/64	3/32	2-1/2	1/4
DA514004	1/8	1/16	5/16	2-3/8	1/8
DA514006	3/16	3/32	3/8	3-1/8	3/16
DA514008	1/4	1/8	1/2	3-1/2	1/4
DA514010	5/16	5/32	9/16	4	5/16
DA514012	3/8	3/16	3/4	4	3/8
DA514016	1/2	1/4	7/8	4-1/4	1/2
DA514020	5/8	5/16	1-1/4	5-1/2	5/8
DA514024	3/4	3/8	1-1/2	6-1/4	3/4
DA514032	1	1/2	2	7-1/8	1

Endmills for high speed &amp; general cutting - ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

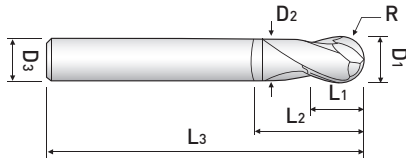
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, LONG LENGTH, BALL NOSE with EXTENDED NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Suitable for copy milling
- Suitable for deep copy milling with long neck type

## DA522 ...series



ULTRA FINE



HELIX



p.936~937

EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
DA522004	1/8	1/16	5/16	-	2-3/4	-	1/4
DA522006	3/16	3/32	1/2	-	3-1/8	-	1/4
DA522008	1/4	1/8	1/2	7/8	3-1/8	.242	1/4
DA522010	5/16	5/32	9/16	1-1/16	3-1/2	.305	5/16
DA522012	3/8	3/16	3/4	1-1/4	4	.367	3/8
DA522016	1/2	1/4	7/8	1-3/8	4-1/4	.492	1/2
DA522020	5/8	5/16	1-1/4	2	5-1/2	.617	5/8
DA522024	3/4	3/8	1-1/2	2-1/4	6-1/4	.742	3/4
DA522032	1	1/2	2-1/8	3	7	.992	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

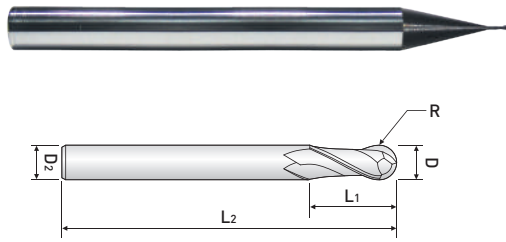
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, MINIATURE, BALL NOSE

- High precision milling in medical, optical, electronics and aerospace industrials
- Excellent performance at dry cutting condition
- Excellent performance on high hardened steel

## MD502 ...series



EDP. No.	D	R	C.L	OAL	SH.Dia.
MD502024	.024	.012	.043	1-1/2	1/8
MD502028	.028	.014	.060	1-1/2	1/8
MD502031	.031	.0155	.080	1-1/2	1/8
MD502035	.035	.0175	.087	1-1/2	1/8
MD502040	.040	.020	.100	1-1/2	1/8
MD502043	.043	.0215	.118	1-1/2	1/8
MD502047	.047	.0235	.118	1-1/2	1/8
MD502052	.052	.026	.138	1-1/2	1/8
MD502055	.055	.0275	.138	1-1/2	1/8
MD502062	.062	.031	.157	1-1/2	1/8

Endmills for high speed & general cutting - ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

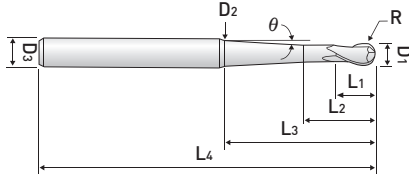
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, BALL NOSE with TAPER NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Suitable for copy milling
- Suitable for deep copy milling with taper long neck type

## DA542 ...series



ULTRA FINE



HELIX



±.001



AlTiN



p.938

EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	L <sub>4</sub>	θ
DA542001	1/16	1/32	5/32	15/64	7/8	.096	1/4	2-3/8	1°30'
DA542002	1/16	1/32	5/32	15/64	1-5/8	.208	1/4	3-1/8	3°
DA542004	1/8	1/16	1/4	21/64	2-1/16	.216	1/4	3-5/8	1°30'
DA542006	3/16	3/32	3/8	29/64	2-3/8	.288	3/8	4-3/8	1°30'
DA542008	1/4	1/8	1/2	5/8	2-1/16	.325	3/8	4-3/8	1°30'
DA542010	5/16	5/32	9/16	11/16	2-1/16	.385	1/2	4-3/4	1°30'
DA542012	3/8	3/16	11/16	13/16	2-3/8	.458	1/2	5-1/16	1°30'
DA542016	1/2	1/4	7/8	1	3-1/4	.618	3/4	6-3/8	1°30'

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

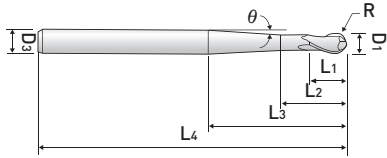
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, BALL NOSE with PENCIL NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Suitable for copy milling
- Suitable for deep copy milling with taper long neck type

## DA552 ...series



ULTRA FINE

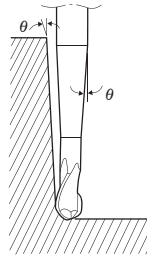


HELIX



p.939

EDP. No.	D <sub>1</sub>	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>	L <sub>4</sub>	θ
DA552006	3/16	3/32	9/16	.659	3-11/32	3/8	7-3/4	2°
DA552007	3/16	3/32	9/16	.666	2-13/16	3/8	6	2°30'
DA552008	1/4	1/8	3/4	.859	4-7/16	1/2	7-3/4	2°
DA552009	1/4	1/8	3/4	.856	3-23/32	1/2	6	2°30'
DA552010	5/16	5/32	3/4	.868	4-29/32	1/2	7-3/4	1°20'
DA552011	5/16	5/32	3/4	.870	3-15/16	1/2	6	1°45'
DA552012	3/8	3/16	1-3/16	1.326	4-29/32	5/8	7-3/4	2°
DA552013	3/8	3/16	1-3/16	1.325	4-3/16	5/8	6	2°30'
DA552016	1/2	1/4	1-3/16	1.309	4	5/8	7-3/4	1°20'
DA552017	1/2	1/4	1-3/16	1.329	3-3/8	5/8	6	1°45'



MILLING ON TAPERED WALL

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

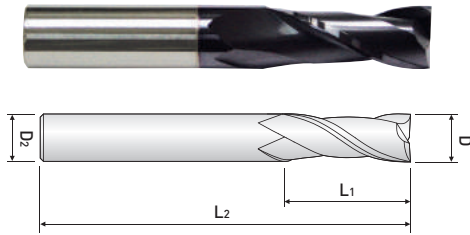
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZA502 ...series



ULTRA FINE



HELIX



p.940

EDP. No.	D	C.L	OAL	SH.Dia.
ZA502002	1/32	1/8	1-1/2	1/8
ZA502004	1/16	3/16	1-1/2	1/8
ZA502006	3/32	5/16	1-1/2	1/8
ZA502008	1/8	1/2	1-1/2	1/8
ZA502010	5/32	9/16	2	3/16
ZA502012	3/16	5/8	2	3/16
ZA502014	7/32	5/8	2-1/2	1/4
ZA502016	1/4	3/4	2-1/2	1/4
ZA502018	9/32	3/4	2-1/2	5/16
ZA502020	5/16	13/16	2-1/2	5/16
ZA502024	3/8	1	2-1/2	3/8
ZA502026	13/32	1	2-3/4	7/16
ZA502028	7/16	1	2-3/4	7/16
ZA502032	1/2	1	3	1/2
ZA502036	9/16	1-1/8	3-1/2	9/16
ZA502040	5/8	1-1/4	3-1/2	5/8
ZA502048	3/4	1-1/2	4	3/4
ZA502064	1	1-1/2	4	1

Endmills for high speed &amp; general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

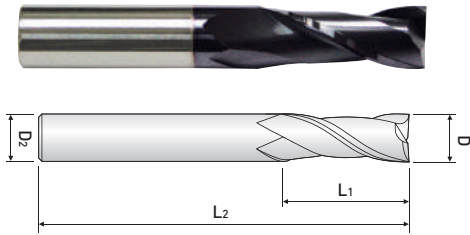
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZA522 ...series



ULTRA FINE



HELIX



p.940

EDP. No.	D	C.L	OAL	SH.Dia.
ZA522008	1/8	3/4	2-1/4	1/8
ZA522012	3/16	3/4	2-1/2	3/16
ZA522016	1/4	1-1/8	3	1/4
ZA522020	5/16	1-1/8	3	5/16
ZA522024	3/8	1-1/8	3	3/8
ZA522032	1/2	2	4	1/2
ZA522040	5/8	2-1/4	5	5/8
ZA522048	3/4	2-1/4	5	3/4
ZA522064	1	2-1/4	5	1

Endmills for high speed &amp; general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

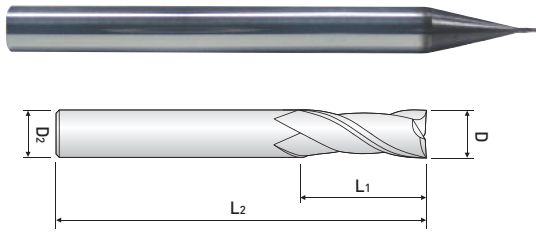
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, MINIATURE

- High precision milling in medical, optical, electronics and aero space industries
- Excellent performance on high hardened steel

## MZ502 ...series



EDP. No.	D	C.L	OAL	SH.Dia.
MZ502016	.016	.031	1-1/2	1/8
MZ502020	.020	.040	1-1/2	1/8
MZ502024	.024	.047	1-1/2	1/8
MZ502028	.028	.055	1-1/2	1/8
MZ502031	.031	.063	1-1/2	1/8
MZ502035	.035	.080	1-1/2	1/8
MZ502040	.040	.100	1-1/2	1/8
MZ502043	.043	.100	1-1/2	1/8
MZ502047	.047	.157	1-1/2	1/8
MZ502052	.052	.157	1-1/2	1/8
MZ502055	.055	.157	1-1/2	1/8
MZ502062	.062	.157	1-1/2	1/8

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

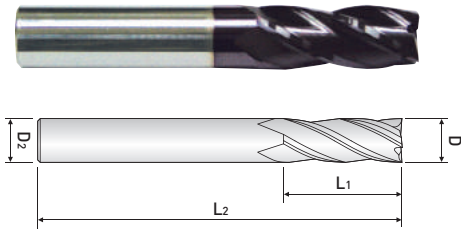
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.001	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZA504 ...series



EDP. No.	D	C.L	OAL	SH.Dia.
ZA504004	1/16	3/16	1-1/2	1/8
ZA504008	1/8	1/2	1-1/2	1/8
ZA504012	3/16	5/8	2	3/16
ZA504016	1/4	3/4	2-1/2	1/4
ZA504020	5/16	13/16	2-1/2	5/16
ZA504024	3/8	1	2-1/2	3/8
ZA504028	7/16	1	2-3/4	7/16
ZA504032	1/2	1	3	1/2
ZA504040	5/8	1-1/4	3-1/2	5/8
ZA504048	3/4	1-1/2	4	3/4
ZA504064	1	1-1/2	4	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

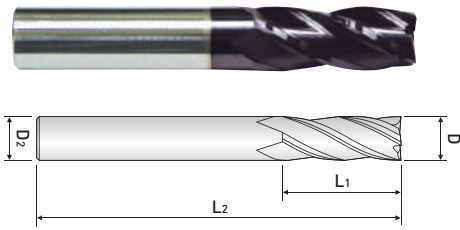
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZA524 ...series



ULTRA FINE



HELIX



p.942

EDP. No.	D	C.L	OAL	SH.Dia.
ZA524004	1/16	1/4	1-1/2	1/8
ZA524008	1/8	3/4	2-1/4	1/8
ZA524012	3/16	3/4	2-1/2	3/16
ZA524016	1/4	1-1/8	3	1/4
ZA524020	5/16	1-1/8	3	5/16
ZA504022	11/32	7/8	2-1/2	3/8
ZA524024	3/8	1-1/8	3	3/8
ZA524032	1/2	2	4	1/2
ZA524040	5/8	2-1/4	5	5/8
ZA524048	3/4	2-1/4	5	3/4
ZA524064	1	2-1/4	5	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

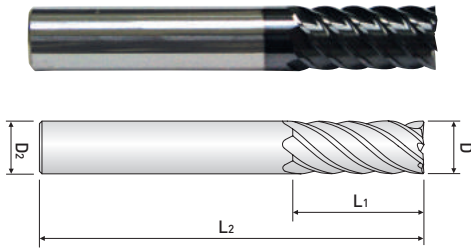
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 6&8 FLUTE, 45° HELIX LONG LENGTH

- Designed to machine tool steel, hardened materials
- High speed cutting and finish milling with high feed rate
- Superior workpiece finishes
- Superior wear resistant

## ZA506&8 ...series



EDP. No.	D	C.L	OAL	SH.Dia.	NO. OF FLUTE
ZA506016	1/4	1/2	2-1/4	1/4	6
ZA506020	5/16	3/4	2-1/2	5/16	6
ZA506024	3/8	7/8	2-7/8	3/8	6
ZA506032	1/2	1	3-1/4	1/2	6
ZA506040	5/8	1-1/4	3-5/8	5/8	6
ZA508048	3/4	1-1/2	4-1/8	3/4	8
ZA508064	1	1-3/4	4-1/4	1	8

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

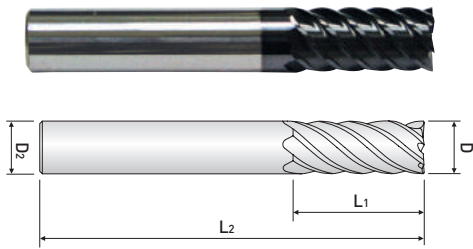
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

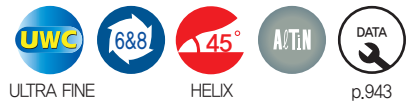
# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 6&8 FLUTE, 45°HELIX EXTRA LONG LENGTH

- Designed to machine tool steel, hardened materials
- High speed cutting and finish milling with high feed rate
- Superior workpiece finishes
- Superior wear resistant

## ZA526&8 ...series



EDP. No.	D	C.L	OAL	SH.Dia.	NO. OF FLUTE
ZA526016	1/4	1	2-3/4	1/4	6
ZA526020	5/16	1-1/2	3-5/8	5/16	6
ZA526024	3/8	1-3/4	4	3/8	6
ZA526032	1/2	2-3/16	4-3/8	1/2	6
ZA526040	5/8	2-5/8	5-1/8	5/8	6
ZA528048	3/4	2-1/4	5	3/4	8
ZA528049	3/4	3-1/4	6	3/4	8
ZA528050	3/4	4-1/8	7	3/4	8
ZA528064	1	4-1/8	7	1	8

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

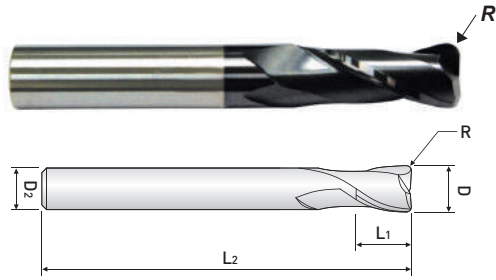
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, STUB LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZR502A .....series



EDP. No.	D	R	C.L	OAL	SH.Dia.
ZR502A00408	1/16	.008	1/8	2-1/4	1/4
ZR502A00810	1/8	.010	1/4	2-1/4	1/4
ZR502A00820		.020			
ZR502A00830		.030			
ZR502A01210	3/16	.010	3/8	2-1/2	1/4
ZR502A01220		.020			
ZR502A01230		.030			
ZR502A01610	1/4	.010	1/2	3	1/4
ZR502A01620		.020			
ZR502A01630		.030			
ZR502A01660		.040			
ZR502A02020	5/16	.020	1/2	3	5/16
ZR502A02030		.030			
ZR502A02060		.060			
ZR502A02090		.090			
ZR502A02420	3/8	.020	5/8	3	3/8
ZR502A02430		.030			
ZR502A02460		.060			
ZR502A02490		.090			
ZR502A03220	1/2	.020	5/8	4	1/2
ZR502A03230		.030			
ZR502A03260		.060			
ZR502A03290		.090			



### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

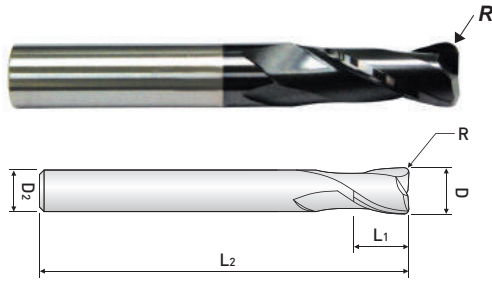
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



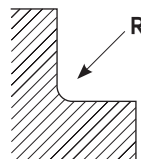
## 2 FLUTE, REGULAR LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZR522A ...series



EDP. No.	D	R	C.L	OAL	SH.Dia.
ZR522A00408	1/16	.008	3/16	2-1/4	1/4
ZR522A00810	1/8	.010	1/2	2-1/4	1/4
ZR522A00820		.020			
ZR522A00830		.030			
ZR522A01210	3/16	.010	5/8	2-1/2	1/4
ZR522A01220		.020			
ZR522A01230		.030			
ZR522A01610	1/4	.010	3/4	3	1/4
ZR522A01620		.020			
ZR522A01630		.030			
ZR522A01660		.060			
ZR522A02020	5/16	.020	13/16	3	5/16
ZR522A02030		.030			
ZR522A02060		.060			
ZR522A02090		.090			
ZR522A02420	3/8	.020	1	3	3/8
ZR522A02430		.030			
ZR522A02460		.060			
ZR522A02490		.090			
ZR522A02820	7/16	.020	1	4	7/16
ZR522A02830		.030			
ZR522A02860		.060			
ZR522A02890		.090			
ZR522A03220	1/2	.020	1	4	1/2
ZR522A03230		.030			
ZR522A03260		.060			
ZR522A03290		.090			



### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

○:General Application ◎:The most suitable Application

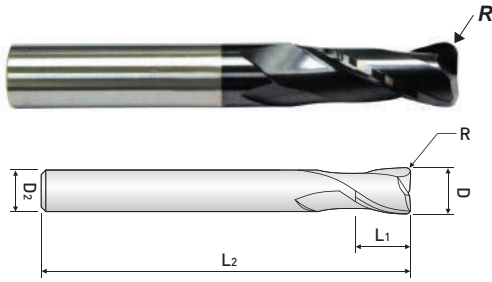
### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, LONG LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZR532A .....series



EDP. No.	D	R	C.L	OAL	SH.Dia.
ZR532A01620	1/4	.020	1-1/8	3	1/4
ZR532A01630		.030			
ZR532A01660		.060			
ZR532A02020	5/16	.020	1-1/8	3	5/16
ZR532A02030		.030			
ZR532A02060		.060			
ZR532A02090		.090			
ZR532A02420	3/8	.020	1-1/8	3	3/8
ZR532A02430		.030			
ZR532A02460		.060			
ZR532A02490		.090			
ZR532A03220	1/2	.020	2	4	1/2
ZR532A03230		.030			
ZR532A03260		.060			
ZR532A03290		.090			



Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

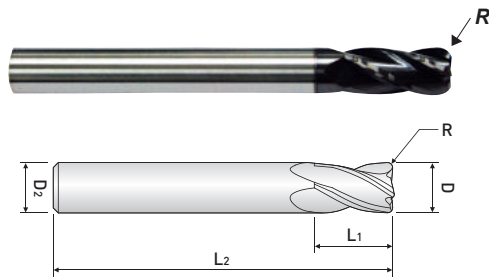
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



### 4 FLUTE, STUB LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZR504A .....series



EDP. No.	D	R	C.L	OAL	SH.Dia.
ZR504A00408	1/16	.008	1/8	2-1/4	1/4
ZR504A00810	1/8	.010	1/4	2-1/4	1/4
ZR504A00820		.020			
ZR504A00830		.030			
ZR504A01210	3/16	.010	3/8	2-1/2	1/4
ZR504A01220		.020			
ZR504A01230		.030			
ZR504A01610	1/4	.010	1/2	3	1/4
ZR504A01620		.020			
ZR504A01630		.030			
ZR504A01660		.060			
ZR504A02020	5/16	.020	1/2	3	5/16
ZR504A02030		.030			
ZR504A02060		.060			
ZR504A02090		.090			
ZR504A02420	3/8	.020	5/8	3	3/8
ZR504A02430		.030			
ZR504A02460		.060			
ZR504A02490		.090			
ZR504A03220	1/2	.020	5/8	4	1/2
ZR504A03230		.030			
ZR504A03260		.060			
ZR504A03290		.090			



#### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

○:General Application ◎:The most suitable Application

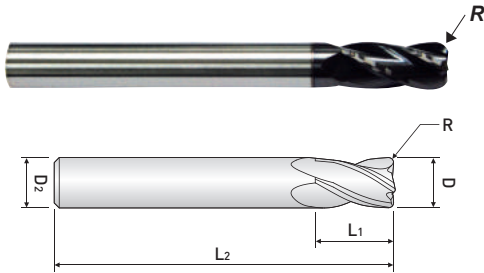
#### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



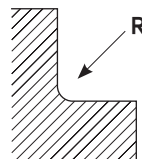
## 4 FLUTE, REGULAR LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZR524A .....series



EDP. No.	D	R	C.L	OAL	SH.Dia.
ZR524A00408	1/16	.008	3/16	2-1/4	1/4
ZR524A00810	1/8	.010	1/2	2-1/4	1/4
ZR524A00820		.020			
ZR524A00830		.030			
ZR524A01210	3/16	.010	5/8	2-1/2	1/4
ZR524A01220		.020			
ZR524A01230		.030			
ZR524A01610	1/4	.010	3/4	3	1/4
ZR524A01620		.020			
ZR524A01630		.030			
ZR524A01660		.060			
ZR524A02020	5/16	.020	13/16	3	5/16
ZR524A02030		.030			
ZR524A02060		.060			
ZR524A02090		.090			
ZR524A02420	3/8	.020	1	3	3/8
ZR524A02430		.030			
ZR524A02460		.060			
ZR524A02490		.090			
ZR524A02820	7/16	.020	1	4	7/16
ZR524A02830		.030			
ZR524A02860		.060			
ZR524A02890		.090			
ZR524A03220	1/2	.020	1	4	1/2
ZR524A03230		.030			
ZR524A03260		.060			
ZR524A03290		.090			



### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○	○			○		○

○:General Application ◎:The most suitable Application

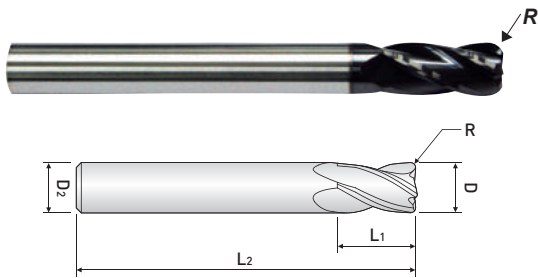
### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting - ZAMUS CLASSIC Series

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



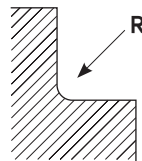
## 4 FLUTE, LONG LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZR534A .....series



EDP. No.	D	R	C.L	OAL	SH.Dia.
ZR534A01620	1/4	.020	1-1/8	3	1/4
ZR534A01630		.030			
ZR534A01660		.060			
ZR534A02020	5/16	.020	1-1/8	3	5/16
ZR534A02030		.030			
ZR534A02060		.060			
ZR534A02090		.090			
ZR534A02420	3/8	.020	1-1/8	3	3/8
ZR534A02430		.030			
ZR534A02460		.060			
ZR534A02490		.090			
ZR534A03220	1/2	.020	2	4	1/2
ZR534A03230		.030			
ZR534A03260		.060			
ZR534A03290		.090			



### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

○:General Application ◎:The most suitable Application

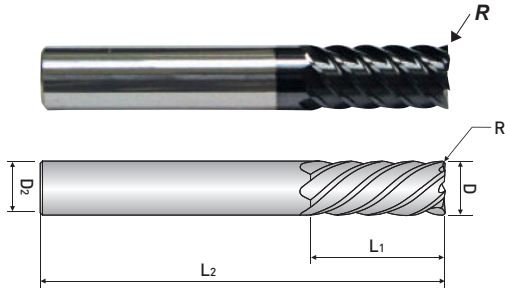
### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 6&8 FLUTE, 45° HELIX, LONG LENGTH, CORNER RADIUS

- Designed to machine tool steel, hardened materials
- High speed cutting and finish milling with high feed rates
- Superior workpiece finishes

## ZR506(8)A .....series



EDP. No.	D	R	C.L	OAL	SH.Dia.	Z
ZR506A01620	1/4	.020	1/2	2-1/4	1/4	6
ZR506A02020	5/16	.020	3/4	2-1/2	5/16	6
ZR506A02420	3/8	.020	7/8	2-7/8	3/8	6
ZR506A02430		.030				
ZR506A03220	1/2	.020	1	3-1/4	1/2	6
ZR506A03230		.030				
ZR506A04030	5/8	.030	1-1/4	3-5/8	5/8	6
ZR506A04060		.060				
ZR508A04830	3/4	.030	1-1/2	4-1/8	3/4	8
ZR508A04860		.060				
ZR508A04890		.090				



Endmills for high speed & general cutting – ZAMUS CLASSIC Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

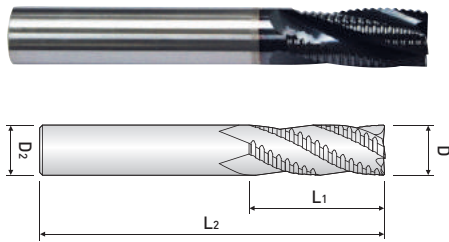
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## ROUGHING END MILL - LONG LENGTH

- Designed for machine tool steel, alloy steel, mold steel and other highly hardened materials
- High velocity milling of hardened steels
- For dry and wet milling
- Fast chip ejection

## FA50 ....series



EDP. No.	Dia.	C.L.	OAL	SH.Dia.	Z
FA503016	1/4	3/4	2-1/2	1/4	3
FA503020	5/16	3/4	2-1/2	5/16	3
FA503024	3/8	7/8	2-1/2	3/8	3
FA504032	1/2	1	3	1/2	4
FA504040	5/8	1-1/4	3-1/2	5/8	4
FA504048	3/4	1-5/8	4	3/4	4
FA505064	1	1-3/4	4	1	5

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

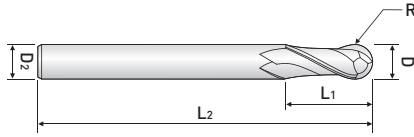
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	1/4 ~ 3/8	1/2 ~ 5/8	3/4 ~ 1
Tolerance of Mill Dia.	0 ~ -.0022	0 ~ -.0027	0 ~ -.0033

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, SHORT LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Suitable for copy milling

## DB402 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
DB402010	1	0.5	3	38	4
DB402012	1.2	0.6	3	38	4
DB402015	1.5	0.75	3	42	4
DB402020	2	1	3	42	6
DB402025	2.5	1.25	3	42	6
DB402030	3	1.5	4	50	6
DB402035	3.5	1.75	4	50	6
DB402040	4	2	5	50	6
DB402045	4.5	2.25	5	50	6
DB402050	5	2.5	6	50	6
DB402055	5.5	2.75	6	50	6
DB402060	6	3	7	50	6
DB402070	7	3.5	8	60	8
DB402080	8	4	9	60	8
DB402090	9	4.5	10	70	10
DB402100	10	5	11	70	10
DB402120	12	6	12	75	12
DB402140	14	7	14	80	14
DB402160	16	8	16	82	16
DB402200	20	10	20	100	20

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

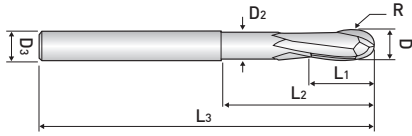
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, 15° HELIX STUB CUT LENGTH, BALL NOSE with EXTENDED NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Suitable for copy milling.

## DB412 ...series



ULTRA FINE



HELIX



±0.01



A/TiN



p.968

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
DB412010	1	0.5	1	3	50	0.95	4
DB412015	1.5	0.75	2	5	50	1.4	4
DB412020	2	1	3	6	50	1.9	6
DB412030S	3	1.5	4	8	50	2.9	4
DB412030L					75		6
DB412040S	4	2	5	10	50	3.9	4
DB412040L					75		6
DB412050	5	2.5	5	10	50	4.9	6
DB412060S	6	3	6	12	50	5.9	6
DB412060L				16	100		
DB412080	8	4	8	16	60	7.9	8
DB412080L				25	100		
DB412100	10	5	10	20	70	9.9	10
DB412100L				30	100		

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

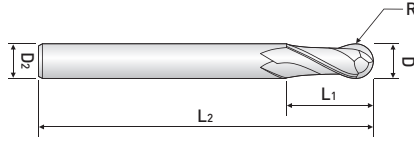
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Suitable for copy milling

## DB512 ...series



ULTRA FINE



HELIX



±0.01



p.972

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
DB512010S4	1	0.5	3	50	4
DB512010					6
DB512015	1.5	0.75	4	50	6
DB512020S4	2	1	5	60	4
DB512020					6
DB512025	2.5	1.25	6	60	6
DB512030S4	3	1.5	8	70	4
DB512030					6
DB512035	3.5	1.75	8	70	6
DB512040S4	4	2	8	70	4
DB512040					6
DB512045	4.5	2.25	10	70	6
DB512050	5	2.5	12	80	6
DB512055	5.5	2.75	12	80	6
DB512060	6	3	12	90	6
DB512065	6.5	3.25	12	90	8
DB512070	7	3.5	15	90	8
DB512080	8	4	15	100	8
DB512090	9	4.5	20	100	10
DB512100	10	5	20	100	10
DB512101			25	150	
DB512110	11	5.5	25	110	12
DB512120	12	6	25	110	12
DB512121			30	150	
DB512122			35	200	
DB512130	13	6.5	30	110	14
DB512140	14	7	30	110	14
DB512150	15	7.5	35	140	16
DB512160	16	8	35	140	16
DB512161			40	200	
DB512162			45	250	
DB512180	18	9	40	150	18
DB512200	20	10	40	160	20
DB512201			45	200	
DB512202			50	250	
DB512250	25	12.5	50	180	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

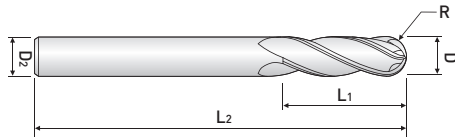
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Suitable for copy milling

## DB514 ...series



ULTRA FINE



HELIX



±0.01



AVTiN



p.973

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
DB514030	3	1.5	8	70	6
DB514040	4	2	8	70	6
DB514050	5	2.5	10	80	6
DB514060	6	3	12	90	6
DB514070	7	3.5	15	90	8
DB514080	8	4	15	100	8
DB514090	9	4.5	20	100	10
DB514100	10	5	20	100	10
DB514110	11	5.5	25	110	12
DB514120	12	6	25	110	12
DB514130	13	6.5	30	110	14
DB514140	14	7	30	110	14
DB514150	15	7.5	35	140	16
DB514160	16	8	35	140	16
DB514180	18	9	40	150	18
DB514200	20	10	40	160	20
DB514250	25	12.5	50	180	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

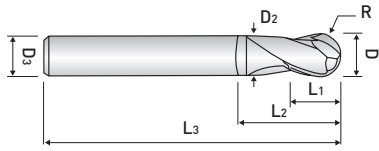
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, STUB CUT LENGTH, BALL NOSE with EXTENDED NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Suitable for copy milling
- Designed to high strength

## DB502 ...series



ULTRA FINE



HELIX



p.972

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
DB502010	1	0.5	1	3	50	0.95	6
DB502015	1.5	0.75	1.5	4	50	1.45	6
DB502020	2	1	2	6	60	1.9	6
DB502030	3	1.5	4	9	70	2.85	6
DB502040	4	2	5	12	70	3.85	6
DB502050	5	2.5	6	15	80	4.7	6
DB502060	6	3	7	18	90	5.7	6
DB502080	8	4	10	24	90	7.7	8
DB502100	10	5	12	30	100	9.5	10
DB502120	12	6	14	36	110	11.5	12

Endmills for high speed &amp; general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

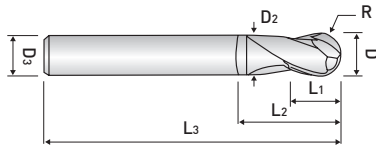
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, EXTENDED NECK-LONG SHANK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Suitable for copy milling
- Suitable for deep copy milling with long neck type

## DB522 ...series



ULTRA FINE



HELIX



p.972

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
DB522030	3	1.5	4	35	100	2.9	6
DB522040	4	2	6	35	100	3.9	6
DB522050	5	2.5	7	40	115	4.9	6
DB522060	6	3	8	45	115	5.9	6
DB522061							8
DB522070	7	3.5	10	45	125	6.9	8
DB522080	8	4	12	55	125	7.9	8
DB522081							10
DB522090	9	4.5	15	65	140	8.9	10
DB522100	10	5	15	65	140	9.9	10
DB522120	12	6	18	75	150	11.9	12
DB522140	14	7	23	75	155	13.9	14
DB522160	16	8	30	75	155	15.9	16

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

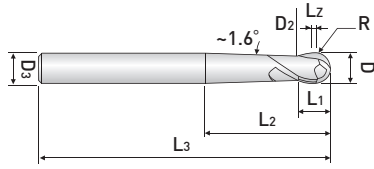
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, MMC-SPHERE TYPE

- For copy milling & steep sloped machining in mold & die
- ALTiN coated for high wear resistance

## DB532 ...series



ULTRA FINE



HELIX



p.974

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	L <sub>z</sub>
DB532030	3	1.5	4	30	80	2.5	6	1.5
DB532031			2.3					-
DB532040	4	2	5	30	80	3.3	6	1.5
DB532041			3.1					-
DB532050	5	2.5	6	43	80	4.1	6	2
DB532051			3.9	38				-
DB532060	6	3	7	30	100	4.7	6	2
DB532061			4.9	28				-
DB532080	8	4	9	36	100	6.5	8	3
DB532081			6.3	33				-
DB532100	10	5	11	43	100	8.2	10	3
DB532101			7.9	40				-
DB532120	12	6	13	52	100	9.8	12	3
DB532121			9.5	49				-
DB532160	16	8	15	61	150	13.4	16	3
DB532161			12.4	59				-

Endmills for high speed &amp; general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

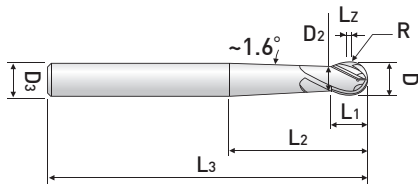
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, MMC-SPHERE TYPE

- For copy milling & Steep sloped machining in Mold & Die
- ALTiN coated for high wear resistance

## DB534 ...series



ULTRA FINE



HELIX



±0.01



ALTiN



p.975

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	L <sub>z</sub>
DB534050	5	2.5	6	43	80	4.1	6	2
DB534051			3.9	38				-
DB534060	6	3	7	30	100	4.7	6	2
DB534061			4.9	28				-
DB534080	8	4	9	36	100	6.5	8	3
DB534081			6.3	33				-
DB534100	10	5	11	43	100	8.2	10	3
DB534101			7.9	40				-
DB534120	12	6	13	52	100	9.8	12	3
DB534121			9.5	49				-
DB534160	16	8	15	61	150	13.4	16	3
DB534161			12.4	59				-

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

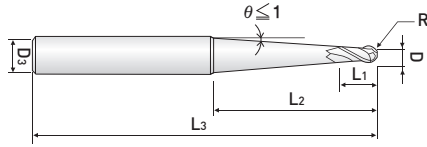
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, BALL NOSE with TAPER NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Suitable for copy milling
- Suitable for deep copy milling with taper long neck type

## DB54(5)2 ...series



ULTRA FINE



HELIX



p.972

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
DB542020	2	1.0	3	63	110	6
DB552020			5	85	155	
DB542030	3	1.5	5	65	110	6
DB552030			7	87	155	
DB542040	4	2.0	7	67	110	6
DB552040			10	90	155	8
DB542050	5	2.5	10	70	110	6
DB552050			15	95	155	8
DB542060	6	3.0	18	78	155	10
DB552060			20	110	200	
DB542080	8	4.0	30	100	155	12
DB552080				120	200	
DB542100	10	5.0	40	100	155	12
DB552100				120	200	
DB542120	12	6.0	50	110	155	16
DB552120				130	200	

Endmills for high speed &amp; general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

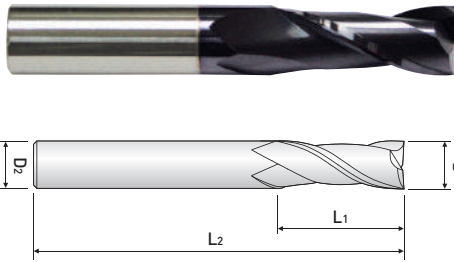
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZE502 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE502010S4	1	3	42	4
ZE502010				6
ZE502015	1.5	4	42	6
ZE502020S4				4
ZE502020	2	6	42	6
ZE502025				6
ZE502030S4	2.5	8	42	6
ZE502030				4
ZE502035	3	10	50	6
ZE502040S4				4
ZE502040	3.5	10	50	6
ZE502045				4
ZE502050	4	12	50	6
ZE502055				6
ZE502060	4.5	14	50	6
ZE502065				6
ZE502070	5	15	50	6
ZE502075				6
ZE502080	5.5	15	50	6
ZE502085				6
ZE502090	6	15	50	6
ZE502095				6
ZE502100	6.5	18	60	8
ZE502105				8
ZE502110	7	20	60	8
ZE502115				8
ZE502120	7.5	20	60	8
ZE502125S12				8
ZE502130S12	8	20	60	8
ZE502130				8
ZE502130S16	8.5	23	70	10
ZE502140				10
ZE502140S16	9	25	70	10
ZE502150				10
ZE502160	9.5	25	70	10
ZE502170				10
ZE502180	10	25	70	10
ZE502190				10
ZE502200	10.5	28	75	12
ZE502220				12
ZE502240	11	30	75	12
ZE502250				12
ZE502250	11.5	30	75	12
ZE502250				12
ZE502250	12	30	80	12
ZE502250				12
ZE502250	12.5	30	80	12
ZE502250				12
ZE502250	13	30	80	12
ZE502250				12
ZE502250	13	35	85	14
ZE502250			90	16
ZE502250	14	35	85	14
ZE502250			90	16
ZE502250	15	40	90	16
ZE502250			90	16
ZE502250	16	40	90	16
ZE502250			90	16
ZE502250	17	40	100	16
ZE502250			100	16
ZE502250	18	45	100	18
ZE502250			100	18
ZE502250	19	45	100	20
ZE502250			100	20
ZE502250	20	45	100	20
ZE502250			100	20
ZE502250	22	45	100	20
ZE502250			100	20
ZE502250	24	50	120	25
ZE502250			120	25
ZE502250	25	50	120	25
ZE502250			120	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

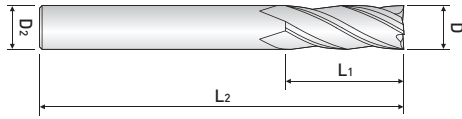
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZE504 ...series



ULTRA FINE



HELIX



A/TiN



7832

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE504010	1	2.5	42	6
ZE504015	1.5	4	42	6
ZE504020S4	2	6	42	4
ZE504020				6
ZE504025	2.5	8	42	6
ZE504030S4	3	10	50	4
ZE504030				6
ZE504035	3.5	10	50	6
ZE504040S4	4	12	50	4
ZE504040				6
ZE504045	4.5	14	50	6
ZE504050	5	15	50	6
ZE504055	5.5	15	50	6
ZE504060	6	15	50	6
ZE504065	6.5	18	60	8
ZE504070	7	20	60	8
ZE504075	7.5	20	60	8
ZE504080	8	20	60	8
ZE504085	8.5	23	70	10
ZE504090	9	25	70	10
ZE504095	9.5	25	70	10
ZE504100	10	25	70	10
ZE504105	10.5	28	75	12
ZE504110	11	30	75	12
ZE504115	11.5	30	75	12
ZE504120	12	30	75	12
ZE504125S12	12.5	30	80	12
ZE504130S12	13	30	80	12
ZE504130		35	85	14
ZE504130S16			90	16
ZE504140	14	35	85	14
ZE504140S16			90	16
ZE504150	15	40	90	16
ZE504160	16	40	90	16
ZE504170	17	40	100	16
ZE504180	18	45	100	18
ZE504190	19	45	100	20
ZE504200	20	45	100	20
ZE504220	22	45	100	20
ZE504240	24	50	120	25
ZE504250	25	50	120	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

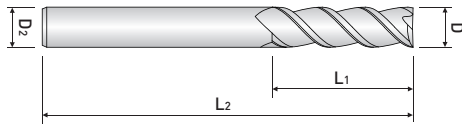
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 3 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZE503 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE503060	6	15	50	6
ZE503070	7	18	60	8
ZE503080	8	18	60	8
ZE503090	9	22	70	10
ZE503100	10	22	70	10
ZE503110	11	26	75	12
ZE503120	12	26	75	12
ZE503130	13	32	85	14
ZE503140	14	32	85	14
ZE503150	15	35	90	16
ZE503160	16	35	90	16
ZE503180	18	40	100	18
ZE503200	20	40	100	20
ZE503250	25	50	120	25
ZE503320	32	70	150	32

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

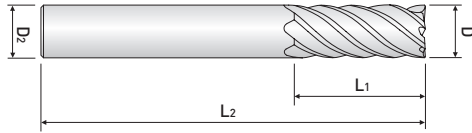
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 6 FLUTE, REGULAR & LONG LENGTH

- Designed for highly hardened materials up to HRC 55
- Suitable for high speed & finishing machining

## ZE506 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE506060	6	15	50	6
ZE506061		26	70	
ZE506070	7	18	60	8
ZE506080	8	18	60	8
ZE506081		36	90	
ZE506090	9	22	70	10
ZE506100	10	22	70	10
ZE506101		46	100	
ZE506110	11	26	75	12
ZE506120	12	26	75	12
ZE506121		56	110	
ZE506130	13	32	85	14
ZE506140	14	32	85	14
ZE506150	15	35	90	16
ZE506160	16	35	90	16
ZE506161		66	130	
ZE506180	18	44	100	18
ZE506200	20	44	100	20
ZE506201		76	150	
ZE506250	25	50	120	25
ZE506251		92	180	
ZE506320	32	70	150	32

Endmills for high speed &amp; general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

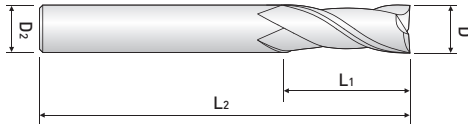
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, MEDIUM LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZM502 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZM502020	2	8	40	4
ZM502030	3	12	50	6
ZM502040	4	15	50	6
ZM502050	5	20	60	6
ZM502060	6	20	60	6
ZM502080	8	25	70	8
ZM502100	10	30	90	10
ZM502120	12	30	90	12
ZM502140	14	40	110	16
ZM502160	16	50	110	16
ZM502180	18	50	110	20
ZM502200	20	55	110	20
ZM502250	25	75	140	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

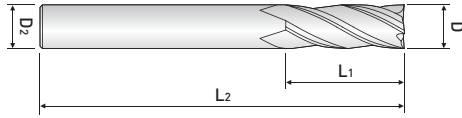
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, MEDIUM LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZM504 ...series



ULTRA FINE



HELIX



p.942

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZM504020	2	8	40	4
ZM504030	3	12	50	6
ZM504040	4	15	50	6
ZM504050	5	20	60	6
ZM504060	6	20	60	6
ZM504080	8	25	70	8
ZM504100	10	30	90	10
ZM504120	12	30	90	12
ZM504140	14	40	110	16
ZM504160	16	50	110	16
ZM504180	18	50	110	20
ZM504200	20	55	110	20
ZM504250	25	75	140	25

Endmills for high speed &amp; general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

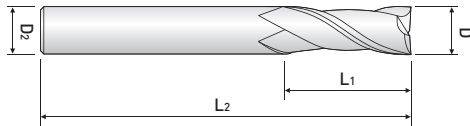
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, MEDIUM CUT LONG SHANK TYPE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZM522 ...series



ULTRA FINE



HELIX



p.982

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZM522030	3	10	70	6
ZM522040	4	12	70	6
ZM522050	5	15	80	6
ZM522060	6	15	80	6
ZM522080	8	20	100	8
ZM522100	10	25	100	10
ZM522120	12	30	110	12
ZM522160	16	40	125	16
ZM522200	20	45	150	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

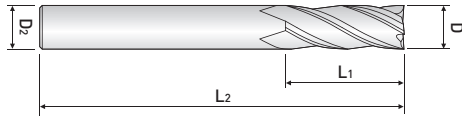
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, MEDIUM CUT LONG SHANK TYPE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZM524 ...series



ULTRA FINE



HELIX



p.982

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZM524030	3	10	70	6
ZM524040	4	12	70	6
ZM524050	5	15	80	6
ZM524060	6	15	80	6
ZM524080	8	20	100	8
ZM524100	10	25	100	10
ZM524120	12	30	110	12
ZM524160	16	40	125	16
ZM524200	20	45	150	20

Endmills for high speed &amp; general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

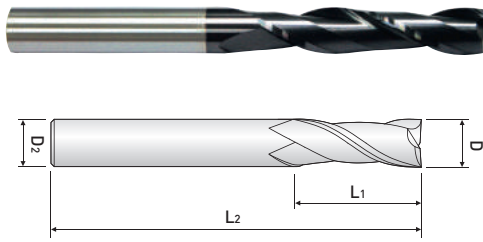
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

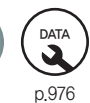
# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZE522 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE522030	3	25	75	6
ZE522040	4	25	75	6
ZE522050	5	30	80	6
ZE522060	6	30	80	6
ZE522070	7	35	85	8
ZE522080	8	35	85	8
ZE522090	9	45	100	10
ZE522100	10	45	100	10
ZE522101		60	155	
ZE522110	11	50	110	12
ZE522120	12	55	120	12
ZE522121		65	155	
ZE522140	14	60	120	14
ZE522160	16	60	120	16
ZE522161		75	165	
ZE522180	18	60	120	18
ZE522200	20	60	120	20
ZE522201		75	165	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

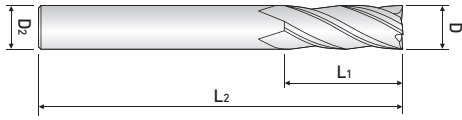
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZE524 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE524030	3	25	75	6
ZE524040	4	25	75	6
ZE524050	5	30	80	6
ZE524060	6	30	80	6
ZE524070	7	35	85	8
ZE524080	8	35	85	8
ZE524090	9	45	100	10
ZE524100	10	45	100	10
ZE524110	11	50	110	12
ZE524120	12	55	120	12
ZE524140	14	60	120	14
ZE524160	16	60	120	16
ZE524180	18	60	120	18
ZE524200	20	60	120	20

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

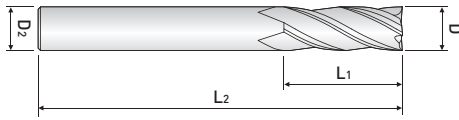
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, EXTRA LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes

## ZE534 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE534040	4	30	130	6
ZE534050	5	35	130	6
ZE534060	6	40	130	6
ZE534061		50	155	
ZE534081	8	60	155	8
ZE534082		80	200	
ZE534101	10	60	155	10
ZE534102		80	200	
ZE534121	12	60	155	12
ZE534122		80	200	
ZE534161	16	80	155	16
ZE534162		100	200	
ZE534163		120	250	
ZE534201	20	80	165	20
ZE534202		100	200	
ZE534203		130	250	
ZE534252	25	100	200	25
ZE534253		150	250	

※ Please reduce cutting speed around 20~30% from the above table for ZE534 series.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

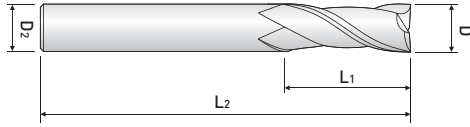
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, 35° HELIX REGULAR LENGTH

- Designed for high hardened materials up to HRC 62
- Suitable for high speed machining

## ZE512 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE512010	1	3	40	6
ZE512015	1.5	4	40	6
ZE512020	2	5	40	6
ZE512025	2.5	6	40	6
ZE512030	3	8	45	6
ZE512035	3.5	10	45	6
ZE512040	4	10	45	6
ZE512045	4.5	11	45	6
ZE512050	5	13	50	6
ZE512055	5.5	13	50	6
ZE512060	6	13	50	6
ZE512065	6.5	16	60	8
ZE512070	7	18	60	8
ZE512080	8	19	60	8
ZE512100	10	22	70	10
ZE512120	12	26	75	12

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

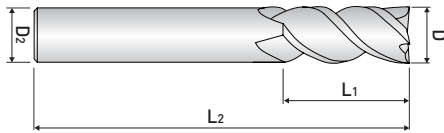
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, 45° HELIX REGULAR LENGTH

- Designed for high hardened materials up to HRc 62
- Suitable for high speed machining

## ZE514 ...series



ULTRA FINE



HELIX



A/TiN



p.978

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE514020	2	5	40	6
ZE514025	2.5	6	40	6
ZE514030	3	8	45	6
ZE514040	4	10	45	6
ZE514050	5	13	50	6
ZE514060	6	13	50	6
ZE514080	8	19	60	8
ZE514100	10	22	70	10
ZE514120	12	26	75	12

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

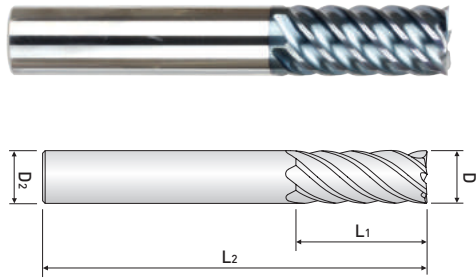
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 6 FLUTE, 50° HELIX REGULAR LENGTH

- Designed for high hardened materials up to HRC 62
- Suitable for high speed machining

## ZE516 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE516060	6	13	50	6
ZE516080	8	18	60	8
ZE516100	10	22	70	10
ZE516120	12	26	75	12
ZE516160	16	35	90	16
ZE516200	20	44	100	20

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

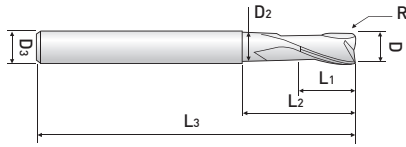
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes
- Increased feed rate

## ZR502 ...series



ULTRA FINE



HELIX

R  
±0.02

A/TiN



p.983

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZR5020405	4	0.5	6	10	55	3.7	6
ZR5020410		1					
ZR5020605	6	0.5	8	15	55	5.7	6
ZR5020610		1					
ZR5020805	8	0.5	10	20	65	7.7	8
ZR5020810		1					
ZR5020815		1.5					
ZR5020820		2					
ZR5021005	10	0.5	12	28	80	9.5	10
ZR5021010		1					
ZR5021015		1.5					
ZR5021020		2					
ZR5021205	12	0.5	15	30	82	11.5	12
ZR5021210		1					
ZR5021215		1.5					
ZR5021220		2					

Endmills for high speed &amp; general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

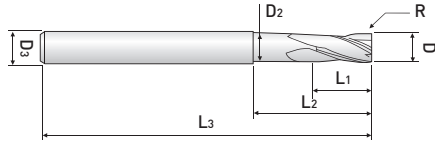
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes
- Increased feed rate

## ZR504 ...series



ULTRA FINE



HELIX



p.984

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZR5040405	4	0.5	6	10	55	3.7	6
ZR5040410		1					
ZR5040605	6	0.5	8	15	55	5.7	6
ZR5040610		1					
ZR5040805	8	0.5	10	20	65	7.7	8
ZR5040810		1					
ZR5040815		1.5					
ZR5040820		2					
ZR5041005	10	0.5	12	28	80	9.7	10
ZR5041010		1					
ZR5041015		1.5					
ZR5041020		2					
ZR5041205	12	0.5	15	30	82	11.7	12
ZR5041210		1					
ZR5041215		1.5					
ZR5041220		2					

Endmills for high speed &amp; general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

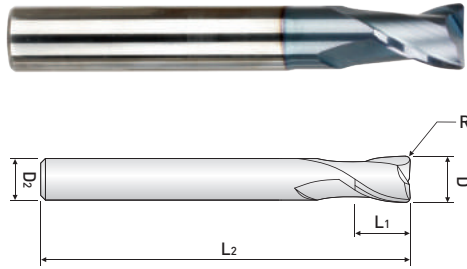
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

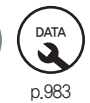
# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, REGULAR LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes
- Increased feed rate

## ZR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZR5120605	6	0.5	15	55	6
ZR5120610		1			
ZR5120805	8	0.5	20	65	8
ZR5120810		1			
ZR5120815		1.5			
ZR5120820		2			
ZR5121005	10	0.5	25	80	10
ZR5121010		1			
ZR5121015		1.5			
ZR5121020		2			
ZR5121025		2.5			
ZR5121030	3				
ZR5121205	12	0.5	30	82	12
ZR5121210		1			
ZR5121215		1.5			
ZR5121220		2			
ZR5121225		2.5			
ZR5121230	3				
ZR5121605	16	0.5	40	100	16
ZR5121610		1			
ZR5121615		1.5			
ZR5121620		2			
ZR5121630	3				
ZR5122005	20	0.5	45	110	20
ZR5122010		1			
ZR5122015		1.5			
ZR5122020		2			
ZR5122030		3			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

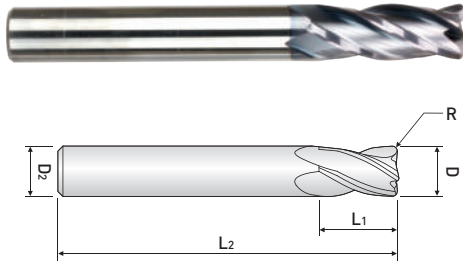
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, REGULAR LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes
- Increased feed rate

## ZR514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZR5140605	6	0.5	15	55	6
ZR5140610		1			
ZR5140805	8	0.5	20	65	8
ZR5140810		1			
ZR5140815		1.5			
ZR5140820		2			
ZR5141005	10	0.5	25	80	10
ZR5141010		1			
ZR5141015		1.5			
ZR5141020		2			
ZR5141025		2.5			
ZR5141030	3				
ZR5141205	12	0.5	30	82	12
ZR5141210		1			
ZR5141215		1.5			
ZR5141220		2			
ZR5141225		2.5			
ZR5141230	3				
ZR5141605	16	0.5	40	100	16
ZR5141610		1			
ZR5141615		1.5			
ZR5141620		2			
ZR5141630	3				
ZR5142005	20	0.5	45	110	20
ZR5142010		1			
ZR5142015		1.5			
ZR5142020		2			
ZR5142030		3			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

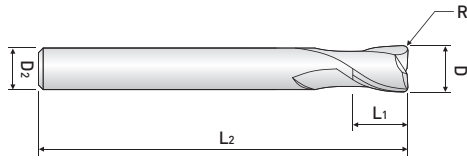
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 2 FLUTE, LONG LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes
- Increased feed rate

## ZR522 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZR5220302S4	3	0.2	8	60	4
ZR5220302					6
ZR5220305S4		0.5			4
ZR5220305					6
ZR5220402S4	4	0.2	11	70	4
ZR5220402		0.2			6
ZR5220405S4		0.5			4
ZR5220405		0.5			6
ZR5220410S4		1			4
ZR5220410		1			6
ZR5220502	5	0.2	13	80	6
ZR5220505		0.5			
ZR5220510		1			
ZR5220602	6	0.2	13	90	6
ZR5220605		0.5			
ZR5220610		1			
ZR5220805	8	0.5	19	100	8
ZR5220810		1			
ZR5220815		1.5			
ZR5220820		2			
ZR5221005	10	0.5	22	100	10
ZR5221010		1			
ZR5221015		1.5			
ZR5221020		2			
ZR5221025		2.5			
ZR5221205	12	0.5	26	110	12
ZR5221210		1			
ZR5221215		1.5			
ZR5221220		2			
ZR5221225		2.5			
ZR5221230		3			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

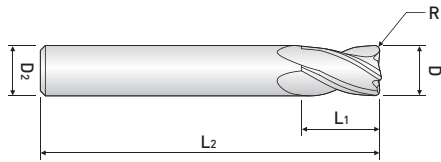
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, LONG LENGTH, CORNER RADIUS

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Superior workpiece finishes
- Increased feed rate

## ZR524 ...series



ULTRA FINE



HELIX



p.984

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZR5240302S4	3	0.2	8	60	4
ZR5240302					6
ZR5240305S4		0.5			4
ZR5240305					6
ZR5240402S4	4	0.2	11	70	4
ZR5240402					6
ZR5240405S4		0.5			4
ZR5240405					6
ZR5240410S4	1	4			
ZR5240410		6			
ZR5240502	5	0.2	13	80	6
ZR5240505		0.5			
ZR5240510		1			
ZR5240602	6	0.2	13	90	6
ZR5240605		0.5			
ZR5240610		1			
ZR5240805	8	0.5	19	100	8
ZR5240810		1			
ZR5240815		1.5			
ZR5240820		2			
ZR5241005	10	0.5	22	100	10
ZR5241010		1			
ZR5241015		1.5			
ZR5241020		2			
ZR5241025		2.5			
ZR5241205	12	0.5	26	110	12
ZR5241210		1			
ZR5241215		1.5			
ZR5241220		2			
ZR5241225		2.5			
ZR5241230		3			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

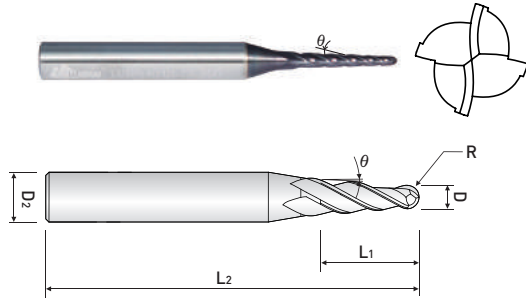
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※:Items can be changed for quality improvement without notice.

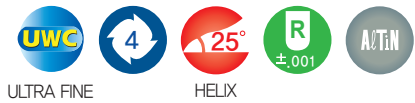
# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## TPRB604A ....05series



EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.
TPRB604A-0030-05	.030	.015	30'	.210	3	3/16
TPRB604A-0040-05	.040	.020	30'	.280	3	3/16
TPRB604A-0050-05	.050	.025	30'	.350	3	3/16
TPRB604A-0060-05	.060	.030	30'	.420	3	3/16
TPRB604A-0070-05	.070	.035	30'	.490	3	3/16
TPRB604A-0080-05	.080	.040	30'	.560	3	3/16
TPRB604A-0090-05	.090	.045	30'	.630	3	3/16
TPRB604A-0100-05	.100	.050	30'	.700	3	3/16
TPRB604A-0125-05	.125	.0625	30'	.875	3	3/16

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

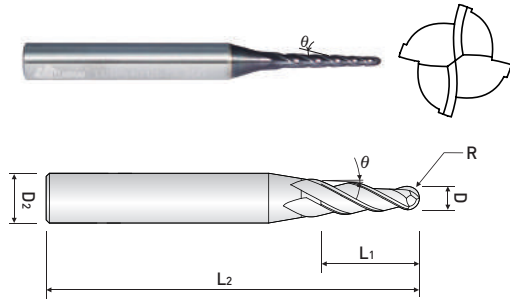
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

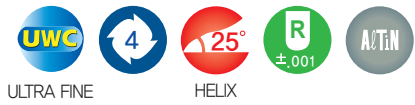
# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## TPRB604A ....10series



EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.
TPRB604A-0030-10	.030	.015	1°	.210	3	3/16
TPRB604A-0040-10	.040	.020	1°	.280	3	3/16
TPRB604A-0050-10	.050	.025	1°	.350	3	3/16
TPRB604A-0060-10	.060	.030	1°	.420	3	3/16
TPRB604A-0070-10	.070	.035	1°	.490	3	3/16
TPRB604A-0080-10	.080	.040	1°	.560	3	3/16
TPRB604A-0090-10	.090	.045	1°	.630	3	3/16
TPRB604A-0100-10	.100	.050	1°	.700	3	3/16
TPRB604A-0125-10	.125	.0625	1°	.875	3	3/16

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

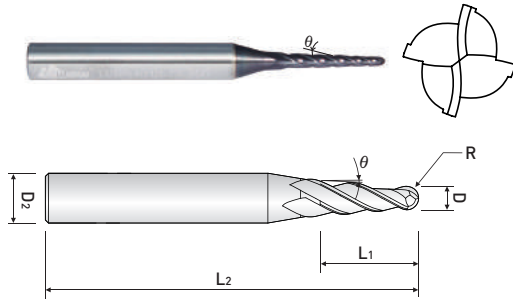
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

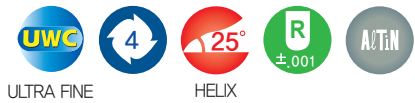
# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## TPRB604A ....15series



EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.
TPRB604A-0030-05	.030	.015	1° 30'	.210	3	3/16
TPRB604A-0040-05	.040	.020	1° 30'	.280	3	3/16
TPRB604A-0050-05	.050	.025	1° 30'	.350	3	3/16
TPRB604A-0060-05	.060	.030	1° 30'	.420	3	3/16
TPRB604A-0070-05	.070	.035	1° 30'	.490	3	3/16
TPRB604A-0080-05	.080	.040	1° 30'	.560	3	3/16
TPRB604A-0090-05	.090	.045	1° 30'	.630	3	3/16
TPRB604A-0100-05	.100	.050	1° 30'	.700	3	3/16
TPRB604A-0125-05	.125	.0625	1° 30'	.875	3	3/16

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

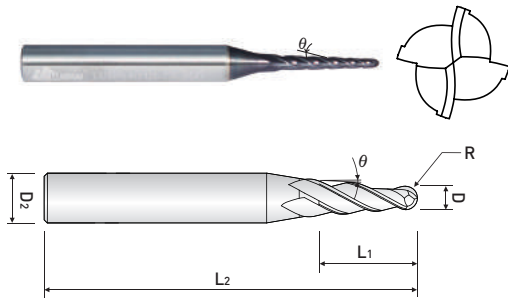
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## TPRB604A ....20series



EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.
TPRB604A-0030-20	.030	.015	2°	.210	3	3/16
TPRB604A-0040-20	.040	.020	2°	.280	3	3/16
TPRB604A-0050-20	.050	.025	2°	.350	3	3/16
TPRB604A-0060-20	.060	.030	2°	.420	3	3/16
TPRB604A-0070-20	.070	.035	2°	.490	3	3/16
TPRB604A-0080-20	.080	.040	2°	.560	3	3/16
TPRB604A-0090-20	.090	.045	2°	.630	3	3/16
TPRB604A-0100-20	.100	.050	2°	.700	3	3/16
TPRB604A-0125-20	.125	.0625	2°	.875	3	3/16

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

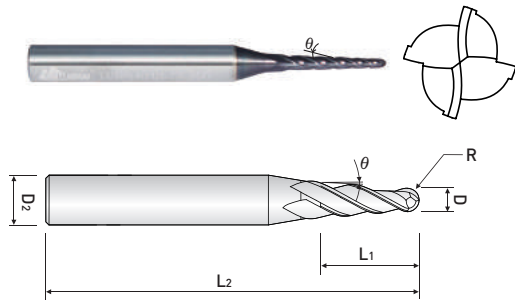
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

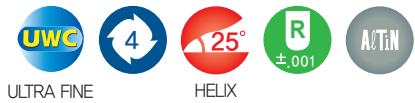
# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## TPRB604A ....30series



EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.
TPRB604A-0030-30	.030	.015	3°	.210	3	3/16
TPRB604A-0040-30	.040	.020	3°	.280	3	3/16
TPRB604A-0050-30	.050	.025	3°	.350	3	3/16
TPRB604A-0060-30	.060	.030	3°	.420	3	3/16
TPRB604A-0070-30	.070	.035	3°	.490	3	3/16
TPRB604A-0080-30	.080	.040	3°	.560	3	3/16
TPRB604A-0090-30	.090	.045	3°	.630	3	3/16
TPRB604A-0100-30	.100	.050	3°	.700	3	3/16
TPRB604A-0125-30	.125	.0625	3°	.875	3	3/16

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

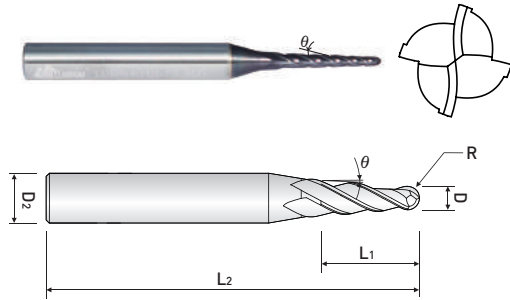
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

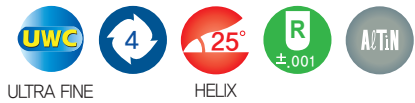
# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## TPRB624A ....05series



EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.
TPRB624A-0030-05	.030	.015	30'	.420	3	3/16
TPRB624A-0040-05	.040	.020	30'	.260	3	3/16
TPRB624A-0050-05	.050	.025	30'	.700	3	3/16
TPRB624A-0060-05	.060	.030	30'	.840	3	3/16
TPRB624A-0070-05	.070	.035	30'	.980	3	3/16
TPRB624A-0080-05	.080	.040	30'	1.120	3	3/16
TPRB624A-0090-05	.090	.045	30'	1.260	3	3/16
TPRB624A-0100-05	.100	.050	30'	1.400	3	3/16
TPRB624A-0125-05	.125	.0625	30'	1.750	3	3/16

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

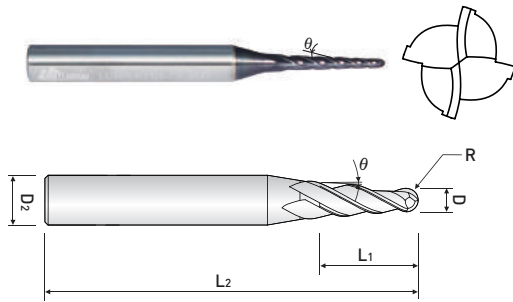
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

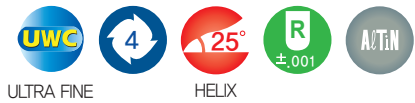
# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## TPRB624A ....10series



EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.
TPRB624A-0030-10	.030	.015	1°	.420	3	3/16
TPRB624A-0040-10	.040	.020	1°	.560	3	3/16
TPRB624A-0050-10	.050	.025	1°	.700	3	3/16
TPRB624A-0060-10	.060	.030	1°	.840	3	3/16
TPRB624A-0070-10	.070	.035	1°	.980	3	3/16
TPRB624A-0080-10	.080	.040	1°	1.120	3	3/16
TPRB624A-0090-10	.090	.045	1°	1.260	3	3/16
TPRB624A-0100-10	.100	.050	1°	1.400	3	3/16
TPRB624A-0125-10	.125	.0625	1°	1.750	3	3/16

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

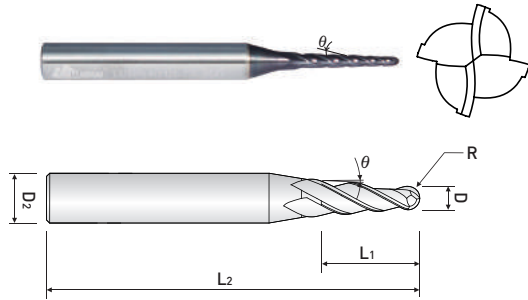
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

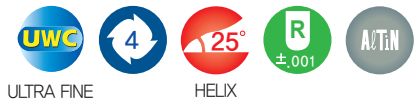
# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## TPRB624A ....15series



EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.
TPRB624A-0030-15	.030	.015	1°30'	.420	3	3/16
TPRB624A-0040-15	.040	.020	1°30'	.260	3	3/16
TPRB624A-0050-15	.050	.025	1°30'	.700	3	3/16
TPRB624A-0060-15	.060	.030	1°30'	.840	3	3/16
TPRB624A-0070-15	.070	.035	1°30'	.980	3	3/16
TPRB624A-0080-15	.080	.040	1°30'	1.120	3	3/16
TPRB624A-0090-15	.090	.045	1°30'	1.260	3	3/16
TPRB624A-0100-15	.100	.050	1°30'	1.400	3	3/16
TPRB624A-0125-15	.125	.0625	1°30'	1.750	3	3/16

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

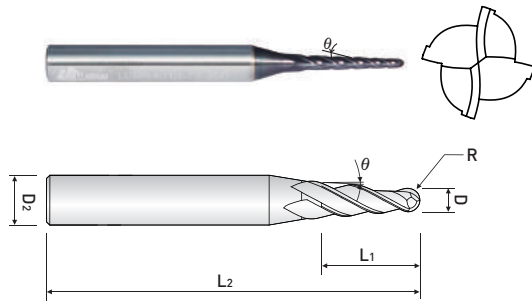
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

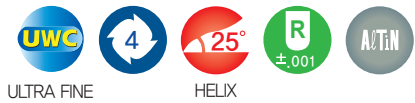
# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## TPRB624A ....20series



EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.
TPRB624A-0030-20	.030	.015	2°	.420	3	3/16
TPRB624A-0040-20	.040	.020	2°	.260	3	3/16
TPRB624A-0050-20	.050	.025	2°	.700	3	3/16
TPRB624A-0060-20	.060	.030	2°	.840	3	3/16
TPRB624A-0070-20	.070	.035	2°	.980	3	3/16
TPRB624A-0080-20	.080	.040	2°	1.120	3	3/16
TPRB624A-0090-20	.090	.045	2°	1.260	3	3/16
TPRB624A-0100-20	.100	.050	2°	1.400	3	3/16
TPRB624A-0125-20	.125	.0625	2°	1.750	3	3/16

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

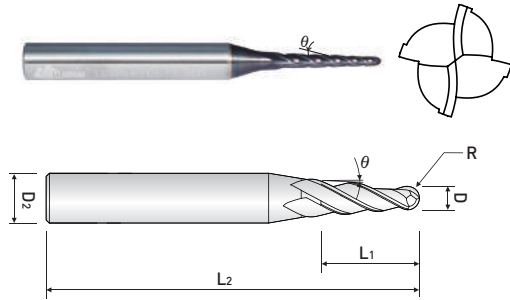
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER RIB BALL, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## TPRB624A ....30series



ULTRA FINE



HELIX



EDP. No.	D	R	$\theta$	C.L	OAL	SH.Dia.
TPRB624A-0030-30	.030	.015	3°	.420	3	3/16
TPRB624A-0040-30	.040	.020	3°	.260	3	3/16
TPRB624A-0050-30	.050	.025	3°	.700	3	3/16
TPRB624A-0060-30	.060	.030	3°	.840	3	3/16
TPRB624A-0070-30	.070	.035	3°	.980	3	3/16
TPRB624A-0080-30	.080	.040	3°	1.120	3	3/16
TPRB624A-0090-30	.090	.045	3°	1.260	3	3/16
TPRB624A-0100-30	.100	.050	3°	1.400	3	3/16
TPRB624A-0125-30	.125	.0625	3°	1.750	3	3/16

Endmills for high speed &amp; general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

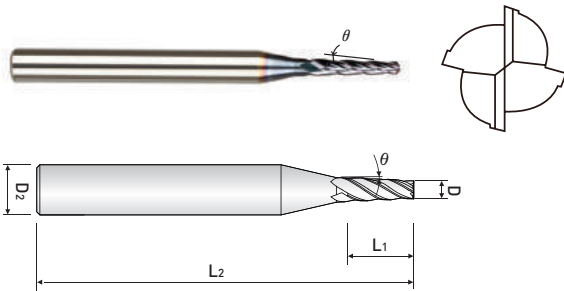
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER ENDMILLS

- Rigid taper end mill for highly productive rib processing

## TPRE604A ....05series



EDP. No.	D	$\theta$	C.L	OAL	SH.Dia.
TPRE4A604-0030-05	.030	30°	.210	3	3/16
TPRE4A604-0040-05	.040	30°	.280	3	3/16
TPRE4A604-0050-05	.050	30°	.350	3	3/16
TPRE4A604-0060-05	.060	30°	.420	3	3/16
TPRE4A604-0070-05	.070	30°	.490	3	3/16
TPRE4A604-0080-05	.080	30°	.560	3	3/16
TPRE4A604-0090-05	.090	30°	.630	3	3/16
TPRE4A604-0100-05	.100	30°	.700	3	3/16
TPRE4A604-0125-05	.125	30°	.875	3	3/16

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

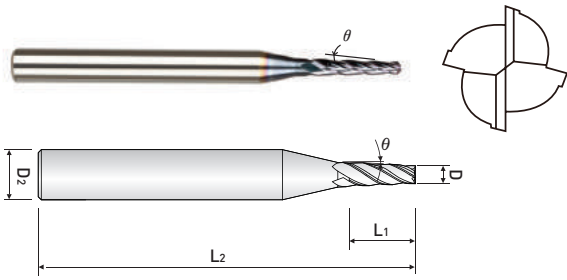
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER ENDMILLS

- Rigid taper end mill for highly productive rib processing

## TPRE604A ....10series



EDP. No.	D	$\theta$	C.L	OAL	SH.Dia.
TPRE4A604-0030-10	.030	1°	.210	3	3/16
TPRE4A604-0040-10	.040	1°	.280	3	3/16
TPRE4A604-0050-10	.050	1°	.350	3	3/16
TPRE4A604-0060-10	.060	1°	.420	3	3/16
TPRE4A604-0070-10	.070	1°	.490	3	3/16
TPRE4A604-0080-10	.080	1°	.560	3	3/16
TPRE4A604-0090-10	.090	1°	.630	3	3/16
TPRE4A604-0100-10	.100	1°	.700	3	3/16
TPRE4A604-0125-10	.125	1°	.875	3	3/16

Endmills for high speed & general cutting - ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

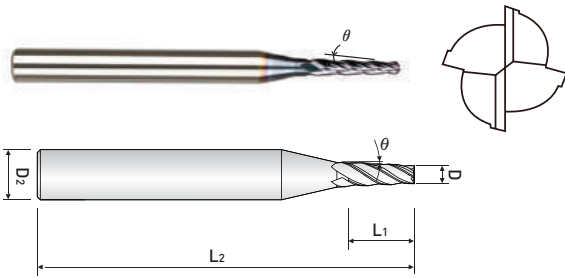
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER ENDMILLS

- Rigid taper end mill for highly productive rib processing

## TPRE604A ....15series



EDP. No.	D	$\theta$	C.L	OAL	SH.Dia.
TPRE4A604-0030-15	.030	1°30'	.210	3	3/16
TPRE4A604-0040-15	.040	1°30'	.280	3	3/16
TPRE4A604-0050-15	.050	1°30'	.350	3	3/16
TPRE4A604-0060-15	.060	1°30'	.420	3	3/16
TPRE4A604-0070-15	.070	1°30'	.490	3	3/16
TPRE4A604-0080-15	.080	1°30'	.560	3	3/16
TPRE4A604-0090-15	.090	1°30'	.630	3	3/16
TPRE4A604-0100-15	.100	1°30'	.700	3	3/16
TPRE4A604-0125-15	.125	1°30'	.875	3	3/16

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

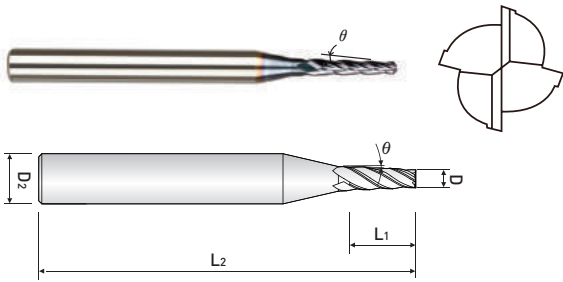
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER ENDMILLS

- Rigid taper end mill for highly productive rib processing

## TPRE604A ....20series



EDP. No.	D	$\theta$	C.L	OAL	SH.Dia.
TPRE4A604-0030-20	.030	2°	.210	3	3/16
TPRE4A604-0040-20	.040	2°	.280	3	3/16
TPRE4A604-0050-20	.050	2°	.350	3	3/16
TPRE4A604-0060-20	.060	2°	.420	3	3/16
TPRE4A604-0070-20	.070	2°	.490	3	3/16
TPRE4A604-0080-20	.080	2°	.560	3	3/16
TPRE4A604-0090-20	.090	2°	.630	3	3/16
TPRE4A604-0100-20	.100	2°	.700	3	3/16
TPRE4A604-0125-20	.125	2°	.875	3	3/16

Endmills for high speed & general cutting - ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

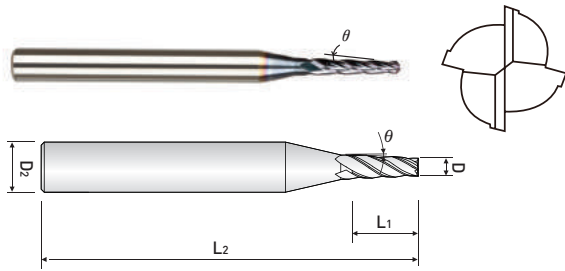
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE TAPER ENDMILLS

- Rigid taper end mill for highly productive rib processing

## TPRE604A ....30series



EDP. No.	D	$\theta$	C.L	OAL	SH.Dia.
TPRE4A604-0030-30	.030	3°	.210	3	3/16
TPRE4A604-0040-30	.040	3°	.280	3	3/16
TPRE4A604-0050-30	.050	3°	.350	3	3/16
TPRE4A604-0060-30	.060	3°	.420	3	3/16
TPRE4A604-0070-30	.070	3°	.490	3	3/16
TPRE4A604-0080-30	.080	3°	.560	3	3/16
TPRE4A604-0090-30	.090	3°	.630	3	3/16
TPRE4A604-0100-30	.100	3°	.700	3	3/16
TPRE4A604-0125-30	.125	3°	.875	3	3/16

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

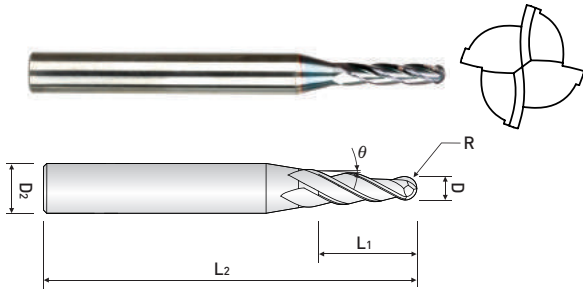
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -.0012	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series

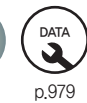


## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance : ±10'

## TPRB4.....-050 series



EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRB4006-04-050	0.3	30'	4	40	4
TPRB4006-06-050			6		
TPRB4008-06-050	0.4	30'	6	45	4
TPRB4008-08-050			8		
TPRB4008-10-050			10		
TPRB4010-06-050	0.5	30'	6	45	4
TPRB4010-08-050			8		
TPRB4010-10-050			10		
TPRB4010-12-050			12		
TPRB4010-16-050			16	50	
TPRB4012-06-050	0.6	30'	6	45	4
TPRB4012-08-050			8		
TPRB4012-10-050			10		
TPRB4012-12-050			12		
TPRB4012-16-050			16	50	
TPRB4015-08-050	0.75	30'	8	45	4
TPRB4015-10-050			10		
TPRB4015-12-050			12		
TPRB4015-16-050			16		
TPRB4015-20-050			20	55	
TPRB4016-08-050	0.8	30'	8	45	4
TPRB4016-10-050			10		
TPRB4016-12-050			12		
TPRB4016-16-050			16		
TPRB4016-20-050			20	55	
TPRB4018-08-050	0.9	30'	8	45	4
TPRB4018-10-050			10		
TPRB4018-12-050			12		
TPRB4018-16-050			16		
TPRB4018-20-050			20	55	
TPRB4020-10-050	1.0	30'	10	45	4
TPRB4020-12-050			12		
TPRB4020-16-050			16		
TPRB4020-20-050			20		
TPRB4020-25-050			25	55	
TPRB4025-10-050	1.25	30'	10	45	4
TPRB4025-12-050			12		
TPRB4025-16-050			16		
TPRB4025-20-050			20		
TPRB4025-25-050			25	55	

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

○:General Application ◎:The most suitable Application

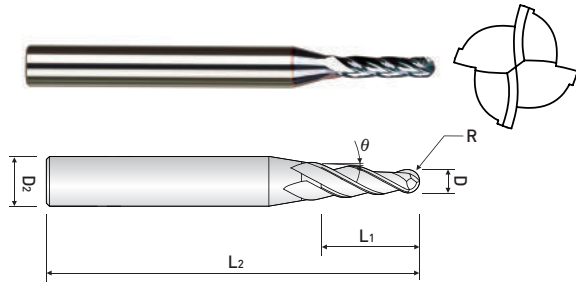
■ Tolerance

Radius (mm)	Shank Dia.
±0.01	h6

※:Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance : ±10'

## TPRB4.....-075 series



EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRB4006-04-075	0.3	45'	4	40	4
TPRB4006-06-075			6		
TPRB4008-06-075	0.4	45'	6	45	4
TPRB4008-08-075			8		
TPRB4008-10-075			10		
TPRB4010-08-075	0.5	45'	8	45	4
TPRB4010-10-075			10		
TPRB4010-12-075			12		
TPRB4012-08-075	0.6	45'	8	45	4
TPRB4012-10-075			10		
TPRB4012-12-075			12		
TPRB4012-16-075			16		
TPRB4015-08-075	0.75	45'	8	50	4
TPRB4015-10-075			10		
TPRB4015-12-075			12		
TPRB4015-16-075			16		
TPRB4015-20-075			20		
TPRB4016-08-075	0.8	45'	8	45	4
TPRB4016-10-075			10		
TPRB4016-12-075			12		
TPRB4016-16-075			16		
TPRB4016-20-075			20		
TPRB4018-08-075	0.9	45'	8	45	4
TPRB4018-10-075			10		
TPRB4018-12-075			12		
TPRB4018-16-075			16		
TPRB4018-20-075			20		
TPRB4020-10-075	1.0	45'	10	45	4
TPRB4020-12-075			12		
TPRB4020-16-075			16		
TPRB4020-20-075			20		
TPRB4020-25-075			25		
TPRB4025-10-075	1.25	45'	10	45	4
TPRB4025-12-075			12		
TPRB4025-16-075			16		
TPRB4025-20-075			20		
TPRB4025-25-075			25		

※ These tools are manufactured based on order received.

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		

○:General Application ◎:The most suitable Application

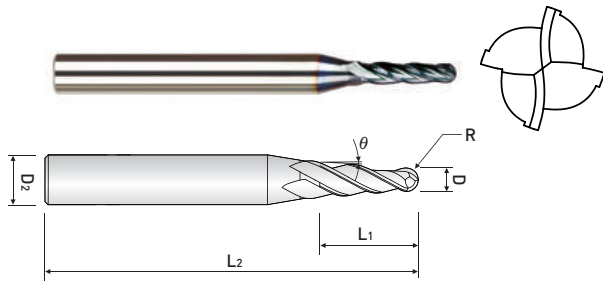
■ Tolerance

Radius (mm)	Shank Dia.
±0.01	h6

※:Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

## TPRB4.....-100 series

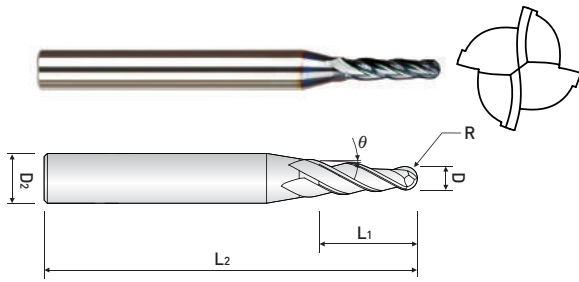


EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRB4006-04-100	0.3	1°00'	4	40	4
TPRB4006-06-100			6		
TPRB4008-06-100	0.4	1°00'	6	45	4
TPRB4008-08-100			8		
TPRB4008-10-100			10		
TPRB4010-06-100	0.5	1°00'	6	45	4
TPRB4010-08-100			8		
TPRB4010-10-100			10		
TPRB4010-12-100			12		
TPRB4010-16-100			16		
TPRB4012-06-100	0.6	1°00'	6	45	4
TPRB4012-08-100			8		
TPRB4012-10-100			10		
TPRB4012-12-100			12		
TPRB4012-16-100			16		
TPRB4015-08-100	0.75	1°00'	8	45	4
TPRB4015-10-100			10		
TPRB4015-12-100			12		
TPRB4015-16-100			16		
TPRB4015-20-100			20		
TPRB4016-08-100	0.8	1°00'	8	45	4
TPRB4016-10-100			10		
TPRB4016-12-100			12		
TPRB4016-16-100			16		
TPRB4016-20-100			20		
TPRB4018-08-100	0.9	1°00'	8	45	4
TPRB4018-10-100			10		
TPRB4018-12-100			12		
TPRB4018-16-100			16		
TPRB4018-20-100			20		

※ These tools are manufactured based on order received.

NEXT >>>

# Endmills for high speed & general cutting ZAMUS CLASSIC Series

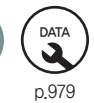


## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

## TPRB4.....-100 series



EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRB4020-10-100	1.0	1°00'	10	45	4
TPRB4020-12-100			12		
TPRB4020-16-100			16	50	
TPRB4020-20-100			20		
TPRB4020-25-100			25	55	
TPRB4025-10-100	1.25	1°00'	10	45	4
TPRB4025-12-100			12		
TPRB4025-16-100			16	50	
TPRB4025-20-100			20		
TPRB4025-25-100			25	55	

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

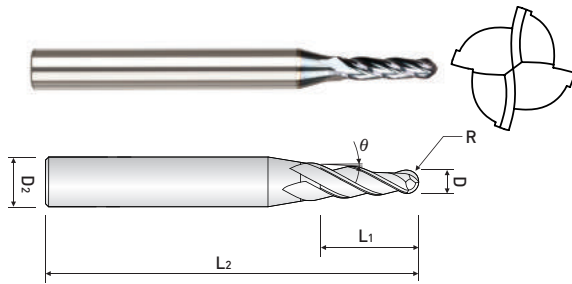
○:General Application ◎:The most suitable Application

### ■ Tolerance

Radius (mm)	Shank Dia.
$\pm 0.01$	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

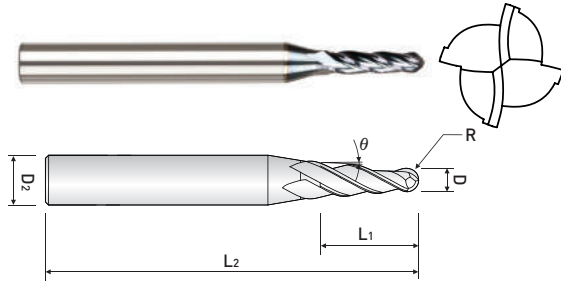
## TPRB4.....-150 series



EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRB4006-04-150	0.3	1°30'	4	40	4
TPRB4006-06-150			6		
TPRB4008-06-150	0.4	1°30'	6	45	4
TPRB4008-08-150			8		
TPRB4008-10-150			10		
TPRB4010-06-150	0.5	1°30'	6	45	4
TPRB4010-08-150			8		
TPRB4010-10-150			10		
TPRB4010-12-150			12		
TPRB4010-16-150			16		
TPRB4012-06-150	0.6	1°30'	6	45	4
TPRB4012-08-150			8		
TPRB4012-10-150			10		
TPRB4012-12-150			12		
TPRB4012-16-150			16		
TPRB4015-08-150	0.75	1°30'	8	45	4
TPRB4015-10-150			10		
TPRB4015-12-150			12		
TPRB4015-16-150			16		
TPRB4015-20-150			20		
TPRB4016-08-150	0.8	1°30'	8	45	4
TPRB4016-10-150			10		
TPRB4016-12-150			12		
TPRB4016-16-150			16		
TPRB4016-20-150			20		
TPRB4018-08-150	0.9	1°30'	8	45	4
TPRB4018-10-150			10		
TPRB4018-12-150			12		
TPRB4018-16-150			16		
TPRB4018-20-150			20		

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

## TPRB4.....-150 series



ULTRA FINE



HELIX



$\pm 0.01$



A/TiN



p.979

EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRB4020-10-150	1.0	1°30'	10	45	4
TPRB4020-12-150			12		
TPRB4020-16-150			16	50	
TPRB4020-20-150			20	55	
TPRB4020-25-150			25	60	
TPRB4020-30-150			30	60	
TPRB4025-10-150	1.25	1°30'	10	45	4
TPRB4025-12-150			12		
TPRB4025-16-150			16	50	
TPRB4025-20-150			20	55	
TPRB4025-25-150			25	60	
TPRB4025-30-150			30	60	

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

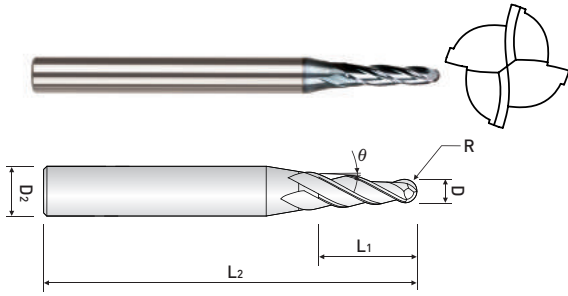
○:General Application ◎:The most suitable Application

### ■ Tolerance

Radius (mm)	Shank Dia.
$\pm 0.01$	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series

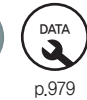


## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

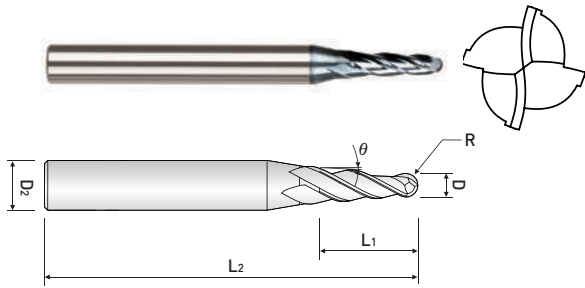
## TPRB4.....-200 series



EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRB4006-04-200	0.3	2°00'	4	40	4
TPRB4006-06-200			6		
TPRB4008-06-200	0.4	2°00'	6	45	4
TPRB4008-08-200			8		
TPRB4008-10-200			10		
TPRB4010-06-200	0.5	2°00'	6	45	4
TPRB4010-08-200			8		
TPRB4010-10-200			10		
TPRB4010-12-200			12		
TPRB4010-16-200			16		
TPRB4012-06-200	0.6	2°00'	6	45	4
TPRB4012-08-200			8		
TPRB4012-10-200			10		
TPRB4012-12-200			12		
TPRB4012-16-200			16		
TPRB4015-08-200	0.75	2°00'	8	45	4
TPRB4015-10-200			10		
TPRB4015-12-200			12		
TPRB4015-16-200			16		
TPRB4015-20-200			20		
TPRB4016-08-200	0.8	2°00'	8	45	4
TPRB4016-10-200			10		
TPRB4016-12-200			12		
TPRB4016-16-200			16		
TPRB4016-20-200			20		
TPRB4018-08-200	0.9	2°00'	8	45	4
TPRB4018-10-200			10		
TPRB4018-12-200			12		
TPRB4018-16-200			16		
TPRB4018-20-200			20		

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series

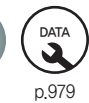


## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance : ±10'

## TPRB4.....-200 series



EDP. No.	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRB4020-10-200	1.0	2°00'	10	45	4
TPRB4020-12-200			12		
TPRB4020-16-200			16	50	
TPRB4020-20-200			20	55	
TPRB4020-25-200			25		
TPRB4020-30-200			30	60	
TPRB4025-10-200	1.25	2°00'	10	45	4
TPRB4025-12-200			12		
TPRB4025-16-200			16	50	
TPRB4025-20-200			20	55	
TPRB4025-25-200			25		
TPRB4025-30-200			30	60	

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

○:General Application ◎:The most suitable Application

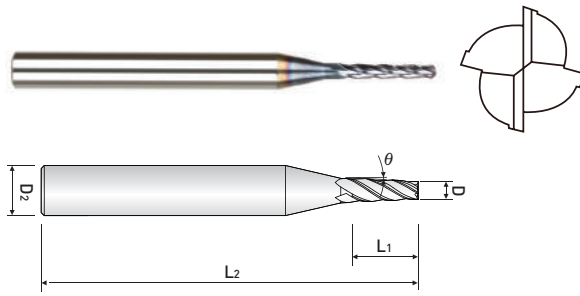
### ■ Tolerance

Radius (mm)	Shank Dia.
±0.01	h6

※:Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

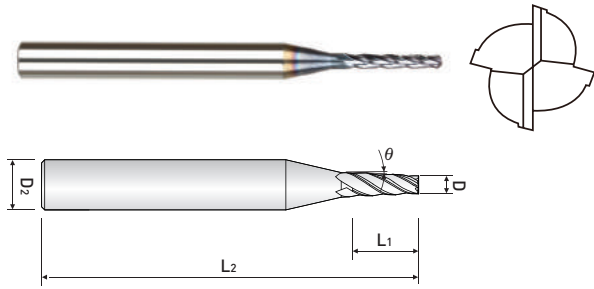
## TPRE4...-050 series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRE4004-02-050	0.4	30'	2	40	4
TPRE4004-03-050			3		
TPRE4004-04-050			4		
TPRE4005-02-050	0.5	30'	2	40	4
TPRE4005-04-050			4		
TPRE4005-06-050			6		
TPRE4006-04-050	0.6	30'	4	40	4
TPRE4006-06-050			6		
TPRE4007-06-050	0.7	30'	6	40	4
TPRE4007-08-050			8		
TPRE4008-06-050	0.8	30'	6	45	4
TPRE4008-08-050			8		
TPRE4008-10-050			10		
TPRE4009-06-050	0.9	30'	6	45	4
TPRE4009-08-050			8		
TPRE4009-10-050			10		
TPRE4010-06-050	1.0	30'	6	45	4
TPRE4010-08-050			8		
TPRE4010-10-050			10		
TPRE4010-12-050			12		
TPRE4010-16-050			16	50	
TPRE4012-06-050	1.2	30'	6	45	4
TPRE4012-08-050			8		
TPRE4012-10-050			10		
TPRE4012-12-050			12		
TPRE4012-16-050			16		
TPRE4014-08-050	1.4	30'	8	45	4
TPRE4014-12-050			12		
TPRE4014-16-050			16		

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance : ±10'

## TPRE4...-050 series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRE4015-08-050	1.5	30'	8	45	4
TPRE4015-10-050			10		
TPRE4015-12-050			12		
TPRE4015-16-050			16		
TPRE4015-20-050			20		
TPRE4016-08-050	1.6	30'	8	45	4
TPRE4016-10-050			10		
TPRE4016-12-050			12		
TPRE4016-16-050			16		
TPRE4016-20-050			20		
TPRE4018-08-050	1.8	30'	8	45	4
TPRE4018-10-050			10		
TPRE4018-12-050			12		
TPRE4018-16-050			16		
TPRE4018-20-050			20		
TPRE4020-10-050	2.0	30'	10	45	4
TPRE4020-12-050			12		
TPRE4020-16-050			16		
TPRE4020-20-050			20		
TPRE4020-25-050			25		
TPRE4025-10-050	2.5	30'	10	45	4
TPRE4025-12-050			12		
TPRE4025-16-050			16		
TPRE4025-20-050			20		
TPRE4025-25-050			25		
TPRE4025-30-050			30		

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

○:General Application ◎:The most suitable Application

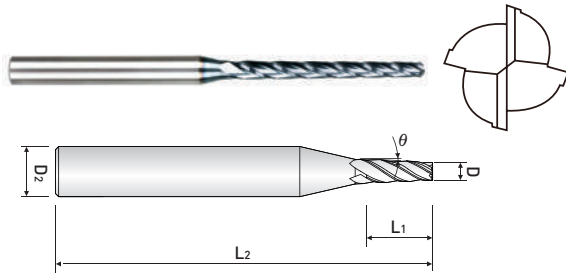
### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※:Items can be changed for quality improvement without notice.

Endmills for high speed & general cutting – ZAMUS CLASSIC Series

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

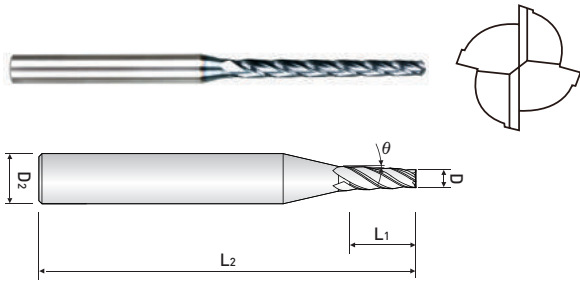
## TPRE4...-075 series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRE4004-02-075	0.4	45'	2	40	4
TPRE4004-03-075			3		
TPRE4004-04-075			4		
TPRE4005-04-075	0.5	45'	4	40	4
TPRE4005-06-075			6		
TPRE4006-04-075	0.6	45'	4	40	4
TPRE4006-06-075			6		
TPRE4007-06-075	0.7	45'	6	40	4
TPRE4007-08-075			8		
TPRE4008-06-075	0.8	45'	6	45	4
TPRE4008-08-075			8		
TPRE4008-10-075			10		
TPRE4009-06-075	0.9	45'	6	45	4
TPRE4009-08-075			8		
TPRE4009-10-075			10		
TPRE4010-08-075	1.0	45'	8	45	4
TPRE4010-10-075			10		
TPRE4010-12-075			12		
TPRE4012-08-075	1.2	45'	8	45	4
TPRE4012-10-075			10		
TPRE4012-12-075			12		
TPRE4012-16-075			16	50	
TPRE4015-08-075	1.5	45'	8	45	4
TPRE4015-10-075			10		
TPRE4015-12-075			12		
TPRE4015-16-075			16	50	
TPRE4015-20-075			20	55	

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-075 series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRE4016-08-075	1.6	45'	8	45	4
TPRE4016-10-075			10		
TPRE4016-12-075			12		
TPRE4016-16-075			16		
TPRE4016-20-075			20		
TPRE4018-08-075	1.8	45'	8	45	4
TPRE4018-10-075			10		
TPRE4018-12-075			12		
TPRE4018-16-075			16		
TPRE4018-20-075			20		
TPRE4020-10-075	2.0	45'	10	45	4
TPRE4020-12-075			12		
TPRE4020-16-075			16		
TPRE4020-20-075			20		
TPRE4020-25-075			25		
TPRE4025-10-075	2.5	45'	10	45	4
TPRE4025-12-075			12		
TPRE4025-16-075			16		
TPRE4025-20-075			20		
TPRE4025-25-075			25		
TPRE4025-30-075	3.0	45'	30	60	4
TPRE4030-25-075			25	55	
TPRE4030-40-075			40	80	6

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

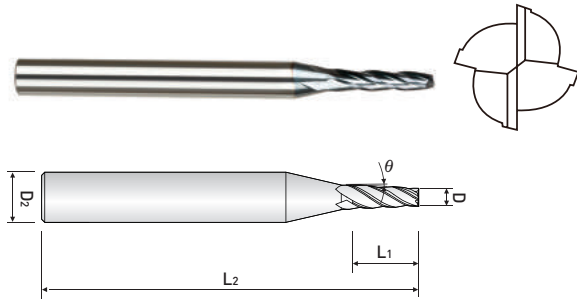
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-100 series

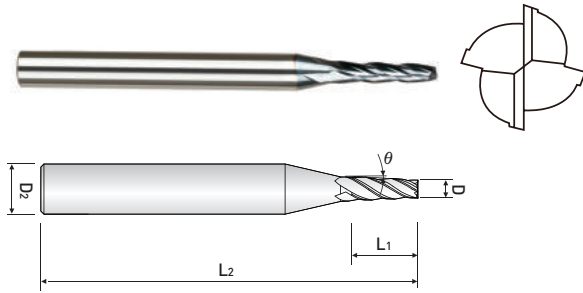


EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRE4004-02-100	0.4	1°00'	2	40	4
TPRE4004-03-100			3		
TPRE4004-04-100			4		
TPRE4005-02-100	0.5	1°00'	2	40	4
TPRE4005-04-100			4		
TPRE4005-06-100			6		
TPRE4006-04-100	0.6	1°00'	4	40	4
TPRE4006-06-100			6		
TPRE4007-06-100	0.7	1°00'	6	40	4
TPRE4007-08-100			8		
TPRE4008-06-100	0.8	1°00'	6	45	4
TPRE4008-08-100			8		
TPRE4008-10-100			10		
TPRE4009-06-100	0.9	1°00'	6	45	4
TPRE4009-08-100			8		
TPRE4009-10-100			10		
TPRE4010-06-100	1.0	1°00'	6	45	4
TPRE4010-08-100			8		
TPRE4010-10-100			10		
TPRE4010-12-100			12		
TPRE4010-16-100			16	50	
TPRE4012-06-100	1.2	1°00'	6	45	4
TPRE4012-08-100			8		
TPRE4012-10-100			10		
TPRE4012-12-100			12		
TPRE4012-16-100			16		
TPRE4014-08-100	1.4	1°00'	8	45	4
TPRE4014-12-100			12		
TPRE4014-16-100			16		

※ These tools are manufactured based on order received.

NEXT >>>

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-100 series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRE4015-08-100	1.5	1°00'	8	45	4
TPRE4015-10-100			10		
TPRE4015-12-100			12		
TPRE4015-16-100			16		
TPRE4015-20-100			20		
TPRE4016-08-100	1.6	1°00'	8	45	4
TPRE4016-10-100			10		
TPRE4016-12-100			12		
TPRE4016-16-100			16		
TPRE4016-20-100			20		
TPRE4018-08-100	1.8	1°00'	8	45	4
TPRE4018-10-100			10		
TPRE4018-12-100			12		
TPRE4018-16-100			16		
TPRE4018-20-100			20		
TPRE4020-10-100	2.0	1°00'	10	45	4
TPRE4020-12-100			12		
TPRE4020-16-100			16		
TPRE4020-20-100			20		
TPRE4020-25-100			25		
TPRE4025-10-100	2.5	1°00'	10	45	4
TPRE4025-12-100			12		
TPRE4025-16-100			16		
TPRE4025-20-100			20		
TPRE4025-25-100			25		
TPRE4025-30-100			30		
TPRE4030-25-100	3.0	1°00'	25	55	4
TPRE4030-40-100			40		

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

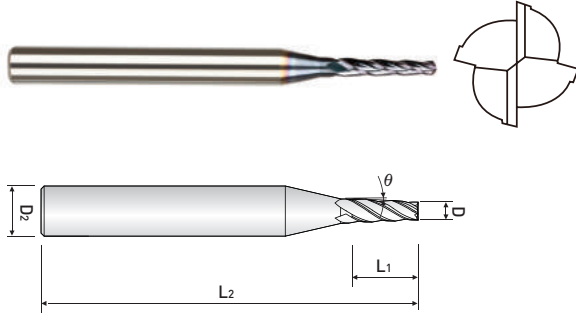
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

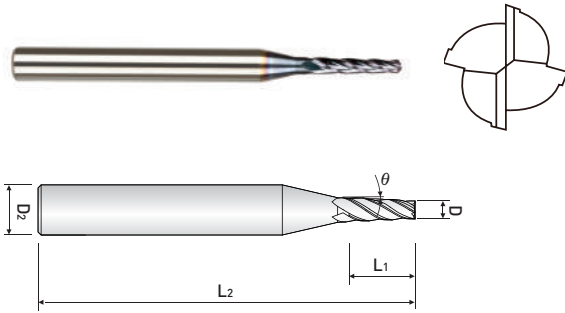
## TPRE4...-150 series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRE4004-02-150	0.4	1°30'	2	40	4
TPRE4004-03-150			3		
TPRE4004-04-150			4		
TPRE4005-04-150	0.5	1°30'	4	40	4
TPRE4005-06-150			6		
TPRE4006-04-150	0.6	1°30'	4	40	4
TPRE4006-06-150			6		
TPRE4007-06-150	0.7	1°30'	6	40	4
TPRE4007-08-150			8		
TPRE4008-06-150	0.8	1°30'	6	45	4
TPRE4008-08-150			8		
TPRE4008-10-150			10		
TPRE4009-06-150	0.9	1°30'	6	45	4
TPRE4009-08-150			8		
TPRE4009-10-150			10		
TPRE4010-06-150	1.0	1°30'	6	45	4
TPRE4010-08-150			8		
TPRE4010-10-150			10		
TPRE4010-12-150			12		
TPRE4010-16-150			16	50	
TPRE4012-06-150	1.2	1°30'	6	45	4
TPRE4012-08-150			8		
TPRE4012-10-150			10		
TPRE4012-12-150			12		
TPRE4012-16-150			16		
TPRE4014-08-150	1.4	1°30'	8	45	4
TPRE4014-12-150			12		
TPRE4014-16-150			16		

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-150 series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRE4015-08-150	1.5	1°30'	8	45	4
TPRE4015-10-150			10		
TPRE4015-12-150			12		
TPRE4015-16-150			16		
TPRE4015-20-150			20		
TPRE4016-08-150	1.6	1°30'	8	45	4
TPRE4016-10-150			10		
TPRE4016-12-150			12		
TPRE4016-16-150			16		
TPRE4016-20-150			20		
TPRE4018-08-150	1.8	1°30'	8	45	4
TPRE4018-10-150			10		
TPRE4018-12-150			12		
TPRE4018-16-150			16		
TPRE4018-20-150			20		
TPRE4020-10-150	2.0	1°30'	10	45	4
TPRE4020-12-150			12		
TPRE4020-16-150			16		
TPRE4020-20-150			20		
TPRE4020-25-150			25		
TPRE4025-10-150	2.5	1°30'	10	45	4
TPRE4025-12-150			12		
TPRE4025-16-150			16		
TPRE4025-20-150			20		
TPRE4025-25-150			25		
TPRE4025-30-150			30	65	6
TPRE4030-25-150	3.0	1°30'	25	60	6
TPRE4030-40-150			40	80	

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

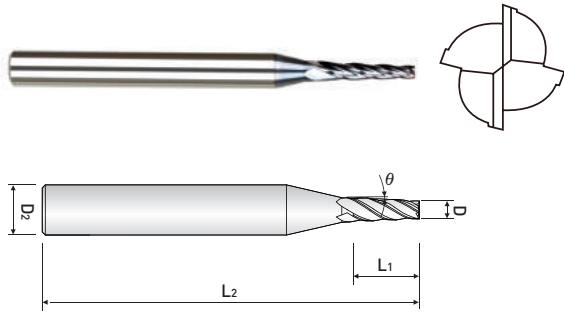
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

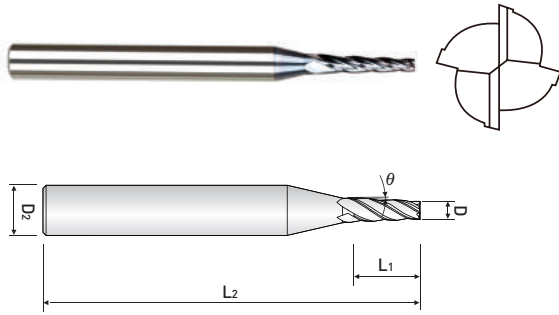
## TPRE4...-200 series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRE4004-02-200	0.4	2°00'	2	40	4
TPRE4004-03-200			3		
TPRE4004-04-200			4		
TPRE4005-04-200	0.5	2°00'	4	40	4
TPRE4005-06-200			6		
TPRE4006-04-200	0.6	2°00'	4	40	4
TPRE4006-06-200			6		
TPRE4007-06-200	0.7	2°00'	6	40	4
TPRE4007-08-200			8		
TPRE4008-06-200	0.8	2°00'	6	45	4
TPRE4008-08-200			8		
TPRE4008-10-200			10		
TPRE4009-06-200	0.9	2°00'	6	45	4
TPRE4009-08-200			8		
TPRE4009-10-200			10		
TPRE4010-06-200	1.0	2°00'	6	45	4
TPRE4010-08-200			8		
TPRE4010-10-200			10		
TPRE4010-12-200			12		
TPRE4010-16-200			16	50	
TPRE4012-06-200	1.2	2°00'	6	45	4
TPRE4012-08-200			8		
TPRE4012-10-200			10		
TPRE4012-12-200			12		
TPRE4012-16-200			16		
TPRE4014-08-200	1.4	2°00'	8	45	4
TPRE4014-12-200			12		
TPRE4014-16-200			16		

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-200 series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRE4015-08-200	1.5	2°00'	8	45	4
TPRE4015-10-200			10		
TPRE4015-12-200			12		
TPRE4015-16-200			16		
TPRE4015-20-200			20		
TPRE4016-08-200	1.6	2°00'	8	45	4
TPRE4016-10-200			10		
TPRE4016-12-200			12		
TPRE4016-16-200			16		
TPRE4016-20-200			20		
TPRE4018-08-200	1.8	2°00'	8	45	4
TPRE4018-10-200			10		
TPRE4018-12-200			12		
TPRE4018-16-200			16		
TPRE4018-20-200			20		
TPRE4020-10-200	2.0	2°00'	10	45	4
TPRE4020-12-200			12		
TPRE4020-16-200			16		
TPRE4020-20-200			20		
TPRE4020-25-200			25		
TPRE4025-10-200	2.5	2°00'	10	45	4
TPRE4025-12-200			12		
TPRE4025-16-200			16		
TPRE4025-20-200			20		
TPRE4025-25-200			25		
TPRE4025-30-200			30	65	6
TPRE4030-25-200	3.0	2°00'	25	60	6
TPRE4030-40-200			40	80	

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

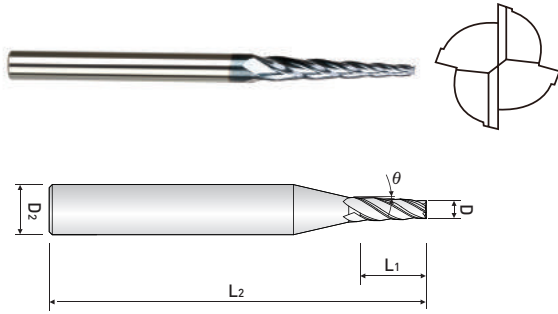
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## MULTIPLE FLUTES – TAPER BALL ENDMILLS for RIB PROCESSING

- Applying high hardened taper angle on the tool leads to highly efficient Rib processing
- Suitable to do machining performance on the inclined workpiece for electricity and electronic precise mold

■ Taper Tolerance :  $\pm 10'$

## TPRE4...-300 series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TPRE4005-04-300	0.5	3°00'	4	40	4
TPRE4006-04-300	0.6	3°00'	4	40	4
TPRE4007-06-300	0.7	3°00'	6	40	4
TPRE4008-06-300	0.8	3°00'	6	45	4
TPRE4008-10-300			10		
TPRE4009-08-300	0.9	3°00'	8	45	4
TPRE4010-08-300	1.0	3°00'	8	45	4
TPRE4010-12-300			12		
TPRE4012-10-300	1.2	3°00'	10	45	4
TPRE4012-16-300			16	50	
TPRE4015-12-300	1.5	3°00'	12	45	4
TPRE4015-20-300			20	55	
TPRE4016-12-300	1.6	3°00'	12	45	4
TPRE4016-20-300			20	55	
TPRE4018-12-300	1.8	3°00'	12	45	4
TPRE4018-20-300			20	55	
TPRE4020-16-300	2.0	3°00'	16	50	4
TPRE4020-25-300			25	60	6
TPRE4025-20-300	2.5	3°00'	20	60	6
TPRE4025-30-300			30	65	
TPRE4030-25-300	3.0	3°00'	25	60	6
TPRE4030-40-300			40	80	8

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

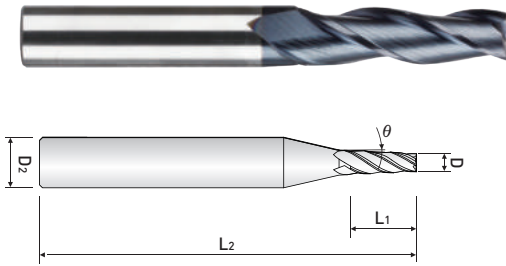
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0.03	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 3 FLUTE, TAPER END MILL

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- AlTiN coated for high wear resistance

## TE503 .....series



EDP. No.	D	$\theta$	L <sub>1</sub>	N.D	L <sub>2</sub>	D <sub>2</sub>		
TE50303106	3	1°	10	3.4	50	6		
TE50303206		2°		3.7				
TE50303306		3°		4				
TE50303506		5°		4.8				
TE50304106	4	1°	15	4.5	50	6		
TE50304206		2°		5				
TE50304306		3°		5.6				
TE50304508		5°		6.6		8		
TE50305106	5	1°	20	5.7	60	6		
TE50305208		2°		6.4		8		
TE50305308		3°		7.1				
TE50305508		5°		(17.1)		8.5		
TE50306108	6	1°	20	6.7	60	8		
TE50306208		2°		7.4				
TE50306308		3°		8.1				
TE50306510		5°		9.5			70	10
TE50308110	8	1°	25	8.9	70	10		
TE50308210		2°		9.8				
TE50308312		3°		10.6			75	12
TE50308512		5°		(22.8)				
TE50310112	10	1°	35	11.2	90	12		
TE50310212		2°	28	12.4		14		
TE50310314		3°	35	13.7				
TE50310516		5°	(34.3)	16.1		16		

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

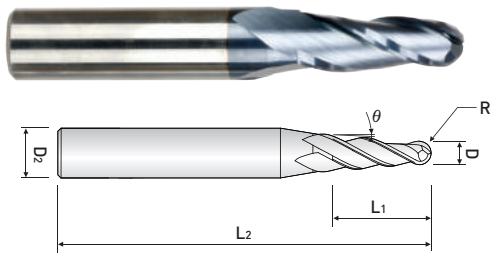
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.02	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 3 FLUTE, TAPER BALL END MILL

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- AlTiN coated for high wear resistance

## TB503 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TB50315306	3	1.5	3°	12	60	6
TB50320306	4	2		15	60	6
TB50325308	5	2.5		18	60	8
TB50330310	6	3		22	70	10
TB50340312	8	4		26	75	12
TB50350312	10	5		19	75	12
TB50360316	12	6		36	90	16
TB50315506	3	1.5	5°	12	60	6
TB50320508	4	2		15	60	8
TB50325510	5	2.5		18	70	10
TB50330510	6	3		22	70	10
TB50340512	8	4		26	75	12
TB50350516	10	5		30	90	16
TB50360520	12	6		36	100	20
TB50315706	3	1.5	7°	12	60	6
TB50320708	4	2		15	60	8
TB50325710	5	2.5		18	70	10
TB50330712	6	3		22	75	12
TB50340716	8	4		26	90	16
TB50350716	10	5		30	90	16
TB50360720	12	6		36	100	20

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

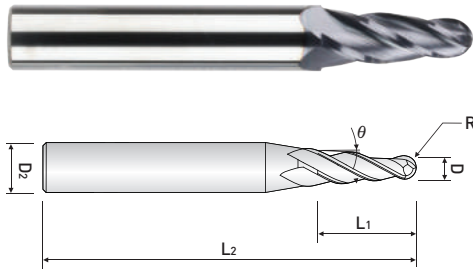
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.05	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 4 FLUTE, TAPER BALL END MILL

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- AlTiN coated for high wear resistance

## TB504 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TB50425308	5	2.5	3°	18	60	8
TB50430310	6	3		22	70	10
TB50440312	8	4		26	75	12
TB50450312	10	5		19	75	12
TB50460316	12	6		36	90	16
TB50425510	5	2.5	5°	18	70	10
TB50430510	6	3		22	70	10
TB50440512	8	4		26	75	12
TB50450516	10	5		30	90	16
TB50460520	12	6		36	100	20
TB50425710	5	2.5	7°	18	70	10
TB50430712	6	3		22	75	12
TB50440716	8	4		26	90	16
TB50450716	10	5		30	90	16
TB50460720	12	6		36	100	20

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

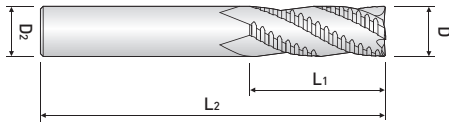
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0.05	h6

※:Items can be changed for quality improvement without notice.

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 3~6 FLUTE, ROUGHING & FINISHING END MILL

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- AlTiN coated for high wear resistance

## ZF60 ....series



ULTRA FINE



HELIX



p.985

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZF603040	4	10	50	6
ZF603050	5	13	50	6
ZF603060	6	15	50	6
ZF603070	7	18	60	8
ZF603080	8	18	60	8
ZF604090	9	22	70	10
ZF604100	10	22	70	10
ZF604110	11	26	75	12
ZF604120	12	26	75	12
ZF604130	13	32	85	14
ZF604140	14	32	85	14
ZF604150	15	35	90	16
ZF604160	16	35	90	16
ZF604180	18	44	100	18
ZF604200	20	44	100	20
ZF605250	25	50	120	25
ZF606320	32	70	150	32

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

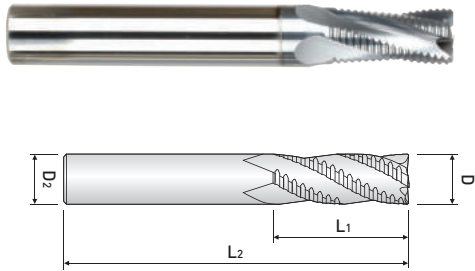
○:General Application ◎:The most suitable Application

### ■ Tolerance

μm = 1/1000mm

Tolerance	Dia.	φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 30
Cutting Edge(h10)	0	0	0	0	0	0
	-40	-40	-48	-58	-70	-84
Shank(h6)	0	0	0	0	0	0
	-6	-6	-8	-9	-11	-13

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 3~5 FLUTE, ROUGHING END MILL - FINE Pitch DIN6527L / DIN6535-HA, DIN6535-HB

- Designed for machine tool steel, alloy steel, mold steel and other highly hardened materials
- High velocity milling of hardened steels
- For dry and wet milling
- Fast chip ejection

## ZF61 ...series



ULTRA FINE

HELIX

Conventional Pitch

p.985

EDP. No.		D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
PLAIN SHANK	FLAT SHANK				
ZF613040	ZF613040F	4	10	50	6
ZF613050	ZF613050F	5	13	50	6
ZF613060	ZF613060F	6	16	57	6
ZF613070	ZF613070F	7	16	63	8
ZF613080	ZF613080F	8	16	63	8
ZF614090	ZF614090F	9	19	72	10
ZF614100	ZF614100F	10	22	72	10
ZF614120	ZF614120F	12	26	83	12
ZF614140	ZF614140F	14	32	83	14
ZF614160	ZF614160F	16	35	92	16
ZF614180	ZF614180F	18	40	100	18
ZF614200	ZF614200F	20	44	104	20
ZF615250	ZF615250F	25	50	120	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

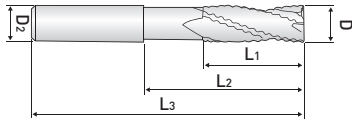
○:General Application ◎:The most suitable Application

### ■ Tolerance

μm = 1/1000mm

Tolerance	Dia.	φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 30
Cutting Edge(h10)	0	0	0	0	0	0
	-40	-48	-58	-70	-84	
Shank(h6)	0	0	0	0	0	0
	-6	-8	-9	-11	-13	

# Endmills for high speed & general cutting ZAMUS CLASSIC Series



## 3 FLUTE, Z - AXIS ROUGHING END MILL

- Reducing cycle time by 1 pass operating from Z-axis to slotting
- Preventing the working interruption as Neck type

## PK503 ...series



ULTRA FINE



HELIX

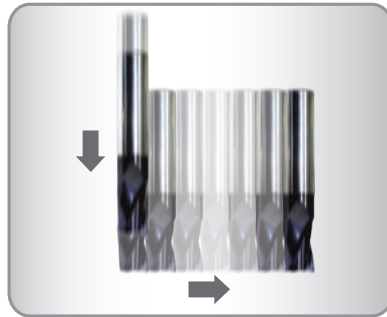


Conventional Pitch



p.986

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	Z
PK503060	6	9	15	57	6	3
PK503080	8	12	20	63	8	
PK503100	10	15	25	72	10	
PK503120	12	18	30	83	12	
PK503140	14	21	35	83	14	
PK503160	16	24	40	92	16	
PK503200	20	30	50	104	20	



Endmills for high speed & general cutting – ZAMUS CLASSIC Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

○:General Application ◎:The most suitable Application

### ■ Tolerance

μm = 1/1000mm

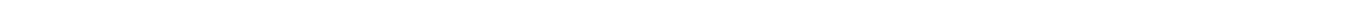
Tolerance Dia,	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(d11)	-20 -85	-30 -105	-40 -150	-50 -180	-65 -225
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13



# MEMO



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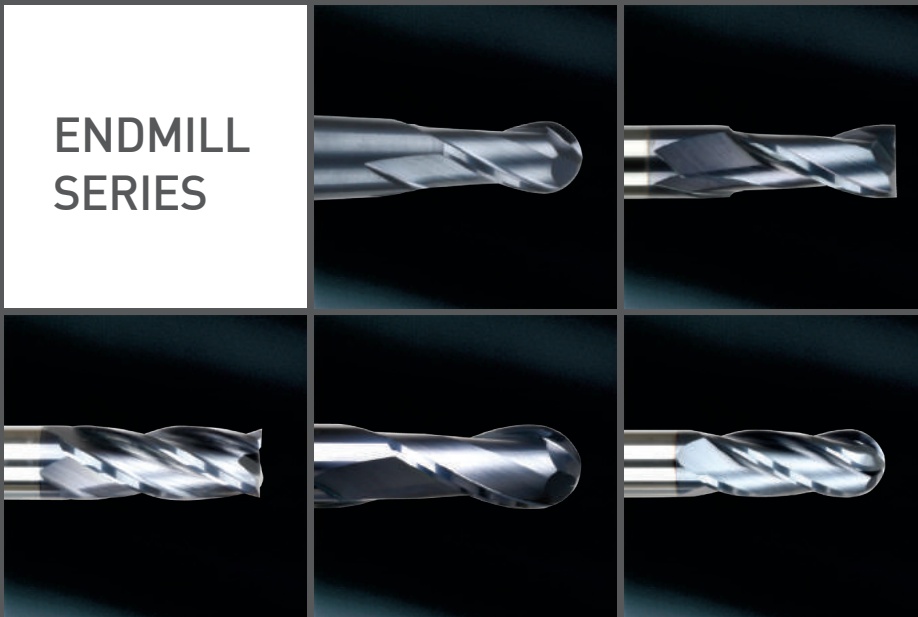




# Endmills for high speed & general cutting

ZAMUS THUNDER SERIES

ENDMILL  
SERIES



# Endmills for high speed & general cutting ZAMUS THUNDER Series

Endmills for high speed & general cutting \_ ZAMUS THUNDER Series

**WIDIN**

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
DB312 ... series		LONG LENGTH, BALL NOSE	METRIC	•	325
DB342 ... series		BALL NOSE with TAPER NECK	METRIC	•	326
ZE302 ... series		REGULAR LENGTH	METRIC	•	327
ZE304 ... series		REGULAR LENGTH	METRIC	•	328
ZE322 ... series		LONG & EXTRA LONG LENGTH	METRIC	•	329
ZE324 ... series		LONG and EXTRA LONG LENGTH	METRIC	•	330
ZR322 ... series		CORNER RADIUS LONG LENGTH	METRIC	•	331
ZR324 ... series		CORNER RADIUS with LONG SHANK	METRIC	•	332
ZR304H ... series		45° HELIX STUB CUT LENGTH, CORNER RADIUS, EXTENDED NECK	METRIC	•	333
ZR324H ... series		45° HELIX STUB CUT LENGTH, CORNER RADIUS, LONG SHANK	METRIC	•	334
TX302 ... series		REGULAR LENGTH	METRIC	•	335
TS302 ... series		REGULAR LENGTH	METRIC	•	336
TM302 ... series		ENDMILL FOR COMPLEX AUTOMATIC LATHE	METRIC	•	337
TX304 ... series		REGULAR LENGTH	METRIC	•	338

NEXT >>>

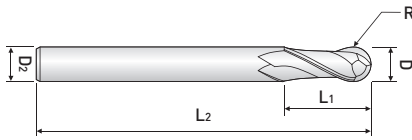
# Endmills for high speed & general cutting ZAMUS THUNDER Series

## Endmills for high speed & general cutting \_ ZAMUS THUNDER Series

**WIDIN**

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
TS304 ... series		REGULAR LENGTH	METRIC	•	339
TM304 ... series		ENDMILL FOR COMPLEX AUTOMATIC LATHE	METRIC	•	340
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TXB302 ... series		REGULAR LENGTH, BALL NOSE	METRIC	•	342
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TX202 ... series		SHORT LENGTH	METRIC	•	344
TX222 ... series		LONG LENGTH	METRIC	•	345
TX204 ... series		SHORT LENGTH	METRIC	•	346
TX224 ... series		LONG LENGTH	METRIC	•	347
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TXB222 ... series		LONG LENGTH, BALL NOSE	METRIC	•	349
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TXB204 ... series		REGULAR LENGTH, BALL NOSE	METRIC	•	351

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTE, LONG LENGTH, BALL NOSE

- Suitable for deep slotting machining performance as long size shape with taper neck.

## DB312 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
DB312010S4	1	0.5	2.5	50	4
DB312010					6
DB312012	1.2	0.6	3	50	6
DB312015	1.5	0.75	4	50	6
DB312020S4	2	1	5	50	4
DB312020					6
DB312025	2.5	1.25	6	60	6
DB312030S3	3	1.5	8	60	3
DB312030S4					4
DB312030					6
DB312035	3.5	1.75	8	70	6
DB312040S4	4	2	8	70	4
DB312040					6
DB312045	4.5	2.25	8	70	6
DB312050	5	2.5	10	80	6
DB312055	5.5	2.75	10	80	6
DB312060S	6	3	12	60	6
DB312060				90	
DB312065	6.5	3.25	12	90	8
DB312070	7	3.5	14	90	8
DB312080S	8	4	14	60	8
DB312080				100	
DB312090	9	4.5	18	100	10
DB312100S	10	5	18	60	10
DB312100				100	
DB312120	12	6	22	110	12
DB312140	14	7	26	110	14
DB312160	16	8	30	140	16
DB312180	18	9	34	140	18
DB312200	20	10	38	160	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB225~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

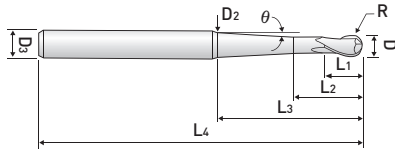
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (inch)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTE, BALL NOSE with TAPER NECK

- Suitable for deep slotting machining performance as long size shape with taper neck

## DB342 .....series



FINE GRAIN



HELIX



p.972

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>	D <sub>3</sub>	θ
DB34201015	1	0.5	2	4	23	60	2	6	1°30'
4.3							5°		
5							3°		
DB34202015	2	1	4	6	23	60	2.9	6	1°30'
5							5°		
5.7							3°		
DB34202030	3	1.5	6	8	32	70	5.6	6	3°
5.3							1°30'		
6							3°		
DB34204030	4	2	8	10	28	70	6	6	3°
49							1°30'		
41							3°		
DB34205030	5	2.5	10	12	41	90	8	8	3°
61							1°30'		
7.6							1°30'		
DB34206030	6	3	12	15	34	90	8	8	3°
53							1°30'		
36							3°		
DB34208030	8	4	14	17	36	100	10	10	3°
55							1°30'		
40							3°		
DB34210030	10	5	18	21	40	110	12	12	3°
59							1°30'		
63							3°		
DB34212030	12	6	22	25	63	140	16	16	3°
83							1°30'		
15							1°30'		

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

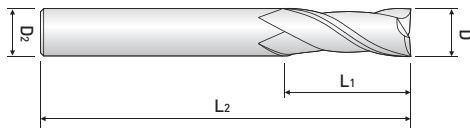
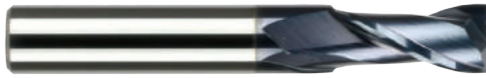
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials

## ZE302 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE302010	1	2.5	40	6
ZE302015	1.5	4	40	6
ZE302020	2	6	40	6
ZE302025	2.5	8	40	6
ZE302030	3	8	45	6
ZE302035	3.5	10	45	6
ZE302040	4	11	45	6
ZE302045	4.5	11	45	6
ZE302050	5	13	50	6
ZE302055	5.5	13	50	6
ZE302060	6	13	50	6
ZE302065	6.5	16	60	8
ZE302070	7	16	60	8
ZE302075	7.5	16	60	8
ZE302080	8	19	60	8
ZE302085	8.5	19	70	10
ZE302090	9	19	70	10
ZE302095	9.5	19	70	10
ZE302100	10	22	70	10
ZE302105	10.5	22	75	12
ZE302110	11	22	75	12
ZE302115	11.5	22	75	12
ZE302120	12	26	75	12
ZE302130	13	26	80	12
ZE302140	14	26	80	14
ZE302150	15	32	90	16
ZE302160	16	32	90	16
ZE302180	18	32	100	18
ZE302200	20	38	100	20

Endmills for high speed & general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

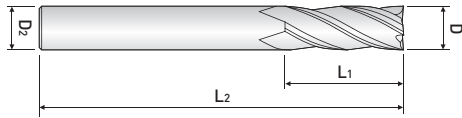
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 4 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials

## ZE304 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE304020	2	6	40	6
ZE304025	2.5	8	40	6
ZE304030	3	8	45	6
ZE304035	3.5	10	45	6
ZE304040	4	11	45	6
ZE304045	4.5	11	45	6
ZE304050	5	13	50	6
ZE304055	5.5	13	50	6
ZE304060	6	13	50	6
ZE304065	6.5	16	60	8
ZE304070	7	16	60	8
ZE304075	7.5	16	60	8
ZE304080	8	19	60	8
ZE304085	8.5	19	70	10
ZE304090	9	19	70	10
ZE304095	9.5	19	70	10
ZE304100	10	22	70	10
ZE304105	10.5	22	75	12
ZE304110	11	22	75	12
ZE304115	11.5	22	75	12
ZE304120	12	26	75	12
ZE304130	13	26	80	12
ZE304140	14	26	80	14
ZE304150	15	32	90	16
ZE304160	16	32	90	16
ZE304180	18	32	100	18
ZE304200	20	38	100	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

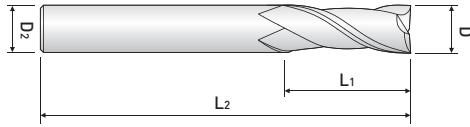
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTE, LONG & EXTRA LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials

## ZE322 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE322030	3	15	60	6
ZE322031		20	70	
ZE322030S			100	3
ZE322040	4	15	60	6
ZE322041		20	70	
ZE322040S			100	4
ZE322050	5	20	60	6
ZE322051			80	
ZE322052		25	100	
ZE322060	6	20	80	6
ZE322061		30	100	
ZE322062		40	150	
ZE322080	8	30	90	8
ZE322081		35	100	
ZE322082		40	150	
ZE322100	10	30	90	10
ZE322101		35	100	
ZE322102		45	150	
ZE322103		55	180	
ZE322120	12	30	90	12
ZE322121		40	110	
ZE322122		50	150	
ZE322123		60	200	
ZE322140	14	40	120	14
ZE322141		60	150	
ZE322160	16	50	140	16
ZE322161		70	160	
ZE322162		80	200	
ZE322180	18	50	140	18
ZE322200	20	60	150	20
ZE322201		100	200	
ZE322202		130	250	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

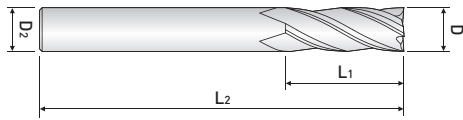
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 4 FLUTE, LONG & EXTRA LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials



## ZE324 ...series

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZE324030	3	15	60	6
ZE324031		20	70	
ZE324030S			100	3
ZE324040	4	15	60	6
ZE324041		20	70	
ZE324040S			100	4
ZE324050	5	20	60	6
ZE324051			80	
ZE324052		25	100	
ZE324060	6	20	80	6
ZE324061		30	100	
ZE324062		40	150	
ZE324080	8	30	90	8
ZE324081		35	100	
ZE324082		40	150	
ZE324100	10	30	90	10
ZE324101		35	100	
ZE324102		45	150	
ZE324103		55	180	
ZE324120	12	30	90	12
ZE324121		40	110	
ZE324122		50	150	
ZE324123		60	200	
ZE324140	14	40	120	14
ZE324141		60	150	
ZE324160	16	50	140	16
ZE324161		70	160	
ZE324162		80	200	
ZE324180	18	50	140	18
ZE324200	20	60	150	20
ZE324201		100	200	
ZE324202		130	250	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

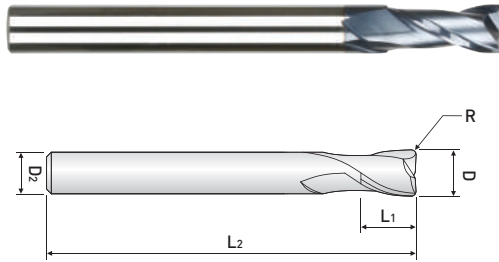
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTE, CORNER RADIUS LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- TiALN coated for high wear resistance

## ZR322 ....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
ZR3220302S4	3	0.2	8	60	4
ZR3220302		0.3			6
ZR3220303					6
ZR3220305S4					4
ZR3220305		0.5			6
ZR3220402S4	4	0.2	11	70	4
ZR3220402		0.3			6
ZR3220403					6
ZR3220405S4					4
ZR3220405		0.5			6
ZR3220410S4					4
ZR3220410	1.0	6			
ZR3220502	5	0.2	13	80	6
ZR3220503		0.3			
ZR3220505		0.5			
ZR3220510		1.0			
ZR3220602		6			
ZR3220603	0.3				
ZR3220605	0.5				
ZR3220610	1.0				
ZR3220803	8	0.3	19	100	8
ZR3220805		0.5			
ZR3220810		1.0			
ZR3220815		1.5			
ZR3220820		2.0			
ZR3221003	10	0.3	22	100	10
ZR3221005		0.5			
ZR3221010		1.0			
ZR3221015		1.5			
ZR3221020		2.0			
ZR3221025		2.5			
ZR3221205	12	0.5	26	110	12
ZR3221210		1.0			
ZR3221215		1.5			
ZR3221220		2.0			
ZR3221225		2.5			
ZR3221230		3.0			

Endmills for high speed & general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) H822 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

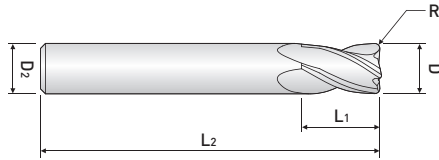
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 4 FLUTE, CORNER RADIUS LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- TiALN coated for high wear resistance

## ZR324 ....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>			
ZR3240302S4	3	0.2	8	60	4			
ZR3240302		0.3			6			
ZR3240303					0.5	6		
ZR3240305S4						4		
ZR3240305						6		
ZR3240402S4	4	0.2	11	70	4			
ZR3240402		0.3			6			
ZR3240403					0.5	6		
ZR3240405S4						1.0	4	
ZR3240405							6	
ZR3240410S4							4	
ZR3240410	6							
ZR3240502	5	0.2	13	80	6			
ZR3240503		0.3						
ZR3240505						0.5		
ZR3240510							1.0	
ZR3240602							0.2	
ZR3240603	6	0.3	13	90	6			
ZR3240605						0.5		
ZR3240610							1.0	
ZR3240803		0.3						
ZR3240805	8	0.5	19	100	8			
ZR3240810		1.0						
ZR3240815		1.5						
ZR3240820		2.0						
ZR3241003		10				0.3	22	100
ZR3241005	0.5							
ZR3241010			1.0					
ZR3241015				1.5				
ZR3241020					2.0			
ZR3241025						2.5		
ZR3241205	12	0.5	26	110	12			
ZR3241210		1.0						
ZR3241215						1.5		
ZR3241220							2.0	
ZR3241225								2.5
ZR3241230								

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

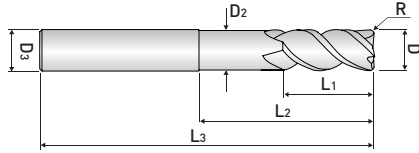
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 4 FLUTE, 45° HELIX STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Designed for high hardened materials up to HRC 45
- Suitable for high speed machining

## ZR304H ...series



FINE GRAIN



HELIX



p.984

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZR304H0303	3	0.3	4	12	55	2.8	6
ZR304H0305		0.5					
ZR304H0403	4	0.3	5	16	55	3.8	6
ZR304H0405		0.5					
ZR304H0605	6	0.5	7	20	60	5.8	6
ZR304H0610		1.0					
ZR304H0805	8	0.5	10	25	65	7.8	8
ZR304H0810		1.0					
ZR304H1005	10	0.5	12	30	70	9.8	10
ZR304H1010		1.0					
ZR304H1015		1.5					
ZR304H1020		2.0					
ZR304H1205	12	0.5	15	30	80	11.8	12
ZR304H1210		1.0					
ZR304H1215		1.5					
ZR304H1220		2.0					

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

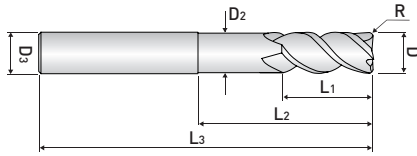
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 4 FLUTE, 45° HELIX STUB CUT LENGTH, CORNER RADIUS LONG SHANK

- Designed for high hardened materials up to HRc 45
- Suitable for high speed machining

## ZR324H ...series



FINE GRAIN



HELIX



p.984

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
ZR324H0605	6	0.5	9	20	90	5.8	6
ZR324H0610		1.0					
ZR324H0805	8	0.5	12	25	100	7.8	8
ZR324H0810		1.0					
ZR324H1005	10	0.5	15	32	100	9.8	10
ZR324H1010		1.0					
ZR324H1015		1.5					
ZR324H1020		2.0					
ZR324H1205	12	0.5	18	38	110	11.8	12
ZR324H1210		1.0					
ZR324H1215		1.5					
ZR324H1220		2.0					

※ These tools are manufactured based on order received.

Endmills for high speed & general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

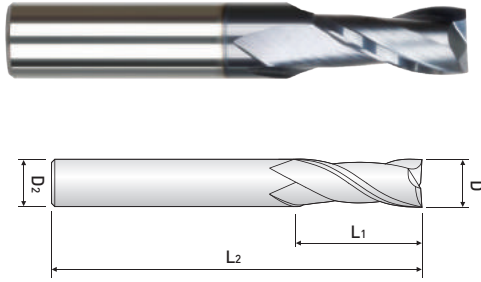
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Excellent high-performance Endmills

## TX302...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TX302010	1	3	50	4
TX302015	1.5	4	50	4
TX302020	2	6	50	4
TX302025	2.5	8	50	4
TX302030	3	9	50	4
TX302040	4	11	50	4
TX302050	5	13	50	6
TX302060	6	16	50	6
TX302070	7	16	60	8
TX302080	8	19	60	8
TX302090	9	19	60	10
TX302100	10	25	75	10
TX302120	12	30	75	12
TX302140	14	32	75	14
TX302160	16	32	100	16
TX302180	18	32	100	18
TX302200	20	38	100	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

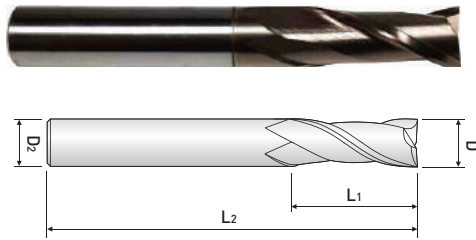
○:General Application ◎:The most suitable Application

### ■ Tolerance

μm = 1/1000mm

Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(e8)		-14	-20	-25	-32	-40
		-28	-38	-47	-59	-73
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13

# Endmills for high speed & general cutting ZAMUS THUNDER Series



2 FLUTE, REGULAR LENGTH

## TS302 ...series



EDP. No.	D	C.L	OAL	SH.Dia.
TS302 010	1	3	45	6
TS302 015	1.5	4	45	6
TS302 020	2	6	45	6
TS302 025	2.5	8	45	6
TS302 030	3	10	50	6
TS302 035	3.5	10	50	6
TS302 040	4	12	50	6
TS302 045	4.5	14	50	6
TS302 050	5	15	50	6
TS302 055	5.5	15	50	6
TS302 060	6	15	57	6
TS302 065	6.5	18	63	8
TS302 070	7	20	63	8
TS302 075	7.5	20	63	8
TS302 080	8	20	63	8
TS302 085	8.5	23	72	10
TS302 090	9	25	72	10
TS302 095	9.5	25	72	10
TS302 100	10	25	72	10
TS302 105	10.5	28	80	12
TS302 110	11	30	80	12
TS302 115	11.5	30	80	12
TS302 120	12	30	80	12
TS302 125	12.5	35	80	12
TS302 130	13	35	80	12
TS302 140	14	35	80	12
TS302 150	15	42	100	16
TS302 160	16	42	100	16
TS302 170	17	42	100	16
TS302 180	18	45	100	16
TS302 190	19	48	105	20
TS302 200	20	48	105	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

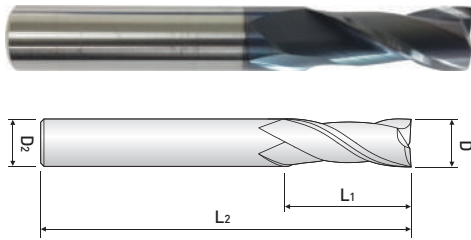
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTES, VARIABLE HELIX ENDMILL FOR A COMPLEX AUTOMATIC LATHES (THUNDER MINI)

- Suitable for low hardness machine (automatic lathe) with unique design

## TM302...series



EDP. No.	D	C.L	OAL	SH.Dia.
TM302 010	1	2	35	3
TM302 015	1.5	3	35	3
TM302 020	2	4	35	3
TM302 025	2.5	4	35	3
TM302 030	3	5	35	3
TM302 040	4	6	40	4
TM302 050	5	8	40	5
TM302 060	6	10	45	6
TM302 070	7	12	45	7
TM302 080	8	12	45	8
TM302 090	9	15	50	9
TM302 100	10	15	50	10

Endmills for high speed & general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

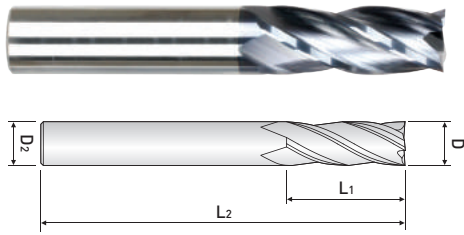
○: General Application ◎: The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 4 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Excellent high-performance Endmills

## TX304...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TX304010	1	3	50	4
TX304015	1.5	4	50	4
TX304020	2	6	50	4
TX304025	2.5	8	50	4
TX304030	3	9	50	4
TX304040	4	11	50	4
TX304050	5	13	50	6
TX304060	6	16	50	6
TX304070	7	16	60	8
TX304080	8	19	60	8
TX304090	9	19	60	10
TX304100	10	25	75	10
TX304120	12	30	75	12
TX304140	14	32	75	14
TX304160	16	32	100	16
TX304180	18	32	100	18
TX304200	20	38	100	20

Endmills for high speed &amp; general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

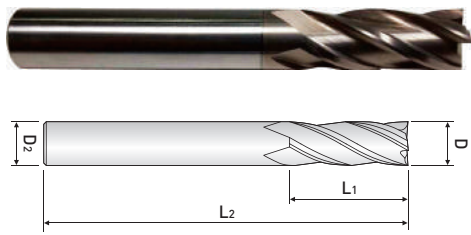
○:General Application ◎:The most suitable Application

### ■ Tolerance

μm =1/1000mm

Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(e8)		-14	-20	-25	-32	-40
		-28	-38	-47	-59	-73
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13

# Endmills for high speed & general cutting ZAMUS THUNDER Series



4 FLUTE, REGULAR LENGTH

## TS304...series



EDP. No.	D	C.L	OAL	SH.Dia
TS304 020	2	6	45	6
TS304 025	2.5	8	45	6
TS304 030	3	10	50	6
TS304 035	3.5	10	50	6
TS304 040	4	12	50	6
TS304 045	4.5	14	50	6
TS304 050	5	15	50	6
TS304 055	5.5	15	50	6
TS304 060	6	15	57	6
TS304 065	6.5	18	63	8
TS304 070	7	20	63	8
TS304 075	7.5	20	63	8
TS304 080	8	20	63	8
TS304 085	8.5	23	72	10
TS304 090	9	25	72	10
TS304 095	9.5	25	72	10
TS304 100	10	25	72	10
TS304 105	10.5	28	80	12
TS304 110	11	30	80	12
TS304 115	11.5	30	80	12
TS304 120	12	30	80	12
TS304 125	12.5	35	80	12
TS304 130	13	35	80	12
TS304 140	14	35	80	12
TS304 150	15	42	100	16
TS304 160	16	42	100	16
TS304 170	17	42	100	16
TS304 180	18	45	100	16
TS304 190	19	48	105	20
TS304 200	20	48	105	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

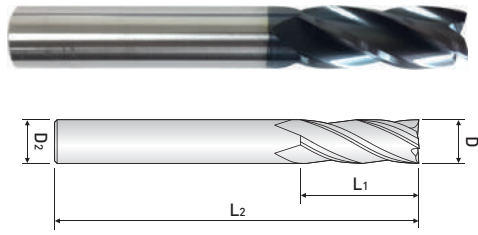
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 4 FLUTES, VARIABLE HELIX ENDMILL FOR COMPLEX AUTOMATIC LATHES

- Suitable for low hardness machine(automatic lathe) with unique design

## TM304...series



EDP. No.	D	C.L	OAL	SH.Dia
TM304 020	2	4	35	3
TM304 025	2.5	4	35	3
TM304 030	3	5	35	3
TM304 040	4	6	40	4
TM304 050	5	8	40	5
TM304 060	6	10	45	6
TM304 070	7	12	45	7
TM304 080	8	12	45	8
TM304 090	9	15	50	9
TM304 100	10	15	50	10

Endmills for high speed & general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

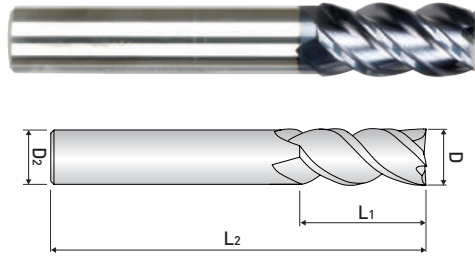
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



4 FLUTE, 45° HELIX, REGULAR LENGTH

## TX304H ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TX304H030	3	8	50	6
TX304H040	4	11	50	6
TX304H050	5	13	50	6
TX304H060	6	13	50	6
TX304H080	8	19	60	8
TX304H100	10	22	70	10
TX304H120	12	26	75	12
TX304H130	13	26	80	12
TX304H140	14	26	80	14
TX304H160	16	32	90	16
TX304H180	18	32	100	18
TX304H200	20	38	100	20

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

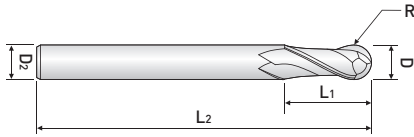
○:General Application ◎:The most suitable Application

### ■ Tolerance

μm = 1/1000mm

Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(e8)		-14	-20	-25	-32	-40
		-28	-38	-47	-59	-73
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTE, REGULAR LENGTH, BALL NOSE

- Designed to machine tool steel, alloy, mold steel and other high hardened material
- Suitable to profile processing

## TXB302...series



FINE GRAIN



HELIX



±0.02



TiAlN



p.989

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TXB302010	1	0.5	2	50	4
TXB302015	1.5	0.75	3	50	4
TXB302020	2	1	4	50	4
TXB302025	2.5	1.25	6	50	4
TXB302030	3	1.5	6	50	4
TXB302040	4	2	8	50	4
TXB302050	5	2.5	10	50	6
TXB302060	6	3	12	50	6
TXB302080	8	4	14	60	8
TXB302100	10	5	18	75	10
TXB302120	12	6	22	75	12
TXB302140	14	7	32	75	14
TXB302160	16	8	32	100	16
TXB302180	18	9	32	100	18
TXB302200	20	10	38	100	20

Endmills for high speed &amp; general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

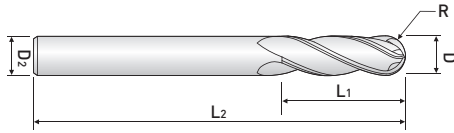
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,04	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 4 FLUTE, REGULAR LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Excellent workpiece finishes

## TXB304...series



FINE GRAIN



HELIX



p.989

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TXB304010	1	0.5	2	50	4
TXB304015	1.5	0.75	3	50	4
TXB304020	2	1	4	50	4
TXB304030	3	1.5	6	50	4
TXB304040	4	2	8	50	4
TXB304050	5	2.5	10	50	6
TXB304060	6	3	12	50	6
TXB304080	8	4	14	60	8
TXB304100	10	5	18	75	10
TXB304120	12	6	22	75	12
TXB304140	14	7	32	75	14
TXB304160	16	8	32	100	16
TXB304180	18	9	32	100	18
TXB304200	20	10	38	100	20

Endmills for high speed &amp; general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

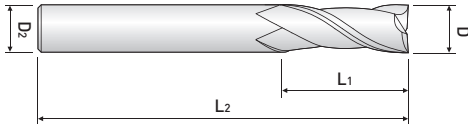
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,04	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTE, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Excellent workpiece finishes

## TX202...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TX202010	1	3	39	3
TX202015	1.5	5	39	3
TX202020	2	7	39	3
TX202025	2.5	8	39	3
TX202030	3	10	39	3
TX202040	4	14	51	4
TX202050	5	16	51	5
TX202060	6	19	64	6
TX202080	8	21	64	8
TX202100	10	25	70	10
TX202120	12	25	76	12
TX202160	16	32	89	16
TX202200	20	38	102	20

Endmills for high speed &amp; general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

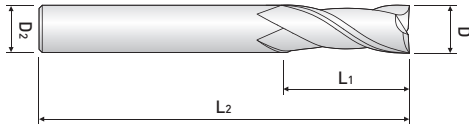
◎:General Application ○:The most suitable Application

### ■ Tolerance

μm = 1/1000mm

Tolerance Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(e8)	-14 -28	-20 -38	-25 -47	-32 -59	-40 -73
Shank(h6)	0 -6	0 -8	0 -9	0 -11	0 -13

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTE, LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Excellent workpiece finishes

## TX222...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TX222030	3	20	60	3
TX222040	4	20	60	4
TX222050	5	25	75	5
TX222060	6	30	75	6
TX222080	8	30	75	8
TX222100	10	40	100	10
TX222120	12	45	100	12
TX222140	14	45	100	14
TX222160	16	45	100	16
TX222180	18	45	100	18
TX222200	20	45	100	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

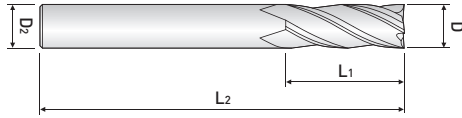
○:General Application ◎:The most suitable Application

### ■ Tolerance

μm = 1/1000mm

Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(e8)		-14	-20	-25	-32	-40
		-28	-38	-47	-59	-73
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 4 FLUTE, SHORT LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Excellent workpiece finishes

## TX204...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TX204010	1	3	39	3
TX204015	1.5	5	39	3
TX204020	2	7	39	3
TX204025	2.5	8	39	3
TX204030	3	10	39	3
TX204040	4	14	51	4
TX204050	5	16	51	5
TX204060	6	19	64	6
TX204080	8	21	64	8
TX204100	10	25	70	10
TX204120	12	25	76	12
TX204160	16	32	89	16
TX204200	20	38	102	20

Endmills for high speed &amp; general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

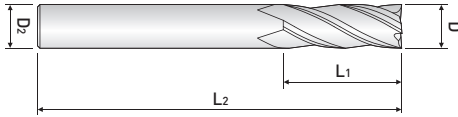
○:General Application ◎:The most suitable Application

### ■ Tolerance

μm = 1/1000mm

Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(e8)		-14	-20	-25	-32	-40
		-28	-38	-47	-59	-73
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 4 FLUTE, LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Excellent workpiece finishes

## TX224...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TX224030	3	20	60	3
TX224040	4	20	60	4
TX224050	5	25	75	5
TX224060	6	30	75	6
TX224080	8	30	75	8
TX224100	10	40	100	10
TX224120	12	45	100	12
TX224140	14	45	100	14
TX224160	16	45	100	16
TX224180	18	45	100	18
TX224200	20	45	100	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

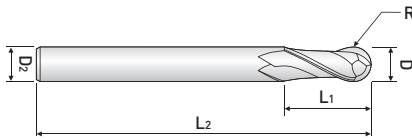
○:General Application ◎:The most suitable Application

### ■ Tolerance

μm = 1/1000mm

Tolerance	Dia.	from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Cutting Edge(e8)		-14	-20	-25	-32	-40
		-28	-38	-47	-59	-73
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTE, REGULAR LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## TXB202...series



FINE GRAIN



HELIX



±0.02



TiAlN



p.989

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TXB202010	1	0.5	3	39	3
TXB202015	1.5	0.75	5	39	3
TXB202020	2	1	7	39	3
TXB202025	2.5	1.25	8	39	3
TXB202030	3	1.5	10	39	3
TXB202040	4	2	14	51	4
TXB202050	5	2.5	16	51	5
TXB202060	6	3	19	64	6
TXB202080	8	4	21	64	8
TXB202100	10	5	25	70	10
TXB202120	12	6	25	76	12
TXB202160	16	8	32	89	16
TXB202200	20	10	38	100	20

Endmills for high speed &amp; general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

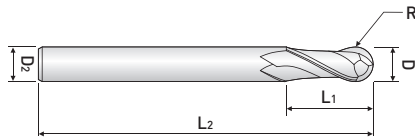
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,04	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTE, LONG LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials.
- Excellent workpiece finishes

## TXB222...series



FINE GRAIN



HELIX



±0.02



TiAlN



p.989

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TXB222030	3	1.5	20	60	3
TXB222040	4	2	20	60	4
TXB222050	5	2.5	25	75	5
TXB222060	6	3	30	75	6
TXB222080	8	4	30	100	8
TXB222100	10	5	40	100	10
TXB222120	12	6	45	100	12
TXB222140	14	7	45	100	14
TXB222160	16	8	45	100	16
TXB222180	18	9	45	100	18
TXB222200	20	10	45	100	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
◎	◎	○							

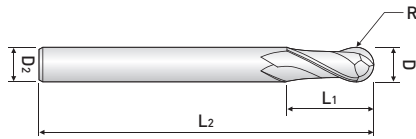
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,04	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 2 FLUTE, LONG REACH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## TXB232...series



FINE GRAIN



HELIX



±0.02



TiAlN



p.989

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TXB232030	3	1.5	5	75	3
TXB232040	4	2	8	75	4
TXB232050	5	2.5	9	75	5
TXB232060	6	3	10	100	6
TXB232080	8	4	12	100	8
TXB232100	10	5	14	100	10
TXB232120	12	6	16	100	12
TXB232140	14	7	18	100	14
TXB232160	16	8	22	150	16
TXB232200	20	10	26	150	20

Endmills for high speed &amp; general cutting – ZAMUS THUNDER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

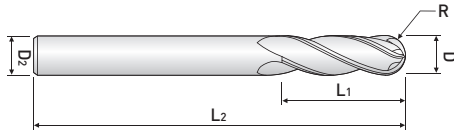
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,04	h6

※ These tools are manufactured based on order received.

# Endmills for high speed & general cutting ZAMUS THUNDER Series



## 4 FLUTE, REGULAR LENGTH, BALL NOSE

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- Excellent workpiece finishes

## TXB204...series



FINE GRAIN



HELIX



p.989

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
TXB204020	2	1	7	39	3
TXB204030	3	1.5	10	39	3
TXB204040	4	2	14	51	4
TXB204050	5	2.5	16	51	5
TXB204060	6	3	19	64	6
TXB204080	8	4	21	64	8
TXB204100	10	5	25	70	10
TXB204120	12	6	25	76	12
TXB204160	16	8	32	89	16
TXB204200	20	10	38	100	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
◎	◎	○							

○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,04	h6

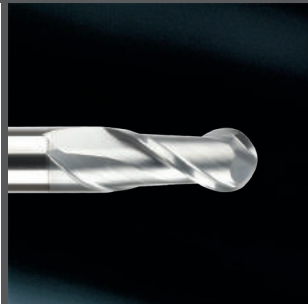
※ These tools are manufactured based on order received.



# Endmills for difficult to cut Materials





SUS WAVE SERIES

ENDMILL  
SERIES

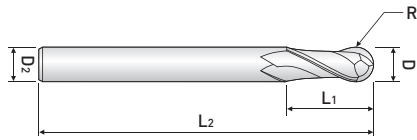


## Endmills for difficult to cut materials \_ SUS WAVE SERIES

**WIDIN**

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
DS502 ...series		BALL NOSE REGULAR & LONG LENGTH	METRIC	•	354
SM503 ...series		REGULAR LENGTH	METRIC	•	355
SM504 ...series		REGULAR LENGTH, CORNER RADIUS	METRIC	•	356
ZF62 ...series		ROUGHING END MILL	METRIC	•	357

# Endmills for difficult to cut materials *SUS WAVE Series*



## 2 FLUTE, BALL NOSE REGULAR & LONG LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials
- For copy-milling machines

## DS502 ...series



ULTRA FINE



HELIX



p.990

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
DS502010	1	0.5	3	50	6
DS502020	2	1	6	50	6
DS502030	3	1.5	8	50	6
DS502031				70	
DS502040	4	2	10	50	6
DS502041				70	
DS502050	5	2.5	13	50	6
DS502051				80	
DS502060	6	3	13	50	6
DS502061				90	
DS502080	8	4	19	60	8
DS502081				100	
DS502100	10	5	22	70	10
DS502101				100	
DS502120	12	6	26	75	12
DS502121				110	

Endmills for difficult to cut materials – SUS WAVE Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○				◎

○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.02	h6

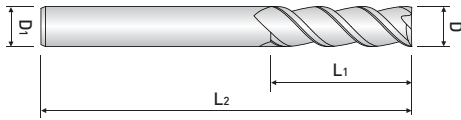
※ These tools are manufactured based on order received.

# Endmills for difficult to cut materials *SUS WAVE Series*



## 3 FLUTE, REGULAR LENGTH

- Suitable for Stainless steel, Titanium, Inconel



## SM503 ...series



ULTRA FINE



HELIX



HELIX



HELIX



p.991

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
SM503010	1	2	45	4
SM503015	1.5	3	45	4
SM503020	2	4	50	6
SM503030	3	6	50	6
SM503040	4	8	50	6
SM503050	5	10	50	6
SM503060	6	13	60	6
SM503080	8	19	70	8
SM503100	10	22	80	10
SM503120	12	26	90	12
SM503140	14	26	90	12
SM503160	16	30	110	16
SM503180	18	32	110	18
SM503200	20	32	140	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	○			○				◎

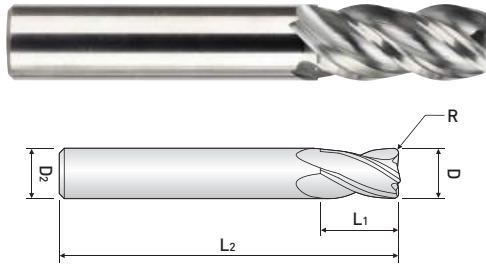
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.02	h6

※ These tools are manufactured based on order received.

# Endmills for difficult to cut materials *SUS WAVE Series*



## 4 FLUTE, REGULAR LENGTH

- Suitable for Stainless steel, Titanium, Inconel
- Variable helix Type
- High performance by applying corner radius to prevent chipping  
(Not suitable for a work which requires R shape)

## SM504 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
SM504020	2	0.1	6	45	6
SM504030	3	0.1	10	45	6
SM504040	4	0.2	12	50	6
SM504050	5	0.2	13	50	6
SM504060	6	0.2	13	50	6
SM504070	7	0.2	16	60	8
SM504080	8	0.2	16	60	8
SM504090	9	0.2	19	70	10
SM504100	10	0.3	22	70	10
SM504120	12	0.3	26	75	12
SM504140	14	0.3	26	82	14
SM504160	16	0.3	32	90	16
SM504180	18	0.3	32	100	18
SM504200	20	0.3	38	100	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	○			○				◎

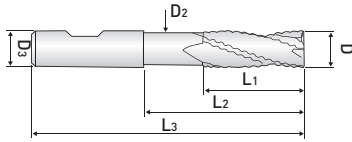
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 12	0 ~ -0.02	h6
over 12	0 ~ -0.03	

※ These tools are manufactured based on order received.

# Endmills for difficult to cut materials SUS WAVE Series



## 4~6 FLUTE, ROUGHING END MILL DIN6527 / DIN6535-HA, DIN6535-HB

- Designed to machine tool steel, alloy steel, stainless steel and other low hardness materials
- Fast chip ejection

## ZF62 ....series



EDP. No.		D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>	Z
PLAIN SHANK	FLAT SHANK							
ZF624060	ZF624060F	6	7	-	-	54	6	4
ZF624061	ZF624061F		16	-	-	57		
ZF624062	ZF624062F			20	5.5			
ZF624080	ZF624080F	8	9	-	-	58	8	4
ZF624081	ZF624081F		16	-	-	63		
ZF624082	ZF624082F			26	7.5			
ZF624100	ZF624100F	10	14	-	-	66	10	4
ZF624101	ZF624101F		22	-	-	72		
ZF624102	ZF624102F			31	9.5			
ZF624120	ZF624120F	12	16	-	-	73	12	4
ZF624121	ZF624121F		26	-	-	83		
ZF624122	ZF624122F			37	11.5			
ZF625160	ZF625160F	16	22	-	-	82	16	5
ZF625161	ZF625161F		32	-	-	92		
ZF625162	ZF625162F			51	15.5	100		
ZF626200	ZF626200F	20	26	-	-	92	20	6
ZF626201	ZF626201F		38	-	-	104		
ZF626202	ZF626202F			59	19.2	110		

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	○			○				◎

○:General Application ◎:The most suitable Application

### ■ Tolerance

μm = 1/1000mm

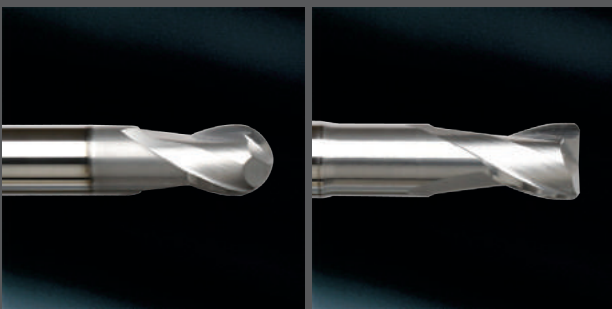
Tolerance	Dia.	φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 30
Cutting Edge(h10)		0	0	0	0	0
		-40	-48	-58	-70	-84
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13



# Endmill for non-ferrous Metal Machining



ZAMUS COPPER MATE SERIES

ENDMILL  
SERIES

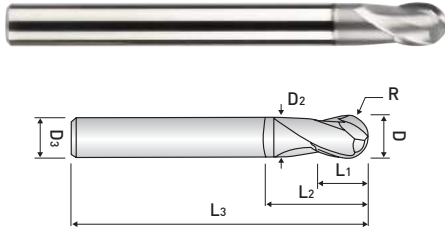


## Endmill for non-ferrous metal machining \_ ZAMUS COPPER MATE SERIES

**WIDIN**

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
BC502 .....series		STUB CUT with EXTENDED NECK	METRIC	•	360
RC502.....series		STUB CUT with EXTENDED NECK	METRIC	•	361

# Endmill for non-ferrous metal machining ZAMUS COPPER MATE Series



**2 FLUTE, STUB CUT LENGTH,  
BALL NOSE with EXTENDED NECK**

- Suitable for copper & non-ferrous material

## BC502 ...series



ULTRA FINE



HELIX



p.992

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
BC502010	1	0.5	1.5	3	50	0.8	6
BC502015	1.5	0.75	2	4	50	1.3	6
BC502020	2	1	2.5	5	50	1.8	6
BC502025	2.5	1.25	3	7	50	2.3	6
BC502030	3	1.5	4	10	60	2.8	6
BC502040	4	2	5	10	60	3.8	6
BC502050	5	2.5	6	12	60	4.8	6
BC502060	6	3	7	12	60	5.8	6
BC502061					90		
BC502080	8	4	9	15	70	7.8	8
BC502081				16	100		
BC502100	10	5	11	25	75	9.8	10
BC502101					100		
BC502120	12	6	12	25	80	11.8	12
BC502121					110		

※ These tools are manufactured based on order received.

Endmill for non-ferrous metal machining – ZAMUS COPPER MATE Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○				◎			○	

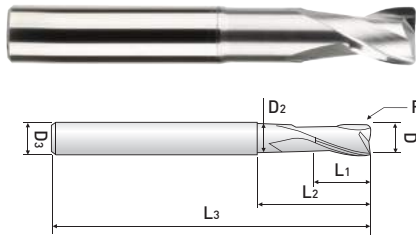
○:General Application ◎:The most suitable Application

### ■ Tolerance

Radius (mm)	Shank Dia.
±0,01	h6

※ These tools are manufactured based on order received.

# Endmill for non-ferrous metal machining ZAMUS COPPER MATE Series



## 2 FLUTE, STUB CUT LENGTH, CORNER RADIUS with EXTENDED NECK

- Suitable for copper & non-ferrous material

## RC502 .....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
RC5020200509	2	0.5	3	9	55	1.8	6
RC5020300509	3	0.5	4	9	55	2.8	6
RC5020300516				16			
RC5020300520				20			
RC5020400512	4	0.5	5	12	55	3.7	6
RC5020400516				16			
RC5020400520				20			
RC5020600520	6	0.5	7	20	60	5.5	6
RC5020601020		1					
RC5020800525	8	0.5	9	25	60	7.4	8
RC5020801025		1					
RC5021000532	10	0.5	11	32	70	9.2	10
RC5021001032		1					
RC5021200538	12	0.5	12	38	80	11	12
RC5021201038		1					

※ These tools are manufactured based on order received.

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○				◎			○	

○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 - -0,012	h6
over 6	0 - -0,015	

※ These tools are manufactured based on order received.







# Endmill for Graphite and Non-ferrous

ZAMUS GRA MATE SERIES

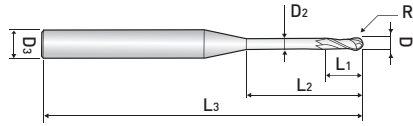


## Endmill for Graphite and Non-ferrous \_ ZAMUS GRA MATE SERIES

**WIDIN**

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
G .....series		DIAMOND COATING BALL NOSE	METRIC	•	364
GE .....series		DIAMOND COATING END MILL	METRIC	•	637
WGR502 ....series		2 FLUTE, DIAMOND COATING RADIUS	METRIC	•	368
WGR504 ....series		4 FLUTE, DIAMOND COATING RADIUS	METRIC	•	369
WGB504 ....series		4 FLUTE, DIAMOND COATING, BALL NOSE	METRIC	•	370
WGE504 ....series		4 FLUTE, DIAMOND COATING SQUARE	METRIC	•	372
WROU ....series		8~12FLUTE, ROUTER	METRIC	•	373

# Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



## 2 FLUTE, DIAMOND COATING BALL NOSE

- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass etc

## G .....series

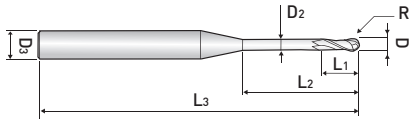


HELIX DIAMOND p.994

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
G00501003	0.5	0.25	1	3	50	0.45	4
G00501006				6			
G00501010				10			
G00601203	0.6	0.3	1.2	3	50	0.55	4
G00601206				6			
G00601208				8			
G00601210				10			
G00601212				12			
G0080164	0.8	0.4	1.6	4	50	0.75	4
G0080166				6			
G0080168				8			
G0100306	1	0.5	3	6	60	0.95	4
G0100308				8			
G0100310				10			
G0100312				12			
G0100314				14			
G0100316				16			
G0100318				18			
G0100320	20						
G0120410	1.2	0.6	4	10	70	1.15	4
G0150510	1.5	0.75	5	10	60	1.45	4
G0150512				12			
G0150516				16			
G0150520				20			
G0150525				25	70		
G0150530				30			

NEXT >>

# Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



## 2 FLUTE, DIAMOND COATING BALL NOSE

- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass etc

## G .....series



HELIX



DIAMOND

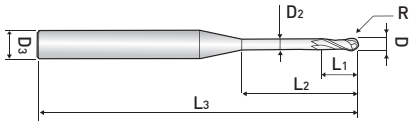


p.994

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>	
G0200812	2	1	8	12	60	1.95	4	
G0200816				16				
G0200820				20				
G0200825				25	70			
G0200830				30				
G0200835				35	80			
G0200840				40				
G0201020				10	20			80
G0201020L								100
G0251020				2.5	1.25			10
G0301216	3	1.5	12	16	60	2.9	6	
G0301220				20				
G0301225				25	70			
G0301230				30				
G0301235				35	80			
G0301240				40				
G0301245				45	90			
G0301525				15				25
G04015S	4	2	15	-	50	-	4	
G04015M				-	80	-		
G04015L				-	120	-		
G0401520				20	60	3.9	6	
G0401525				25	70			
G0401530				30	80			
G0401535				35				
G0401540				40	90			
G0401545				45				
G0401550				50	100			
G0402030				20	30			80

NEXT &gt;&gt;

# Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



## 2 FLUTE, DIAMOND COATING BALL NOSE

- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass etc

## G .....series



HELIX DIAMOND p.994

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
G0503050	5	2.5	30	50	100	4.8	6
G0503050L					150		
G06020S	6	3	20	-	70	-	6
G06020M					100		
G06020L					150		
G0603050	6	3	30	50	100	5.8	6
G0603050L					150		
G08025S	8	4	25	-	70	-	8
G08025M					110		
G08025L					160		
G0804060					110		
G0804060L	40	60	200	7.8	8		
G10030S	10	5	30	-	80	-	10
G10030M					120		
G10030L					170		
G1005070					120		
G1005070L	50	70	200	9.7	10		
G12035S	12	6	35	-	80	-	12
G12035M					130		
G12035L					180		
G1205575					130		
G1205575L	55	75	200	11.7	12		

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
						◎		○	

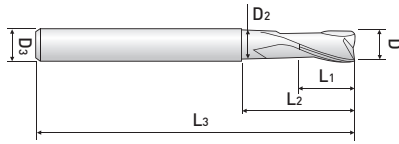
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



## 2 FLUTE, DIAMOND COATING BALL NOSE

- High performance on graphite, wrought aluminum, bakelite, plastics, wood, brass etc

## GE .....series



HELIX DIAMOND p.995

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
GE00501006	0.5	1	6	50	0.45	4
GE00601206	0.6	1.2	6	50	0.55	4
GE00601210			10			
GE00701506	0.7	1.5	6	50	0.65	4
GE00802006	0.8	2	6	50	0.75	4
GE0100308	1	3	8	60	0.95	4
GE0100310			10			
GE0100312			12			
GE0150412	1.5	4	12	60	1.45	4
GE0200612	2	6	12	60	1.95	4
GE0200612S6						6
GE0250812	2.5	8	12	60	2.43	4
GE0301012	3	10	12	60	2.9	4
GE0301016			16			
GE0301012S6			12			6
GE0301016S6			16			
GE04012S	4	12	-	60	-	6
GE0401216			16			
GE0401220			20			
GE0501520	5	15	20	60	4.8	6
GE06020S	6	20	-	60	-	6
GE0602030			30		80	
GE0603050			50		150	
GE08025S	8	25	-	70	-	8
GE0802540			40		100	
GE0804070			70		150	
GE10030S	10	30	-	80	-	10
GE1003050			50		100	
GE1004580			80		160	
GE12030S	12	30	-	80	-	12
GE1203050			50		110	
GE1205080			80		160	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
						◎		○	

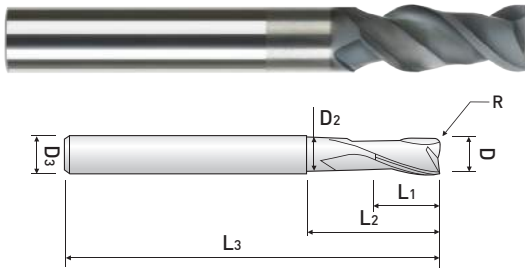
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



## 2 FLUTE, DIAMOND COATING RADIUS ENDMILLS

- High performance on Graphite and Non-ferrous material
- Applicable various Shape machining by applying Variable Corner Radius

## WGR502 .....series



HELIX

AGAINST  
CHIPPING

DIAMOND

p.995

EDP No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
WGR502 002	0.2	-	0.3	-	40	-	3
WGR502 003	0.3	-	0.5	-	40	-	3
WGR502 004	0.4	-	0.6	-	40	-	3
WGR502 005 025	0.5	0.05	0.7	2.5	40	0.45	3
WGR502 005 040				4			
WGR502 006 030	0.6	0.05	0.9	3	40	0.55	3
WGR502 006 050				5			
WGR502 008 040	0.8	0.05	1.2	4	40	0.75	3
WGR502 008 070				7			
WGR502 010 050	1	0.1	1.5	5	40	0.95	3
WGR502 010 085				8.5			
WGR502 010 120				12			
WGR502 012 060	1.2	0.1	1.8	6	50	1.15	3
WGR502 012 100				10			
WGR502 015 075	1.5	0.15	2.2	7.5	50	1.4	3
WGR502 015 120				12			
WGR502 015 180				18			
WGR502 020 100	2	0.15	2.2	10	60	1.9	3
WGR502 020 160				16			
WGR502 020 250				25			
WGR502 030 100	3	0.2	3	10	65	2.9	4
WGR502 030 150				15			
WGR502 030 200				20			
WGR502 030 250				25			
WGR502 030 300	4	0.2	4	30	75	3.9	6
WGR502 040 200				20			
WGR502 040 300				30			
WGR502 040 400				40			
WGR502 050 200	5	0.3	5	20	75	4.9	6
WGR502 050 300				30			
WGR502 050 400				40			
WGR502 050 500				50			
WGR502 060 300	6	0.3	6	30	90	5.9	6
WGR502 060 400				40			
WGR502 060 500				50			
WGR502 060 600				60			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
						◎		○	

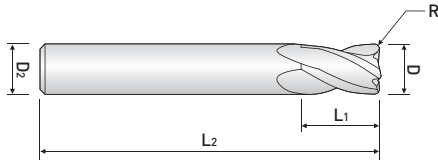
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Dia.	Tolerance	
All size	0 ~ -0,020	h6

※ These tools are manufactured based on order received.

# Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



## 4 FLUTE, DIAMOND COATING RADIUS ENDMILLS

- Improve coating stability by applying high-end Diamond Coating
- Applicable non-ferrous material such as Graphite and CFRP

## WGR504 .....series



EDP No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WGR504 030 02 080	3.0	0.2	8	80	4
WGR504 030 03 080		0.3			
WGR504 030 05 080		0.5			
WGR504 040 03 100	4.0	0.3	10	100	4
WGR504 040 05 100		0.5			
WGR504 040 10 100		1.0			
WGR504 060 03 110	6.0	0.3	15	110	6
WGR504 060 05 110		0.5			
WGR504 060 10 110		1.0			
WGR504 080 05 110	8.0	0.5	20	110	8
WGR504 080 10 110		1.0			
WGR504 080 05 130		0.5		130	
WGR504 080 10 130		1.0			
WGR504 100 05 130	10.0	0.5	25	130	10
WGR504 100 10 130		1.0			
WGR504 100 05 150		0.5		150	
WGR504 100 10 150		1.0			
WGR504 120 05 130	12.0	0.5	30	130	12
WGR504 120 10 130		1.0			
WGR504 120 05 150		0.5		150	
WGR504 120 10 150		1.0			
WGR504 160 05 200	16.0	0.5	32	200	16
WGR504 160 10 200		1.0			
WGR504 200 05 200	20.0	0.5	40	200	20
WGR504 200 10 200		1.0			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
						◎		○	

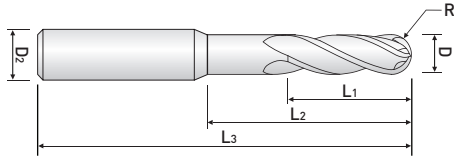
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Dia.	Tolerance	
up to 12	0 - -0,020	h6
over 12	0 - -0,030	

※ These tools are manufactured based on order received.

# Endmill for Graphite and Non-ferrous *ZAMUS GRA MATE Series*



## 4 FLUTE, DIAMOND COATING, BALL NOSE ENDMILLS

- High performance on Graphite and Non-ferrous material

## WGB504 .....series



HELIX ALL SIZE DIAMOND p.996

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
WGB504 010	1.0	0.5	3	-	60	4
WGB504 010 10				10		
WGB504 010 15				15		
WGB504 010 20				20		
WGB504 010 25				25		
WGB504 010 30				30		
WGB504 015	1.5	0.75	4	-	80	4
WGB504 015 10				10		
WGB504 015 15				15		
WGB504 015 20				20		
WGB504 015 25				25		
WGB504 015 30				30		
WGB504 020	2.0	1.0	6	-	100	4
WGB504 020 10				10		
WGB504 020 15				15		
WGB504 020 20				20		
WGB504 020 25				25		
WGB504 020 30				30		
WGB504 020 40	40					
WGB504 030	3.0	1.5	9	-	100	4
WGB504 030 15				15		
WGB504 030 20				20		
WGB504 030 25				25		
WGB504 030 30				30		
WGB504 030 40				40		
WGB504 030 50	50					
WGB504 040 060	4.0	2.0	12	-	60	4
WGB504 040 080					80	
WGB504 040 110					110	
WGB504 040 130					130	
WGB504 040 150					150	
WGB504 050 080	5.0	2.5	15	25	80	6
WGB504 050 110					110	
WGB504 060 090	6.0	3.0	20	-	90	6
WGB504 060 110					110	
WGB504 060 130					130	
WGB504 060 150					150	
WGB504 060 180					180	

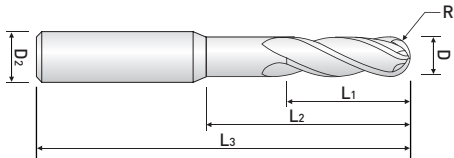
NEXT >>>

# Endmill for Graphite and Non-ferrous *ZAMUS GRA MATE Series*



## 4 FLUTE, DIAMOND COATING, BALL NOSE ENDMILLS

- High performance on Graphite and Non-ferrous material



## WGB504 .....series



HELIX ALL SIZE DIAMOND p.996

EDP No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
WGB504 080 110	8.0	4.0	25	-	110	8
WGB504 080 130					130	
WGB504 080 150					150	
WGB504 080 200					200	
WGB504 100 110	10.0	5.0	30	-	110	10
WGB504 100 130					130	
WGB504 100 150					150	
WGB504 100 180					180	
WGB504 100 200					200	
WGB504 120 110	12.0	6.0	35	-	110	12
WGB504 120 130					130	
WGB504 120 150					150	
WGB504 120 180					180	
WGB504 120 200					200	
WGB504 160 150	16.0	8.0	50	-	150	16
WGB504 160 200					200	
WGB504 200 150	20.0	10.0	60	-	150	20
WGB504 200 200					200	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
						◎		○	

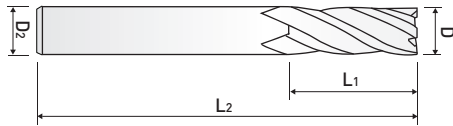
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Dia.	Tolerance	
up to 12	0 - -0,020	h6
over 12	0 - -0,030	

※ These tools are manufactured based on order received.

# Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



## 4 FLUTE, DIAMOND COATING, BALL NOSE ENDMILLS

- High performance on Graphite, Reinforced plastic and Non-ferrous material

## WGE504 .....series



HELIX



DIAMOND



p.998

EDP No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WGE504 020	2.0	6	50	4
WGE504 020 08		8		
WGE504 020 10		10		
WGE504 025	2.5	8	50	4
WGE504 030	3.0	8	50	6
WGE504 030 10		10		
WGE504 030 12		12		
WGE504 030 16		16		
WGE504 030 20	20	60	6	
WGE504 040	4.0	10		50
WGE504 040 12		12		
WGE504 040 16		16		60
WGE504 040 20		20		
WGE504 040 25		25		
WGE504 050	5.0	15	60	6
WGE504 060	6.0	15	60	6
WGE504 060 20		20	110	
WGE504 060 30		30	150	
WGE504 080	8.0	20	70	8
WGE504 080 30		30	110	
WGE504 080 40		40	150	
WGE504 100	10.0	25	75	10
WGE504 100 40		40	110	
WGE504 100 50		50	150	
WGE504 120	12.0	30	80	12
WGE504 120 50		50	120	
WGE504 120 60		60	160	
WGE504 160	16.0	50	110	16
WGE504 160 70		70	160	
WGE504 160 90		90	160	
WGE504 160 100		100	200	
WGE504 200	20.0	70	160	20
WGE504 200 90		90	160	
WGE504 200 100		100	200	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
						◎		○	

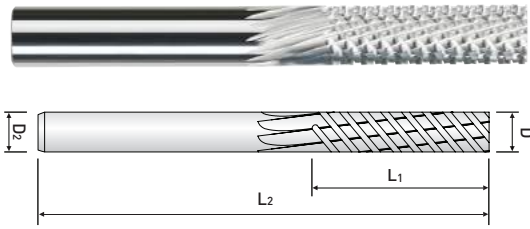
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Dia.	Tolerance	
All Size	0 ~ -0,030	h6

※ These tools are manufactured based on order received.

# Endmill for Graphite and Non-ferrous ZAMUS GRA MATE Series



## WINNER ROUTER SERIES

- Suitable for Ceramic machining such as Graphite and Non-ferrous material
- Suitable for composite material machining such as CFRP, AFRP and GFRP

## WROU .....series



HELIX

HELIX

DIAMOND

p.997

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	No.OF FLUTE	END STYLE	COATING
WROU060XN	6	25	63	6	8	X	X
WROU060YN						O	X
WROU060XC	6	25	63	6	8	X	O
WROU060YC						O	O
WROU080XN	8	25	63	8	10	X	X
WROU080YN						O	X
WROU080XC	8	25	63	8	10	X	O
WROU080YC						O	O
WROU100XN	10	28	63	10	12	X	X
WROU100YN						O	X
WROU100XC	10	28	63	10	12	X	O
WROU100YC						O	O
WROU120XN	12	38	89	12	12	X	X
WROU120YN						O	X
WROU120XC	12	38	89	12	12	X	O
WROU120YC						O	O

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
						◎		○	

○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Dia.	Tolerance	
All Size	0 ~ -0,05	h6

※ These tools are manufactured based on order received.




















# Aluminum Endmills

ALU WAVE SERIES



## Aluminum Endmills \_ ALU WAVE SERIES

**WIDIN**

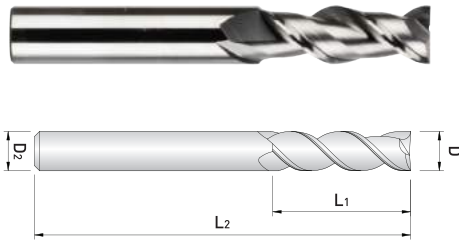
EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
WAE302A ...series		STUB LENGTH, UNCOATED	INCH	•	377
WAE502A ...series		STUB LENGTH, DLC COATED	INCH	•	377
WAE312A ...series		REGULAR LENGTH, UNCOATED	INCH	•	378
WAE512A ...series		REGULAR LENGTH, DLC COATED	INCH	•	378
WAE322A ...series		LONG LENGTH, UNCOATED	INCH	•	379
WAE522A ...series		LONG LENGTH, DLC COATED	INCH	•	379
WAR302A ...series		STUB LENGTH, UNCOATED	INCH	•	380
WAR502A ...series		STUB LENGTH, DLC COATED	INCH	•	380
WAR312A ...series		REGULAR LENGTH, UNCOATED	INCH	•	381
WAR512A ...series		REGULAR LENGTH, DLC COATED	INCH	•	381
WAR322A ...series		LONG LENGTH, UNCOATED	INCH	•	382
WAR522A ...series		LONG LENGTH, DLC COATED	INCH	•	382
WAE303A ...series		STUB LENGTH, UNCOATED	INCH	•	383
WAE503A ...series		STUB LENGTH, DLC COATED	INCH	•	383
WAE313A ...series		STUB LENGTH, UNCOATED	INCH	•	384
WAE513A ...series		REGULAR LENGTH, DLC COATED	INCH	•	384
WAE323A ...series		LONG LENGTH, UNCOATED	INCH	•	385
WAE523A ...series		LONG LENGTH, DLC COATED	INCH	•	385
WAR303A ...series		STUB LENGTH, UNCOATED	INCH	•	386
WAR503A ...series		STUB LENGTH, DLC COATED	INCH	•	386

## Aluminum Endmills \_ ALU WAVE SERIES

**WIDIN**

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
WAR313A ...series		REGULAR LENGTH, UNCOATED	INCH	•	387
WAR513A ...series		REGULAR LENGTH, DLC COATED	INCH	•	387
WAR323A ...series		LONG LENGTH, UNCOATED	INCH	•	388
WAR523A ...series		LONG LENGTH, DLC COATED	INCH	•	388
WAB312A ...series		LONG LENGTH, BALL NOSE	INCH	•	389
WAF303A ...series		ROUGHING ENDMILL FOR ALUMINNM	INCH	•	390
WAF313A ...series		ROUGHING ENDMILL FOR ALUMINNM	INCH	•	391
WAB312 ...series		2 FLUTE, 50 HELIX BALL ENDMILL FOR ALUMINNM	METRIC	•	392
WAE301 ...series		1 FLUTE, SQUARE ENDMILL, REGULAR LENGTH	METRIC	•	393
WAE302 ...series		2 FLUTE, SQUARE ENDMILL, REGULAR LENGTH	METRIC	•	395
WAE30(2)3 ...series		3 FLUTE, SQUARE ENDMILL, REGULAR & LONG LENGTH	METRIC	•	396
WAR302 ...series		2 FLUTE, CORNER RADIUS ENDMILL, REGULAR LENGTH	METRIC	•	400
WAR303 ...series		3 FLUTE, CORNER RADIUS ENDMILL, REGULAR LENGTH	METRIC	•	401
WAR502 ...series		2 FLUTE, CORNER RADIUS ENDMILL, DLC COATED, REGULAR LENGTH	METRIC	•	402
WAR503 ...series		3 FLUTE, CORNER RADIUS ENDMILL, DLC COATED, REGULAR LENGTH	METRIC	•	403
WAF303 ...series		3 FLUTE, ROUGHER ENDMILL, REGULAR & LONG LENGTH	METRIC	•	404

# Aluminum Endmills *ALU WAVE Series*



## 2 FLUTE, STUB LENGTH, SQUARE - for Aluminum

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics.
- Available both Uncoated and Diamond Like Coated for more performance options.

## WAE302A .....series



EDP. No.		Dimension (Inch)			
NON-Coated	D.L.C.Coated	D	C.L	OAL	SH.Dia
WAE302A008	WAE502A008	1/8	1/4	1-1/2	1/8
WAE302A012	WAE502A012	3/16	5/16	2	3/16
WAE302A016	WAE502A016	1/4	3/8	2-1/2	1/4
WAE302A020	WAE502A020	5/16	7/16	2-1/2	5/16
WAE302A024	WAE502A024	3/8	1/2	2-1/2	3/8
WAE302A028	WAE502A028	7/16	9/16	2-3/4	7/16
WAE302A032	WAE502A032	1/2	3/4	3	1/2
WAE302A040	WAE502A040	5/8	7/8	3-1/2	5/8
WAE302A048	WAE502A048	3/4	1	4	3/4
WAE302A064	WAE502A064	1	1-1/2	4	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

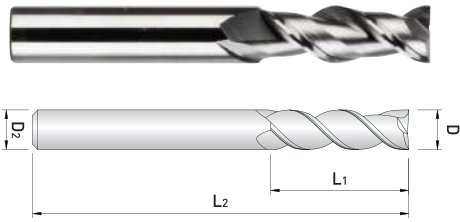
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	Shank Dia.
0 ~ .0008	h6

※ These tools are manufactured based on order received.

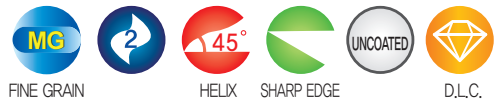
# Aluminum Endmills *ALU WAVE Series*



## 2 FLUTE, REGULAR CUT LENGTH, SQUARE - for Aluminum

- High performance geometry and polished flutes
- Optimized design for effective chip evacuation
- Great workpiece finish
- Excellent for Aluminum, Other Non-Ferrous Metals, Graphite & Plastics

## WAE312A .....series



EDP. No.		Dimension (Inch)			
NON-Coated	D.L.C.Coated	D	C.L	OAL	SH.Dia
WAE312A008	WAE512A008	1/8	3/8	1-1/2	1/8
WAE312A012	WAE512A012	3/16	9/16	2	3/16
WAE312A016	WAE512A016	1/4	3/4	2-1/2	1/4
WAE312A020	WAE512A020	5/16	13/16	2-1/2	5/16
WAE312A024	WAE512A024	3/8	1	2-1/2	3/8
WAE312A028	WAE512A028	7/16	1	2-3/4	7/16
WAE312A032	WAE512A032	1/2	1-1/4	3	1/2
WAE312A040	WAE512A040	5/8	1-5/8	3-1/2	5/8
WAE312A048	WAE512A048	3/4	1-5/8	4	3/4
WAE312A064	WAE512A064	1	2	5	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

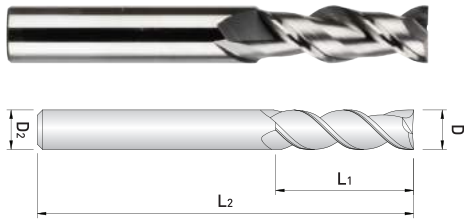
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	Shank Dia.
0 ~ .0008	h6

※ These tools are manufactured based on order received.

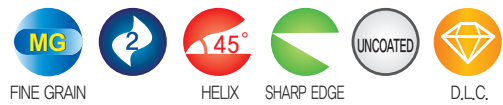
# Aluminum Endmills *ALU WAVE Series*



## 2 FLUTE, LONG CUT LENGTH, SQUARE - for Aluminum

- High performance geometry and polished flutes
- Optimized design for effective chip evacuation
- Great workpiece finish
- Excellent for Aluminum, Other Non-Ferrous Metals, Graphite & Plastics

## WAE322A .....series



EDP. No.		Dimension (Inch)			
NON-Coated	D.L.C.Coated	D	C.L	OAL	SH.Dia
WAE322A016	WAE522A016	1/4	1-1/2	4	1/4
WAE322A020	WAE522A020	5/16	1-1/2	4	5/16
WAE322A024	WAE522A024	3/8	1-1/2	4	3/8
WAE322A032	WAE522A032	1/2	2	4	1/2
WAE322A040	WAE522A040	5/8	2-1/2	5	5/8
WAE322A048	WAE522A048	3/4	2-1/2	5	3/4
WAE322A064	WAE522A064	1	3-1/4	6	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

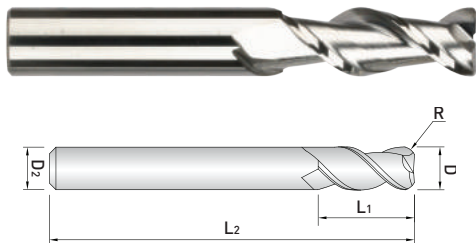
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	Shank Dia.
0 ~ .0008	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 2 FLUTE, REGULAR CUT LENGTH, CORNER RADIUS - for Aluminum

- High performance geometry and polished flutes
- Optimized design for effective chip evacuation
- Great workpiece finish
- Excellent for Aluminum, Other Non-Ferrous Metals, Graphite & Plastics

## WAR302A .....series



EDP. No.		Dimension (Inch)				
NON-Coated	D.L.C.Coated	D	R	C.L	OAL	SH.Dia
WAR302A008010	WAR502A008010	1/8	.010	1/4	1-1/2	1/8
WAR302A012010	WAR502A012010	3/16	.010	5/16	2	3/16
WAR302A016010	WAR502A016010	1/4	.010	3/8	2-1/2	1/4
WAR302A020020	WAR502A020020	5/16	.020	7/16	2-1/2	5/16
WAR302A024020	WAR502A024020	3/8	.020	1/2	2-1/2	3/8
WAR302A028020	WAR502A028020	7/16	.020	9/16	2-3/4	7/16
WAR302A032020	WAR502A032020	1/2	.020	3/4	3	1/2
WAR302A040030	WAR502A040030	5/8	.030	7/8	3-1/2	5/8
WAR302A048030	WAR502A048030	3/4	.030	1	4	3/4
WAR302A064030	WAR502A064030	1	.030	1-1/2	4	1

Aluminum Endmills – ALU WAVE Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

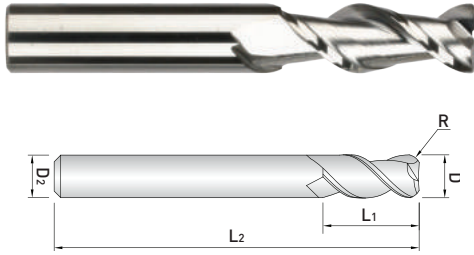
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (Inch)	Shank Dia.
0 ~ .0008	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 2 FLUTE, REGULAR CUT LENGTH, CORNER RADIUS - for Aluminum

- High performance geometry and polished flutes
- Optimized design for effective chip evacuation
- Great workpiece finish
- Excellent for Aluminum, Other Non-Ferrous Metals, Graphite & Plastics

## WAR312A .....series



EDP. No.		Dimension (Inch)				
NON-Coated	D.L.C.Coated	D	R	C.L	OAL	SH.Dia
WAR312A008010	WAR512A008010	1/8	.010	3/8	1-1/2	1/8
WAR312A012010	WAR512A012010	3/16	.010	9/16	2	3/16
WAR312A016010	WAR512A016010	1/4	.010	3/4	2-1/2	1/4
WAR312A020020	WAR512A020020	5/16	.020	13/16	2-1/2	5/16
WAR312A024020	WAR512A024020	3/8	.020	1	2-1/2	3/8
WAR312A028020	WAR512A028020	7/16	.020	1	2-3/4	7/16
WAR312A032020	WAR512A032020	1/2	.020	1-1/4	3	1/2
WAR312A040030	WAR512A040030	5/8	.030	1-5/8	3-1/2	5/8
WAR312A048030	WAR512A048030	3/4	.030	1-5/8	4	3/4
WAR312A064030	WAR512A064030	1	.030	2	5	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

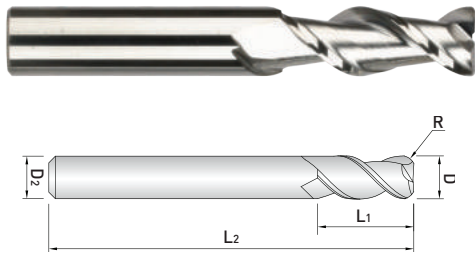
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	Shank Dia.
0 ~ .0008	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 2 FLUTE, LONG CUT LENGTH, CORNER RADIUS - for Aluminum

- High performance geometry and polished flutes
- Optimized design for effective chip evacuation
- Great workpiece finish
- Excellent for Aluminum, Other Non-Ferrous Metals, Graphite & Plastics

## WAR322A .....series



EDP. No.		Dimension (Inch)				
NON-Coated	D.L.C.Coated	D	R	C.L	OAL	SH.Dia
WAR322A016010	WAR522A016010	1/4	.010	1-1/2	4	1/4
WAR322A020020	WAR522A020020	5/16	.020	1-1/2	4	5/16
WAR322A024020	WAR522A024020	3/8	.020	1-1/2	4	3/8
WAR322A032020	WAR522A032020	1/2	.020	2	4	1/2
WAR322A040030	WAR522A040030	5/8	.030	2-1/2	5	5/8
WAR322A048030	WAR522A048030	3/4	.030	2-1/2	5	3/4
WAR322A064030	WAR522A064030	1	.030	3-1/4	6	1

Aluminum Endmills – ALU WAVE Series

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

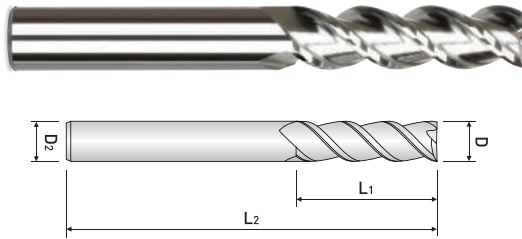
○:General Application ◎:The most suitable Application

■ Tolerance

Mill Dia. (Inch)	Shank Dia.
0 ~ .0008	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills ALU WAVE Series



## 3 FLUTE, STUB LENGTH, SQUARE - for Aluminum

- High performance geometry and polished flutes
- Designed for high speed cutting with excellent workpiece finish
- Optimized design for reducing cutting load and effective chip evacuation
- Excellent for Aluminum, Aluminum Alloys, Copper and Other Non-Ferrous Metals

## WAE303A .....series



EDP. No.		Dimension (Inch)			
NON-Coated	D.L.C.Coated	D	C.L	OAL	SH.Dia
WAE303A008	WAE503A008	1/8	1/4	1-1/2	1/8
WAE303A012	WAE503A012	3/16	5/16	2	3/16
WAE303A016	WAE503A016	1/4	3/8	2-1/2	1/4
WAE303A020	WAE503A020	5/16	7/16	2-1/2	5/16
WAE303A024	WAE503A024	3/8	1/2	2-1/2	3/8
WAE303A028	WAE503A028	7/16	9/16	2-3/4	7/16
WAE303A032	WAE503A032	1/2	5/8	3	1/2
WAE303A040	WAE503A040	5/8	3/4	3-1/2	5/8
WAE303A048	WAE503A048	3/4	1	4	3/4
WAE303A064	WAE503A064	1	1-1/4	4	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

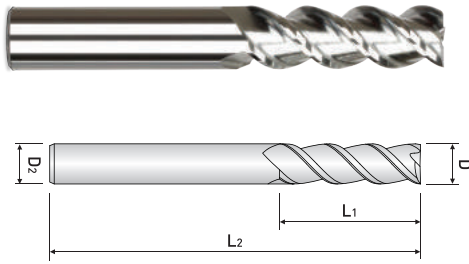
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	Shank Dia.
0 ~ .0008	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 3 FLUTE, REGULAR LENGTH, SQUARE - for Aluminum

- High performance geometry and polished flutes
- Designed for high speed cutting with excellent workpiece finish
- Optimized design for reducing cutting load and effective chip evacuation
- Excellent for Aluminum, Aluminum Alloys, Copper and Other Non-Ferrous Metals

## WAE313A .....series



EDP. No.		Dimension (Inch)			
NON-Coated	D.L.C.Coated	D	C.L	OAL	SH.Dia
WAE313A008	WAE513A008	1/8	3/8	1-1/2	1/8
WAE313A012	WAE513A012	3/16	9/16	2	3/16
WAE313A016	WAE513A016	1/4	3/4	2-1/2	1/4
WAE313A020	WAE513A020	5/16	13/16	2-1/2	5/16
WAE313A024	WAE513A024	3/8	1	2-1/2	3/8
WAE313A028	WAE513A028	7/16	1-1/4	2-3/4	7/16
WAE313A032	WAE513A032	1/2	1-1/4	3	1/2
WAE313A040	WAE513A040	5/8	1-5/8	3-1/2	5/8
WAE313A048	WAE513A048	3/4	1-5/8	4	3/4
WAE313A064	WAE513A064	1	2	5	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

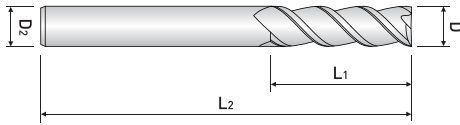
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	Shank Dia.
0 ~ .0008	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills ALU WAVE Series



## 2 FLUTE, REGULAR CUT LENGTH, SQUARE - for Aluminum

- High performance geometry and polished flutes
- Designed for high speed cutting with excellent workpiece finish
- Optimized design for reducing cutting load and effective chip evacuation
- Excellent for Aluminum, Aluminum Alloys, Copper and Other Non-Ferrous Metals

## WAE323A .....series



EDP. No.		Dimension (Inch)			
NON-Coated	D.L.C.Coated	D	C.L	OAL	SH.Dia
WAE323A016	WAE523A016	1/4	1-1/2	4	1/4
WAE323A020	WAE523A020	5/16	1-1/2	4	5/16
WAE323A024	WAE523A024	3/8	1-1/2	4	3/8
WAE323A032	WAE523A032	1/2	2	4	1/2
WAE323A040	WAE523A040	5/8	2-1/2	5	5/8
WAE323A048	WAE523A048	3/4	2-1/2	5	3/4
WAE323A064	WAE523A064	1	3-1/4	6	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~ HB225	Alloy Steels (SCM, SK...) HB22 ~ 325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

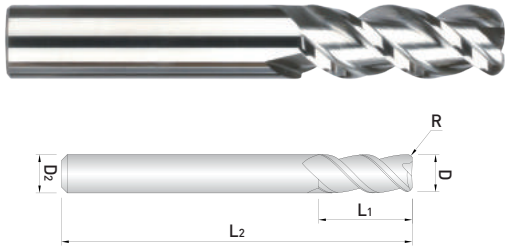
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	Shank Dia.
0 ~ .0008	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 3 FLUTE, STUB LENGTH, CORNER RADIUS - for Aluminum

- High performance geometry and polished flutes
- Designed for high speed cutting with excellent workpiece finish
- Optimized design for reducing cutting load and effective chip evacuation
- Excellent for Aluminum, Aluminum Alloys, Copper and Other Non-Ferrous Metals

## WAR303A .....series



EDP. No.		Dimension (Inch)				
NON-Coated	D.L.C.Coated	D	R	C.L	OAL	SH.Dia
WAR303A008010	WAR503A008010	1/8	.010	1/4	1-1/2	1/8
WAR303A012010	WAR503A012010	3/16	.010	5/16	2	3/16
WAR303A012020	WAR503A012020	3/16	.020	5/16	2	3/16
WAR303A016010	WAR503A016010	1/4	.010	3/8	2-1/2	1/4
WAR303A016020	WAR503A016020	1/4	.020	3/8	2-1/2	1/4
WAR303A016030	WAR503A016030	1/4	.030	3/8	2-1/2	1/4
WAR303A016060	WAR503A016060	1/4	.060	3/8	2-1/2	1/4
WAR303A020020	WAR503A020020	5/16	.020	7/16	2-1/2	5/16
WAR303A020030	WAR503A020030	5/16	.030	7/16	2-1/2	5/16
WAR303A024020	WAR503A024020	3/8	.020	1/2	2-1/2	3/8
WAR303A024030	WAR503A024030	3/8	.030	1/2	2-1/2	3/8
WAR303A024060	WAR503A024060	3/8	.060	1/2	2-1/2	3/8
WAR303A028020	WAR503A028020	7/16	.020	9/16	2-3/4	7/16
WAR303A032020	WAR503A032020	1/2	.020	5/8	3	1/2
WAR303A032030	WAR503A032030	1/2	.030	5/8	3	1/2
WAR303A032060	WAR503A032060	1/2	.060	5/8	3	1/2
WAR303A040030	WAR503A040030	5/8	.030	3/4	3-1/2	5/8
WAR303A040060	WAR503A040060	5/8	.060	3/4	3-1/2	5/8
WAR303A040090	WAR503A040090	5/8	.090	3/4	3-1/2	5/8
WAR303A048060	WAR503A048060	3/4	.060	1	4	3/4
WAR303A048090	WAR503A048090	3/4	.090	1	4	3/4
WAR303A048120	WAR503A048120	3/4	.120	1	4	3/4
WAR303A064060	WAR503A064060	1	.060	1-1/4	4	1
WAR303A064090	WAR503A064090	1	.090	1-1/4	4	1
WAR303A064120	WAR503A064120	1	.120	1-1/4	4	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

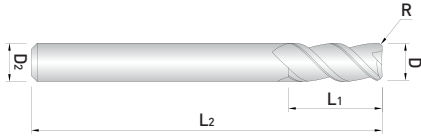
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	Shank Dia.
0 ~ .0008	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 3 FLUTE, STUB LENGTH, CORNER RADIUS - for Aluminum

- High performance geometry and polished flutes
- Designed for high speed cutting with excellent workpiece finish
- Optimized design for reducing cutting load and effective chip evacuation
- Excellent for Aluminum, Aluminum Alloys, Copper and Other Non-Ferrous Metals

## WAR313A .....series



EDP. No.		Dimension (Inch)				
NON-Coated	D.L.C.Coated	D	R	C.L	OAL	SH.Dia
WAR313A008010	WAR513A008010	1/8	.010	3/8	1-1/2	1/8
WAR313A012010	WAR513A012010	3/16	.010	9/16	2	3/16
WAR313A012020	WAR513A012020	3/16	3/16	9/16	2	3/16
WAR313A016010	WAR513A016010	1/4	.010	5/8	2-1/2	1/4
WAR313A016020	WAR513A016020	1/4	.020	5/8	2-1/2	1/4
WAR313A016030	WAR513A016030	1/4	.030	5/8	2-1/2	1/4
WAR313A016060	WAR513A016060	1/4	.060	5/8	2-1/2	1/4
WAR313A020020	WAR513A020020	5/16	.020	13/16	2-1/2	5/16
WAR313A020030	WAR513A020030	5/16	.030	13/16	2-1/2	5/16
WAR313A024020	WAR513A024020	3/8	.020	1	2-1/2	3/8
WAR313A024030	WAR513A024030	3/8	.030	1	2-1/2	3/8
WAR313A024060	WAR513A024060	3/8	.060	1	2-1/2	3/8
WAR313A028020	WAR513A028020	7/16	.020	1-1/4	2-3/4	7/16
WAR313A032020	WAR513A032020	1/2	.020	1-1/4	3	1/2
WAR313A032030	WAR513A032030	1/2	.030	1-1/4	3	1/2
WAR313A032060	WAR513A032060	1/2	.060	1-1/4	3	1/2
WAR313A040030	WAR513A040030	5/8	.030	1-5/8	3-1/2	5/8
WAR313A040060	WAR513A040060	5/8	.060	1-5/8	3-1/2	5/8
WAR313A040090	WAR513A040090	5/8	.090	1-5/8	3-1/2	5/8
WAR313A048060	WAR513A048060	3/4	.060	1-5/8	4	3/4
WAR313A048090	WAR513A048090	3/4	.090	1-5/8	4	3/4
WAR313A048120	WAR513A048120	3/4	.120	1-5/8	4	3/4
WAR313A064060	WAR513A064060	1	.060	2	5	1
WAR313A064090	WAR513A064090	1	.090	2	5	1
WAR313A064120	WAR513A064120	1	.120	2	5	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

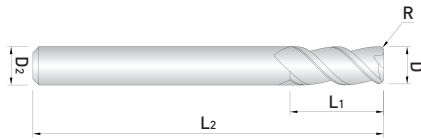
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	Shank Dia.
0 ~ .0008	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 3 FLUTE, LONG LENGTH, CORNER RADIUS ENDMILL - for Aluminum

- High performance geometry and polished flutes
- Designed for high speed cutting with excellent workpiece finish
- Optimized design for reducing cutting load and effective chip evacuation
- Excellent for Aluminum, Aluminum Alloys, Copper and Other Non-Ferrous Metals

## WAR323A .....series



FINE GRAIN



HELIX



D.L.C.



UNCOATED

EDP. No.		Dimension (Inch)				
NON-Coated	D.L.C.Coated	D	R	C.L	OAL	SH.Dia
WAR323A016010	WAR523A016010	1/4	.010	1-1/2	4	1/4
WAR323A016020	WAR523A016020	1/4	1/4	1-1/2	4	1/4
WAR323A016030	WAR523A016030	1/4	1/4	1-1/2	4	1/4
WAR323A016060	WAR523A016060	1/4	1/4	1-1/2	4	1/4
WAR323A020020	WAR523A020020	5/16	5/16	1-1/2	4	5/16
WAR323A020030	WAR523A020030	5/16	5/16	1-1/2	4	5/16
WAR323A024020	WAR523A024020	3/8	3/8	1-1/2	4	3/8
WAR323A024030	WAR523A024030	3/8	3/8	1-1/2	4	3/8
WAR323A024060	WAR523A024060	3/8	3/8	1-1/2	4	3/8
WAR323A032020	WAR523A032020	1/2	1/2	2	4	1/2
WAR323A032030	WAR523A032030	1/2	1/2	2	4	1/2
WAR323A032060	WAR523A032060	1/2	1/2	2	4	1/2
WAR323A040030	WAR523A040030	5/8	5/8	2-1/2	5	5/8
WAR323A040060	WAR523A040060	5/8	5/8	2-1/2	5	5/8
WAR323A040090	WAR523A040090	5/8	5/8	2-1/2	5	5/8
WAR323A048060	WAR523A048060	3/4	3/4	2-1/2	5	3/4
WAR323A048090	WAR523A048090	3/4	3/4	2-1/2	5	3/4
WAR323A048120	WAR523A048120	3/4	3/4	2-1/2	5	3/4
WAR323A064060	WAR523A064060	1	1	3-1/4	6	1
WAR323A064090	WAR523A064090	1	1	3-1/4	6	1
WAR323A064120	WAR523A064120	1	1	3-1/4	6	1

Aluminum Endmills – ALU WAVE Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

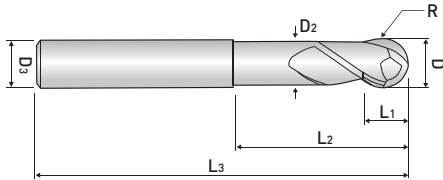
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	Shank Dia.
0 ~ .0008	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills ALU WAVE Series



## 2 FLUTE, REGULAR LENGTH, STUB BALL NOSE ENDMILL - for Aluminum

- High performance geometry and polished flutes on Aluminum, Non-Ferrous Materials, Graphite & Plastics
- Available both Uncoated and Diamond Like Coated for more performance options

## WAB312A .....series



EDP. No.	Dimension(Inch)						
	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	SH.Dia
WAB312A008	1/8	R1/16	1/8	3/8	3	.115	1/8
WAB312A012	3/16	R3/32	3/16	9/16	3	.175	3/16
WAB312A016	1/4	R1/8	1/4	2	3	.230	1/4
WAB312A024	3/8	R3/16	3/8	2-1/4	3-1/2	.345	3/8
WAB312A032	1/2	R1/4	1/2	2-1/2	4	.460	1/2

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
	○				○			◎	

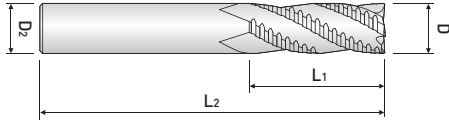
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	Shank Dia.
± .0008	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 3 FLUTE, ROUGHER ENDMILL, REGULAR & LONG LENGTH - for Aluminum

DIN6527L / DIN6535-HA, DIN6535-HB

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-Ferrous material
- High performance geometry and coarse pitch combined for excellent tool life
- Regular and Long lengths
- Uncoated only
- Excellent for Aluminum, Aluminum Alloys, Non-Ferrous Metals, Graphite and Plastics

## WAF303A .....series



EDP. No.	Dimension (Inch)			
	D	C.L	OAL	SH.Dia
WAF303A024	3/8	1	3	3/8
WAF303A024L	3/8	1-1/2	3-1/2	3/8
WAF303A032	1/2	1-1/4	3-1/4	1/2
WAF303A032L	1/2	2	4	1/2
WAF303A040	5/8	1-1/4	3-1/2	5/8
WAF303A040L	5/8	2-1/2	5	5/8
WAF303A048	3/4	1-1/2	4	3/4
WAF303A048L	3/4	2-1/2	5	3/4
WAF303A064	1	1-1/2	4	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

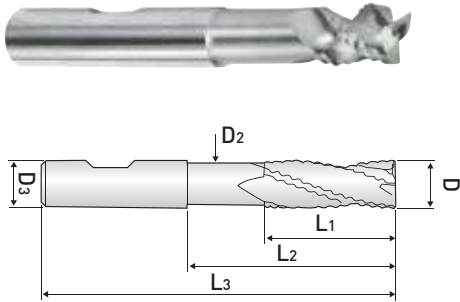
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	1/4 ~ 3/8	1/2 ~ 5/8	3/4 ~ 1
Tolerance	0 ~ -.0022	0 ~ -.0027	0 ~ -.0033

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 3 FLUTE, ROUGHER ENDMILL, LONG REACH & STUB CUT - for Aluminum

- High performance geometry and coarse pitch combined for excellent tool life
- Extra-long OAL with long necked reach and stub flute length
- Uncoated only
- Excellent for Aluminum, Aluminum Alloys, Non-Ferrous Metals, Graphite and Plastics

## WAF313A .....series



EDP. No.	Dimension (Inch)					
	D	C.L	Neck Length	OAL	Neck Dia.	SH.Dia
WAF313A024	3/8	7/16	2-1/4	3-1/2	0.345	3/8
WAF313A032	1/2	9/16	2-1/2	4	0.460	1/2
WAF313A040	5/8	3/4	3	5	0.575	5/8
WAF313A048	3/4	13/16	4	6	0.710	3/4
WAF313A064	1	15/16	4	6	0.960	1

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

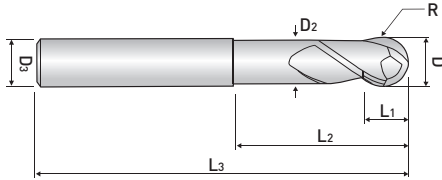
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (Inch)	1/4 ~ 3/8	1/2 ~ 5/8	3/4 ~ 1
Tolerance	0 ~ -.0022	0 ~ -.0027	0 ~ -.0033

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 2 FLUTE, STUB CUT BALL NOSE - for Aluminum

- Excellent cutting quality on aluminum & copper
- high polished flute face improving chip evacuation and Lubricity

## WAB312 ...series



FINE GRAIN



HELIX



p.998

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
WAB312 060	6	3	5.5	25	55	5.4	6
WAB312 061	6	3	5.5	40	90	5.4	6
WAB312 080	8	4	7	30	65	7.2	8
WAB312 081	8	4	7	50	100	7.2	8
WAB312 100	10	5	8.5	35	75	9	10
WAB312 101	10	5	10	50	100	9	10
WAB312 102	10	5	10	60	150	9	10
WAB312 120	12	6	10.5	40	75	11	12
WAB312 121	12	6	12	50	110	11	12
WAB312 122	12	6	12	60	150	11	12
WAB312 160	16	8	14	50	90	14.5	16
WAB312 161	16	8	16	70	150	14.5	16
WAB312 162	16	8	16	90	200	14.5	16
WAB312 200	20	10	17	50	100	18	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
					○			◎	

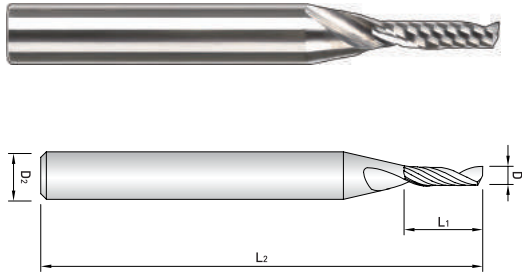
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0,02	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 1 FLUTE, SQUARE ENDMILL, REGULAR LENGTH - for Aluminum

- Excellent cutting quality on aluminum & copper
- high polished flute face improving chip evacuation and Lubricity

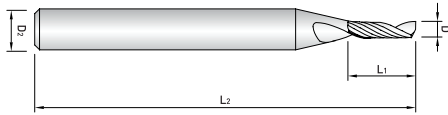
## WAE301 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WAE301 002	0.2	0.3	40	4
WAE301 003	0.3	0.9	40	4
WAE301 004	0.4	1.2	40	4
WAE301 005	0.5	1.5	40	4
WAE301 006	0.6	1.8	40	4
WAE301 007	0.7	2.1	40	4
WAE301 008	0.8	2.4	40	4
WAE301 009	0.9	2.7	40	4
WAE301 010	1	3	45	6
WAE301 010-4.5	1	4.5	45	6
WAE301 010-6	1	6	50	6
WAE301 012	1.2	3	45	6
WAE301 012-5	1.2	5	45	6
WAE301 012-6	1.2	6	50	6
WAE301 015	1.5	4	45	6
WAE301 015-6	1.5	6	50	6
WAE301 015-8	1.5	8	50	6
WAE301 020	2	6	50	6
WAE301 020-8	2	8	50	6
WAE301 020-10	2	10	50	6
WAE301 025	2.5	7	50	6

NEXT &gt;&gt;

# Aluminum Endmills *ALU WAVE Series*



## 1 FLUTE, SQUARE ENDMILL, REGULAR LENGTH - for Aluminum

- Excellent cutting quality on aluminum & copper
- high polished flute face improving chip evacuation and Lubricity



## WAE301 ...series

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WAE301 025-8	2.5	8	50	6
WAE301 025-10	2.5	10	50	6
WAE301 025-12	2.5	12	50	6
WAE301 030	3	8	50	6
WAE301 030-12	3	12	50	6
WAE301 030-15	3	15	50	6
WAE301 040	4	10	50	6
WAE301 040-15	4	15	50	6
WAE301 040-20	4	20	60	6
WAE301 050	5	13	60	6
WAE301 050-20	5	20	60	6
WAE301 050-25	5	25	60	6
WAE301 060	6	15	60	6
WAE301 060-20	6	20	60	6
WAE301 060-25	6	25	60	6
WAE301 080	8	20	70	8
WAE301 080-25	8	25	75	8
WAE301 100	10	22	75	10
WAE301 100-30	10	30	80	10
WAE301 120	12	26	75	12
WAE301 120-35	12	35	90	12

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
					○			◎	

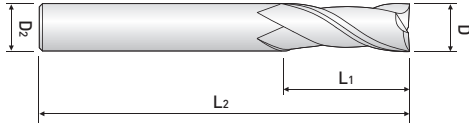
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 5	0 ~ -0.02	h6
over 5	0 ~ -0.03	

※ These tools are manufactured based on order received.

# Aluminum Endmills ALU WAVE Series



## 2 FLUTE, SQUARE ENDMILL, REGULAR LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-ferrous material
- high polished flute face improving chip evacuation and Lubricity

## WAE302 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WAE302 010	1	3	50	4
WAE302 010-6	1	6	60	6
WAE302 012	1.2	4	50	6
WAE302 015	1.5	6	50	6
WAE302 015-8	1.5	8	60	6
WAE302 020 S4	2	6	50	4
WAE302 020	2	6	50	6
WAE302 020-10	2	10	60	6
WAE302 025	2.5	12	55	6
WAE302 030	3	12	55	6
WAE302 030-15	3	15	65	6
WAE302 035	3.5	14	57	6
WAE302 040	4	14	55	6
WAE302 040-16	4	16	65	6
WAE302 050	5	17	55	6
WAE302 050-22	5	22	60	6
WAE302 060	6	17	60	6
WAE302 060-22	6	22	60	6
WAE302 070	7	20	63	8
WAE302 080	8	23	70	8
WAE302 080-31	8	31	80	8
WAE302 090	9	25	72	10
WAE302 100	10	28	75	10
WAE302 100-36	10	36	90	10
WAE302 110	11	30	80	12
WAE302 120	12	33	80	12
WAE302 120-41	12	41	95	12
WAE302 122	12	45	100	12
WAE302 130	13	35	85	14
WAE302 140	14	38	90	14
WAE302 150	15	40	90	16
WAE302 160	16	45	100	16
WAE302 160-53	16	53	110	16
WAE302 180	18	49	100	18
WAE302 200	20	50	100	20
WAE302 200-55	20	55	110	20
WAE302 250	25	50	120	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCI400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

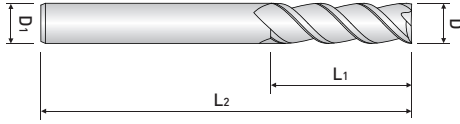
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 3 FLUTE, SQUARE ENDMILL, REGULAR & LONG LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-ferrous material
- Suitable for high speed cutting
- Optimized design for reducing cutting load and maximizing chip evacuation

## WAE30(2)3 ...series

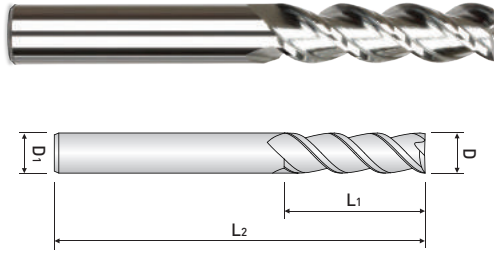


p.1000

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WAE303 010-02	1	2	40	6
WAE303 010-025	1	2.5	40	6
WAE303 010	1	3	50	6
WAE303 010-04	1	4	60	6
WAE303 010-06	1	6	60	6
WAE303 012	1.2	4	50	6
WAE303 015-03	1.5	3	40	6
WAE303 015	1.5	5	50	6
WAE303 015-06	1.5	6	60	6
WAE303 015-08	1.5	8	60	6
WAE303 015-10	1.5	10	60	6
WAE303 020-03	2	3	40	6
WAE303 020	2	6	50	6
WAE303 020-08	2	8	60	6
WAE303 020-10	2	10	60	6
WAE303 020-12	2	12	60	6
WAE303 025	2.5	8	40	6
WAE303 025-10	2.5	10	55	6
WAE303 025-12	2.5	12	60	6
WAE303 030-04	3	4	45	6
WAE303 030-08	3	8	45	6
WAE303 030	3	12	55	6
WAE303 031	3	15	65	6
WAE323 030	3	20	70	6
WAE323 031	3	25	75	6
WAE323 032	3	30	80	6
WAE303 035	3.5	12	55	6
WAE303 040-05	4	5	45	6
WAE303 040-08	4	8	45	6
WAE303 040-11	4	11	45	6
WAE303 040	4	14	55	6
WAE303 040-16	4	16	65	6
WAE303 041	4	20	70	6
WAE323 040	4	26	75	6
WAE323 041	4	30	80	6
WAE303 045	4.5	15	55	6

NEXT &gt;&gt;

# Aluminum Endmills *ALU WAVE Series*



## 3 FLUTE, SQUARE ENDMILL, REGULAR & LONG LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-ferrous material
- Suitable for high speed cutting
- Optimized design for reducing cutting load and maximizing chip evacuation

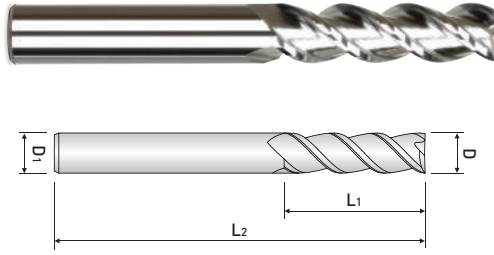
## WAE30(2)3 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WAE303 050-06	5	6	45	6
WAE303 050	5	17	55	6
WAE303 051	5	22	60	6
WAE303 052	5	26	70	6
WAE323 050	5	31	75	6
WAE323 051	5	36	80	6
WAE323 052	5	41	85	6
WAE323 053	5	46	90	6
WAE303 055	5.5	17	55	6
WAE303 060-07	6	7	50	6
WAE303 060-13	6	13	50	6
WAE303 060	6	17	60	6
WAE303 061	6	22	60	6
WAE303 062	6	26	70	6
WAE303 063	6	31	75	6
WAE323 060	6	36	80	6
WAE323 061	6	43	90	6
WAE323 062	6	51	100	6
WAE303 070	7	23	65	8
WAE303 080-10	8	10	60	8
WAE303 080-20	8	20	60	8
WAE303 080	8	23	70	8
WAE303 080-29	8	29	80	8
WAE303 081	8	31	80	8
WAE303 082	8	36	85	8
WAE323 080	8	41	90	8
WAE323 081	8	46	95	8
WAE323 082	8	51	100	8
WAE323 083	8	56	105	8
WAE323 084	8	66	110	8
WAE303 090	9	28	70	10
WAE303 100-12	10	12	65	10
WAE303 100-23	10	23	65	10
WAE303 100	10	28	75	10

NEXT &gt;&gt;

# Aluminum Endmills *ALU WAVE Series*



## 3 FLUTE, SQUARE ENDMILL, REGULAR & LONG LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-ferrous material
- Suitable for high speed cutting
- Optimized design for reducing cutting load and maximizing chip evacuation

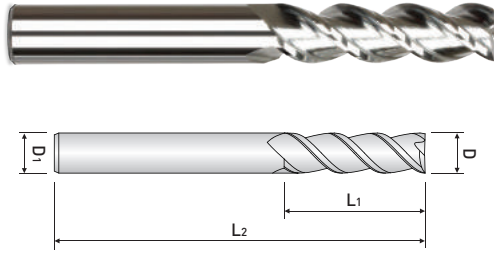
## WAE30(2)3 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WAE303 100-33	10	33	90	10
WAE303 101	10	36	90	10
WAE303 100-41	10	41	90	10
WAE303 102	10	46	100	10
WAE303 103	10	51	100	10
WAE323 100	10	56	110	10
WAE323 100-61	10	61	110	10
WAE323 101	10	66	120	10
WAE303 110	11	30	80	12
WAE303 120-14	12	14	70	12
WAE303 120-27	12	27	70	12
WAE303 120	12	33	80	12
WAE303 121	12	41	95	12
WAE303 122	12	46	100	12
WAE303 122-51	12	51	100	12
WAE303 123	12	56	110	12
WAE303 124-61	12	61	110	12
WAE323 120	12	66	120	12
WAE323 120-71	12	71	120	12
WAE323 121	12	76	135	12
WAE303 130	13	35	85	14
WAE303 140	14	38	90	14
WAE303 150	15	40	90	16
WAE303 160-19	16	19	90	16
WAE303 160-33	16	33	90	16
WAE303 160	16	45	100	16
WAE303 160-53	16	53	105	16
WAE303 161	16	56	110	16
WAE303 162	16	66	130	16
WAE303 163	16	76	150	16
WAE323 160	16	86	160	16
WAE323 161	16	96	180	16
WAE323 162	16	106	190	16
WAE323 163	16	116	200	16

NEXT &gt;&gt;

# Aluminum Endmills ALU WAVE Series



## 3 FLUTE, SQUARE ENDMILL, REGULAR & LONG LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-ferrous material
- Suitable for high speed cutting
- Optimized design for reducing cutting load and maximizing chip evacuation

## WAE30(2)3 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WAE303 180	18	49	100	18
WAE303 200-23	20	23	90	20
WAE303 200-39	20	39	90	20
WAE303 200	20	50	100	20
WAE303 201	20	60	110	20
WAE303 202	20	70	130	20
WAE303 203	20	76	150	20
WAE323 200	20	86	160	20
WAE323 201	20	96	180	20
WAE323 202	20	106	190	20
WAE323 203	20	116	200	20
WAE323 204	20	126	220	20
WAE303 250	25	50	120	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

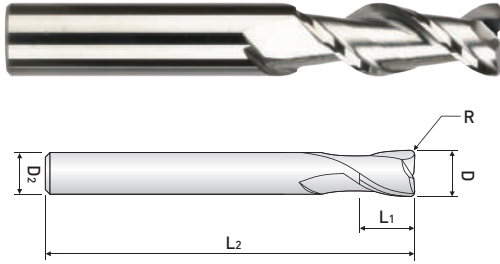
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 2 FLUTE, CORNER RADIUS ENDMILL, REGULAR LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-Ferrous Material

## WAR302 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WAR302 06 05	6	0.5	15	50	6
WAR302 06 10		1			
WAR302 06 15		1.5			
WAR302 06 20		2			
WAR302 08 05	8	0.5	20	60	8
WAR302 08 10		1			
WAR302 08 15		1.5			
WAR302 08 20		2			
WAR302 08 30		3			
WAR302 10 05	10	0.5	25	70	10
WAR302 10 10		1			
WAR302 10 15		1.5			
WAR302 10 20		2			
WAR302 10 30		3			
WAR302 10 40	4				
WAR302 12 10	12	1	30	75	12
WAR302 12 20		2			
WAR302 12 30		3			
WAR302 12 40		4			
WAR302 14 10	14	1	35	80	14
WAR302 14 20		2			
WAR302 14 30		3			
WAR302 14 40		4			
WAR302 14 50		5			
WAR302 16 10	16	1	40	90	16
WAR302 16 20		2			
WAR302 16 30		3			
WAR302 16 40		4			
WAR302 16 50		5			
WAR302 20 10	20	1	45	100	20
WAR302 20 20		2			
WAR302 20 30		3			
WAR302 20 40		4			
WAR302 20 50		5			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
					○			◎	

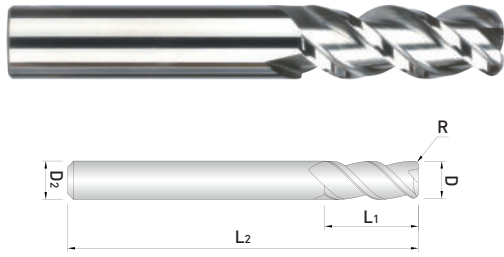
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills ALU WAVE Series



## 3 FLUTE, REGULAR LENGTH, CORNER RADIUS - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-Ferrous Material
- Suitable for High Speed Cutting
- Optimized design for reducing cutting load and effective chip evacuation

## WAR303 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WAR303 06 05	6	0.5	15	50	6
WAR303 06 10		1			
WAR303 06 15		1.5			
WAR303 06 20		2			
WAR303 08 05	8	0.5	20	60	8
WAR303 08 10		1			
WAR303 08 15		1.5			
WAR303 08 20		2			
WAR303 10 05	10	0.5	25	70	10
WAR303 10 10		1			
WAR303 10 15		1.5			
WAR303 10 20		2			
WAR303 10 30		3			
WAR303 10 40		4			
WAR303 12 10	12	1	30	75	12
WAR303 12 20		2			
WAR303 12 30		3			
WAR303 12 40		4			
WAR303 14 10	14	1	35	80	14
WAR303 14 20		2			
WAR303 14 30		3			
WAR303 14 40		4			
WAR303 14 50		5			
WAR303 16 10	16	1	40	90	16
WAR303 16 20		2			
WAR303 16 30		3			
WAR303 16 40		4			
WAR303 16 50		5			
WAR303 20 10	20	1	45	100	20
WAR303 20 20		2			
WAR303 20 30		3			
WAR303 20 40		4			
WAR303 20 50		5			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

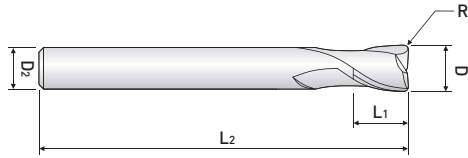
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 2 FLUTE, CORNER RADIUS ENDMILL with DLC COATING, REGULAR LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-Ferrous Material
- Adjust Corner Radius to prevent chipping (Not applicable for R Shape machining)
- Diamond Film Coating maximizes the tool life
- DLC Coated to improve chip evacuation and prolong tool life

## WAR502 ...series



FINE GRAIN



HELIX



D.L.C.



p.1002

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WAR502 010	1	0.05	3	40	6
WAR502 015	1.5	0.05	5	40	6
WAR502 020	2	0.1	6	40	6
WAR502 021		0.1	12		
WAR502 030	3	0.1	10	50	6
WAR502 031		0.1	20		
WAR502 040	4	0.1	12	50	6
WAR502 041		0.1	20		
WAR502 050	5	0.1	15	57	6
WAR502 060	6	0.1	15	57	6
WAR502 061		0.1	22		
WAR502 070	7	0.1	20	63	8
WAR502 080	8	0.1	20	63	8
WAR502 081		0.1	28		
WAR502 090	9	0.1	25	72	10
WAR502 100	10	0.2	28	72	10
WAR502 101		0.2	32		
WAR502 110	11	0.2	30	80	12
WAR502 120	12	0.2	32	80	12
WAR502 121		0.2	40		

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
					○			◎	

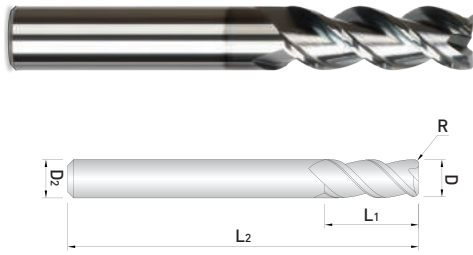
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
±0,02	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills *ALU WAVE Series*



## 3 FLUTE, CORNER RADIUS ENDMILL with DLC COATING, REGULAR LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-Ferrous Material
- Diamond Film Coating maximizes the tool life
- DLC Coated to improve chip evacuation and prolong tool life

## WAR503 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WAR503 040	4	0.5	14	57	6
WAR503 041		1	25	62	
WAR503 060	6	0.5	16	57	6
WAR503 061		1	25	62	
WAR503 080	8	0.5	22	63	8
WAR503 081		1	35	80	
WAR503 100	10	0.5	28	72	10
WAR503 101		1	45	100	
WAR503 120	12	0.5	32	80	12
WAR503 121		1	45	100	
WAR503 160	16	0.5	45	90	16
WAR503 161		1	65	125	
WAR503 200	20	0.5	50	100	20
WAR503 201		1	70	130	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
	○				○			◎	

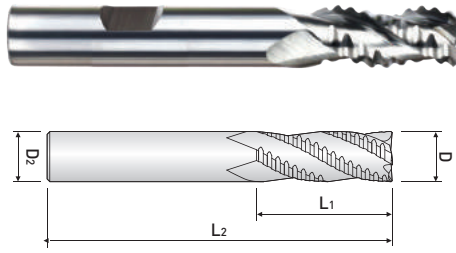
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Aluminum Endmills ALU WAVE Series



## 3 FLUTE, ROUGHER ENDMILL, REGULAR & LONG LENGTH - for Aluminum

- Suitable for Aluminum, Aluminum Alloy, Copper & Non-Ferrous Material
- High performance geometry and coarse pitch combined for excellent tool life
- Regular and Long lengths
- Uncoated only
- Excellent for Aluminum, Aluminum Alloys, Non-Ferrous Metals, Graphite and Plastics

## WAF303 ...series



p.1005

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WAF303 040	4	10	55	6
WAF303 050	5	15	55	6
WAF303 060	6	16	60	6
WAF303 061	6	25	80	6
WAF303 070	7	16	63	8
WAF303 080	8	20	65	8
WAF303 081	8	30	90	8
WAF303 090	9	19	72	10
WAF303 100	10	25	75	10
WAF303 101	10	40	100	10
WAF303 120	12	30	80	12
WAF303 121	12	50	110	12
WAF303 140	14	35	90	14
WAF303 160	16	42	100	16
WAF303 161	16	52	150	16
WAF303 162	16	65	125	16
WAF303 180	18	32	92	18
WAF303 200	20	38	104	20
WAF303 201	20	55	160	20

※ Flat Shank is available upon request

ex) WAF303100F : Flat shank

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
	○				○			◎	

○:General Application ◎:The most suitable Application

### ■ Tolerance

mm = 1/1000mm

Tolerance	Dia.	φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 30
Cutting Edge(h10)	0		0	0	0	0
	-40		-48	-58	-70	-84
Shank(h6)	0		0	0	0	0
	-6		-8	-9	-11	-13



# MEMO



Area with horizontal dotted lines for writing.





# Endmills for General & Multi-purpose

STANDARD ENDMILL SERIES

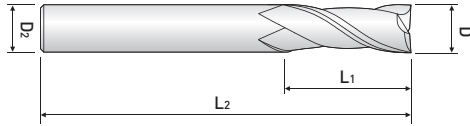


## Endmills for General &amp; Multi-purpose \_ STANDARD END MILL SERIES

**WIDIN**

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
E302 ...series		REGULAR LENGTH	METRIC	•	408
E304 ...series		REGULAR LENGTH	METRIC	•	410
B302 ...series		BALL NOSE LONG LENGTH	METRIC	•	411
BL422 ...series		BALL NOSE EXTRA LONG LENGTH	METRIC	•	412
B304 ...series		BALL NOSE LONG LENGTH	METRIC	•	413
E322 ...series		LONG LENGTH	METRIC	•	414
E324 ...series		LONG LENGTH	METRIC	•	415
EB302 ...series		REGULAR LENGTH - BRAZED TYPE	METRIC	•	416
EB304 ...series		REGULAR LENGTH - BRAZED TYPE	METRIC	•	417
EB306 ...series		REGULAR LENGTH - BRAZED TYPE	METRIC	•	418
EB322 ...series		LONG LENGTH - BRAZED TYPE	METRIC	•	419
EB324 ...series		LONG LENGTH - BRAZED TYPE	METRIC	•	420
BB302 ...series		BALL NOSE REGULAR LENGTH - BRAZED TYPE	METRIC	•	421
BB342 ...series		BALL NOSE REGULAR LENGTH - BRAZED TYPE(ECONOMIC TYPE)	METRIC	•	422
EBF304 ...series		ROUGHING ENDMILL WITH BRAZED CARBIDE CUTTING	METRIC	•	423

# Endmills for General & Multi-purpose STANDARD END MILL Series



## 2 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials

## E302 ...series



FINE GRAIN



HELIX



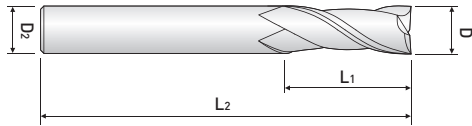
p.1006

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
E302010S4	1	3	42	4
E302010				6
E302015S4	1.5	4	42	4
E302015				6
E302020S4	2	6	42	4
E302020				6
E302025S4	2.5	8	42	4
E302025				6
E302030	3	10	50	6
E302035	3.5	10	50	6
E302040	4	12	50	6
E302045	4.5	14	50	6
E302050	5	15	50	6
E302055	5.5	15	50	6
E302060	6	15	50	6
E302065	6.5	18	60	8
E302070	7	20	60	8
E302075	7.5	20	60	8
E302080	8	20	60	8
E302085	8.5	23	70	10
E302090	9	25	70	10
E302095	9.5	25	70	10
E302100	10	25	70	10
E302105	10.5	28	75	12
E302110	11	30	75	12

※ Please reduce cutting speed around 20~30%

NEXT >>>

# Endmills for General & Multi-purpose STANDARD END MILL Series



## 2 FLUTE, REGULAR LENGTH

- Designed to machine tool steel, alloy steel, mold steel and other high hardened materials



FINE GRAIN



p.1006

## E302 ...series

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
E302115	11.5	30	75	12
E302120	12	30	75	12
E302130	13	35	85	14
E302130S16			90	16
E302140	14	35	85	14
E302140S16			90	16
E302150	15	40	90	16
E302160	16	40	90	16
E302180	18	45	100	18
E302200	20	45	100	20
E302250	25	50	120	25

※ Please reduce cutting speed around 20~30%

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○								

○:General Application ◎:The most suitable Application

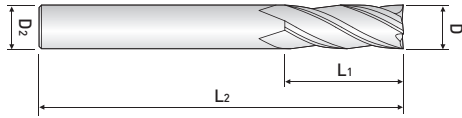
### ■ Tolerance

Tolerance	Dia.	mm = 1/1000mm				
		φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 30
Cutting Edge(h10)		0	0	0	0	0
		-40	-48	-58	-70	-84
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13

# Endmills for General & Multi-purpose STANDARD END MILL Series



4 FLUTE, REGULAR LENGTH



## E304 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
E304020S4	2	6	42	4
E304020				6
E304025	2.5	8	42	6
E304030	3	10	50	6
E304035	3.5	10	50	6
E304040	4	12	50	6
E304045	4.5	14	50	6
E304050	5	15	50	6
E304055	5.5	15	50	6
E304060	6	15	50	6
E304065	6.5	18	60	8
E304070	7	20	60	8
E304075	7.5	20	60	8
E304080	8	20	60	8
E304085	8.5	23	70	10
E304090	9	25	70	10
E304095	9.5	25	70	10
E304100	10	25	70	10
E304105	10.5	28	75	12
E304110	11	30	75	12
E304115	11.5	30	75	12
E304120	12	30	75	12
E304130	13	35	85	14
E304130S16			90	16
E304140	14	35	85	14
E304140S16			90	16
E304150	15	40	90	16
E304160	16	40	90	16
E304180	18	45	100	18
E304200	20	45	100	20
E304250	25	50	120	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SOM, SK...) HB22 ~325	Prehardened Steels (NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○								

○:General Application ◎:The most suitable Application

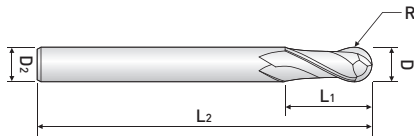
### ■ Tolerance

Tolerance	Dia.	μm = 1/1000mm				
		φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 30
Cutting Edge(h10)	0	0	0	0	0	0
	-40	-48	-58	-70	-84	
Shank(h6)	0	0	0	0	0	0
	-6	-8	-9	-11	-13	

# Endmills for General & Multi-purpose STANDARD END MILL Series



2 FLUTE, BALL NOSE LONG LENGTH



## B302 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
B302010	1	0.5	3	50	6
B302015	1.5	0.75	4	50	6
B302020	2	1	6	60	6
B302025	2.5	1.25	6	60	6
B302030	3	1.5	8	70	6
B302035	3.5	1.75	8	70	6
B302040	4	2	8	70	6
B302045	4.5	2.25	10	70	6
B302050	5	2.5	12	80	6
B302055	5.5	2.75	12	80	6
B302060	6	3	12	90	6
B302065	6.5	3.25	12	90	8
B302070	7	3.5	20	90	8
B302080	8	4	20	100	8
B302090	9	4.5	25	100	10
B302100	10	5	25	100	10
B302110	11	5.5	30	110	12
B302120	12	6	30	110	12
B302130	13	6.5	35	120	14
B302140	14	7	35	120	14
B302150	15	7.5	40	140	16
B302160	16	8	40	140	16
B302180	18	9	45	150	18
B302200	20	10	45	160	20
B302250	25	12.5	50	180	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C,...) ~HB225	Alloy Steels (SCM, SK,...) HB22 ~325	Prehardened Steels(NAK,...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○								

○:General Application ◎:The most suitable Application

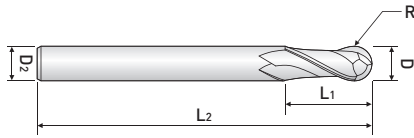
### ■ Tolerance

Tolerance	Dia.	μm = 1/1000mm				
		φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 30
Cutting Edge(h10)		0	0	0	0	0
		-40	-48	-58	-70	-84
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13

# Endmills for General & Multi-purpose STANDARD END MILL Series



2 FLUTE, BALL NOSE EXTRA LONG LENGTH



## BL422 ...series



FINE GRAIN



HELIX



±0.02



p.1007

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
BL422030	3	1.5	30	75	3
BL422040	4	2	30	75	4
BL422050	5	2.5	40	100	5
BL422060	6	3	50	150	6
BL422080	8	4	50	150	8
BL422100	10	5	60	150	10
BL422120	12	6	75	150	12
BL422140	14	7	75	150	14
BL422160	16	8	75	150	16
BL422180	18	9	75	150	18
BL422200	20	10	75	150	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○								

○:General Application ◎:The most suitable Application

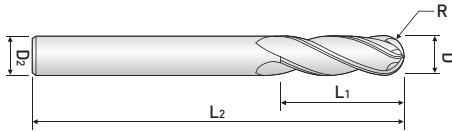
### ■ Tolerance

Tolerance	Dia.	μm = 1/1000mm				
		φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 30
Cutting Edge(h10)	0	0	0	0	0	0
	-40	-48	-58	-70	-84	
Shank(h6)	0	0	0	0	0	0
	-6	-8	-9	-11	-13	

# Endmills for General & Multi-purpose STANDARD END MILL Series



4 FLUTE, BALL NOSE LONG LENGTH



## B304 ...series



p.1007

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
B304030	3	1.5	8	70	6
B304040	4	2	8	70	6
B304050	5	2.5	12	80	6
B304060	6	3	12	90	6
B304070	7	3.5	20	90	8
B304080	8	4	20	100	8
B304090	9	4.5	25	100	10
B304100	10	5	25	100	10
B304110	11	5.5	30	110	12
B304120	12	6	30	110	12
B304130	13	6.5	35	120	14
B304140	14	7	35	120	14
B304150	15	7.5	40	140	16
B304160	16	8	40	140	16
B304180	18	9	45	150	18
B304200	20	10	45	160	20
B304250	25	12.5	50	180	25

### ■ Applicable Working Material

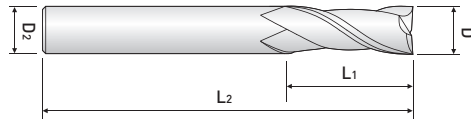
Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SOM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○								

○:General Application ◎:The most suitable Application

### ■ Tolerance

Tolerance	Dia.	μm = 1/1000mm				
		φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 30
Cutting Edge(h10)		0	0	0	0	0
		-40	-48	-58	-70	-84
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13

# Endmills for General & Multi-purpose STANDARD END MILL Series



2 FLUTE, LONG LENGTH

## E322 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
E322030	3	25	75	6
E322040	4	25	75	6
E322050	5	30	85	6
E322060	6	30	85	6
E322070	7	35	85	8
E322080	8	35	85	8
E322090	9	45	100	10
E322100	10	45	100	10
E322101		60	155	
E322120	12	55	120	12
E322121		65	155	
E322140	14	60	120	14
E322160	16	60	120	16
E322161		75	165	
E322180	18	60	120	18
E322200	20	60	120	20
E322201		75	165	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C,...) ~HB225	Alloy Steels (SOM, SK,...) HB22 ~325	Prehardened Steels (NAK,...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○								

○:General Application ◎:The most suitable Application

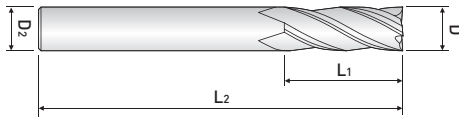
### ■ Tolerance

Tolerance	Dia.	μm = 1/1000mm				
		φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 30
Cutting Edge(h10)	0	0	0	0	0	0
	-40	-48	-58	-70	-84	
Shank(h6)	0	0	0	0	0	0
	-6	-8	-9	-11	-13	

# Endmills for General & Multi-purpose STANDARD END MILL Series



4 FLUTE, LONG LENGTH



## E324 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
E324030	3	25	75	6
E324040	4	25	75	6
E324050	5	30	85	6
E324060	6	30	85	6
E324070	7	35	85	8
E324080	8	35	85	8
E324090	9	45	100	10
E324100	10	45	100	10
E324101		60	155	
E324120	12	55	120	12
E324121		65	155	
E324140	14	60	120	14
E324160	16	60	120	16
E324161		75	165	
E324180	18	60	120	18
E324200	20	60	120	20
E324201		75	165	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SOM, SK...) HB22 ~325	Prehardened Steels (NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○								

○:General Application ◎:The most suitable Application

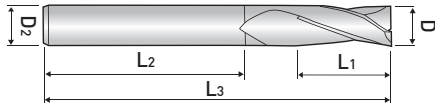
### ■ Tolerance

Tolerance	Dia.	μm = 1/1000mm				
		φ 1~φ 3	φ 3~φ 6	φ 6~φ 10	φ 10~φ 18	φ 18~φ 30
Cutting Edge(h10)		0	0	0	0	0
		-40	-48	-58	-70	-84
Shank(h6)		0	0	0	0	0
		-6	-8	-9	-11	-13

# Endmills for General & Multi-purpose STANDARD END MILL Series



2 FLUTE, REGULAR LENGTH  
- BRAZED TYPE



## EB302 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
EB302140	14	28	60	98	16
EB302150	15	28	60	98	16
EB302160	16	28	60	98	16
EB302170	17	32	70	115	20
EB302180	18	32	70	115	20
EB302190	19	32	70	115	20
EB302200	20	32	70	115	20
EB302210	21	32	70	115	20
EB302220	22	32	70	115	20
EB302230	23	40	85	140	25
EB302240	24	40	85	140	25
EB302250	25	40	85	140	25
EB302260	26	40	85	140	25
EB302270	27	40	85	140	25
EB302280	28	40	85	140	25
EB302290	29	50	85	150	32
EB302300	30	50	85	150	32
EB302310	31	50	85	150	32
EB302320	32	50	85	150	32
EB302350	35	50	85	150	32
EB302360	36	50	85	150	32
EB302380	38	55	85	155	32
EB302400	40	55	85	155	32
EB302420	42	55	85	155	32
EB302450	45	63	85	160	32
EB302500	50	63	85	160	32

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○								

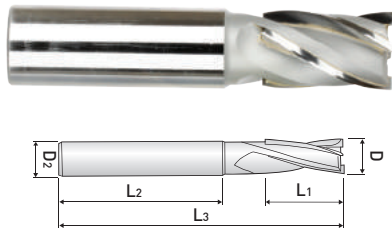
### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,05	h7

○:General Application ◎:The most suitable Application

※:Items can be changed for quality improvement without notice.

# Endmills for General & Multi-purpose STANDARD END MILL Series



4 FLUTE, REGULAR LENGTH  
- BRAZED TYPE

## EB304 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
EB304140	14	28	60	98	16
EB304150	15	28	60	98	16
EB304160	16	28	60	98	16
EB304170	17	32	70	115	20
EB304180	18	32	70	115	20
EB304190	19	32	70	115	20
EB304200	20	32	70	115	20
EB304210	21	32	70	115	20
EB304220	22	32	70	115	20
EB304230	23	40	85	140	25
EB304240	24	40	85	140	25
EB304250	25	40	85	140	25
EB304260	26	40	85	140	25
EB304270	27	40	85	140	25
EB304280	28	40	85	140	25
EB304290	29	50	85	150	32
EB304300	30	50	85	150	32
EB304310	31	50	85	150	32
EB304320	32	50	85	150	32
EB304350	35	50	85	150	32
EB304360	36	50	85	150	32
EB304380	38	55	85	155	32
EB304400	40	55	85	155	32
EB304420	42	55	85	155	32
EB304450	45	63	85	160	32
EB304500	50	63	85	160	32

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○								

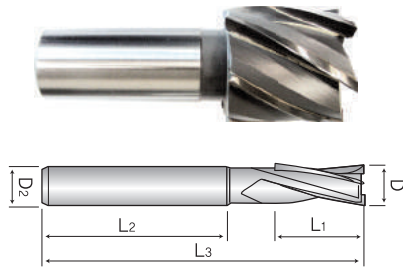
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,05	h7

※:Items can be changed for quality improvement without notice.

# Endmills for General & Multi-purpose STANDARD END MILL Series



6 FLUTE, REGULAR LENGTH  
- BRAZED TYPE

## EB306 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
EB306 300	30	50	85	150	32
EB306 320	32	50	85	150	32
EB306 350	35	50	85	150	32
EB306 380	38	55	85	155	32
EB306 380 S42	38	55	85	155	42
EB306 400	40	55	85	155	32
EB306 400 S42	40	55	85	155	42
EB306 420	42	55	85	155	32
EB306 420 S42	42	55	85	155	42
EB306 450	45	63	85	160	32
EB306 450 S42	45	63	85	160	42
EB306 500	50	63	85	160	32
EB306 500 S42	50	63	85	160	42

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○								

○:General Application ◎:The most suitable Application

### ■ Tolerance

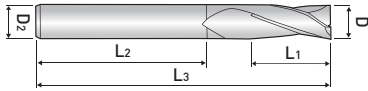
Mill Dia. (mm)	Shank Dia.
0 ~ -0,05	h7

※:Items can be changed for quality improvement without notice.

# Endmills for General & Multi-purpose STANDARD END MILL Series



2 FLUTE, LONG LENGTH  
- BRAZED TYPE



## EB322 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
EB322140	14	50	60	130	16
EB322150	15	50	60	130	16
EB322160	16	50	60	130	16
EB322180	18	60	60	140	20
EB322200	20	60	60	140	20
EB322220	22	60	60	140	20
EB322240	24	70	60	150	25
EB322250	25	70	60	150	25
EB322260	26	70	60	150	25
EB322280	28	70	60	150	25
EB322300	30	80	70	180	32
EB322320	32	90	70	190	32
EB322350	35	100	70	200	32
EB322380	38	100	70	220	32
EB322400	40	100	70	220	32
EB322450	45	120	80	230	32

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○								

○:General Application ◎:The most suitable Application

### ■ Tolerance

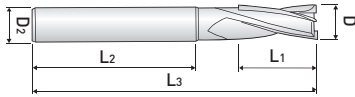
Mill Dia. (mm)	Shank Dia.
0 ~ -0,05	h7

※:Items can be changed for quality improvement without notice.

# Endmills for General & Multi-purpose STANDARD END MILL Series



4 FLUTE, LONG LENGTH  
- BRAZED TYPE



## EB324 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
EB324140	14	50	60	130	16
EB324150	15	50	60	130	16
EB324160	16	50	60	130	16
EB324180	18	60	60	140	20
EB324200	20	60	60	140	20
EB324220	22	60	60	140	20
EB324240	24	70	60	150	25
EB324250	25	70	60	150	25
EB324260	26	70	60	150	25
EB324280	28	70	60	150	25
EB324300	30	80	70	180	32
EB324320	32	90	70	190	32
EB324350	35	100	70	200	32
EB324380	38	100	70	220	32
EB324400	40	100	70	220	32
EB324450	45	120	80	230	32
EB324500	50	140	80	240	32

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○								

○:General Application ◎:The most suitable Application

### ■ Tolerance

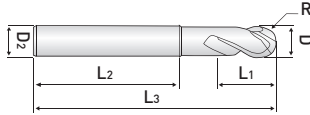
Mill Dia. (mm)	Shank Dia.
0 ~ -0,05	h7

※:Items can be changed for quality improvement without notice.

# Endmills for General & Multi-purpose STANDARD END MILL Series



2 FLUTE, BALL NOSE REGULAR LENGTH  
- BRAZED TYPE



## BB302 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
BB302150	15	7.5	28	55	100	16
BB302160	16	8	28	55	100	16
BB302180	18	9	29	55	110	20
BB302200	20	10	29	55	110	20
BB302220	22	11	36	60	110	25
BB302240	24	12	37	60	110	25
BB302250	25	12.5	38	60	120	25
BB302280	28	14	40	65	120	32
BB302300	30	15	46	65	130	32
BB302320	32	16	47	65	140	32

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○								

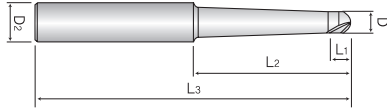
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,05	h7

※:Items can be changed for quality improvement without notice.

# Endmills for General & Multi-purpose STANDARD END MILL Series



**2 FLUTE, BALL NOSE ECONOMIC  
- BRAZED TYPE**

## BB342 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
BB342 150	15	7.5	15	40	100	20
BB342 160	16	8	15	40	100	20
BB342 170	17	8.5	16	45	110	25
BB342 180	18	9	16	45	110	25
BB342 190	19	9.5	17	45	110	25
BB342 200	20	10	17	45	110	25
BB342 210	21	10.5	17	45	110	25
BB342 220	22	11	17	45	110	25
BB342 240	24	12	20	55	120	32
BB342 250	25	12.5	20	55	120	32
BB342 280	28	14	22	65	130	32
BB342 300	30	15	25	65	130	32
BB342 320	32	16	25	75	140	32

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○								

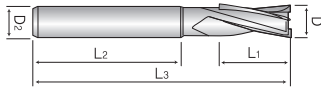
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,05	h7

※:Items can be changed for quality improvement without notice.

# Endmills for General & Multi-purpose STANDARD END MILL Series



**4 FLUTE, ROUGHING ENDMILL  
- BRAZED TYPE**

## EBF304 ...series



FINE GRAIN



HELIX



Chamfered Pitch Type

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
EBF304 160	16	28	60	98	16
EBF304 180	18	32	70	115	20
EBF304 200	20	32	70	115	20
EBF304 250	25	40	85	140	25
EBF304 300	30	50	85	150	32
EBF304 320	32	50	85	150	32
EBF304 350	35	50	85	150	32
EBF304 400	40	55	85	155	42
EBF304 420	42	55	85	155	42
EBF304 450	45	63	85	160	42
EBF304 500	50	63	85	160	42

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○								

○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,05	h7

※:Items can be changed for quality improvement without notice.



**MEMO**



Area with horizontal dotted lines for writing.





# Endmills for Mold & Die

WINNER SERIES

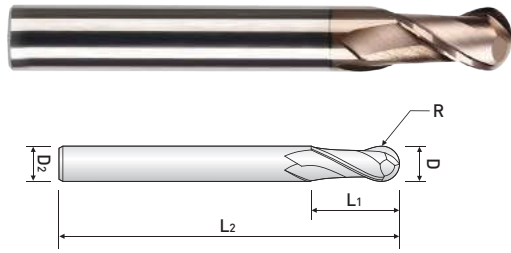


EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
WHPB902 ... series		APPLIED ULTRA-HIGH PRECISION R TOLERANCE	METRIC	•	428
WB502 ... series		SHORT LENGTH + REGULAR LENGTH + LONG LENGTH	METRIC	•	429
WB502---P ... series		HIGH PRECISION	METRIC	•	433
WB512 ... series		for RIB PROCESSING	METRIC	•	434
WB512---S6 ... series		for RIB PROCESSING (Shank-6)	METRIC	•	441
WB542... series		TAPER NECK	METRIC	•	444
WB532... series		MILLING MACHINE COPY	METRIC	•	455
WSB502... series		STRAIGHT FLUTE	METRIC	•	456
WB503... series		HIGH FEED & CENTER MATCH	METRIC	•	457
WB504... series		HIGH FEED	METRIC	•	458
WR502 ... series		SHORT LENGTH + REGULAR LENGTH + LONG LENGTH	METRIC	•	459
WR512 ... series		LONG NECK	METRIC	•	464
WR542 ... series		TAPER NECK	METRIC	•	476
WDR503 ... series		DOUBLE CORNER RADIUS	METRIC	•	486
WXR504 ... series		SHORT LENGTH+REGULAR LENGTH +LONG SHANK+VARIABLE INDEX GEOMETRY	METRIC	•	487
WXR514 ... series		LONG NECK +VARIABLE INDEX GEOMETRY	METRIC	•	491
WR544 ... series		TAPER NECK	METRIC	•	501
WSPM4 ... series		HIGH FEED	METRIC	•	508
WR504 ... series		SHORT LENGTH+REGULAR LENGTH +END TEETH VARIABLE INDEX GEOMETRY	METRIC	•	510
WR514 ... series		LONG NECK CORNER RADIUS	METRIC	•	512
WR506 ... series		45° CORNER RADIUS	METRIC	•	513

## Endmills for Mold &amp; Die \_ WINNER SERIES

EDP. No.	APPEARANCE	FEATURE	INCH & METRIC	STOCK	PAGE
WME502 ... series		Ø0.03~	METRIC	•	514
WE502---S4 ... series		Ø0.1 + SHANK 4	METRIC	•	516
WE502---S3 ... series		SHANK 3	METRIC	•	517
WE502 ... series		SHORT + REGULAR + LONG LENGTH	METRIC	•	518
WE522 ... series		LONG	METRIC	•	521
WE512 ... series		LONG NECK	METRIC	•	525
WME504 ... series		VARIABLE INDEX GEOMETRY	METRIC	•	532
WXE504... series		SHORT + REGULAR + LONG LENGTH + VARIABLE INDEX GEOMETRY	METRIC	•	534
WE524 ... series		LONG	METRIC	•	536
WE514 ... series		LONG NECK	METRIC	•	540
WE504---H ... series		45° HELIX + REGULAR + LONG	METRIC	•	544
WE506 ... series		45° HELIX + REGULAR + LONG	METRIC	•	546
WF61 ... series		ROUGHING ENDMILL	METRIC	•	547
WF60 ... series		ROUGHING ENDMILL-CORNER R	METRIC	•	548
WTE502 ... series		TAPER	METRIC	•	549
WTE504 ... series		TAPER	METRIC	•	553
WTE514 ... series		RIB	METRIC	•	555
WTB502 ... series		TAPER BALL	METRIC	•	560
WTR504 ... series		TAPER CORNER RADIUS	METRIC	•	562

# Endmills for Mold & Die(Ball) WINNER Series



## ULTRA HIGH PRECISION BALL ENDMILLS

- Longer tool life and improvement on stable machining by the newest W Coating
- Actualization of high precision by applying the world's first Ultra precision Tolerance

## WHPB902 .....series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WHPB902 001	0.1	0.05	0.2	40	4
WHPB902 0015	0.15	0.075	0.3	40	4
WHPB902 002	0.2	0.1	0.4	40	4
WHPB902 003	0.3	0.15	0.6	40	4
WHPB902 004	0.4	0.2	0.8	40	4
WHPB902 005	0.5	0.25	1.0	40	4
WHPB902 006	0.6	0.3	1.2	40	4
WHPB902 007	0.7	0.35	1.4	40	4
WHPB902 008	0.8	0.4	1.6	40	4
WHPB902 009	0.9	0.45	1.8	40	4
WHPB902 010	1.0	0.5	2.5	50	6
WHPB902 012	1.2	0.6	3.0	50	6
WHPB902 015	1.5	0.75	4.0	50	6
WHPB902 020	2.0	1	5.0	50	6
WHPB902 025	2.5	1.25	6.0	60	6
WHPB902 030	3.0	1.5	6.0	60	6
WHPB902 040	4.0	2	8.0	70	6
WHPB902 050	5.0	2.5	10.0	80	6
WHPB902 060	6.0	3	12.0	90	6
WHPB902 080	8.0	4	14.0	100	8
WHPB902 100	10.0	5	18.0	100	10
WHPB902 120	12.0	6	24.0	110	12

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
						◎		○	

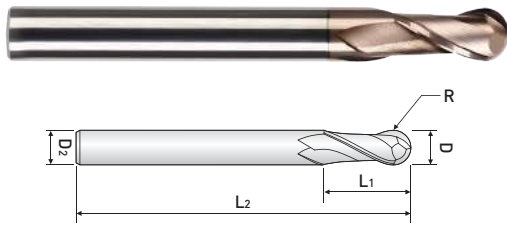
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 - -0.012	h6
over 6	0 - -0.015	

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE BALL, SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- Better wear resistance and machining with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel Alloy Steel, Carbon Steel

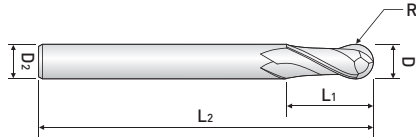
## WB502 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WB502 001S	0.1	0.05	0.1	40	4
WB502 001			0.2		4
WB502 001 S3			0.2		3
WB502 0015S	0.15	0.075	0.15	40	4
WB502 0015			0.3		4
WB502 0015 S3			0.3		3
WB502 002S	0.2	0.1	0.2	40	4
WB502 002			0.4		4
WB502 002 S3			0.4		3
WB502 003S	0.3	0.15	0.3	40	4
WB502 003			0.6		4
WB502 003 S3			0.6		3
WB502 004S	0.4	0.2	0.4	40	4
WB502 004			0.8		4
WB502 004 S3			0.8		3
WB502 005S	0.5	0.25	0.5	40	4
WB502 005			1.0		4
WB502 005 S3			1.0		3
WB502 006S	0.6	0.3	0.6	40	4
WB502 006			1.2		4
WB502 006 S3			1.2		3
WB502 007S	0.7	0.35	0.7	40	4
WB502 007			1.4		4
WB502 007 S3			1.4		3
WB502 008S	0.8	0.4	0.8	40	4
WB502 008			1.6		4
WB502 008 S3			1.6		3
WB502 009S	0.9	0.45	0.9	40	4
WB502 009			1.8		4
WB502 009 S3			1.8		3
WB502 010S	1.0	0.5	1.5	40	6
WB502 010 S3			2.5		3
WB502 010 S4			2.5		4
WB502 010			2.5		6
WB502 010 070			2.5		6
WB502 010 100			2.5		6

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE BALL, SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- Better wear resistance and machining with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel Alloy Steel, Carbon Steel

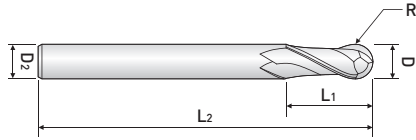
## WB502 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WB502 0120S	1.2	0.6	2.0	40	6
WB502 012 S3			3.0	50	3
WB502 012 S4			3.0	50	4
WB502 012			3.0	50	6
WB502 012 070			3.0	70	6
WB502 012 100			3.0	100	6
WB502 015S	1.5	0.75	2.5	40	6
WB502 015 S3			4.0	50	3
WB502 015 S4			4.0	50	4
WB502 015			4.0	50	6
WB502 015 070			4.0	70	6
WB502 015 100			4.0	100	6
WB502 020S	2.0	1	3.0	40	6
WB502 020 S3			5.0	50	3
WB502 020 S4			5.0	50	4
WB502 020			5.0	50	6
WB502 020 080			5.0	80	6
WB502 020 100			5.0	100	6
WB502 025S	2.5	1.25	4.0	40	6
WB502 025 S3			6.0	60	3
WB502 025 S4			6.0	60	4
WB502 025			6.0	60	6
WB502 025 080			6.0	80	6
WB502 025 100			6.0	100	6
WB502 030S	3.0	1.5	4.5	40	6
WB502 030 S3			6.0	60	3
WB502 030 S4			6.0	60	4
WB502 030			6.0	60	6
WB502 030 080			6.0	80	6
WB502 030 100			6.0	100	6
WB502 035	3.5	1.75	8.0	70	6
WB502 040S	4.0	2	6.0	50	6
WB502 040 S4			8.0	70	4
WB502 040			8.0	70	6
WB502 040 100 S4			8.0	100	4
WB502 040 120 S4			8.0	120	4
WB502 040 100			8.0	100	6
WB502 040 120	8.0	120	6		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE BALL, SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- Better wear resistance and machining with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel Alloy Steel, Carbon Steel

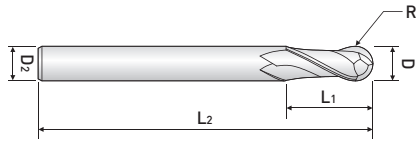
## WB502 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WB502 045	4.5	2.25	9.0	80	6
WB502 050S	5.0	2.5	7.5	60	6
WB502 050			10.0	80	6
WB502 050 S5			10.0	80	5
WB502 055			11.0	90	6
WB502 060S	6.0	3	9.0	50	6
WB502 060 060			9.0	60	6
WB502 060 080			9.0	80	6
WB502 060			12.0	90	6
WB502 060 110			12.0	110	6
WB502 060 130			12.0	130	6
WB502 060 150	12.0	150	6		
WB502 065	6.5	3.25	13.0	90	8
WB502 070	7.0	3.5	14.0	90	8
WB502 080S	8.0	4	12.0	50	8
WB502 080 060			12.0	60	8
WB502 080 080			12.0	80	8
WB502 080 090			12.0	90	8
WB502 080			14.0	100	8
WB502 080 130			14.0	130	8
WB502 080 150			14.0	150	8
WB502 085	8.5	4.25	16.0	100	10
WB502 090	9.0	4.5	18.0	100	10
WB502 100S	10.0	5	15.0	50	10
WB502 100 060			15.0	60	10
WB502 100 080			15.0	80	10
WB502 100 090			15.0	90	10
WB502 100			18.0	100	10
WB502 100 130			18.0	130	10
WB502 100 150			18.0	150	10
WB502 100 180			18.0	180	10
WB502 100 200			18.0	200	10
WB502 110	11.0	5.5	20.0	100	12
WB502 120S	12.0	6	18.0	60	12
WB502 120 080			18.0	80	12
WB502 120 090			18.0	90	12
WB502 120 100			18.0	100	12
WB502 120			24.0	110	12

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE BALL, SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- Better wear resistance and machining with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel Alloy Steel, Carbon Steel

## WB502 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WB502 120 130	12.0	6	24.0	130	12
WB502 120 150			24.0	150	12
WB502 120 180			24.0	180	12
WB502 120 200			24.0	200	12
WB502 130	13.0	6.5	24.0	100	12
WB502 140 S12	14.0	7	26.0	100	12
WB502 140			26.0	100	14
WB502 140 S16			26.0	100	16
WB502 150	15.0	7.5	28.0	140	16
WB502 160 100	16.0	8	24.0	100	16
WB502 160 130			24.0	130	16
WB502 160			30.0	150	16
WB502 160 180			30.0	180	16
WB502 160 200			30.0	200	16
WB502 180 S16	18.0	9	34.0	150	16
WB502 180			34.0	150	18
WB502 200 100	20.0	10	30.0	100	20
WB502 200 130			30.0	130	20
WB502 200			38.0	150	20
WB502 200 200			38.0	200	20
WB502 250 120	25.0	12.5	50.0	120	25
WB502 250			50.0	180	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

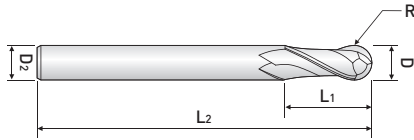
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	h6
over 6	0 ~ -0.015	

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(Ball) WINNER Series



## High PRECISION BALL

- High precise performance with R tolerance below 3 micron
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel, Alloy Steel, Carbon Steel

## WB502...P ...series



ULTRA FINE

HELIX

up to R3

over R3

W Coating

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WB502 001P	0.1	0.05	0.2	40	4
WB502 0015P	0.15	0.075	0.3	40	4
WB502 002P	0.2	0.1	0.4	40	4
WB502 003P	0.3	0.15	0.6	40	4
WB502 004P	0.4	0.2	0.8	40	4
WB502 005P	0.5	0.25	1.0	40	4
WB502 006P	0.6	0.3	1.2	40	4
WB502 007P	0.7	0.35	1.4	40	4
WB502 008P	0.8	0.4	1.6	40	4
WB502 009P	0.9	0.45	1.8	40	4
WB502 010P	1.0	0.5	2.5	50	6
WB502 012P	1.2	0.6	3.0	50	6
WB502 015P	1.5	0.75	4.0	50	6
WB502 020P	2.0	1	5.0	50	6
WB502 025P	2.5	1.25	6.0	60	6
WB502 030P	3.0	1.5	6.0	60	6
WB502 040P	4.0	2	8.0	70	6
WB502 050P	5.0	2.5	10.0	80	6
WB502 060P	6.0	3	12.0	90	6
WB502 080P	8.0	4	14.0	100	8
WB502 100P	10.0	5	18.0	100	10
WB502 120P	12.0	6	24.0	110	12

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

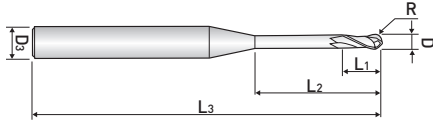
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0 ~ -0.012	h6
over 6	0 ~ -0.015	

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel Alloy Steel, Carbon Steel

## WB512 ...series



ULTRA FINE

HELIX

up to R3

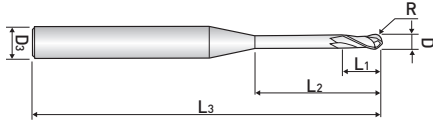
over R3

W Coating p.1009~1012

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WB512 001 002	0.1	0.05	0.1	0.2	40	4
WB512 001 003				0.3		
WB512 001 005				0.5		
WB512 001 01				1.0		
WB512 002 005	0.2	0.1	0.2	0.5	40	4
WB512 002 01				1.0		
WB512 002 015				1.5		
WB512 002 02				2.0		
WB512 002 03				3.0		
WB512 003 01	0.3	0.15	0.3	1.0	40	4
WB512 003 015				1.5		
WB512 003 02				2.0		
WB512 003 025				2.5		
WB512 003 03				3.0		
WB512 003 04				4.0		
WB512 003 05				5.0		
WB512 004 01	0.4	0.2	0.4	1.0	40	4
WB512 004 015				1.5		
WB512 004 02				2.0		
WB512 004 025				2.5		
WB512 004 03				3.0		
WB512 004 04				4.0		
WB512 004 05				5.0		
WB512 004 06				6.0		
WB512 004 08				8.0		
WB512 004 10				10.0		
WB512 005 01	0.5	0.25	0.5	1.0	45	4
WB512 005 015				1.5		
WB512 005 02				2.0		
WB512 005 025				2.5		
WB512 005 03				3.0		
WB512 005 04				4.0		
WB512 005 05				5.0		
WB512 005 06				6.0		
WB512 005 08				8.0		
WB512 005 10				10.0		

NEXT &gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel Alloy Steel, Carbon Steel

## WB512 ...series



ULTRA FINE

HELIX

up to R3

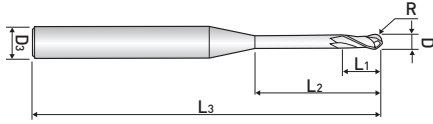
over R3

W Coating p.1009~1012

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>					
WB512 005 12	0.5	0.25	0.5	12.0	45	4					
WB512 005 14				14.0							
WB512 005 16				16.0							
WB512 006 01	0.6	0.3	0.6	1.0	45	4					
WB512 006 02				2.0							
WB512 006 03				3.0							
WB512 006 04				4.0							
WB512 006 05				5.0							
WB512 006 06				6.0							
WB512 006 08				8.0							
WB512 006 10				10.0							
WB512 006 12				12.0							
WB512 006 14				14.0							
WB512 006 16				16.0							
WB512 007 02				0.7			0.35	0.7	2.0	45	4
WB512 007 04	4.0										
WB512 007 06	6.0										
WB512 007 08	8.0										
WB512 007 10	10.0										
WB512 007 12	12.0										
WB512 008 01	0.8	0.4	0.8	1.0	45	4					
WB512 008 02				2.0							
WB512 008 03				3.0							
WB512 008 04				4.0							
WB512 008 05				5.0							
WB512 008 06				6.0							
WB512 008 08				8.0							
WB512 008 10				10.0							
WB512 008 12				12.0							
WB512 008 14				14.0							
WB512 008 16				16.0							
WB512 008 20				20.0							
WB512 009 04				0.9			0.45	0.9	4.0	45	4
WB512 009 06									6.0		
WB512 009 08									8.0		
WB512 009 10	10.0										

NEXT &gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel Alloy Steel, Carbon Steel

## WB512 ...series



ULTRA FINE

HELIX

up to R3

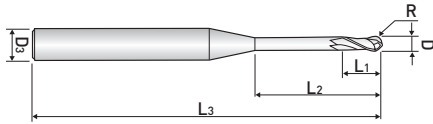
over R3

W Coating p.1009~1012

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WB512 010 02	1.0	0.5	1.0	2.0	50	4
WB512 010 03				3.0		
WB512 010 04				4.0		
WB512 010 05				5.0		
WB512 010 06				6.0		
WB512 010 07				7.0		
WB512 010 08				8.0		
WB512 010 09				9.0		
WB512 010 10				10.0		
WB512 010 12				12.0		
WB512 010 14				14.0		
WB512 010 16				16.0		
WB512 010 18				18.0		
WB512 010 20				20.0	55	
WB512 010 22				22.0	60	
WB512 010 26				26.0	70	
WB512 010 30				30.0	80	
WB512 010 40				40.0	100	
WB512 010 50	50.0	100				
WB512 012 04	1.2	0.6	1.2	4.0	50	4
WB512 012 06				6.0		
WB512 012 08				8.0		
WB512 012 10				10.0		
WB512 012 12				12.0		
WB512 012 16				16.0		
WB512 012 20				20.0	55	
WB512 012 26				26.0	60	
WB512 014 06	1.4	0.7	1.4	6.0	50	4
WB512 014 08				8.0		
WB512 014 10				10.0		
WB512 014 12				12.0		
WB512 014 16				16.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel Alloy Steel, Carbon Steel

## WB512 ...series



ULTRA FINE

HELIX

up to R3

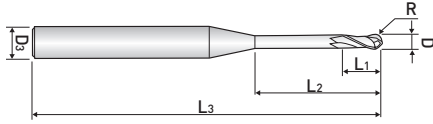
over R3

W Coating p.1009~1012

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>	
WB512 015 03	1.5	0.75	1.5	3.0	50	4	
WB512 015 04				4.0			
WB512 015 05				5.0			
WB512 015 06				6.0			
WB512 015 07				7.0			
WB512 015 08				8.0			
WB512 015 10				10.0			
WB512 015 12				12.0			
WB512 015 14				14.0			
WB512 015 16				16.0			
WB512 015 18				18.0			
WB512 015 20				20.0			55
WB512 015 22				22.0			60
WB512 015 26				26.0			70
WB512 015 30				30.0			80
WB512 015 35	35.0						
WB512 015 40	40.0						
WB512 016 04	1.6	0.8	1.6	4.0	50	4	
WB512 016 06				6.0			
WB512 016 08				8.0			
WB512 016 10				10.0			
WB512 016 12				12.0			
WB512 016 16				16.0			
WB512 016 20	20.0	55					
WB512 018 04	1.8	0.9	1.8	4.0	50	4	
WB512 018 06				6.0			
WB512 018 08				8.0			
WB512 018 10				10.0			
WB512 018 12				12.0			
WB512 018 16				16.0			
WB512 018 20	20.0	55					
WB512 020 04	2.0	1	2.0	4.0	50	4	
WB512 020 06				6.0			
WB512 020 08				8.0			
WB512 020 10				10.0			
WB512 020 12				12.0			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel Alloy Steel, Carbon Steel

## WB512 ...series



ULTRA FINE

HELIX

up to R3

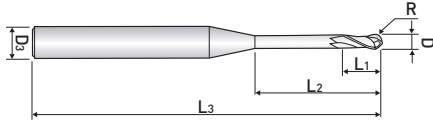
over R3

W Coating p.1009~1012

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WB512 020 14	2.0	1	2.0	14.0	50	4
WB512 020 16				16.0		
WB512 020 18				18.0		
WB512 020 20				20.0	55	
WB512 020 22				22.0		
WB512 020 26				26.0	60	
WB512 020 30				30.0		
WB512 020 35				35.0	70	
WB512 020 40				40.0		
WB512 020 45				45.0	80	
WB512 020 50				50.0		
WB512 020 60				60.0	100	
WB512 025 08	2.5	1.25	2.5	8.0	50	4
WB512 025 10				10.0		
WB512 025 12				12.0		
WB512 025 16				16.0		
WB512 025 20				20.0	60	
WB512 025 22				22.0		
WB512 025 26				26.0	70	
WB512 025 30				30.0		
WB512 025 35				35.0	80	
WB512 025 40				40.0		
WB512 025 45				45.0	90	
WB512 025 50				50.0		
WB512 030 06	3.0	1.5	3.0	6.0	50	6
WB512 030 08				8.0		
WB512 030 10				10.0		
WB512 030 12				12.0		
WB512 030 14				14.0	60	
WB512 030 16				16.0		
WB512 030 18				18.0		
WB512 030 20				20.0	65	
WB512 030 22				22.0		
WB512 030 26				26.0	70	
WB512 030 30				30.0		
WB512 030 35				35.0	80	
WB512 030 40				40.0		
WB512 030 45				45.0	90	

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel Alloy Steel, Carbon Steel

## WB512 ...series



ULTRA FINE

HELIX

up to R3

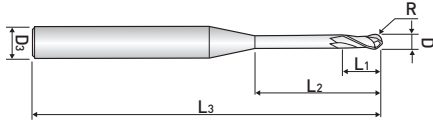
over R3

W Coating p.1009~1012

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WB512 030 50	3.0	1.5	3.0	50.0	100	6
WB512 030 60				60.0		
WB512 040 08	4.0	2	4.0	8.0	50	6
WB512 040 10				10.0		
WB512 040 12				12.0		
WB512 040 14				14.0		
WB512 040 16				16.0		
WB512 040 18				18.0	60	
WB512 040 20				20.0		
WB512 040 22				22.0		
WB512 040 26				26.0		
WB512 040 30				30.0		
WB512 040 35	35.0	70				
WB512 040 40	40.0	80				
WB512 040 45	45.0	90				
WB512 040 50	50.0	100				
WB512 040 55	55.0					
WB512 040 60	60.0					
WB512 050 15	5.0	2.5	6.0	15.0	60	6
WB512 050 20				20.0		
WB512 050 26				26.0		
WB512 050 30				30.0	70	
WB512 050 35				35.0		
WB512 050 40				40.0		
WB512 050 45				45.0	80	
WB512 050 50				50.0	90	
WB512 050 55				55.0	100	
WB512 050 60				60.0		
WB512 060 20	6.0	3	8.0	20.0		60
WB512 060 30				30.0		
WB512 060 20 90			12.0	20.0	90	
WB512 060 30 90				30.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, for RIB PROCESSING

- Excellent effect in preventing breakage with a shape of neck without notch
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel Alloy Steel, Carbon Steel

## WB512 ...series



ULTRA FINE

HELIX

up to R3

over R3

W Coating p.1009~1012

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WB512 080 25	8.0	4	10.0	25.0	70	8
WB512 080 35				35.0		
WB512 080 25 100			14.0	25.0	100	
WB512 080 35 100				35.0		
WB512 100 30	10.0	5	12.0	30.0	75	10
WB512 100 40				40.0		
WB512 100 30 100			18.0	30.0	100	
WB512 100 40 100				40.0		
WB512 120 32	12.0	6	14.0	32.0	80	12
WB512 120 45				45.0		
WB512 120 32 110			22.0	32.0	110	
WB512 120 45 110				45.0		

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

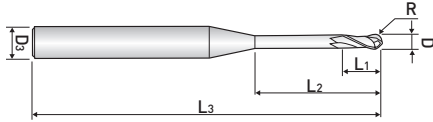
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	h6
over 6	0~-0.015	

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, for RIB PROCESSING(Shank-6)

- High precise performance through increasing chucking power from 6mm Shank
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel, Alloy Steel, Carbon Steel

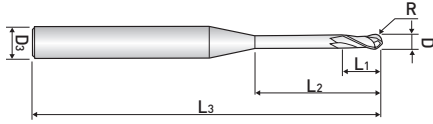
## WB512...S6 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WB512 005 01 S6	0.5	0.25	0.5	1.0	45	6
WB512 005 02 S6				2.0		
WB512 005 04 S6				4.0		
WB512 006 01 S6	0.6	0.3	0.6	1.0	45	6
WB512 006 02 S6				2.0		
WB512 006 03 S6				3.0		
WB512 006 04 S6				4.0		
WB512 006 05 S6				5.0		
WB512 006 06 S6				6.0		
WB512 006 08 S6				8.0		
WB512 006 10 S6				10.0		
WB512 006 12 S6				12.0		
WB512 006 14 S6				14.0		
WB512 006 16 S6	16.0	50				
WB512 008 01 S6	0.8	0.4	0.8	1.0	45	6
WB512 008 02 S6				2.0		
WB512 008 03 S6				3.0		
WB512 008 04 S6				4.0		
WB512 008 05 S6				5.0		
WB512 008 06 S6				6.0		
WB512 008 08 S6				8.0		
WB512 008 10 S6				10.0		
WB512 008 12 S6				12.0		
WB512 008 14 S6				14.0		
WB512 008 16 S6				16.0		
WB512 008 20 S6				20.0		
WB512 010 02 S6	1.0	0.5	1.0	2.0	50	6
WB512 010 03 S6				3.0		
WB512 010 04 S6				4.0		
WB512 010 05 S6				5.0		
WB512 010 06 S6				6.0		
WB512 010 07 S6				7.0		
WB512 010 08 S6				8.0		
WB512 010 09 S6				9.0		
WB512 010 10 S6				10.0		
WB512 010 12 S6				12.0		
WB512 010 14 S6	14.0					
WB512 010 16 S6	16.0					

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, for RIB PROCESSING(Shank-6)

- High precise performance through increasing chucking power from 6mm Shank
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel, Alloy Steel, Carbon Steel

## WB512...S6 ...series



ULTRA FINE

HELIX

up to R3

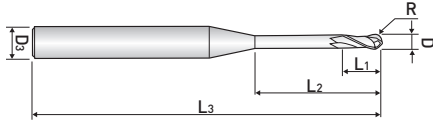
over R3

W Coating

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WB512 010 18 S6	1.0	0.5	1.0	18.0	50	6
WB512 010 20 S6				20.0		
WB512 010 22 S6				22.0		
WB512 010 26 S6				26.0		
WB512 010 30 S6				30.0		
WB512 015 03 S6	1.5	0.75	1.5	3.0	50	6
WB512 015 04 S6				4.0		
WB512 015 06 S6				6.0		
WB512 015 08 S6				8.0		
WB512 015 10 S6				10.0		
WB512 015 12 S6				12.0		
WB512 015 14 S6				14.0		
WB512 015 16 S6				16.0		
WB512 015 18 S6				18.0		
WB512 015 20 S6				20.0		
WB512 015 22 S6				22.0		
WB512 015 26 S6				26.0		
WB512 015 30 S6				30.0		
WB512 015 35 S6				35.0		
WB512 015 40 S6				40.0		
WB512 020 04 S6	2.0	1	2.0	4.0	50	6
WB512 020 06 S6				6.0		
WB512 020 08 S6				8.0		
WB512 020 10 S6				10.0		
WB512 020 12 S6				12.0		
WB512 020 14 S6				14.0		
WB512 020 16 S6				16.0		
WB512 020 18 S6				18.0		
WB512 020 20 S6				20.0		
WB512 020 22 S6				22.0		
WB512 020 26 S6				26.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, for RIB PROCESSING(Shank-6)

- High precise performance through increasing chucking power from 6mm Shank
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRc 55  
Pre-hardened Steel, Alloy Steel, Carbon Steel

## WB512...S6 ...series



ULTRA FINE



HELIX



up to R3



over R3



W Coating

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WB512 020 30 S6	2.0	1	2.0	30.0	70	6
WB512 020 35 S6				35.0		
WB512 020 40 S6				40.0	80	
WB512 020 45 S6				45.0	90	
WB512 020 50 S6				50.0	100	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRc30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		○

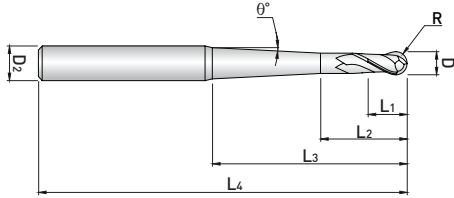
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	
over 6	0~-0.015	

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

## WB542 ...series



ULTRA FINE

HELIX

up to R3

over R3

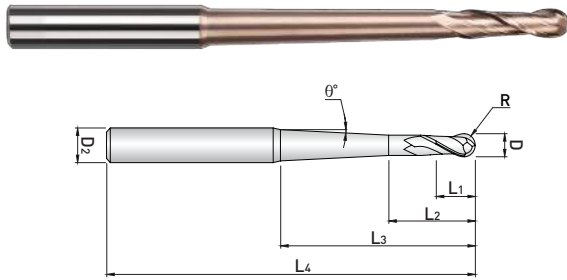
W Coating

p.1013~1014

EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>						
WB542 001 05 005	0.1	0.05	30°	0.1	-	0.5	40	4						
WB542 001 05 01						1.0								
WB542 001 10 005			1°			0.5								
WB542 001 10 01						1.0								
WB542 001 15 005			1°30'			0.5								
WB542 001 15 01						1.0								
WB542 001 20 005			2°			0.5								
WB542 001 20 01						1.0								
WB542 001 30 005			3°			0.5								
WB542 001 30 01						1.0								
WB542 002 05 01	0.2	0.1	30°	0.2	0.4	1.0	40	4						
WB542 002 05 02						2.0								
WB542 002 05 03						3.0								
WB542 002 10 01						1°			1.0					
WB542 002 10 02			2.0											
WB542 002 10 03			3.0											
WB542 002 15 01			1°30'			1.0								
WB542 002 15 02						2.0								
WB542 002 15 03			3.0											
WB542 002 20 01			2°			1.0								
WB542 002 20 02						2.0								
WB542 002 20 03			3.0											
WB542 002 30 01			3°			1.0								
WB542 002 30 02						2.0								
WB542 002 30 03			3.0											
WB542 002 50 02			5°			2.0								
WB542 002 50 03						3.0								
WB542 003 05 02			0.3			0.15			30°	0.3	0.6	2.0	40	4
WB542 003 05 03												3.0		
WB542 003 05 04												4.0		
WB542 003 05 05	5.0													
WB542 003 10 02	1°	2.0												
WB542 003 10 03		3.0												
WB542 003 10 04	4.0													
WB542 003 10 05	5.0													
WB542 003 15 02	1°30'	2.0												
WB542 003 15 03		3.0												
WB542 003 15 04		4.0												

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

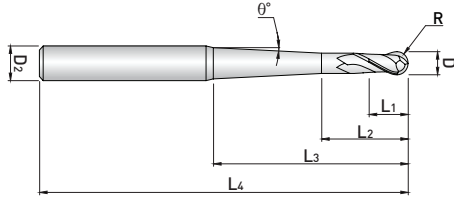
## WB542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>		
WB542 003 15 05	0.3	0.15	1°30'	0.3	0.6	5.0	40	4		
WB542 003 20 02						2.0				
WB542 003 20 03						3.0				
WB542 003 20 04						4.0				
WB542 003 20 05						5.0				
WB542 003 30 02			3°			2.0				
WB542 003 30 03						3.0				
WB542 003 30 04						4.0				
WB542 003 30 05						5.0				
WB542 003 50 05						5.0				
WB542 004 05 02	0.4	0.2	30°	0.4	0.8	2.0	50	4		
WB542 004 05 03						3.0				
WB542 004 05 04						4.0				
WB542 004 05 05						5.0				
WB542 004 05 06						6.0				
WB542 004 10 02						1°			2.0	2.0
WB542 004 10 03										3.0
WB542 004 10 04										4.0
WB542 004 10 05										5.0
WB542 004 10 06										6.0
WB542 004 15 02			1°30'							2.0
WB542 004 15 03										3.0
WB542 004 15 04										4.0
WB542 004 15 05										5.0
WB542 004 15 06										6.0
WB542 004 20 02						2°			2.0	
WB542 004 20 03			3.0							
WB542 004 20 04			4.0							
WB542 004 20 05			5.0							
WB542 004 20 06			6.0							
WB542 004 30 02			3°						2.0	
WB542 004 30 03						3.0				
WB542 004 30 04						4.0				
WB542 004 30 05						5.0				
WB542 004 30 06						6.0				
WB542 004 50 04						5°			4.0	
WB542 004 50 06			6.0							

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

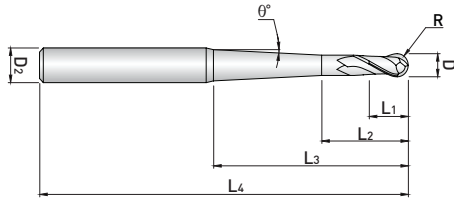
## WB542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>
WB542 005 05 04	0.5	0.25	30°	0.5	1.0	4.0	50	4
WB542 005 05 06						6.0		
WB542 005 05 08						8.0		
WB542 005 05 10						10.0		
WB542 005 10 04			4.0					
WB542 005 10 06			6.0					
WB542 005 10 08			8.0					
WB542 005 10 10			10.0					
WB542 005 15 04			4.0					
WB542 005 15 06			6.0					
WB542 005 15 08			8.0					
WB542 005 15 10			10.0					
WB542 005 20 04			4.0					
WB542 005 20 06			6.0					
WB542 005 20 08			8.0					
WB542 005 20 10			10.0					
WB542 005 30 04	4.0							
WB542 005 30 06	6.0							
WB542 005 30 08	8.0							
WB542 005 30 10	10.0							
WB542 006 05 04	0.6	0.3	30°	0.6	1.2	4.0	50	4.0
WB542 006 05 06						6.0		
WB542 006 05 08						8.0		
WB542 006 05 10						10.0		
WB542 006 05 12			12.0					
WB542 006 10 04			4.0					
WB542 006 10 06			6.0					
WB542 006 10 08			8.0					
WB542 006 10 10			10.0					
WB542 006 10 12			12.0					
WB542 006 15 04			4.0					
WB542 006 15 06			6.0					
WB542 006 15 08			8.0					
WB542 006 15 10			10.0					
WB542 006 15 12			12.0					
WB542 006 20 04			4.0					
WB542 006 20 06	6.0							
WB542 006 20 08	8.0							

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

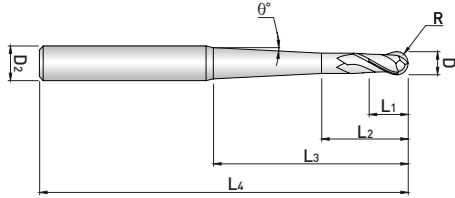
## WB542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>
WB542 006 20 10	0.6	0.3	2°	0.6	1.2	10.0	50	4.0
WB542 006 20 12						12.0		
WB542 006 30 04						4.0		
WB542 006 30 06			6.0					
WB542 006 30 08			8.0					
WB542 006 30 10			10.0					
WB542 006 30 12						12.0		
WB542 008 05 04	0.8	0.4	30°	0.8	1.6	4.0	50	4
WB542 008 05 06						6.0		
WB542 008 05 08						8.0		
WB542 008 05 10						10.0		
WB542 008 05 12						12.0		
WB542 008 05 16						16.0		
WB542 008 10 04			1°			4.0		
WB542 008 10 06						6.0		
WB542 008 10 08						8.0		
WB542 008 10 10						10.0		
WB542 008 10 12						12.0		
WB542 008 10 16						16.0		
WB542 008 15 04			1°30'			4.0		
WB542 008 15 06						6.0		
WB542 008 15 08						8.0		
WB542 008 15 10						10.0		
WB542 008 15 12						12.0		
WB542 008 15 16						16.0		
WB542 008 20 04			2°			4.0		
WB542 008 20 06						6.0		
WB542 008 20 08						8.0		
WB542 008 20 10						10.0		
WB542 008 20 12						12.0		
WB542 008 20 16						16.0		
WB542 008 30 04	3°	4.0						
WB542 008 30 06		6.0						
WB542 008 30 08		8.0						
WB542 008 30 10		10.0						
WB542 008 30 12		12.0						
WB542 008 30 16		16.0						

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

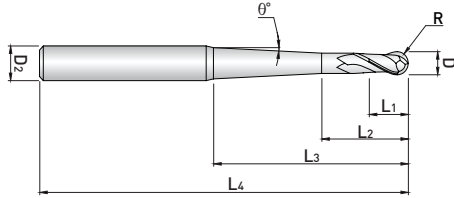
## WB542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>											
WB542 010 05 06	1.0	0.5	30°	1.0	2.5	6.0	50	4											
WB542 010 05 08						8.0													
WB542 010 05 10						10.0													
WB542 010 05 12						12.0													
WB542 010 05 16						16.0													
WB542 010 05 20						20.0													
WB542 010 05 25						25.0			60										
WB542 010 05 30						30.0			70										
WB542 010 05 40						40.0			80										
WB542 010 05 50						50.0			90										
WB542 010 10 06						1°			6.0	1°	1.0	2.5	6.0	50	4				
WB542 010 10 08									8.0										
WB542 010 10 10									10.0										
WB542 010 10 12									12.0										
WB542 010 10 16									16.0										
WB542 010 10 20			20.0																
WB542 010 10 25			25.0				60												
WB542 010 10 30			30.0				70												
WB542 010 10 40			40.0				80												
WB542 010 10 50			50.0				90												
WB542 010 15 06			1°30'				6.0		1°30'				1.0			2.5	6.0	50	4
WB542 010 15 08							8.0												
WB542 010 15 10							10.0												
WB542 010 15 12							12.0												
WB542 010 15 16							16.0												
WB542 010 15 20						20.0													
WB542 010 15 25						25.0	60												
WB542 010 15 30						30.0	70												
WB542 010 15 40						40.0	80												
WB542 010 15 50						50.0	90												
WB542 010 20 06	2°	6.0		2°	1.0	2.5	6.0	50		4									
WB542 010 20 08		8.0																	
WB542 010 20 10		10.0																	
WB542 010 20 12		12.0																	
WB542 010 20 16		16.0																	
WB542 010 20 20		20.0																	
WB542 010 20 25		25.0	60																
WB542 010 20 30		30.0	70																

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

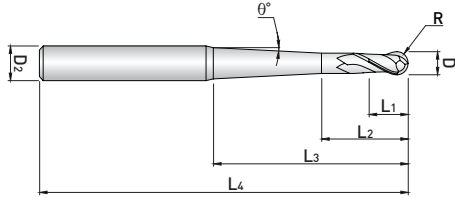
## WB542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>	
WB542 010 20 40	1.0	0.5	2°	1.0	2.5	40.0	80	4	
WB542 010 20 50						50.0	90	6	
WB542 010 30 06						50	4	6.0	
WB542 010 30 08								8.0	
WB542 010 30 10								10.0	
WB542 010 30 12								12.0	
WB542 010 30 16			16.0						
WB542 010 30 20			20.0						
WB542 010 30 25			25.0			60	6		
WB542 010 30 30			30.0			70			
WB542 010 30 40			40.0			80			
WB542 010 30 50			50.0			90			
WB542 010 50 30	30.0	70							
WB542 012 05 08	1.2	0.6	30°	1.2	3.0	8.0		50	4
WB542 012 05 12						12.0			
WB542 012 05 16						16.0			
WB542 012 05 20						20.0			
WB542 012 05 25						25.0	60		
WB542 012 05 30						30.0	70		
WB542 012 10 08			1°			50	8.0		
WB542 012 10 12							12.0		
WB542 012 10 16							16.0		
WB542 012 10 20							20.0		
WB542 012 10 25							25.0	60	
WB542 012 10 30							30.0	70	
WB542 012 15 08			1°30'			50	8.0		
WB542 012 15 12							12.0		
WB542 012 15 16							16.0		
WB542 012 15 20							20.0		
WB542 012 15 25							25.0	60	
WB542 012 15 30							30.0	70	
WB542 012 20 08			2°			50	8.0		
WB542 012 20 12							12.0		
WB542 012 20 16							16.0		
WB542 012 20 20							20.0		
WB542 012 20 25							25.0	60	
WB542 012 20 30							30.0	70	
WB542 012 30 08			3°			50	8.0		
WB542 012 30 12							12.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

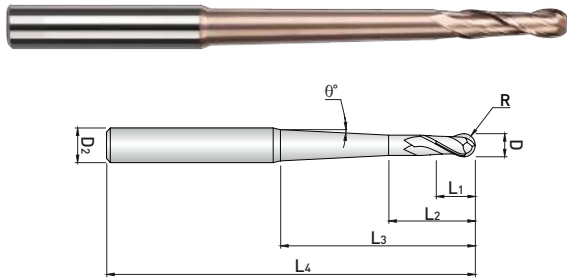
## WB542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>					
WB542 012 30 16	1.2	0.6	3°	1.2	3.0	16.0	50	4					
WB542 012 30 20						20.0							
WB542 012 30 25						25.0							
WB542 012 30 30						30.0							
WB542 015 05 08	1.5	0.75	30°	1.5	4.0	8.0	50	4					
WB542 015 05 10						10.0							
WB542 015 05 12						12.0							
WB542 015 05 16						16.0							
WB542 015 05 20						20.0							
WB542 015 05 25						25.0							
WB542 015 05 30						30.0							
WB542 015 05 40						40.0							
WB542 015 05 50						50.0							
WB542 015 10 08						1°			0.75	1°	1.5	4.0	8.0
WB542 015 10 10			10.0										
WB542 015 10 12			12.0										
WB542 015 10 16			16.0										
WB542 015 10 20			20.0										
WB542 015 10 25			25.0										
WB542 015 10 30			30.0										
WB542 015 10 40			40.0										
WB542 015 10 50			50.0										
WB542 015 15 08			1°30'				0.75						1°30'
WB542 015 15 10						10.0							
WB542 015 15 12	12.0												
WB542 015 15 16	16.0												
WB542 015 15 20	20.0												
WB542 015 15 25	25.0												
WB542 015 15 30	30.0												
WB542 015 15 40	40.0												
WB542 015 15 50	50.0												
WB542 015 20 08	2°	0.75		2°	1.5	4.0		8.0	50	4			
WB542 015 20 10			10.0										
WB542 015 20 12			12.0										
WB542 015 20 16			16.0										
WB542 015 20 20			20.0										
WB542 015 20 25			25.0										
WB542 015 20 30			30.0										
WB542 015 20 40			40.0										

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

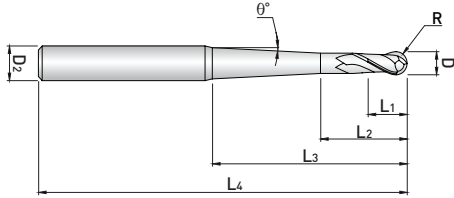
## WB542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>										
WB542 015 20 50	1.5	0.75	2°	1.5	4.0	50.0	90	6										
WB542 015 30 20						20.0	50											
WB542 015 30 30			30.0			70												
WB542 015 30 40			40.0			80												
WB542 015 30 50			50.0			90												
WB542 015 50 30			30.0			70	8											
WB542 020 05 10	2.0	1	30°	2.0	5.0	10.0	50	4										
WB542 020 05 12						12.0												
WB542 020 05 16						16.0												
WB542 020 05 20						20.0												
WB542 020 05 25						25.0			60									
WB542 020 05 30						30.0			70									
WB542 020 05 40						40.0	80											
WB542 020 05 50						50.0	100		6									
WB542 020 05 60						60.0												
WB542 020 05 80						80.0	140											
WB542 020 10 10						2.0	1			1°	2.0	5.0	10.0	50	4			
WB542 020 10 12													12.0					
WB542 020 10 16			16.0															
WB542 020 10 20			20.0															
WB542 020 10 25			25.0					60										
WB542 020 10 30			30.0					70										
WB542 020 10 40			40.0					80										
WB542 020 10 50			50.0					100	6									
WB542 020 10 60			60.0															
WB542 020 10 80			80.0					140										
WB542 020 15 10			2.0					1		1°30'			2.0	5.0		10.0	50	4
WB542 020 15 12																12.0		
WB542 020 15 16						16.0												
WB542 020 15 20						20.0												
WB542 020 15 25	25.0	60																
WB542 020 15 30	30.0	70																
WB542 020 15 40	40.0	80																
WB542 020 15 50	50.0	100		6														
WB542 020 15 60	60.0																	
WB542 020 15 80	80.0	140																
WB542 020 20 10	2.0	1			2°	2.0	5.0		10.0	50					4			
WB542 020 20 12									12.0									
WB542 020 20 16			16.0															

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

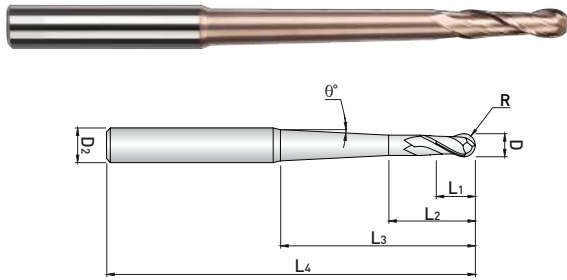
## WB542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>										
WB542 020 20 20	2.0	1	2°	2.0	5.0	20.0	55	4										
WB542 020 20 25						25.0	60											
WB542 020 20 30						30.0	70											
WB542 020 20 40						40.0	80											
WB542 020 20 50						50.0	90											
WB542 020 20 60						60.0	100											
WB542 020 20 80			80.0			140	8											
WB542 020 30 30			3.0			1.5	3°	4.5	6.0	30.0	70	6						
WB542 020 30 40										40.0	80							
WB542 020 30 50										50.0	90							
WB542 020 30 60										60.0	100							
WB542 020 30 80										80.0	140							
WB542 020 30 100	100.0	180																
WB542 020 50 30	3.0	1.5		5°	4.5		6.0			30.0	70	8						
WB542 020 50 40										40.0	90							
WB542 030 05 16										3.0	1.5		30°	4.5	6.0	16.0	60	6
WB542 030 05 20																20.0	65	
WB542 030 05 30																30.0	70	
WB542 030 05 40																40.0	80	
WB542 030 05 50			50.0	90														
WB542 030 05 60			60.0	100														
WB542 030 10 16			1°	1.5		1°		4.5	6.0			16.0				60		
WB542 030 10 20												20.0				65		
WB542 030 10 30												30.0				70		
WB542 030 10 40												40.0				80		
WB542 030 10 50	50.0	90																
WB542 030 10 60	60.0	100																
WB542 030 10 70	70.0	120																
WB542 030 15 16	1°30'	1.5			1°30'		4.5					6.0	16.0			60		
WB542 030 15 20													20.0			65		
WB542 030 15 30													30.0			70		
WB542 030 15 40													40.0			80		
WB542 030 15 50													50.0			90		
WB542 030 15 60			60.0	100														
WB542 030 15 70			70.0	120														
WB542 030 20 16			2°	1.5		2°		4.5	6.0				16.0			60		
WB542 030 20 20													20.0			65		
WB542 030 20 30													30.0			70		
WB542 030 20 40													40.0			80		
WB542 030 20 50										50.0	90							
WB542 030 20 60	60.0	100																
WB542 030 20 70	70.0	120																
WB542 030 25 16	3°	1.5			3°		4.5			6.0	16.0	60						
WB542 030 25 20											20.0	65						
WB542 030 25 30											30.0	70						
WB542 030 25 40											40.0	80						
WB542 030 25 50											50.0	90						
WB542 030 25 60			60.0	100														
WB542 030 30 30	30.0	70	8															
WB542 030 30 30	30.0	70	6															

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

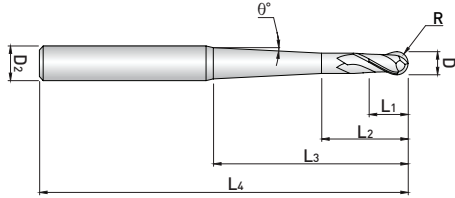
## WB542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>
WB542 030 30 40	3.0	1.5	3°	4.5	6.0	40.0	90	8
WB542 030 50 30			5°			30.0	70	8
WB542 030 50 40						40.0	90	10
WB542 040 05 40	4.0	2	30°	6.0	8.0	40.0	90	6
WB542 040 05 50						50.0	100	
WB542 040 05 60						60.0	110	
WB542 040 05 70						70.0	120	
WB542 040 10 40						40.0	90	
WB542 040 10 50			50.0			100	8	
WB542 040 10 60			60.0			110		
WB542 040 10 70			70.0			120		
WB542 040 15 40			40.0			90		
WB542 040 15 50			50.0			100		
WB542 040 15 60			60.0			110	8	
WB542 040 15 70			70.0			120		
WB542 040 30 50			50.0			100		
WB542 040 50 50			50.0			100	12	
WB542 050 10 60			5.0			2.5	1°	10.0
WB542 050 15 60	1°30'	60.0						
WB542 050 30 40	3°	40.0						
WB542 060 10 60	6.0	3	1°	12.0	15.0	60.0	120	8
WB542 060 10 90						90.0	150	
WB542 060 15 60			1°30'			60.0	120	10
WB542 060 15 90						90.0	150	
WB542 060 20 60			2°			60.0	120	
WB542 060 20 90						90.0	150	12
WB542 060 30 60			3°			60.0	120	
WB542 060 30 90						90.0	150	
WB542 080 10 70	8.0	4	1°	14.0	18.0	70.0	130	10
WB542 080 10 100						100.0	150	12
WB542 080 15 70			1°30'			70.0	130	
WB542 080 15 100						100.0	150	14
WB542 080 20 70			2°			70.0	130	12
WB542 080 20 100						100.0	150	
WB542 080 30 70			3°			70.0	130	
WB542 080 30 100						100.0	150	18

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE, TAPER NECK

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

## WB542 ...series



ULTRA FINE

HELIX

up to R3

over R3

W Coating

p.1013~1014

EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>
WB542 100 10 70	10.0	5	1°	18.0	22.0	70.0	130	12
WB542 100 10 80						80.0	150	14
WB542 100 10 100						100.0	200	
WB542 100 15 70						70.0	130	16
WB542 100 15 80						80.0	150	
WB542 100 15 100						100.0	200	
WB542 100 20 70			70.0			130	14	
WB542 100 20 80			80.0			150		
WB542 100 20 100			100.0			200	16	
WB542 100 30 70			70.0			130		18
WB542 100 30 80			80.0			150	20	
WB542 100 30 100			100.0			200		
WB542 120 10 60	12.0	6	1°	22.0	25.0	60.0	130	14
WB542 120 10 80						80.0	150	16
WB542 120 10 90						90.0	180	
WB542 120 10 100						100.0	200	16
WB542 120 15 60						60.0	130	
WB542 120 15 80						80.0	150	
WB542 120 15 90			90.0			180		
WB542 120 15 100			100.0			200	16	
WB542 120 20 60			60.0			130		
WB542 120 20 80			80.0			150	18	
WB542 120 20 90			90.0			180		
WB542 120 20 100			100.0			200	16	
WB542 120 30 60			60.0			130		18
WB542 120 30 80			80.0			150	18	
WB542 120 30 90			90.0			180		20
WB542 120 30 100			100.0			200		

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

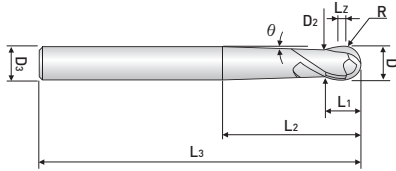
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	h6
over 6	0~-0.015	

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(Ball) WINNER Series



## MILLING MACHINE COPY

- A rounded cutting line enable to machining a various curved shape
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

## WB532 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	D <sub>3</sub>
WB532 030	3.0	1.5	1°30'	2.3	16.0	80	2.5	6
WB532 040	4.0	2	1°30'	3.1	20.0	80	3.3	6
WB532 050	5.0	2.5	1°30'	3.9	25.0	80	4.1	6
WB532 060	6.0	3	1°30'	4.9	30.0	100	4.7	6
WB532 080	8.0	4	1°30'	6.3	35.0	100	6.5	8
WB532 100	10.0	5	1°30'	7.9	40.0	100	8.2	10
WB532 120	12.0	6	1°30'	9.5	50.0	100	9.8	12

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

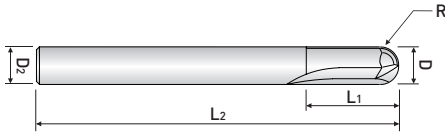
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,03	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(Ball) WINNER Series



## 2 FLUTE STRAIGHT BALL

- Strengthen the hardness of neck by applying Taper neck
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

## WSB502 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WSB502 030	3.0	1.5	10.0	70	6
WSB502 040	4.0	2	12.0	70	6
WSB502 050	5.0	2.5	18.0	90	6
WSB502 060	6.0	3	20.0	90	6
WSB502 080	8.0	4	25.0	100	8
WSB502 100	10.0	5	30.0	100	10
WSB502 120	12.0	6	32.0	110	12
WSB502 160	16.0	8	35.0	150	16
WSB502 200	20.0	10	40.0	150	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

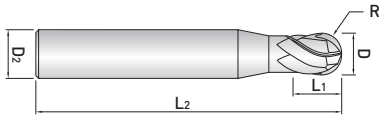
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	h6
over 6	0~-0.015	

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(Ball) WINNER Series



## 3 FLUTE BALL

- Increased tool life and excellent surface roughness with a ball type in the shape of 3 flute center match
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55  
Pre-hardened Steel, Alloy Steel, Carbon Steel

## WB503 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WB503 010	1.0	0.5	1.0	50	6
WB503 015	1.5	0.75	1.5	50	6
WB503 020	2.0	1	2.0	50	6
WB503 030	3.0	1.5	3.0	60	6
WB503 040	4.0	2	4.0	70	6
WB503 050	5.0	2.5	5.0	80	6
WB503 060	6.0	3	6.0	90	6
WB503 080	8.0	4	8.0	100	8
WB503 100	10.0	5	10.0	100	10
WB503 120	12.0	6	12.0	110	12

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

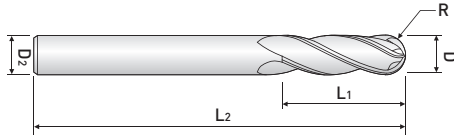
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(Ball) WINNER Series



## 4 FLUTE BALL

- Increased tool life and excellent surface roughness with a ball type in the shape of 4 flute center match
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55  
Pre-hardened Steel, Alloy Steel, Carbon Steel

## WB504 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WB504 010	1.0	0.5	1.0	50	6
WB504 015	1.5	0.75	1.5	50	6
WB504 020	2.0	1	2.0	50	6
WB504 030	3.0	1.5	3.0	60	6
WB504 040	4.0	2	4.0	70	6
WB504 050	5.0	2.5	5.0	80	6
WB504 060	6.0	3	6.0	90	6
WB504 080	8.0	4	8.0	100	8
WB504 100	10.0	5	10.0	100	10
WB504 120	12.0	6	12.0	110	12

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

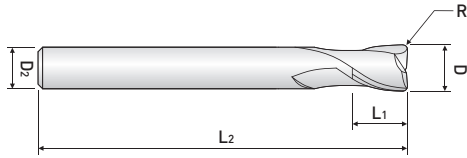
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0 ~ -0,02	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE CORNER RADIUS SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- A variety of sizes on 2 flute corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

## WR502 ...series



ULTRA FINE

HELIX

up to R3

over Ø6

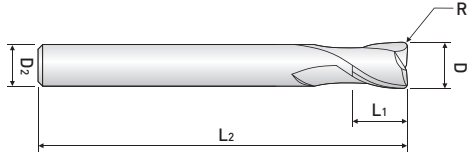
W Coating

p.1017

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WR502 002 002	0.2	0.02	0.4	40	4
WR502 002 005		0.05			
WR502 003 002	0.3	0.02	0.6	40	4
WR502 003 005		0.05			
WR502 004 005	0.4	0.05	0.8	40	4
WR502 004 01		0.10			
WR502 005 005	0.5	0.05	1.0	40	4
WR502 005 01		0.10			
WR502 006 005	0.6	0.05	1.2	40	4
WR502 006 01		0.10			
WR502 006 02		0.20			
WR502 007 005	0.7	0.05	1.4	40	4
WR502 007 01		0.10			
WR502 007 02		0.20			
WR502 008 005	0.8	0.05	1.6	40	4
WR502 008 01		0.10			
WR502 008 02		0.20			
WR502 009 005	0.9	0.05	1.8	40	4
WR502 009 01		0.10			
WR502 010 005	1.0	0.05	2.5	50	6
WR502 010 01		0.10			
WR502 010 02		0.20			
WR502 010 03		0.30			
WR502 012 005	1.2	0.05	3.0	50	6
WR502 012 01		0.10			
WR502 012 02		0.20			
WR502 012 03		0.30			
WR502 015 005	1.5	0.05	4.0	50	6
WR502 015 01		0.10			
WR502 015 02		0.20			
WR502 015 03		0.30			
WR502 015 05		0.50			
WR502 020 01	2.0	0.10	6.0	50	6
WR502 020 02		0.20			
WR502 020 03		0.30			
WR502 020 05		0.50			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE CORNER RADIUS SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- A variety of sizes on 2 flute corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

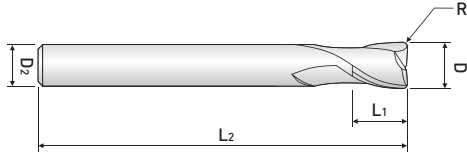
## WR502 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WR502 025 01	2.5	0.10	7.0	60	6
WR502 025 02		0.20			
WR502 025 03		0.30			
WR502 025 05		0.50			
WR502 030 01	3.0	0.10	8.0	60	6
WR502 030 02		0.20			
WR502 030 03		0.30			
WR502 030 05		0.50			
WR502 030 10		1.00			
WR502 035 01	3.5	0.10	10.0	70	6
WR502 035 02		0.20			
WR502 035 03		0.30			
WR502 035 05		0.50			
WR502 040 01 S4	4.0	0.10	10.0	70	4
WR502 040 02 S4		0.20			
WR502 040 03 S4		0.30			
WR502 040 05 S4		0.50			
WR502 040 10 S4		1.00			
WR502 040 01 100 S4	4.0	0.10	10.0	100	4
WR502 040 02 100 S4		0.20			
WR502 040 03 100 S4		0.30			
WR502 040 05 100 S4		0.50			
WR502 040 10 100 S4		1.00			
WR502 040 01	4.0	0.10	10.0	70	6
WR502 040 02		0.20			
WR502 040 03		0.30			
WR502 040 05		0.50			
WR502 040 10		1.00			
WR502 045 01	4.5	0.10	11.0	80	6
WR502 045 02		0.20			
WR502 045 03		0.30			
WR502 045 05		0.50			
WR502 050 01	5.0	0.10	13.0	90	6
WR502 050 02		0.20			
WR502 050 03		0.30			
WR502 050 05		0.50			
WR502 050 10		1.00			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE CORNER RADIUS SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- A variety of sizes on 2 flute corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

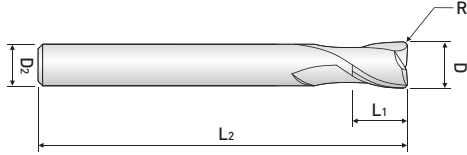
## WR502 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WR502 055 01	5.5	0.10	13.0	90	6
WR502 055 02		0.20			
WR502 055 03		0.30			
WR502 055 05		0.50			
WR502 055 10		1.00			
WR502 060 03 60	6.0	0.30	15.0	60	6
WR502 060 05 60		0.50			
WR502 060 10 60		1.00			
WR502 060 01		0.10			
WR502 060 02		0.20			
WR502 060 03		0.30			
WR502 060 05		0.50			
WR502 060 10		1.00			
WR502 060 15		1.50			
WR502 060 20		2.00			
WR502 060 05 110		0.50		110	
WR502 060 10 110		1.00		110	
WR502 060 05 130		0.50		130	
WR502 060 10 130		1.00		130	
WR502 070 01		7.0		0.10	
WR502 070 02	0.20				
WR502 070 03	0.30				
WR502 070 05	0.50				
WR502 070 10	1.00				
WR502 070 20	2.00				
WR502 080 03 70	8.0	0.30	20.0	70	8
WR502 080 05 70		0.50			
WR502 080 10 70		1.00			
WR502 080 01		0.10			
WR502 080 02		0.20			
WR502 080 03		0.30			
WR502 080 05		0.50			
WR502 080 10		1.00			
WR502 080 15		1.50			
WR502 080 20		2.00			
WR502 080 25		2.50			
WR502 080 30		3.00			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE CORNER RADIUS SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- A variety of sizes on 2 flute corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

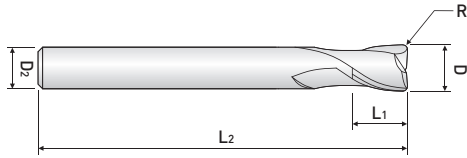
## WR502 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WR502 080 05 120	8.0	0.50	20.0	120	8
WR502 080 10 120		1.00			
WR502 080 05 150		0.50		150	
WR502 080 10 150		1.00			
WR502 100 03 75	10.0	0.30	25.0	75	10
WR502 100 05 75		0.50			
WR502 100 10 75		1.00			
WR502 100 01		0.10			
WR502 100 02		0.20			
WR502 100 03		0.30			
WR502 100 05		0.50			
WR502 100 10		1.00			
WR502 100 15		1.50			
WR502 100 20		2.00			
WR502 100 25		2.50			
WR502 100 30		3.00			
WR502 100 40		4.00			
WR502 100 05 130		0.50		130	
WR502 100 10 130		1.00			
WR502 100 05 150		0.50			
WR502 100 10 150	1.00				
WR502 110 02	11.0	0.20	25.0	110	12
WR502 110 03		0.30			
WR502 110 05		0.50			
WR502 110 10		1.00			
WR502 110 20		2.00			
WR502 120 03 80	12.0	0.30	30.0	80	12
WR502 120 05 80		0.50			
WR502 120 10 80		1.00			
WR502 120 01		0.10			
WR502 120 02		0.20			
WR502 120 03		0.30			
WR502 120 05		0.50			
WR502 120 10		1.00			
WR502 120 15		1.50			
WR502 120 20		2.00			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Corner Radius) WINNER Series



## 2 FLUTE CORNER RADIUS SHORT LENGTH + REGULAR LENGTH + LONG LENGTH

- A variety of sizes on 2 flute corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55
- Pre-hardened Steel, Alloy Steel, Carbon Steel

## WR502 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>		
WR502 120 25	12.0	2.50	30.0	110	12		
WR502 120 30		3.00					
WR502 120 40		4.00					
WR502 120 50		5.00					
WR502 120 05 130		0.50	30.0	130			
WR502 120 10 130		1.00					
WR502 120 05 150		0.50				30.0	150
WR502 120 10 150		1.00					
WR502 140 05	14.0	0.50	30.0	150	16		
WR502 140 10		1.00					
WR502 140 20		2.00					
WR502 160 05	16.0	0.50	32.0	150	16		
WR502 160 10		1.00					
WR502 160 15		1.50					
WR502 160 20		2.00					
WR502 200 05	20.0	0.50	38.0	150	20		
WR502 200 10		1.00					
WR502 200 15		1.50					
WR502 200 20		2.00					

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

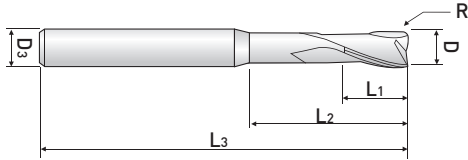
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	
over 6	0~-0.015	

※ These tools are manufactured based on order received.

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

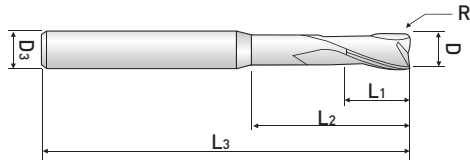
## WR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>	
WR512 002 002 005	0.2	0.02	0.3	0.5	40.0	4.0	
WR512 002 002 01				1.0			
WR512 002 002 015				1.5			
WR512 002 002 02		0.05		2.0			
WR512 002 005 005				0.5			
WR512 002 005 01				1.0			
WR512 002 005 015		1.5					
WR512 002 005 02		2.0					
WR512 003 002 01		0.3		0.02			0.5
WR512 003 002 02	2.0						
WR512 003 002 03	3.0						
WR512 003 005 01	0.05		1.0				
WR512 003 005 02			2.0				
WR512 003 005 03			3.0				
WR512 004 005 01	0.4	0.05	0.6	1.0	40.0	4.0	
WR512 004 005 015				1.5			
WR512 004 005 02				2.0			
WR512 004 005 025				2.5			
WR512 004 005 03				3.0			
WR512 004 005 04				4.0			
WR512 004 01 01		0.1		0.1			1.0
WR512 004 01 015							1.5
WR512 004 01 02							2.0
WR512 004 01 025							2.5
WR512 004 01 03							3.0
WR512 004 01 04							4.0
WR512 005 005 01	0.5	0.05	0.7		1.0	45.0	4.0
WR512 005 005 015					1.5		
WR512 005 005 02					2.0		
WR512 005 005 025					2.5		
WR512 005 005 03					3.0		
WR512 005 005 04					4.0		
WR512 005 005 05		0.10		5.0			
WR512 005 005 06				6.0			
WR512 005 01 01				1.0			
WR512 005 01 015				1.5			
WR512 005 01 02				2.0			
WR512 005 01 02				2.0			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

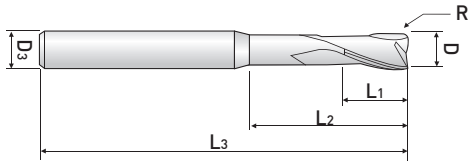
## WR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>				
WR512 005 01 025	0.5	0.10	0.7	2.5	45.0	4.0				
WR512 005 01 03				3.0						
WR512 005 01 04				4.0						
WR512 005 01 05				5.0						
WR512 005 01 06				6.0						
WR512 006 005 02	0.6	0.05	0.9	2.0	45.0	4.0				
WR512 006 005 03				3.0						
WR512 006 005 04				4.0						
WR512 006 005 06				6.0						
WR512 006 005 08				8.0						
WR512 006 005 10		10.0								
WR512 006 01 02		0.10		0.20			2.0			
WR512 006 01 03							3.0			
WR512 006 01 04							4.0			
WR512 006 01 06							6.0			
WR512 006 01 08	8.0									
WR512 006 01 10	10.0									
WR512 006 02 02	0.7	0.05	1.2	2.0	45.0	4.0				
WR512 006 02 03				3.0						
WR512 006 02 04				4.0						
WR512 006 02 06				6.0						
WR512 006 02 08				8.0						
WR512 006 02 10		10.0								
WR512 007 005 02		0.7		0.10			1.2	2.0	45.0	4.0
WR512 007 005 04								4.0		
WR512 007 005 06								6.0		
WR512 007 005 08								8.0		
WR512 007 005 10	10.0									
WR512 007 01 02	0.20		0.20	2.0						
WR512 007 01 04				4.0						
WR512 007 01 06				6.0						
WR512 007 01 08				8.0						
WR512 007 01 10				10.0						
WR512 007 02 02	0.20	0.20	2.0							
WR512 007 02 04			4.0							
WR512 007 02 06			6.0							
WR512 007 02 08			8.0							
WR512 007 02 10			10.0							

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

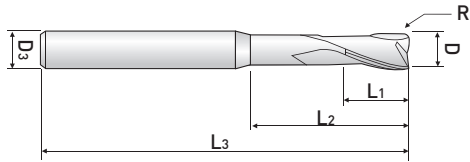
## WR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>				
WR512 008 005 02	0.8	0.05	1.2	2.0	45.0	4.0				
WR512 008 005 03				3.0						
WR512 008 005 04				4.0						
WR512 008 005 06				6.0						
WR512 008 005 08				8.0						
WR512 008 005 10		10.0								
WR512 008 01 02		0.10		2.0						
WR512 008 01 03				3.0						
WR512 008 01 04				4.0						
WR512 008 01 06				6.0						
WR512 008 01 08	8.0									
WR512 008 01 10	10.0									
WR512 008 02 02	1.0	0.20	1.5	2.0	50.0	4.0				
WR512 008 02 03				3.0						
WR512 008 02 04				4.0						
WR512 008 02 06				6.0						
WR512 008 02 08				8.0						
WR512 008 02 10		10.0								
WR512 010 005 03		1.0		0.05			1.5	3.0	50.0	4.0
WR512 010 005 04								4.0		
WR512 010 005 06								6.0		
WR512 010 005 08								8.0		
WR512 010 005 10	10.0									
WR512 010 005 12	12.0									
WR512 010 005 14	14.0									
WR512 010 005 16	16.0									
WR512 010 005 20	20.0									
WR512 010 01 03	0.10		3.0							
WR512 010 01 04			4.0							
WR512 010 01 06			6.0							
WR512 010 01 08			8.0							
WR512 010 01 10			10.0							
WR512 010 01 12			12.0							
WR512 010 01 14			14.0							
WR512 010 01 16			16.0							
WR512 010 01 20			20.0							

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Corner Radius) WINNER Series



## 2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

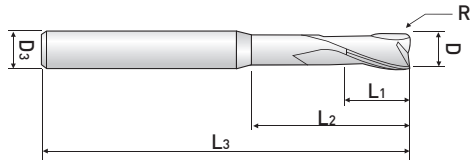
## WR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>					
WR512 010 02 03	1.0	0.20	1.5	3.0	50.0	4.0					
WR512 010 02 04				4.0							
WR512 010 02 06				6.0							
WR512 010 02 08				8.0							
WR512 010 02 10				10.0							
WR512 010 02 12				12.0							
WR512 010 02 14				14.0							
WR512 010 02 16				16.0							
WR512 010 02 20				20.0							
WR512 010 03 03				0.30			0.30	1.5	3.0	50.0	4.0
WR512 010 03 04									4.0		
WR512 010 03 06									6.0		
WR512 010 03 08									8.0		
WR512 010 03 10									10.0		
WR512 010 03 12	12.0										
WR512 010 03 14	14.0										
WR512 010 03 16	16.0										
WR512 010 03 20	20.0										
WR512 012 005 03	1.2	0.05	1.8		3.0	50.0			4.0		
WR512 012 005 04					4.0						
WR512 012 005 06					6.0						
WR512 012 005 08					8.0						
WR512 012 005 10					10.0						
WR512 012 005 12				12.0							
WR512 012 005 16				16.0							
WR512 012 005 20				20.0							
WR512 012 01 03				0.10	0.10		3.0				
WR512 012 01 04							4.0				
WR512 012 01 06		6.0									
WR512 012 01 08		8.0									
WR512 012 01 10		10.0									
WR512 012 01 12		12.0									
WR512 012 01 16		16.0									
WR512 012 01 20		20.0									
WR512 012 02 03		0.20					0.20	3.0			
WR512 012 02 04								4.0			
WR512 012 02 06				6.0							
WR512 012 02 08				8.0							
WR512 012 02 10	10.0										

NEXT >>>

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

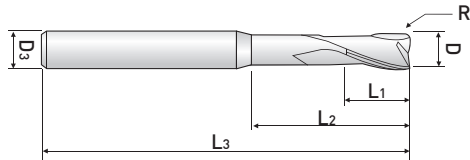
## WR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>				
WR512 012 02 12	1.2	0.20	1.8	12.0	50.0	4.0				
WR512 012 02 16				16.0						
WR512 012 02 20				20.0						
WR512 012 03 03				0.30			3.0			
WR512 012 03 04							4.0			
WR512 012 03 06							6.0			
WR512 012 03 08		8.0								
WR512 012 03 10		10.0								
WR512 012 03 12		12.0								
WR512 012 03 16		16.0								
WR512 012 03 20		20.0								
WR512 015 005 04		1.5		0.05			2.3	4.0	50	4.0
WR512 015 005 06	6.0									
WR512 015 005 08	8.0									
WR512 015 005 10	10.0									
WR512 015 005 12	12.0									
WR512 015 005 14	14.0									
WR512 015 005 16	16.0									
WR512 015 005 20	20.0									
WR512 015 005 22	22.0									
WR512 015 005 26	26.0									
WR512 015 01 04	0.10		0.10		4.0	50				
WR512 015 01 06					6.0					
WR512 015 01 08				8.0						
WR512 015 01 10				10.0						
WR512 015 01 12				12.0						
WR512 015 01 14				14.0						
WR512 015 01 16				16.0						
WR512 015 01 20				20.0						
WR512 015 01 22				22.0						
WR512 015 01 26				26.0						
WR512 015 02 04				0.20	0.20			4.0	50	
WR512 015 02 06								6.0		
WR512 015 02 08	8.0									
WR512 015 02 10	10.0									
WR512 015 02 12	12.0									
WR512 015 02 14	14.0									
WR512 015 02 16	16.0									
WR512 015 02 20	20.0									

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Corner Radius) WINNER Series



## 2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

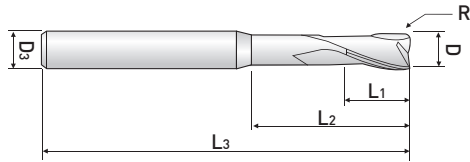
## WR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>	
WR512 015 02 22	1.5	0.20	2.3	22.0	60	4.0	
WR512 015 02 26				26.0			
WR512 015 03 04				4.0			
WR512 015 03 06				6.0			
WR512 015 03 08		8.0					
WR512 015 03 10		10.0					
WR512 015 03 12		12.0					
WR512 015 03 14		14.0					
WR512 015 03 16		16.0					
WR512 015 03 20		20.0					
WR512 015 03 22		22.0					
WR512 015 03 26		26.0					
WR512 015 05 04		0.50		0.30	4.0		50
WR512 015 05 06					6.0		
WR512 015 05 08					8.0		
WR512 015 05 10					10.0		
WR512 015 05 12					12.0		
WR512 015 05 14					14.0		
WR512 015 05 16					16.0		
WR512 015 05 20					20.0		
WR512 015 05 22	22.0						
WR512 015 05 26	26.0						
WR512 020 01 06	2.0	0.10	3.0	6.0	50	4.0	
WR512 020 01 08				8.0			
WR512 020 01 10				10.0			
WR512 020 01 12				12.0			
WR512 020 01 14				14.0			
WR512 020 01 16				16.0			
WR512 020 01 20				20.0			
WR512 020 01 22				22.0			
WR512 020 01 26				26.0			
WR512 020 01 30				30.0			
WR512 020 02 06		0.20		0.20	6.0		50
WR512 020 02 08					8.0		
WR512 020 02 10					10.0		
WR512 020 02 12					12.0		
WR512 020 02 14					14.0		
WR512 020 02 16					16.0		
WR512 020 02 20					20.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

## WR512 ...series



ULTRA FINE

HELIX

up to  $\phi 6$ over  $\phi 6$ 

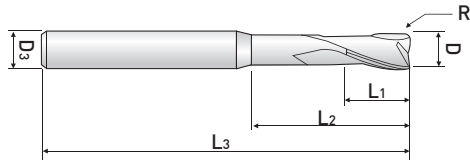
W Coating

p.1021

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>			
WR512 020 02 22	2.0	0.20	3.0	22.0	60	4.0			
WR512 020 02 26				26.0					
WR512 020 02 30				30.0					
WR512 020 03 06		0.30		0.30	6.0		50		
WR512 020 03 08					8.0				
WR512 020 03 10					10.0				
WR512 020 03 12					12.0				
WR512 020 03 14					14.0				
WR512 020 03 16					16.0				
WR512 020 03 20		20.0		60					
WR512 020 03 22		22.0							
WR512 020 03 26		26.0							
WR512 020 03 30	30.0	70							
WR512 020 05 06	2.5	0.50	4.0	6.0	50	4.0			
WR512 020 05 08				8.0					
WR512 020 05 10				10.0					
WR512 020 05 12				12.0					
WR512 020 05 14				14.0					
WR512 020 05 16				16.0					
WR512 020 05 20		20.0		60					
WR512 020 05 22		22.0							
WR512 020 05 26		26.0							
WR512 020 05 30		30.0		70					
WR512 025 01 08		2.5		0.10	4.0		8.0	50	4.0
WR512 025 01 10							10.0		
WR512 025 01 12	12.0								
WR512 025 01 14	14.0								
WR512 025 01 16	16.0								
WR512 025 01 20	20.0		60						
WR512 025 01 26	26.0								
WR512 025 01 30	30.0			70					
WR512 025 02 08	0.20		0.20	8.0		50			
WR512 025 02 10				10.0					
WR512 025 02 12				12.0					
WR512 025 02 14				14.0					
WR512 025 02 16		16.0							
WR512 025 02 20		20.0		60					
WR512 025 02 26	26.0								
WR512 025 02 30	30.0	70							

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

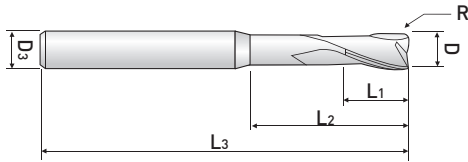
## WR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>			
WR512 025 03 08	2.5	0.30	4.0	8.0	50	4.0			
WR512 025 03 10				10.0					
WR512 025 03 12				12.0					
WR512 025 03 14				14.0					
WR512 025 03 16				16.0					
WR512 025 03 20		20.0							
WR512 025 03 26		26.0		60					
WR512 025 03 30		30.0		70					
WR512 025 05 08		2.5		0.50	4.0		8.0	50	4.0
WR512 025 05 10							10.0		
WR512 025 05 12	12.0								
WR512 025 05 14	14.0								
WR512 025 05 16	16.0								
WR512 025 05 20	20.0								
WR512 025 05 26	26.0		60						
WR512 025 05 30	30.0		70						
WR512 030 01 08	3.0		0.10	4.5		8.0	50	6.0	
WR512 030 01 10						10.0			
WR512 030 01 12		12.0							
WR512 030 01 14		14.0							
WR512 030 01 16		16.0			60				
WR512 030 01 20		20.0							
WR512 030 01 26		26.0			65				
WR512 030 01 30		30.0			70				
WR512 030 01 35		35.0							
WR512 030 01 40		40.0			80				
WR512 030 02 08		0.20	4.5		8.0	50	6.0		
WR512 030 02 10					10.0				
WR512 030 02 12					12.0				
WR512 030 02 14					14.0				
WR512 030 02 16					16.0				60
WR512 030 02 20					20.0				
WR512 030 02 26					26.0	65			
WR512 030 02 30					30.0	70			
WR512 030 02 35					35.0				
WR512 030 02 40					40.0	80			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

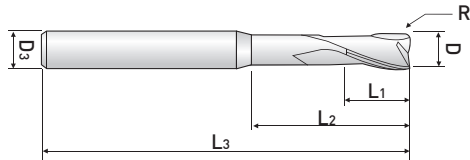
## WR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>			
WR512 030 03 08	3.0	0.30	4.5	8.0	50	6.0			
WR512 030 03 10				10.0					
WR512 030 03 12				12.0					
WR512 030 03 14				14.0	60				
WR512 030 03 16				16.0					
WR512 030 03 20				20.0					
WR512 030 03 26		26.0		65					
WR512 030 03 30		30.0		70					
WR512 030 03 35		35.0							
WR512 030 03 40		40.0							
WR512 030 05 08		3.0		0.50	4.5		8.0	50	6.0
WR512 030 05 10							10.0		
WR512 030 05 12	12.0								
WR512 030 05 14	14.0		60						
WR512 030 05 16	16.0								
WR512 030 05 20	20.0								
WR512 030 05 26	26.0		65						
WR512 030 05 30	30.0		70						
WR512 030 05 35	35.0								
WR512 030 05 40	40.0								
WR512 030 10 08	3.0		1.00	4.5		8.0	50	6.0	
WR512 030 10 10						10.0			
WR512 030 10 12		12.0							
WR512 030 10 14		14.0			60				
WR512 030 10 16		16.0							
WR512 030 10 20		20.0							
WR512 030 10 26		26.0	65						
WR512 030 10 30		30.0	70						
WR512 030 10 35		35.0							
WR512 030 10 40		40.0							
WR512 040 01 10		4.0	0.10		6.0	10.0	50		6.0
WR512 040 01 12						12.0			
WR512 040 01 14	14.0			60					
WR512 040 01 16	16.0								
WR512 040 01 20	20.0								
WR512 040 01 26	26.0			65					
WR512 040 01 30	30.0								

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Corner Radius) WINNER Series



## 2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
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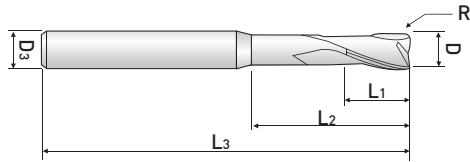
## WR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>			
WR512 040 01 35	4.0	0.10	6.0	35.0	70	6.0			
WR512 040 01 40				40.0	80				
WR512 040 01 45				45.0	90				
WR512 040 01 50				50.0	100				
WR512 040 02 10				10.0	50				
WR512 040 02 12		12.0							
WR512 040 02 14		14.0							
WR512 040 02 16		16.0		60					
WR512 040 02 20		20.0							
WR512 040 02 26		26.0		65					
WR512 040 02 30		30.0							
WR512 040 02 35		35.0			70				
WR512 040 02 40		40.0			80				
WR512 040 02 45		45.0			90				
WR512 040 02 50		50.0		100					
WR512 040 03 10	4.0	0.30	6.0	10.0	50	6.0			
WR512 040 03 12				12.0					
WR512 040 03 14				14.0	60				
WR512 040 03 16				16.0					
WR512 040 03 20				20.0					
WR512 040 03 26		26.0		65					
WR512 040 03 30		30.0							
WR512 040 03 35		35.0			70				
WR512 040 03 40		40.0			80				
WR512 040 03 45		45.0			90				
WR512 040 03 50		50.0		100					
WR512 040 05 10		4.0		0.50	6.0		10.0	50	6.0
WR512 040 05 12							12.0		
WR512 040 05 14							14.0	60	
WR512 040 05 16							16.0		
WR512 040 05 20	20.0								
WR512 040 05 26	26.0		65						
WR512 040 05 30	30.0								
WR512 040 05 35	35.0			70					
WR512 040 05 40	40.0			80					
WR512 040 05 45	45.0			90					
WR512 040 05 50	50.0		100						

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

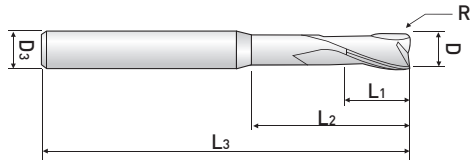
## WR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WR512 040 10 10	4.0	1.00	6.0	10.0	50	6.0
WR512 040 10 12				12.0		
WR512 040 10 14				14.0		
WR512 040 10 16				16.0	60	
WR512 040 10 20				20.0		
WR512 040 10 26				26.0	65	
WR512 040 10 30				30.0		
WR512 040 10 35				35.0		
WR512 040 10 40				40.0	80	
WR512 040 10 45				45.0	90	
WR512 040 10 50				50.0	100	
WR512 050 01				5.0	0.10	
WR512 050 02	0.20					
WR512 050 03	0.30					
WR512 050 05	0.50					
WR512 050 10	1.00					
WR512 050 15	1.50					
WR512 050 20	2.00					
WR512 060 01	6.0	0.10	9.0	20.0	60.0	6.0
WR512 060 02		0.20				
WR512 060 03		0.30				
WR512 060 05		0.50				
WR512 060 10		1.00				
WR512 060 15		1.50				
WR512 060 20		2.00				
WR512 060 03 90		0.30	15.0	30.0	90.0	6.0
WR512 060 05 90		0.50				
WR512 060 10 90		1.00				
WR512 080 01	0.10	12.0				
WR512 080 02	0.20					
WR512 080 03	0.30					
WR512 080 05	0.50					
WR512 080 10	1.00					
WR512 080 15	1.50					
WR512 080 20	2.00					
WR512 080 03 100	0.30	20.0	35.0	100.0	8.0	
WR512 080 05 100	0.50					
WR512 080 10 100	1.00					

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Corner Radius) WINNER Series



## 2 FLUTE LONG NECK CORNER RADIUS

- Excellent effect in preventing breakage with a shape on neck without notch
- A variety of sizes on 2 flute long neck corner R radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

## WR512 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>			
WR512 100 01	10.0	0.10	15.0	30.0	75.0	10.0			
WR512 100 02		0.20							
WR512 100 03		0.30							
WR512 100 05		0.50							
WR512 100 10		1.00							
WR512 100 15		1.50							
WR512 100 20		2.00							
WR512 100 03 100		0.30					25.0	40.0	100.0
WR512 100 05 100	0.50								
WR512 100 10 100	1.00								
WR512 120 02	12.0	0.20	18.0	32.0	80.0	12.0			
WR512 120 03		0.30							
WR512 120 05		0.50							
WR512 120 10		1.00							
WR512 120 15		1.50							
WR512 120 20		2.00							
WR512 120 03 110		0.30					30.0	45.0	110.0
WR512 120 05 110		0.50							
WR512 120 10 110	1.00								
WR512 160 05	16.0	0.50	20.0	35.0	100.0	16.0			
WR512 160 10		1.00							
WR512 160 05 150		0.50	35.0	50.0	150.0				
WR512 160 10 150		1.00							
WR512 200 05	20.0	0.50	25.0	40.0	100.0	20.0			
WR512 200 10		1.00							
WR512 200 05 150		0.50	40.0	55.0	150.0				
WR512 200 10 150		1.00							

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

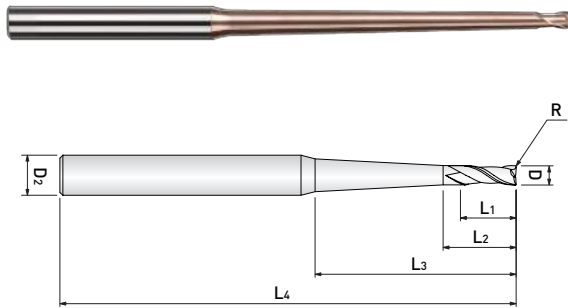
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	h6
over 6	0~-0.015	

※ These tools are manufactured based on order received.

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

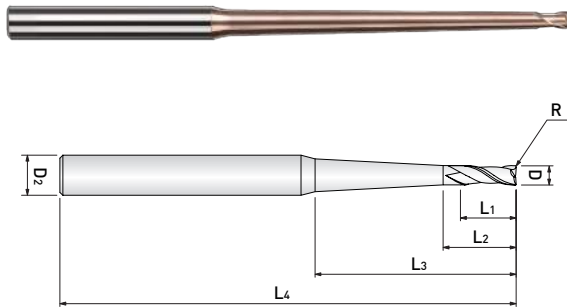
## WR542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>										
WR542 002 005 01 01	0.2	0.05	1°	0.3	0.4	1.0	40	4										
WR542 002 005 01 02						2.0												
WR542 002 005 01 03						3.0												
WR542 002 005 02 01			1.0			2°												
WR542 002 005 02 02			2.0															
WR542 002 005 02 03			3.0															
WR542 003 005 01 02	0.3	0.05	1°	0.5	0.6	2.0	40	4										
WR542 003 005 01 03						3.0												
WR542 003 005 01 04						4.0												
WR542 003 005 01 05			5.0			2°												
WR542 003 005 02 02			2.0															
WR542 003 005 02 03			3.0															
WR542 003 005 02 04			4.0															
WR542 003 005 02 05			5.0															
WR542 004 005 01 02			0.4						0.05	1°	0.6	0.8	2.0	50	4			
WR542 004 005 01 03	3.0																	
WR542 004 005 01 04	4.0																	
WR542 004 005 01 05	5.0																	
WR542 004 005 01 06	6.0	2°																
WR542 004 005 02 02	2.0																	
WR542 004 005 02 03	3.0																	
WR542 004 005 02 04	4.0																	
WR542 004 005 02 05	5.0																	
WR542 004 005 02 06	6.0																	
WR542 004 01 01 02	0.10	1°		0.6	0.8	2.0	50	4										
WR542 004 01 01 03						3.0												
WR542 004 01 01 04						4.0												
WR542 004 01 01 05						5.0												
WR542 004 01 01 06						6.0			2°									
WR542 004 01 02 02						2.0												
WR542 004 01 02 03		3.0																
WR542 004 01 02 04		4.0																
WR542 004 01 02 05		5.0																
WR542 004 01 02 06		6.0																
WR542 005 005 01 04		0.50				0.05			1°	0.70			1.0			4.0	50	4
WR542 005 005 01 06																6.0		
WR542 005 005 01 08	8.0																	

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

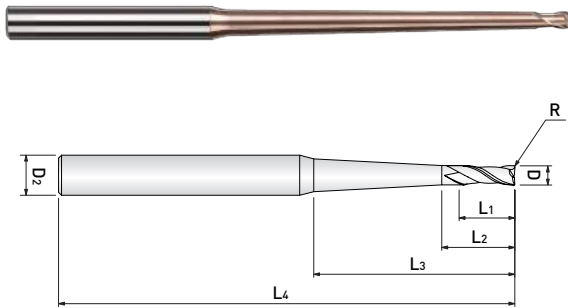
## WR542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>						
WR542 005 005 01 10	0.50	0.05	1°	0.70	1.0	10.0	50	4						
WR542 005 005 02 04						4.0								
WR542 005 005 02 06						6.0								
WR542 005 005 02 08			8.0											
WR542 005 005 02 10			10.0											
WR542 005 01 01 04			0.10			1°			4.0					
WR542 005 01 01 06		6.0												
WR542 005 01 01 08		8.0												
WR542 005 01 01 10		10.0												
WR542 005 01 02 04		2°				4.0								
WR542 005 01 02 06						6.0								
WR542 005 01 02 08			8.0											
WR542 005 01 02 10	10.0													
WR542 006 01 01 04	0.6	0.10	1°	0.9	1.2	4.0	50.0	4.0						
WR542 006 01 01 06						6.0								
WR542 006 01 01 08						8.0								
WR542 006 01 01 10						10.0								
WR542 006 01 01 12						12.0								
WR542 006 01 02 04						2°			4.0					
WR542 006 01 02 06			6.0											
WR542 006 01 02 08			8.0											
WR542 006 01 02 10			10.0											
WR542 006 01 02 12			12.0											
WR542 006 02 01 04			0.20						1°	4.0				
WR542 006 02 01 06						6.0								
WR542 006 02 01 08		8.0												
WR542 006 02 01 10		10.0												
WR542 006 02 01 12		12.0												
WR542 006 02 02 04		2°				4.0								
WR542 006 02 02 06						6.0								
WR542 006 02 02 08						8.0								
WR542 006 02 02 10						10.0								
WR542 006 02 02 12						12.0								
WR542 008 01 01 04						0.8			0.10	1°	1.2	1.6	4.0	50.0
WR542 008 01 01 06		6.0												
WR542 008 01 01 08		8.0												
WR542 008 01 01 10		10.0												

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE TAPER LONG LEAK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

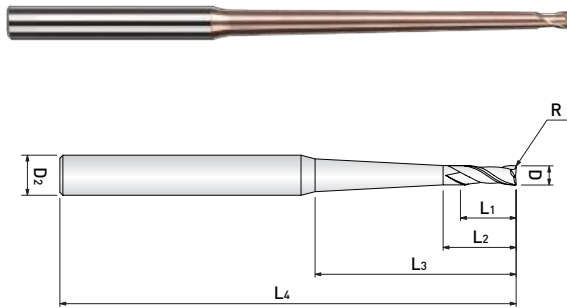
## WR542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>	
WR542 008 01 01 12	0.8	0.10	1°	1.2	1.6	12.0	50.0	4.0	
WR542 008 01 01 16						16.0			
WR542 008 01 02 04						4.0			
WR542 008 01 02 06						6.0			
WR542 008 01 02 08			8.0						
WR542 008 01 02 10			10.0						
WR542 008 01 02 12			12.0						
WR542 008 01 02 16			16.0						
WR542 008 02 01 04		0.20	1°			4.0			
WR542 008 02 01 06						6.0			
WR542 008 02 01 08						8.0			
WR542 008 02 01 10						10.0			
WR542 008 02 01 12			12.0						
WR542 008 02 01 16			16.0						
WR542 008 02 02 04			4.0						
WR542 008 02 02 06			6.0						
WR542 008 02 02 08	8.0								
WR542 008 02 02 10	10.0								
WR542 008 02 02 12	12.0								
WR542 008 02 02 16	16.0								
WR542 010 01 01 06	1.0	0.10	1°	1.5	2.5	6.0	50	4	
WR542 010 01 01 08						8.0			
WR542 010 01 01 10						10.0			
WR542 010 01 01 12						12.0			
WR542 010 01 01 16						16.0			
WR542 010 01 01 20						20.0			
WR542 010 01 01 25						25.0			60
WR542 010 01 01 30						30.0			70
WR542 010 01 01 40			40.0			80			
WR542 010 01 01 50			50.0			90	6		
WR542 010 01 02 06			2°			2°	6.0	50	4
WR542 010 01 02 08							8.0		
WR542 010 01 02 10							10.0		
WR542 010 01 02 12							12.0		
WR542 010 01 02 16							16.0		
WR542 010 01 02 20							20.0		
WR542 010 01 02 25	25.0	60							
WR542 010 01 02 30	30.0	70							

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

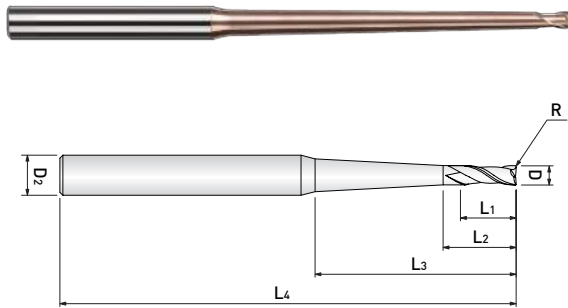
## WR542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>	
WR542 010 01 02 40	1.0	0.10	2°	1.5	2.5	40.0	80	4	
WR542 010 01 02 50						50.0	90	6	
WR542 010 02 01 06						50	1°	6.0	4
WR542 010 02 01 08								8.0	
WR542 010 02 01 10		10.0							
WR542 010 02 01 12		12.0							
WR542 010 02 01 16		16.0							
WR542 010 02 01 20		20.0							
WR542 010 02 01 25		25.0	60						
WR542 010 02 01 30		30.0	70						
WR542 010 02 01 40		40.0	80			6			
WR542 010 02 01 50		50.0	90						
WR542 010 02 02 06		0.20	2°			6.0	50	4	
WR542 010 02 02 08						8.0			
WR542 010 02 02 10						10.0			
WR542 010 02 02 12						12.0			
WR542 010 02 02 16						16.0			
WR542 010 02 02 20						20.0			
WR542 010 02 02 25						25.0			60
WR542 010 02 02 30						30.0			70
WR542 010 02 02 40	40.0	80	6						
WR542 010 02 02 50	50.0	90							
WR542 012 01 01 08	1.2	0.10	1°	1.8	3.0	8.0	50	4	
WR542 012 01 01 12						12.0			
WR542 012 01 01 16						16.0			
WR542 012 01 01 20						20.0			
WR542 012 01 01 25						25.0			60
WR542 012 01 01 30			30.0			70			
WR542 012 01 02 08			0.20			2°	8.0		50
WR542 012 01 02 12							12.0		
WR542 012 01 02 16							16.0		
WR542 012 01 02 20							20.0		
WR542 012 01 02 25		25.0					60		
WR542 012 01 02 30		30.0				70			
WR542 012 02 01 08		1°				8.0	50		
WR542 012 02 01 12						12.0			
WR542 012 02 01 16						16.0			
WR542 012 02 01 20						20.0			
WR542 012 02 01 20			20.0						

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

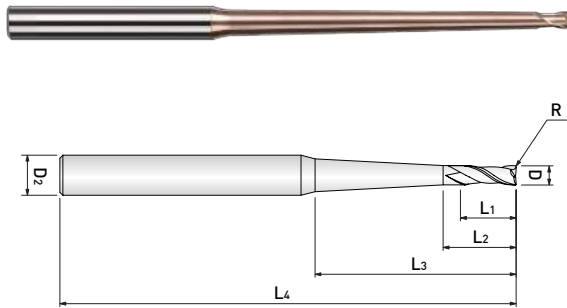
## WR542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>							
WR542 012 02 01 25	1.2	0.20	1°	1.8	3.0	25.0	60	4							
WR542 012 02 01 30						30.0	70								
WR542 012 02 02 08						8.0	50								
WR542 012 02 02 12						12.0									
WR542 012 02 02 16			16.0												
WR542 012 02 02 20			20.0												
WR542 012 02 02 25			25.0			60									
WR542 012 02 02 30			30.0			70									
WR542 015 01 01 08	1.5	0.10	1°	2.3	3.0	8.0	50	4							
WR542 015 01 01 10						10.0									
WR542 015 01 01 12						12.0									
WR542 015 01 01 16						16.0									
WR542 015 01 01 20						20.0									
WR542 015 01 01 25						25.0			60						
WR542 015 01 01 30						30.0			70						
WR542 015 01 01 40						40.0			80						
WR542 015 01 01 50						50.0			90						
WR542 015 01 02 08						2°			0.10	2°	8.0	50			
WR542 015 01 02 10											10.0				
WR542 015 01 02 12											12.0				
WR542 015 01 02 16			16.0												
WR542 015 01 02 20			20.0												
WR542 015 01 02 25			25.0				60								
WR542 015 01 02 30			30.0				70								
WR542 015 01 02 40			40.0				80								
WR542 015 01 02 50			50.0				90								
WR542 015 02 01 08			0.20				0.20				1°		8.0	50	4
WR542 015 02 01 10													10.0		
WR542 015 02 01 12													12.0		
WR542 015 02 01 16						16.0									
WR542 015 02 01 20						20.0									
WR542 015 02 01 25						25.0			60						
WR542 015 02 01 30	30.0	70													
WR542 015 02 01 40	40.0	80													
WR542 015 02 01 50	50.0	90													
WR542 015 02 02 08	2°	0.20		2°	8.0	50									
WR542 015 02 02 10					10.0										
WR542 015 02 02 12					12.0										
WR542 015 02 02 12			12.0												

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

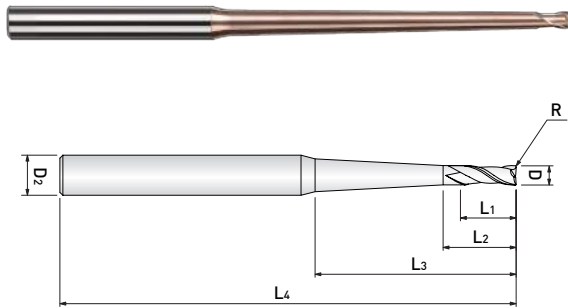
## WR542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>					
WR542 015 02 02 16	1.5	0.20	2°	2.3	3.0	16.0	50	4					
WR542 015 02 02 20						20.0							
WR542 015 02 02 25						25.0							
WR542 015 02 02 30						30.0	60						
WR542 015 02 02 40						40.0							
WR542 015 02 02 50						50.0							
WR542 015 03 01 08	1.5	0.30	1°	2.3	3.0	8.0	50	4					
WR542 015 03 01 10						10.0							
WR542 015 03 01 12						12.0							
WR542 015 03 01 16						16.0							
WR542 015 03 01 20						20.0							
WR542 015 03 01 25						25.0			60				
WR542 015 03 01 30			30.0										
WR542 015 03 01 40			40.0										
WR542 015 03 01 50			50.0			90							
WR542 015 03 02 08			0.30				2°		2.3	3.0	8.0	50	4
WR542 015 03 02 10											10.0		
WR542 015 03 02 12											12.0		
WR542 015 03 02 16	16.0												
WR542 015 03 02 20	20.0												
WR542 015 03 02 25	25.0	60											
WR542 015 03 02 30	30.0												
WR542 015 03 02 40	40.0												
WR542 015 03 02 50	50.0	90											
WR542 020 01 01 10	2.0		0.10	1°	2.0	5.0	10.0	50			4		
WR542 020 01 01 12							12.0						
WR542 020 01 01 16							16.0						
WR542 020 01 01 20							20.0						
WR542 020 01 01 25							25.0		60				
WR542 020 01 01 30		30.0											
WR542 020 01 01 40		40.0											
WR542 020 01 01 50		50.0		100									
WR542 020 01 01 60		60.0											
WR542 020 01 01 80		80.0					140						
WR542 020 01 02 10		10.0											
WR542 020 01 02 12		12.0						50					
WR542 020 01 02 16	16.0												

NEXT &gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

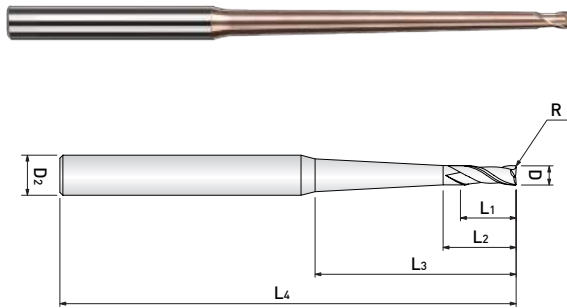
## WR542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>				
WR542 020 01 02 20	2.0	0.10	2°	2.0	5.0	20.0	50	4				
WR542 020 01 02 25						25.0	60					
WR542 020 01 02 30						30.0	70					
WR542 020 01 02 40						40.0	80	6				
WR542 020 01 02 50						50.0	100					
WR542 020 01 02 60						60.0	140	8				
WR542 020 01 02 80						80.0	140	8				
WR542 020 02 01 10						2.0	0.20	1°	10.0	50	4	
WR542 020 02 01 12		12.0										
WR542 020 02 01 16		16.0										
WR542 020 02 01 20		20.0										
WR542 020 02 01 25		25.0	60						6			
WR542 020 02 01 30		30.0	70									
WR542 020 02 01 40		40.0	80						6			
WR542 020 02 01 50		50.0	100									
WR542 020 02 01 60		60.0	140						8			
WR542 020 02 01 80		80.0	140						8			
WR542 020 02 02 10		2.0	0.20						2°	10.0	50	4
WR542 020 02 02 12										12.0		
WR542 020 02 02 16						16.0						
WR542 020 02 02 20						20.0						
WR542 020 02 02 25						25.0	60	6				
WR542 020 02 02 30						30.0	70					
WR542 020 02 02 40						40.0	80	6				
WR542 020 02 02 50	50.0			100								
WR542 020 02 02 60	60.0			140	8							
WR542 020 02 02 80	80.0			140	8							
WR542 020 03 01 10	2.0			0.30	1°	10.0	50	4				
WR542 020 03 01 12						12.0						
WR542 020 03 01 16		16.0										
WR542 020 03 01 20		20.0										
WR542 020 03 01 25		25.0	60			6						
WR542 020 03 01 30		30.0	70									
WR542 020 03 01 40		40.0	80			6						
WR542 020 03 01 50		50.0	100									
WR542 020 03 01 60		60.0	140			8						
WR542 020 03 01 80		80.0	140			8						

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Corner Radius) WINNER Series



## 2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

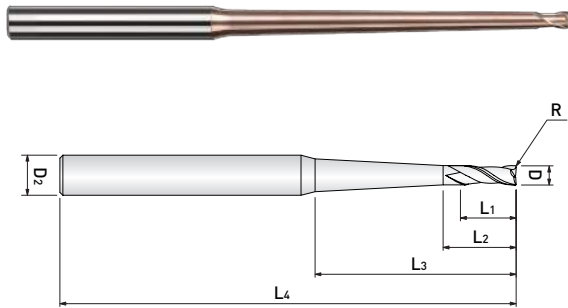
## WR542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>			
WR542 020 03 02 10	2.0	0.30	2°	2.0	5.0	10.0	50	4			
WR542 020 03 02 12						12.0					
WR542 020 03 02 16						16.0					
WR542 020 03 02 20						20.0					
WR542 020 03 02 25						25.0	60				
WR542 020 03 02 30						30.0					
WR542 020 03 02 40						40.0	80				
WR542 020 03 02 50						50.0					
WR542 020 03 02 60		60.0	100								
WR542 020 03 02 80		80.0									
WR542 020 05 01 10		2.0	0.50			1°	2.0	5.0	10.0	50	4
WR542 020 05 01 12									12.0		
WR542 020 05 01 16									16.0		
WR542 020 05 01 20									20.0		
WR542 020 05 01 25									25.0	60	
WR542 020 05 01 30									30.0		
WR542 020 05 01 40	40.0			80							
WR542 020 05 01 50	50.0										
WR542 020 05 01 60	60.0		100								
WR542 020 05 01 80	80.0										
WR542 020 05 02 10	2.0		0.50	2°	2.0	5.0			10.0	50	4
WR542 020 05 02 12									12.0		
WR542 020 05 02 16									16.0		
WR542 020 05 02 20									20.0		
WR542 020 05 02 25									25.0	60	
WR542 020 05 02 30									30.0		
WR542 020 05 02 40		40.0					80				
WR542 020 05 02 50		50.0									
WR542 020 05 02 60		60.0	100								
WR542 020 05 02 80		80.0									
WR542 030 02 01 16		3.0	0.20	1°			4.5	6.0	16.0	60	6
WR542 030 02 01 20									20.0		
WR542 030 02 01 30									30.0		
WR542 030 02 01 40									40.0		
WR542 030 02 01 50				50.0					90		
WR542 030 02 01 60				60.0							
WR542 030 02 01 60	60.0			100							
WR542 030 02 02 16	16.0				60						
WR542 030 02 02 16			2°								

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

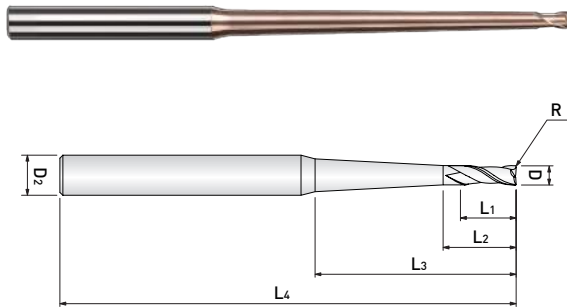
## WR542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>
WR542 030 02 02 20	3.0	0.20	2°	4.5	6.0	20.0	65	6
WR542 030 02 02 30						30.0	70	
WR542 030 02 02 40						40.0	80	
WR542 030 02 02 50						50.0	90	
WR542 030 02 02 60						60.0	100	
WR542 030 02 02 70						70.0	120	
WR542 030 03 01 16		0.30	1°			16.0	60	6
WR542 030 03 01 20						20.0	65	
WR542 030 03 01 30						30.0	70	
WR542 030 03 01 40						40.0	80	
WR542 030 03 01 50						50.0	90	
WR542 030 03 01 60						60.0	100	
WR542 030 03 02 16		0.30	2°			16.0	60	8
WR542 030 03 02 20						20.0	65	
WR542 030 03 02 30						30.0	70	
WR542 030 03 02 40						40.0	80	
WR542 030 03 02 50						50.0	90	
WR542 030 03 02 60						60.0	100	
WR542 030 03 02 70		70.0	120					
WR542 030 05 01 16		0.50	1°			16.0	60	6
WR542 030 05 01 20						20.0	65	
WR542 030 05 01 30						30.0	70	
WR542 030 05 01 40						40.0	80	
WR542 030 05 01 50						50.0	90	
WR542 030 05 01 60	60.0			100				
WR542 030 05 02 16	0.50		2°	16.0	60	8		
WR542 030 05 02 20				20.0	65			
WR542 030 05 02 30				30.0	70			
WR542 030 05 02 40				40.0	80			
WR542 030 05 02 50				50.0	90			
WR542 030 05 02 60				60.0	100			
WR542 030 05 02 70	70.0	120						

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Corner Radius) WINNER Series



## 2 FLUTE TAPER LONG LECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

## WR542 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>	
WR542 040 02 01 40	4.0	0.20	1°	6.0	8.0	40.0	90	6	
WR542 040 02 01 50						50.0	100		
WR542 040 02 01 60						60.0	110		
WR542 040 02 01 70						70.0	120		
WR542 040 02 02 40						40.0	90		8
WR542 040 02 02 50						50.0	100		
WR542 040 02 02 60			60.0			110			
WR542 040 02 02 70			70.0			120			
WR542 040 02 02 70			40.0			90	10		
WR542 040 03 01 40			50.0			100			
WR542 040 03 01 50			60.0			110			
WR542 040 03 01 60			70.0			120			
WR542 040 03 02 40		40.0	90	8					
WR542 040 03 02 50		50.0	100						
WR542 040 03 02 60		60.0	110						
WR542 040 03 02 70		70.0	120						
WR542 040 03 02 70		40.0	90		10				
WR542 040 05 01 40		50.0	100						
WR542 040 05 01 50		60.0	110						
WR542 040 05 01 60		70.0	120						
WR542 040 05 02 40		40.0	90	8					
WR542 040 05 02 50		50.0	100						
WR542 040 05 02 60		60.0	110						
WR542 040 05 02 70		70.0	120						

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

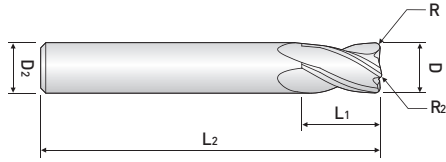
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0--0.012	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 3 FLUTE DOUBLE CORNER RADIUS

- High speed and feed rate lead to an improved productivity due to the choice of unique double corner radius
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55  
Pre-hardened Steel, Alloy Steel, Carbon Steel

## WDR503 ...series



EDP. No.	D	R	R <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WDR503 060 05	6.0	0.50	6.0	10.0	90.0	6.0
WDR503 060 10		1.00				
WDR503 060 20		2.00				
WDR503 080 05	8.0	0.50	8.0	16.0	100.0	8.0
WDR503 080 10		1.00				
WDR503 080 20		2.00				
WDR503 100 05	10.0	0.50	10.0	20.0	100.0	10.0
WDR503 100 10		1.00				
WDR503 100 20		2.00				
WDR503 120 05	12.0	0.50	12.0	24.0	110.0	12.0
WDR503 120 10		1.00				
WDR503 120 20		2.00				
WDR503 160 05	16.0	0.50	16.0	32.0	150.0	16.0
WDR503 160 10		1.00				
WDR503 200 05	20.0	0.50	20.0	40.0	150.0	20.0
WDR503 200 10		1.00				

Endmills for Mold & Die (Corner Radius) – WINNER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

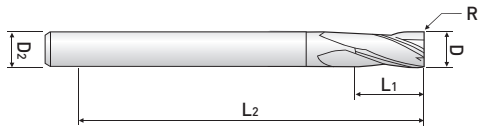
○: General Application ◎: The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.02	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

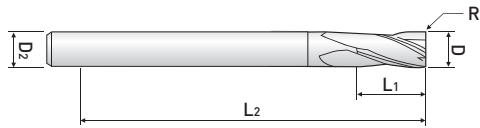
## WXR504 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WXR504 010 005	1.0	0.05	2.5	50	6
WXR504 010 01		0.10			
WXR504 010 02		0.20			
WXR504 010 03		0.30			
WXR504 012 005	1.2	0.05	3.0	50	6
WXR504 012 01		0.10			
WXR504 012 02		0.20			
WXR504 012 03		0.30			
WXR504 015 005	1.5	0.05	4.0	50	6
WXR504 015 01		0.10			
WXR504 015 02		0.20			
WXR504 015 03		0.30			
WXR504 015 05		0.50			
WXR504 020 01	2.0	0.10	6.0	50	6
WXR504 020 02		0.20			
WXR504 020 03		0.30			
WXR504 020 05		0.50			
WXR504 025 01	2.5	0.10	7.0	60	6
WXR504 025 02		0.20			
WXR504 025 03		0.30			
WXR504 025 05		0.50			
WXR504 030 01	3.0	0.10	8.0	60	6
WXR504 030 02		0.20			
WXR504 030 03		0.30			
WXR504 030 05		0.50			
WXR504 030 10		1.00			
WXR504 035 01	3.5	0.10	10.0	70	6
WXR504 035 02		0.20			
WXR504 035 03		0.30			
WXR504 035 05		0.50			
WXR504 040 01 S4	4.0	0.10	10.0	70	4
WXR504 040 02 S4		0.20			
WXR504 040 03 S4		0.30			
WXR504 040 05 S4		0.50			
WXR504 040 10 S4		1.00			
WXR504 040 01 100 S4		0.10		100	
WXR504 040 02 100 S4		0.20			
WXR504 040 03 100 S4		0.30			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

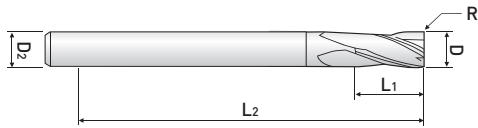
## WXR504 ...series



EDP. No.	D	R	L1	L2	D2
WXR504 040 05 100 S4	4.0	0.50	10.0	100	4
WXR504 040 10 100 S4		1.00			
WXR504 040 01		0.10			
WXR504 040 02		0.20		70	6
WXR504 040 03		0.30			
WXR504 040 05		0.50			
WXR504 040 10		1.00			
WXR504 045 01	4.5	0.10	11.0	80	6
WXR504 045 02		0.20			
WXR504 045 03		0.30			
WXR504 045 05		0.50			
WXR504 050 01	5.0	0.10	13.0	90	6
WXR504 050 02		0.20			
WXR504 050 03		0.30			
WXR504 050 05		0.50			
WXR504 050 10	1.00	13.0	90	6	
WXR504 055 01	0.10				
WXR504 055 02	0.20				
WXR504 055 03	0.30				
WXR504 055 05	0.50				
WXR504 055 10	1.00				
WXR504 060 01 060	6.0				0.10
WXR504 060 02 060		0.20			
WXR504 060 01		0.10			
WXR504 060 02		0.20			
WXR504 060 03		0.30			
WXR504 060 05		0.50			
WXR504 060 10		1.00			
WXR504 060 15		1.50	90		
WXR504 060 20		2.00			
WXR504 060 05 110		0.50			
WXR504 060 10 110		1.00	110		
WXR504 060 05 130		0.50	130		
WXR504 060 10 130		1.00			
WXR504 070 01		7.0	0.10	16.0	90
WXR504 070 02	0.20				
WXR504 070 03	0.30				
WXR504 070 05	0.50				

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

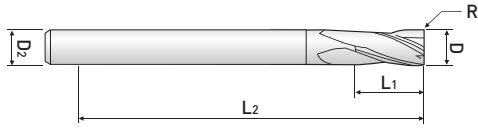
## WXR504 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WXR504 070 10	7.0	1.00	16.0	90	8
WXR504 070 20		2.00			
WXR504 080 03 070	8.0	0.30	20.0	70	8
WXR504 080 05 070		0.50			
WXR504 080 10 070		1.00			
WXR504 080 01		0.10			
WXR504 080 02		0.20			
WXR504 080 03		0.30			
WXR504 080 05		0.50			
WXR504 080 10		1.00			
WXR504 080 15		1.50			
WXR504 080 20		2.00			
WXR504 080 25		2.50			
WXR504 080 30		3.00			
WXR504 080 05 120		0.50		120	
WXR504 080 10 120		1.00			
WXR504 080 05 150		0.50			
WXR504 080 10 150	1.00				
WXR504 100 03 075	0.30	25.0	75	10	
WXR504 100 05 075	0.50				
WXR504 100 10 075	1.00				
WXR504 100 01	0.10				
WXR504 100 02	0.20				
WXR504 100 03	0.30				
WXR504 100 05	0.50				
WXR504 100 10	1.00				
WXR504 100 15	1.50				
WXR504 100 20	2.00				
WXR504 100 25	2.50				
WXR504 100 30	3.00				
WXR504 100 40	4.00		130		
WXR504 100 05 130	0.50				
WXR504 100 10 130	1.00				150
WXR504 100 05 150	0.50				
WXR504 100 10 150	1.00				
WXR504 110 02	11.0	0.20	25	110	12
WXR504 110 03		0.30			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

## WXR504 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WXR504 110 05	11.0	0.50	25	110	12
WXR504 110 10		1.00			
WXR504 110 20		2.00			
WXR504 120 03 080	12.0	0.30	30	80	12
WXR504 120 05 080		0.50			
WXR504 120 10 080		1.00			
WXR504 120 01		0.10			
WXR504 120 02		0.20			
WXR504 120 03		0.30			
WXR504 120 05		0.50			
WXR504 120 10		1.00			
WXR504 120 15		1.50			
WXR504 120 20		2.00			
WXR504 120 25		2.50			
WXR504 120 30		3.00			
WXR504 120 40		4.00			
WXR504 120 50		5.00			
WXR504 120 05 130		0.50		130	
WXR504 120 10 130		1.00			
WXR504 120 05 150	0.50	150			
WXR504 120 10 150	1.00				
WXR504 140 05	14.0	0.50	35	150	16
WXR504 140 10		1.00			
WXR504 140 20		2.00			
WXR504 160 05	16.0	0.50	32	150	16
WXR504 160 10		1.00			
WXR504 160 15		1.50			
WXR504 160 20		2.00			
WXR504 200 05	20.0	0.50	38	150	20
WXR504 200 10		1.00			
WXR504 200 15		1.50			
WXR504 200 20		2.00			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		◎

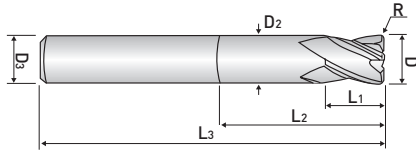
○: General Application ◎: The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.03	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Excellent surface roughness with a variable index geometry for more than 30°
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Excellent effect in preventing breakage with a shape on neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material

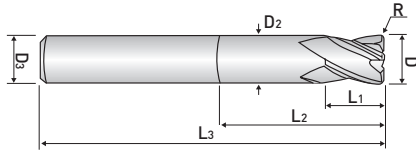
## WXR514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
WXR514 010 005 03	1.0	0.05	1.5	3	50.0	4.0
WXR514 010 005 04				4		
WXR514 010 005 06				6		
WXR514 010 005 08				8		
WXR514 010 005 10				10		
WXR514 010 005 12				12		
WXR514 010 005 14				14		
WXR514 010 005 16				16		
WXR514 010 005 20				20		
WXR514 010 01 03				0.10		
WXR514 010 01 04		4				
WXR514 010 01 06		6				
WXR514 010 01 08		8				
WXR514 010 01 10		10				
WXR514 010 01 12		12				
WXR514 010 01 14		14				
WXR514 010 01 16		16				
WXR514 010 01 20		20				
WXR514 010 02 03		0.20				
WXR514 010 02 04				4		
WXR514 010 02 06	6					
WXR514 010 02 08	8					
WXR514 010 02 10	10					
WXR514 010 02 12	12					
WXR514 010 02 14	14					
WXR514 010 02 16	16					
WXR514 010 02 20	20					
WXR514 010 03 03	0.30		3			
WXR514 010 03 04		4				
WXR514 010 03 06		6				
WXR514 010 03 08		8				
WXR514 010 03 10		10				
WXR514 010 03 12		12				
WXR514 010 03 14		14				
WXR514 010 03 16		16				
WXR514 010 03 20		20				
WXR514 012 005 03		1.2	0.05	1.8	3	50.0
WXR514 012 005 04	4					

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Excellent effect in preventing breakage with a shape on neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material

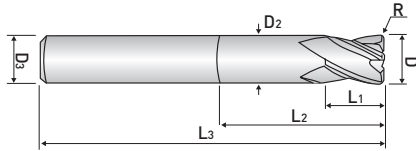
## WXR514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
WXR514 012 005 06	1.2	0.05	1.8	6	50.0	4.0
WXR514 012 005 08				8		
WXR514 012 005 10				10		
WXR514 012 005 12				12		
WXR514 012 005 16				16		
WXR514 012 005 20				20		
WXR514 012 01 03		0.10		3		
WXR514 012 01 04				4		
WXR514 012 01 06				6		
WXR514 012 01 08				8		
WXR514 012 01 10				10		
WXR514 012 01 12				12		
WXR514 012 01 16		16				
WXR514 012 01 20		20				
WXR514 012 02 03		0.20		3		
WXR514 012 02 04				4		
WXR514 012 02 06				6		
WXR514 012 02 08				8		
WXR514 012 02 10				10		
WXR514 012 02 12				12		
WXR514 012 02 16		16				
WXR514 012 02 20		20				
WXR514 012 03 03		0.30		3		
WXR514 012 03 04				4		
WXR514 012 03 06	6					
WXR514 012 03 08	8					
WXR514 012 03 10	10					
WXR514 012 03 12	12					
WXR514 012 03 16	16					
WXR514 012 03 20	20					
WXR514 015 005 04	1.5	0.05	2.3	4	50.0	4.0
WXR514 015 005 06				6		
WXR514 015 005 08				8		
WXR514 015 005 10				10		
WXR514 015 005 12				12		
WXR514 015 005 14				14		
WXR514 015 005 16				16		
WXR514 015 005 20				20		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Excellent surface roughness with a variable index geometry for more than 30°
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
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- Enhanced cutting effect and better wear resistance made from the finest raw material

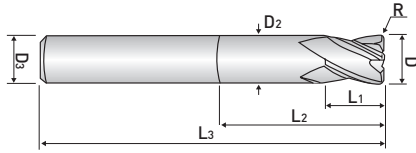
## WXR514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
WXR514 015 005 22	1.5	0.05	2.3	22	60	4.0
WXR514 015 005 26				26		
WXR514 015 01 04				4		
WXR514 015 01 06				6		
WXR514 015 01 08				8		
WXR514 015 01 10				10		
WXR514 015 01 12		12				
WXR514 015 01 14		14				
WXR514 015 01 16		16				
WXR514 015 01 20		20				
WXR514 015 01 22		22				
WXR514 015 01 26		26				
WXR514 015 02 04		4				
WXR514 015 02 06		6				
WXR514 015 02 08		8				
WXR514 015 02 10		10				
WXR514 015 02 12		12				
WXR514 015 02 14		14				
WXR514 015 02 16		16				
WXR514 015 02 20		20				
WXR514 015 02 22		22				
WXR514 015 02 26		26				
WXR514 015 03 04		4				
WXR514 015 03 06		6				
WXR514 015 03 08	8					
WXR514 015 03 10	10					
WXR514 015 03 12	12					
WXR514 015 03 14	14					
WXR514 015 03 16	16					
WXR514 015 03 20	20					
WXR514 015 03 22	22					
WXR514 015 03 26	26					
WXR514 015 05 04	4					
WXR514 015 05 06	6					

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Excellent effect in preventing breakage with a shape on neck without notch
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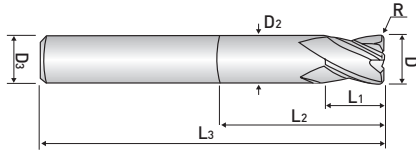
## WXR514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>			
WXR514 015 05 08	1.5	0.50	2.3	8	50	4.0			
WXR514 015 05 10				10					
WXR514 015 05 12				12					
WXR514 015 05 14				14					
WXR514 015 05 16				16					
WXR514 015 05 20				20					
WXR514 015 05 22				22					
WXR514 015 05 26				26					
WXR514 020 01 06	2.0	0.10	3.0	6	50	4.0			
WXR514 020 01 08				8					
WXR514 020 01 10				10					
WXR514 020 01 12				12					
WXR514 020 01 14				14					
WXR514 020 01 16				16					
WXR514 020 01 20				20					
WXR514 020 01 22				22					
WXR514 020 01 26				26					
WXR514 020 01 30				30					
WXR514 020 02 06				0.20			0.20	6	50
WXR514 020 02 08								8	
WXR514 020 02 10		10							
WXR514 020 02 12		12							
WXR514 020 02 14		14							
WXR514 020 02 16		16							
WXR514 020 02 20		20							
WXR514 020 02 22		22							
WXR514 020 02 26		26							
WXR514 020 02 30		30							
WXR514 020 03 06		0.30			0.30		6	70	
WXR514 020 03 08							8		
WXR514 020 03 10							10		
WXR514 020 03 12							12		
WXR514 020 03 14							14		
WXR514 020 03 16							16		
WXR514 020 03 20					20				
WXR514 020 03 22					22				
WXR514 020 03 26				26					
WXR514 020 03 30				30					
WXR514 020 03 30					70				

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
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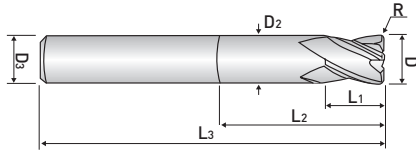
## WXR514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>		
WXR514 020 05 06	2.0	0.50	3.0	6	50	4.0		
WXR514 020 05 08				8				
WXR514 020 05 10				10				
WXR514 020 05 12				12				
WXR514 020 05 14				14				
WXR514 020 05 16				16				
WXR514 020 05 20				20				
WXR514 020 05 22				22				
WXR514 020 05 26				26				
WXR514 020 05 30				30				
WXR514 025 01 08	2.5	0.10	4.0	8	50	4.0		
WXR514 025 01 10				10				
WXR514 025 01 12				12				
WXR514 025 01 14				14				
WXR514 025 01 16				16				
WXR514 025 01 20				20				
WXR514 025 01 26				26				
WXR514 025 01 30				30				
WXR514 025 02 08				0.20			8	50
WXR514 025 02 10							10	
WXR514 025 02 12		12						
WXR514 025 02 14		14						
WXR514 025 02 16		16						
WXR514 025 02 20		20						
WXR514 025 02 26		26						
WXR514 025 02 30		30						
WXR514 025 03 08		0.30			8		50	
WXR514 025 03 10					10			
WXR514 025 03 12				12				
WXR514 025 03 14				14				
WXR514 025 03 16				16				
WXR514 025 03 20				20				
WXR514 025 03 26				26				
WXR514 025 03 30				30				
WXR514 025 05 08				0.50	8			50
WXR514 025 05 10					10			
WXR514 025 05 12		12						
WXR514 025 05 14		14						

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
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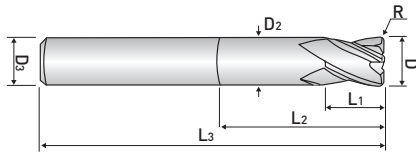
## WXR514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
WXR514 025 05 16	2.5	0.50	4.0	16	50	4.0
WXR514 025 05 20				20		
WXR514 025 05 26				26		
WXR514 025 05 30				30		
WXR514 030 01 08	3.0	0.10	4.5	8	50	6.0
WXR514 030 01 10				10		
WXR514 030 01 12				12		
WXR514 030 01 14				14		
WXR514 030 01 16				16		
WXR514 030 01 20				20		
WXR514 030 01 26				26		
WXR514 030 01 30				30		
WXR514 030 01 35		35				
WXR514 030 01 40		40				
WXR514 030 02 08		0.20		50	8	
WXR514 030 02 10					10	
WXR514 030 02 12					12	
WXR514 030 02 14					14	
WXR514 030 02 16					16	
WXR514 030 02 20					20	
WXR514 030 02 26					26	
WXR514 030 02 30					30	
WXR514 030 02 35		35				
WXR514 030 02 40		40				
WXR514 030 03 08	0.30	50	8			
WXR514 030 03 10			10			
WXR514 030 03 12			12			
WXR514 030 03 14			14			
WXR514 030 03 16			16			
WXR514 030 03 20			20			
WXR514 030 03 26			26			
WXR514 030 03 30			30			
WXR514 030 03 35	35					
WXR514 030 03 40	40					

NEXT &gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Excellent surface roughness with a variable index geometry for more than 30°
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Excellent effect in preventing breakage with a shape on neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material

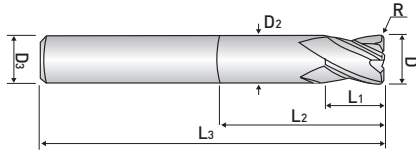
## WXR514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
WXR514 030 05 08	3.0	0.50	4.5	8	50	6.0
WXR514 030 05 10				10		
WXR514 030 05 12				12		
WXR514 030 05 14				14	60	
WXR514 030 05 16				16		
WXR514 030 05 20				20	65	
WXR514 030 05 26				26		
WXR514 030 05 30				30	70	
WXR514 030 05 35				35		
WXR514 030 05 40				40		
WXR514 030 10 08	3.0	1.00	4.5	8	50	6.0
WXR514 030 10 10				10		
WXR514 030 10 12				12		
WXR514 030 10 14				14	60	
WXR514 030 10 16				16		
WXR514 030 10 20				20	65	
WXR514 030 10 26				26		
WXR514 030 10 30				30	70	
WXR514 030 10 35				35		
WXR514 030 10 40				40		
WXR514 040 01 10	4.0	0.10	6.0	10	50	6.0
WXR514 040 01 12				12		
WXR514 040 01 14				14		
WXR514 040 01 16				16	60	
WXR514 040 01 20				20		
WXR514 040 01 26				26	65	
WXR514 040 01 30				30		
WXR514 040 01 35				35	70	
WXR514 040 01 40				40		
WXR514 040 01 45				45		
WXR514 040 01 50	50	100	50			
WXR514 040 02 10	4.0	0.20		6.0	10	
WXR514 040 02 12			12			
WXR514 040 02 14			14		60	
WXR514 040 02 16			16			
WXR514 040 02 20			20		65	
WXR514 040 02 26			26			
WXR514 040 02 30			30		70	

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Excellent effect in preventing breakage with a shape on neck without notch
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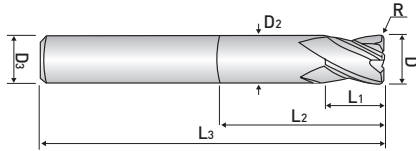
## WXR514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>			
WXR514 040 02 35	4.0	0.20	6.0	35	70	6.0			
WXR514 040 02 40				40	80				
WXR514 040 02 45				45	90				
WXR514 040 02 50				50	100				
WXR514 040 03 10				0.30	10		50		
WXR514 040 03 12					12				
WXR514 040 03 14		14							
WXR514 040 03 16		16			60				
WXR514 040 03 20		20							
WXR514 040 03 26		26						65	
WXR514 040 03 30		30							
WXR514 040 03 35		35		70					
WXR514 040 03 40		40							
WXR514 040 03 45		45			90				
WXR514 040 03 50		50					100		
WXR514 040 05 10		0.50						10	50
WXR514 040 05 12								12	
WXR514 040 05 14				14					
WXR514 040 05 16	16		60						
WXR514 040 05 20	20								
WXR514 040 05 26	26			65					
WXR514 040 05 30	30								
WXR514 040 05 35	35				70				
WXR514 040 05 40	40								
WXR514 040 05 45	45		90						
WXR514 040 05 50	50					100			
WXR514 040 10 10	1.00			10			50		
WXR514 040 10 12				12					
WXR514 040 10 14				14					
WXR514 040 10 16				16	60				
WXR514 040 10 20			20						
WXR514 040 10 26			26	65					
WXR514 040 10 30			30						
WXR514 040 10 35		35	70						
WXR514 040 10 40		40							
WXR514 040 10 45		45			90				
WXR514 040 10 50		50				100			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
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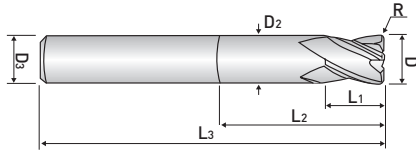
## WXR514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>					
WXR514 050 01	5.0	0.10	8.0	15.0	60.0	6.0					
WXR514 050 02		0.20									
WXR514 050 03		0.30									
WXR514 050 05		0.50									
WXR514 050 10		1.00									
WXR514 050 15		1.50									
WXR514 050 20		2.00									
WXR514 060 01	6.0	0.10	9	20	60	6					
WXR514 060 02		0.20									
WXR514 060 03		0.30									
WXR514 060 05		0.50									
WXR514 060 10		1.00									
WXR514 060 15		1.50									
WXR514 060 20		2.00									
WXR514 060 03 090		0.30	15	30	90						
WXR514 060 05 090		0.50									
WXR514 060 10 090		1.00									
WXR514 080 01		8.0					0.10	12	25	70	8
WXR514 080 02							0.20				
WXR514 080 03							0.30				
WXR514 080 05	0.50										
WXR514 080 10	1.00										
WXR514 080 15	1.50										
WXR514 080 20	2.00										
WXR514 080 03 100	0.30		20	35	100						
WXR514 080 05 100	0.50										
WXR514 080 10 100	1.00										
WXR514 100 01	10.0					0.10	15	30	75	10	
WXR514 100 02		0.20									
WXR514 100 03		0.30									
WXR514 100 05		0.50									
WXR514 100 10		1.00									
WXR514 100 15		1.50									
WXR514 100 20		2.00									
WXR514 100 03 100		0.30	25	40	100						
WXR514 100 05 100		0.50									
WXR514 100 10 100		1.00									
WXR514 100 10 100		1.00									

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## VARIABLE INDEX 4 FLUTE CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Excellent effect in preventing breakage with a shape on neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material

## WXR514 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>			
WXR514 120 02	12.0	0.20	18	32	80	12			
WXR514 120 03		0.30							
WXR514 120 05		0.50							
WXR514 120 10		1.00							
WXR514 120 15		1.50							
WXR514 120 20		2.00							
WXR514 120 03 110		0.30					30	45	110
WXR514 120 05 110	0.50								
WXR514 120 10 110	1.00								
WXR514 160 05	0.50	20	35	100	16				
WXR514 160 10	1.00								
WXR514 160 05 150	0.50					35	50	150	20
WXR514 160 10 150	1.00								
WXR514 200 05	20.0	0.50	25	40	100	20			
WXR514 200 10		1.00							
WXR514 200 05 150		0.50	40	55	150				
WXR514 200 10 150		1.00							

Endmills for Mold & Die (Corner Radius) – WINNER Series

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		◎

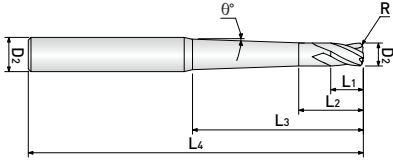
○: General Application ◎: The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.03	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(Corner Radius) WINNER Series



## 4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

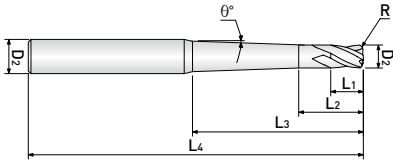
## WR544 ...series



EDP. No.	D	R	θ	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>				
WR544 010 01 01 06	1.0	0.10	1°	1.5	2.5	6.0	50	4				
WR544 010 01 01 08						8.0						
WR544 010 01 01 10						10.0						
WR544 010 01 01 12						12.0						
WR544 010 01 01 16						16.0						
WR544 010 01 01 20						20.0						
WR544 010 01 01 25			25.0			60						
WR544 010 01 01 30			30.0				70					
WR544 010 01 01 40			40.0				80					
WR544 010 01 01 50			50.0			90						
WR544 010 01 02 06			0.20			2°	1°		6.0	50	6	
WR544 010 01 02 08									8.0			
WR544 010 01 02 10									10.0			
WR544 010 01 02 12									12.0			
WR544 010 01 02 16									16.0			
WR544 010 01 02 20		20.0										
WR544 010 01 02 25		25.0				60						
WR544 010 01 02 30		30.0					70					
WR544 010 01 02 40		40.0					80					
WR544 010 01 02 50		50.0				90						
WR544 010 02 01 06		0.20				2°	1°		6.0	50		4
WR544 010 02 01 08									8.0			
WR544 010 02 01 10									10.0			
WR544 010 02 01 12									12.0			
WR544 010 02 01 16									16.0			
WR544 010 02 01 20			20.0									
WR544 010 02 01 25			25.0			60						
WR544 010 02 01 30			30.0				70					
WR544 010 02 01 40			40.0				80					
WR544 010 02 01 50			50.0			90						
WR544 010 02 02 06	0.20		2°	2°	6.0	50	4					
WR544 010 02 02 08					8.0							
WR544 010 02 02 10					10.0							
WR544 010 02 02 12					12.0							
WR544 010 02 02 16					16.0							
WR544 010 02 02 20		20.0										
WR544 010 02 02 25	25.0	60										
WR544 010 02 02 30	30.0		70									

NEXT >>>

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

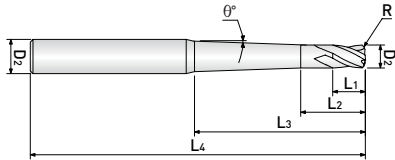
## WR544 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>	
WR544 010 02 02 40	1.0	0.20	2°	1.5	2.5	40.0	80	4	
WR544 010 02 02 50						50.0		6	
WR544 012 01 01 08	1.2	0.10	1°	1.8	3.0	8.0	50	4	
WR544 012 01 01 12						12.0			
WR544 012 01 01 16						16.0			
WR544 012 01 01 20						20.0			
WR544 012 01 01 25			25.0			60			
WR544 012 01 01 30			30.0						
WR544 012 01 02 08			0.20			2°	8.0		50
WR544 012 01 02 12							12.0		
WR544 012 01 02 16		16.0							
WR544 012 01 02 20		20.0							
WR544 012 01 02 25		25.0				60			
WR544 012 01 02 30		30.0							
WR544 012 02 01 08		0.20				1°	8.0		50
WR544 012 02 01 12							12.0		
WR544 012 02 01 16			16.0						
WR544 012 02 01 20			20.0						
WR544 012 02 01 25	25.0		60						
WR544 012 02 01 30	30.0								
WR544 012 02 02 08	0.20		2°	8.0	50				
WR544 012 02 02 12				12.0					
WR544 012 02 02 16		16.0							
WR544 012 02 02 20		20.0							
WR544 012 02 02 25		25.0	60						
WR544 012 02 02 30		30.0							
WR544 015 01 01 08		1.5	0.10	1°	2.3	3.0	8.0	50	4
WR544 015 01 01 10							10.0		
WR544 015 01 01 12	12.0								
WR544 015 01 01 16	16.0								
WR544 015 01 01 20	20.0								
WR544 015 01 01 25	25.0						60		
WR544 015 01 01 30	30.0								
WR544 015 01 01 40	40.0			80					
WR544 015 01 01 50	50.0								
WR544 015 01 02 08	0.20			2°			8.0	50	
WR544 015 01 02 10							10.0		
WR544 015 01 02 12							12.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

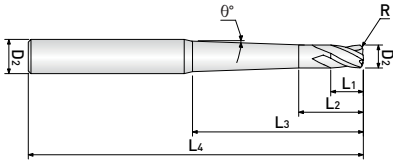
## WR544 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>						
WR544 015 01 02 16	1.5	0.10	2°	2.3	3.0	16.0	50	4						
WR544 015 01 02 20						20.0								
WR544 015 01 02 25						25.0			60					
WR544 015 01 02 30						30.0	70							
WR544 015 01 02 40						40.0	80							
WR544 015 01 02 50						50.0	90							
WR544 015 02 01 08		1.5	0.20			1°	2.3	3.0	8.0	50	4			
WR544 015 02 01 10									10.0					
WR544 015 02 01 12									12.0					
WR544 015 02 01 16									16.0					
WR544 015 02 01 20									20.0					
WR544 015 02 01 25									25.0			60		
WR544 015 02 01 30				30.0	70									
WR544 015 02 01 40				40.0	80									
WR544 015 02 01 50				50.0	90									
WR544 015 02 02 08				1.5	0.20	2°			2.3	3.0	8.0	50	6	
WR544 015 02 02 10											10.0			
WR544 015 02 02 12											12.0			
WR544 015 02 02 16											16.0			
WR544 015 02 02 20											20.0			
WR544 015 02 02 25											25.0			60
WR544 015 02 02 30											30.0			70
WR544 015 02 02 40											40.0			80
WR544 015 02 02 50											50.0			90
WR544 015 03 01 08	1.5	0.30	1°	2.3	3.0	8.0	50	4						
WR544 015 03 01 10						10.0								
WR544 015 03 01 12						12.0								
WR544 015 03 01 16						16.0								
WR544 015 03 01 20						20.0								
WR544 015 03 01 25						25.0					60			
WR544 015 03 01 30						30.0					70			
WR544 015 03 01 40						40.0					80			
WR544 015 03 01 50						50.0					90			
WR544 015 03 02 08			1.5			0.30	2°	2.3	3.0	8.0	50	4		
WR544 015 03 02 10										10.0				
WR544 015 03 02 12										12.0				
WR544 015 03 02 16										16.0				
WR544 015 03 02 20										20.0				

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

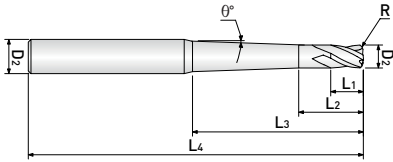
## WR544 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>	
WR544 015 03 02 25	1.5	0.30	2°	2.3	3.0	25.0	60	4	
WR544 015 03 02 30						30.0	70		
WR544 015 03 02 40						40.0	80	6	
WR544 015 03 02 50						50.0	90		
WR544 020 01 01 10	2.0	0.10	1°	2.0	5.0	10.0	50	4	
WR544 020 01 01 12						12.0			
WR544 020 01 01 16						16.0			
WR544 020 01 01 20						20.0			
WR544 020 01 01 25						25.0	60		
WR544 020 01 01 30						30.0	70		
WR544 020 01 01 40						40.0	80	6	
WR544 020 01 01 50						50.0	100		
WR544 020 01 01 60						60.0	140		
WR544 020 01 01 80						80.0	140		
WR544 020 01 02 10		0.20	1°	2.0	5.0	5.0	10.0	50	4
WR544 020 01 02 12							12.0		
WR544 020 01 02 16							16.0		
WR544 020 01 02 20							20.0		
WR544 020 01 02 25							25.0	60	
WR544 020 01 02 30							30.0	70	
WR544 020 01 02 40							40.0	80	6
WR544 020 01 02 50							50.0	100	
WR544 020 01 02 60							60.0	140	
WR544 020 01 02 80							80.0	140	
WR544 020 02 01 10	0.20	1°	2.0	5.0	5.0	10.0	50	4	
WR544 020 02 01 12						12.0			
WR544 020 02 01 16						16.0			
WR544 020 02 01 20						20.0			
WR544 020 02 01 25						25.0	60		
WR544 020 02 01 30						30.0	70		
WR544 020 02 01 40						40.0	80	6	
WR544 020 02 01 50						50.0	100		
WR544 020 02 01 60						60.0	140		
WR544 020 02 01 80						80.0	140		
WR544 020 02 02 10	0.20	2°	2.0	5.0	5.0	10.0	50	4	
WR544 020 02 02 12						12.0			
WR544 020 02 02 16						16.0			
WR544 020 02 02 20						20.0			
WR544 020 02 02 25						25.0			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Corner Radius) WINNER Series



## 4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

## WR544 ...series

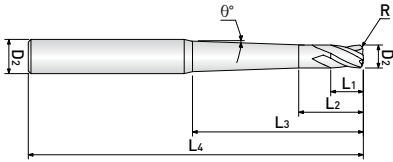


EDP. No.	D	R	θ	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>			
WR544 020 02 02 30	2.0	0.20	2°	2.0	5.0	30.0	70	4			
WR544 020 02 02 40						40.0	80	6			
WR544 020 02 02 50						50.0	100		8		
WR544 020 02 02 60						60.0					
WR544 020 02 02 80						80.0	0.30	1°	10.0	50	4
WR544 020 03 01 10						12.0					
WR544 020 03 01 12		16.0									
WR544 020 03 01 16		20.0									
WR544 020 03 01 20		25.0	60								
WR544 020 03 01 25		30.0				70					
WR544 020 03 01 30		40.0	80								
WR544 020 03 01 40		50.0				100					
WR544 020 03 01 50		60.0	140								
WR544 020 03 01 60		80.0				0.50	1°	10.0	50	4	
WR544 020 03 01 80		12.0									
WR544 020 03 02 10		16.0									
WR544 020 03 02 12		20.0									
WR544 020 03 02 16		25.0	60								
WR544 020 03 02 20		30.0						70			
WR544 020 03 02 25		40.0	80								
WR544 020 03 02 30		50.0				100					
WR544 020 03 02 40		60.0	140								
WR544 020 03 02 50		80.0				0.50	2°	10.0	50	4	
WR544 020 03 02 60		12.0									
WR544 020 03 02 80	16.0										
WR544 020 05 01 10	20.0										
WR544 020 05 01 12	25.0	60									
WR544 020 05 01 16	30.0		70								
WR544 020 05 01 20	40.0	80									
WR544 020 05 01 25	50.0		100								
WR544 020 05 01 30	60.0	140									
WR544 020 05 01 40	80.0		0.50	2°	10.0	50	4				
WR544 020 05 01 50	12.0										
WR544 020 05 01 60	16.0										
WR544 020 05 01 80	20.0										
WR544 020 05 02 10	25.0	60									
WR544 020 05 02 12	30.0				70						
WR544 020 05 02 16	40.0	80									
	50.0		100								
	60.0	140									
	80.0										
	10.0	50	4								
	12.0										
	16.0										

NEXT >>>

Endmills for Mold & Die(Corner Radius) – WINNER Series

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

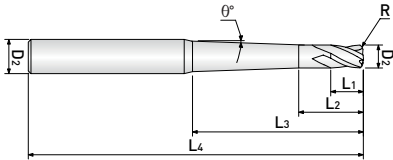
## WR544 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>					
WR544 020 05 02 20	2.0	0.50	2°	2.0	5.0	20.0	50	4					
WR544 020 05 02 25						25.0	60						
WR544 020 05 02 30						30.0	70						
WR544 020 05 02 40											40.0	80	6
WR544 020 05 02 50											50.0	100	
WR544 020 05 02 60											60.0		
WR544 020 05 02 80											80.0	140	8
WR544 030 02 01 16	3.0	0.20	1°	4.5	6.0	16.0	60	6					
WR544 030 02 01 20						20.0	65						
WR544 030 02 01 30						30.0	70						
WR544 030 02 01 40						40.0	80						
WR544 030 02 01 50						50.0	90						
WR544 030 02 01 60						60.0	100						
WR544 030 02 02 16									2°	16.0	60		
WR544 030 02 02 20							20.0			65			
WR544 030 02 02 30							30.0			70			
WR544 030 02 02 40							40.0			80			
WR544 030 02 02 50							50.0			90			
WR544 030 02 02 60							60.0			100			
WR544 030 02 02 70							70.0			120			
WR544 030 03 01 16						0.30	1°		16.0	60	6		
WR544 030 03 01 20								20.0	65				
WR544 030 03 01 30								30.0	70				
WR544 030 03 01 40								40.0	80				
WR544 030 03 01 50								50.0	90				
WR544 030 03 01 60								60.0	100				
WR544 030 03 02 16								2°	16.0	60			
WR544 030 03 02 20							20.0		65				
WR544 030 03 02 30							30.0		70				
WR544 030 03 02 40							40.0		80				
WR544 030 03 02 50							50.0		90				
WR544 030 03 02 60							60.0		100				
WR544 030 03 02 70							70.0		120				
WR544 030 05 01 16			0.50				1°	16.0	60	6			
WR544 030 05 01 20								20.0	65				
WR544 030 05 01 30				30.0	70								
WR544 030 05 01 40				40.0	80								
WR544 030 05 01 50				50.0	90								

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Corner Radius) WINNER Series



## 4 FLUTE TAPER NECK CORNER RADIUS

- Increasing the hardness of neck by applying Taper neck
- Strengthen the hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance with the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

## WR544 ...series



EDP. No.	D	R	θ	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	D <sub>2</sub>						
WR544 030 05 01 60	3.0	0.50	1°	4.5	6.0	60.0	100	6						
WR544 030 05 02 16						16.0	60							
WR544 030 05 02 20						20.0	65							
WR544 030 05 02 30						30.0	70							
WR544 030 05 02 40			40.0			80	2°		50.0	90	8			
WR544 030 05 02 50			60.0			100								
WR544 030 05 02 60			70.0			120								
WR544 030 05 02 70			40.0			90			4.0	6.0		8.0	10	
WR544 040 02 01 40	0.20	1°	1°	50.0	100	6								
WR544 040 02 01 50				60.0	110									
WR544 040 02 01 60				70.0	120		2°	40.0			90			8
WR544 040 02 01 70				50.0	100									
WR544 040 02 02 40			60.0	110	70.0	120		10						
WR544 040 02 02 50			40.0	90	1°	50.0		100			6			
WR544 040 02 02 60			60.0	110		60.0	110	8						
WR544 040 02 02 70			70.0	120		40.0	90							10
WR544 040 03 01 40	0.30	2°	1°	50.0		100	6							
WR544 040 03 01 50				60.0	110	60.0					110			
WR544 040 03 01 60				70.0	120	40.0		90			10			
WR544 040 03 01 70				50.0	100	60.0		110						6
WR544 040 03 02 40			60.0	110	70.0	120	8							
WR544 040 03 02 50			40.0	90	50.0	100		10						
WR544 040 03 02 60			60.0	110	60.0	110					6			
WR544 040 03 02 70			70.0	120	40.0	90			8					
WR544 040 05 01 40	0.50	1°	1°	50.0	100	6								
WR544 040 05 01 50				60.0	110		60.0	110		8				
WR544 040 05 01 60				70.0	120		40.0	90			10			
WR544 040 05 01 70				50.0	100		60.0	110	6					
WR544 040 05 02 40			60.0	110	70.0	120	8							
WR544 040 05 02 50			40.0	90	50.0	100		10						
WR544 040 05 02 60			60.0	110	60.0	110				6				
WR544 040 05 02 70			70.0	120	40.0	90			8					
WR544 040 05 02 70	50.0	100	60.0	110	10									
WR544 040 05 02 70	60.0	110	70.0	120		6								
WR544 040 05 02 70	40.0	90	50.0	100			8							
WR544 040 05 02 70	60.0	110	60.0	110				10						
WR544 040 05 02 70	70.0	120	40.0	90	6									
WR544 040 05 02 70	50.0	100	60.0	110		8								
WR544 040 05 02 70	60.0	110	70.0	120			10							
WR544 040 05 02 70	40.0	90	50.0	100				6						
WR544 040 05 02 70	60.0	110	60.0	110	8									
WR544 040 05 02 70	70.0	120	40.0	90		10								

■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		

○:General Application ◎:The most suitable Application

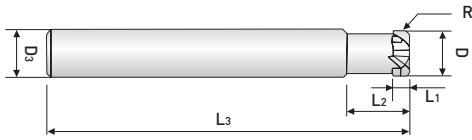
■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0,012	h6

※ These tools are manufactured based on order received.

Endmills for Mold & Die(Corner Radius) – WINNER Series

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 4 FLUTE HIGH FEED RATE CORNER RADIUS

- High speed and feed rate lead to enhanced cutting with Low Helix
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

## WSPM4 ...series



ULTRA FINE



HELIX



All sizes



W Coating

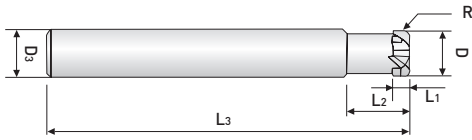


p.1020

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WSPM4010-01	1.0	0.10	1.0	2.5	50.0	6.0
WSPM4010-02		0.20				
WSPM4010-03		0.30				
WSPM4015-02	1.5	0.20	1.5	4.0	50.0	6.0
WSPM4015-03		0.30				
WSPM4015-05		0.50				
WSPM4020-02	2.0	0.20	2.0	6.0	50.0	6.0
WSPM4020-03		0.30				
WSPM4020-05		0.50				
WSPM4030-02	3.0	0.20	3.0	8.0	50.0	6.0
WSPM4030-03		0.30				
WSPM4030-05		0.50				
WSPM4040-02	4.0	0.20	4	10.0	50	6.0
WSPM4040-03		0.30				
WSPM4040-05		0.50				
WSPM4040-10		1.00				
WSPM4060-02	6.0	0.20	6.0	15.0	60.0	6.0
WSPM4060-03		0.30				
WSPM4060-05		0.50				
WSPM4060-10		1.00				
WSPM4060-20		2.00				
WSPM4060-02L		0.20			90.0	
WSPM4060-03L		0.30				
WSPM4060-05L		0.50				
WSPM4060-10L		1.00				
WSPM4060-20L		2.00				
WSPM4080-02	8.0	0.20	8.0	20.0	70.0	8.0
WSPM4080-03		0.30				
WSPM4080-05		0.50				
WSPM4080-10		1.00				
WSPM4080-20		2.00				
WSPM4080-02L		0.20			100.0	
WSPM4080-03L		0.30				
WSPM4080-05L		0.50				
WSPM4080-10L		1.00				
WSPM4080-20L		2.00				
WSPM4100-02	10.0	0.20	10.0	25.0	75	10.0
WSPM4100-03		0.30				
WSPM4100-05		0.50				

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 4 FLUTE HIGH FEED RATE CORNER RADIUS

- High speed and feed rate lead to enhanced cutting with Low Helix
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

## WSPM4 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>			
WSPM4100-10	10.0	1.00	10.0	25.0	75	10.0			
WSPM4100-15		1.50							
WSPM4100-20		2.00							
WSPM4100-02L		0.20							
WSPM4100-03L		0.30							
WSPM4100-05L		0.50							
WSPM4100-10L		1.00			100				
WSPM4100-15L		1.50							
WSPM4100-20L		2.00							
WSPM4120-03		0.30					12.0	30.0	80
WSPM4120-05	0.50								
WSPM4120-10	1.00								
WSPM4120-15	1.50								
WSPM4120-20	2.00								
WSPM4120-30	3.00	110							
WSPM4120-03L	0.30								
WSPM4120-05L	0.50								
WSPM4120-10L	1.00								
WSPM4120-15L	1.50								
WSPM4120-20L	2.00	16.0	35.0	100	16.0				
WSPM4120-30L	3.00								
WSPM4160-05	0.50								
WSPM4160-10	1.00								
WSPM4160-20	2.00								
WSPM4160-05L	0.50			150					
WSPM4160-10L	1.00								
WSPM4160-20L	2.00								
WSPM4200-05	0.50					20.0	40.0	100	20.0
WSPM4200-10	1.00								
WSPM4200-20	2.00								
WSPM4200-05L	0.50								
WSPM4200-10L	1.00								
WSPM4200-20L	2.00	150							

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

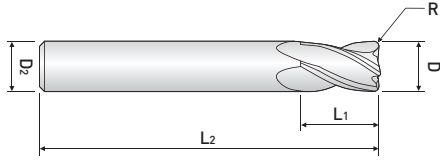
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0--0.030	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 4 FLUTE MULTI PURPOSE CORNER RADIUS

- Excellent surface roughness with a variable index geometry
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

## WR504 ...series



ULTRA FINE



HELIX



All sizes



W Coating

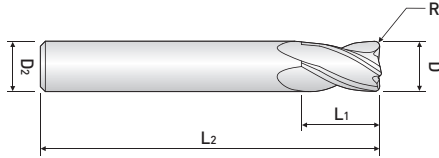


p.1021

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WR504 030 02	3.0	0.20	8.0	60.0	6.0
WR504 030 03		0.30			
WR504 030 05		0.50			
WR504 040 02	4.0	0.20	10.0	70.0	6.0
WR504 040 03		0.30			
WR504 040 05		0.50			
WR504 040 10		1.00			
WR504 050 03 060	5.0	0.30	13.0	60.0	6.0
WR504 050 05 060		0.50		90.0	
WR504 050 03		0.30			
WR504 050 05		0.50			
WR504 060 03 060	6.0	0.30	15	60	6
WR504 060 05 060		0.50			
WR504 060 10 060		1.00		90	
WR504 060 03		0.30			
WR504 060 05		0.50			
WR504 060 10	1.00				
WR504 080 03 070	8.0	0.30	20	70	8
WR504 080 05 070		0.50			
WR504 080 10 070		1.00		100	
WR504 080 03		0.30			
WR504 080 05		0.50			
WR504 080 10	1.00				
WR504 100 03 075	10.0	0.30	25	75	10
WR504 100 05 075		0.50			
WR504 100 10 075		1.00		100	
WR504 100 03		0.30			
WR504 100 05		0.50			
WR504 100 10		1.00			
WR504 120 03 080	12.0	0.30	30	80	12
WR504 120 05 080		0.50			
WR504 120 10 080		1.00		110	
WR504 120 03		0.30			
WR504 120 05		0.50			
WR504 120 10		1.00			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(Corner Radius) WINNER Series



## 4 FLUTE MULTI PURPOSE CORNER RADIUS

- Excellent surface roughness with a variable index geometry
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

## WR504 ...series



EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WR504 160 05 100	16.0	0.50	32.0	100	16.0
WR504 160 10 100		1.00			
WR504 160 15 100		1.50			
WR504 160 20 100		2.00			
WR504 160 05		0.50		150	
WR504 160 10		1.00			
WR504 160 15		1.50			
WR504 160 20		2.00			
WR504 200 05 100	20.0	0.50	38.0	100	20.0
WR504 200 10 100		1.00			
WR504 200 15 100		1.50			
WR504 200 20 100		2.00			
WR504 200 05		0.50		150	
WR504 200 10		1.00			
WR504 200 15		1.50			
WR504 200 20		2.00			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRc55 SKD61	~HRc55 SKD11					
○	○	◎	○				○		◎

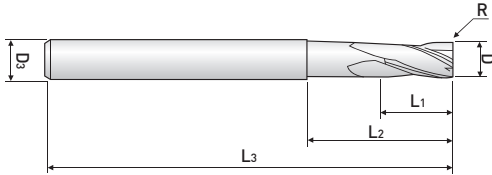
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0--0.030	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die (Corner Radius) WINNER Series



## 4 FLUTE MULTI PURPOSE LONG NECK CORNER RADIUS

- Excellent surface roughness with a variable index geometry
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Excellent effect in preventing breakage with a shape of neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

## WR514 ...series



ULTRA FINE



HELIX



All sizes



W Coating



p.1018

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WR514 060 05	6.0	0.50	10.0	30.0	90.0	6.0
WR514 060 10		1.00				
WR514 080 05	8.0	0.50	12.0	35.0	100.0	8.0
WR514 080 10		1.00				
WR514 100 05	10.0	0.50	15.0	40.0	100.0	10.0
WR514 100 10		1.00				
WR514 120 05	12.0	0.50	20.0	45.0	110.0	12.0
WR514 120 10		1.00				

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels (NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		◎

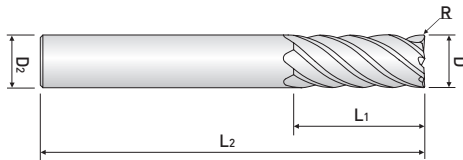
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0--0,030	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(Corner Radius) WINNER Series



## 6 FLUTE 45° CORNER RADIUS

- Dramatically reduce cutting load by 6 flute with high helix
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel



ULTRA FINE



HELIX



All sizes



W Coating



p.1021

## WR506 ...series

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WR506 060 03	6.0	0.30	15.0	90.0	6.0
WR506 060 05		0.50			
WR506 060 10		1.00			
WR506 080 03	8.0	0.30	20.0	100.0	8.0
WR506 080 05		0.50			
WR506 080 10		1.00			
WR506 100 03	10.0	0.30	25.0	100.0	10.0
WR506 100 05		0.50			
WR506 100 10		1.00			
WR506 120 03	12.0	0.30	30.0	110.0	12.0
WR506 120 05		0.50			
WR506 120 10		1.00			
WR506 160 05	16.0	0.50	32.0	150.0	16.0
WR506 160 10		1.00			
WR506 160 15		1.50			
WR506 160 20		2.00			
WR506 200 05	20.0	0.50	38.0	150.0	20.0
WR506 200 10		1.00			
WR506 200 15		1.50			
WR506 200 20		2.00			

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

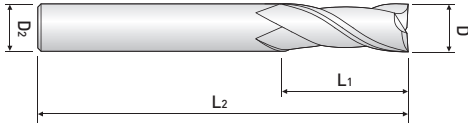
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.03	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE MINIATURE & SQUARE

- From 0.03mm size made by a state of the art machine
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

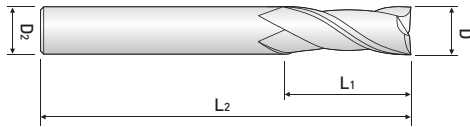
## WME502 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WME502 0003	0.03	0.04	40	4
WME502 0004	0.04	0.06	40	4
WME502 0005	0.05	0.07	40	4
WME502 0006	0.06	0.09	40	4
WME502 0007	0.07	0.10	40	4
WME502 0008	0.08	0.12	40	4
WME502 0009	0.09	0.13	40	4
WME502 001	0.10	0.20	40	4
WME502 0015	0.15	0.30	40	4
WME502 002	0.20	0.40	40	4
WME502 0025	0.25	0.50	40	4
WME502 003	0.30	0.60	40	4
WME502 0035	0.35	0.70	40	4
WME502 004	0.40	0.80	40	4
WME502 0045	0.45	0.90	40	4
WME502 005	0.50	1.00	40	4
WME502 0055	0.55	1.10	40	4
WME502 006	0.60	1.20	40	4
WME502 0065	0.65	1.30	40	4
WME502 007	0.70	1.40	40	4
WME502 0075	0.75	1.50	40	4
WME502 008	0.80	1.60	40	4
WME502 0085	0.85	1.70	40	4
WME502 009	0.90	1.80	40	4
WME502 0095	0.95	2.00	40	4
WME502 010	1.00	2.50	50	6
WME502 012	1.20	3.00	50	6
WME502 015	1.50	4.00	50	6
WME502 020	2.00	6.00	50	6
WME502 025	2.50	7.00	50	6
WME502 030	3.00	8.00	50	6
WME502 035	3.50	10.00	50	6
WME502 040	4.00	10.00	50	6
WME502 045	4.50	14.00	50	6
WME502 050	5.00	15.00	60	6
WME502 055	5.50	15.00	60	6
WME502 060	6.00	15.00	60	6

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE MINIATURE & SQUARE

- From 0.03mm size made by a state of the art machine
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

## WME502 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WME502 065	6.50	18.00	60	8
WME502 070	7.00	20.00	60	8
WME502 075	7.50	20.00	60	8
WME502 080	8.00	20.00	70	8
WME502 085	8.50	22.00	70	10
WME502 090	9.00	22.00	70	10
WME502 095	9.50	24.00	70	10
WME502 100	10.00	25.00	75	10
WME502 105	10.50	26.00	75	12
WME502 110	11.00	30.00	75	12
WME502 115	11.50	30.00	80	12
WME502 120	12.00	30.00	80	12
WME502 130	13.00	35.00	100	12
WME502 140 S12	14.00	35.00	100	12
WME502 140				14
WME502 140 S16				16
WME502 150	15.00	38.00	100	16
WME502 160	16.00	40.00	100	16
WME502 170	17.00	42.00	100	16
WME502 180 S16	18.00	45.00	100	16
WME502 180				18
WME502 190	19.00	45.00	100	20
WME502 200	20.00	45.00	100	20
WME502 210	21.00	45.00	100	20
WME502 220	22.00	45.00	100	20
WME502 230	23.00	50.00	120	25
WME502 240	24.00	50.00	120	25
WME502 250	25.00	50.00	120	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

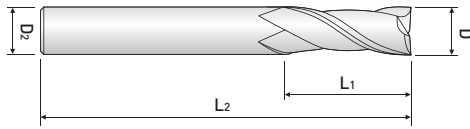
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	h6
over 6	0~-0.015	

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE WITH SHANK 4 BY 0.1 mm

- A variety of diameter sizes by every 0.1mm with shank 4
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

## WE502...S4 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE502 010 S4	1.0	2.5	50	4
WE502 011 S4	1.1	3.0	50	4
WE502 012 S4	1.2	3.0	50	4
WE502 013 S4	1.3	3.0	50	4
WE502 014 S4	1.4	4.0	50	4
WE502 015 S4	1.5	4.0	50	4
WE502 016 S4	1.6	4.0	50	4
WE502 017 S4	1.7	4.0	50	4
WE502 018 S4	1.8	5.0	50	4
WE502 019 S4	1.9	5.0	50	4
WE502 020 S4	2.0	6.0	50	4
WE502 021 S4	2.1	6.0	50	4
WE502 022 S4	2.2	6.0	50	4
WE502 023 S4	2.3	6.0	50	4
WE502 024 S4	2.4	6.0	50	4
WE502 025 S4	2.5	8.0	50	4
WE502 026 S4	2.6	8.0	50	4
WE502 027 S4	2.7	8.0	50	4
WE502 028 S4	2.8	8.0	50	4
WE502 029 S4	2.9	8.0	50	4
WE502 030 S4	3.0	8.0	50	4
WE502 035 S4	3.5	10.0	50	4
WE502 040 S4	4.0	10.0	50	4
WE502 040 080 S4			80	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

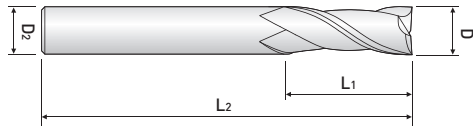
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0--0,012	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE ENDMILL WITH SHANK 3

- Excellent effect in preventing breakage with a shape of neck without notch
- A variety of diameter sizes with Shank 3
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

## WE502...S3 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE502 001 S3	0.1	0.2	40	3
WE502 002 S3	0.2	0.4	40	3
WE502 003 S3	0.3	0.6	40	3
WE502 004 S3	0.4	0.8	40	3
WE502 005 S3	0.5	1.0	40	3
WE502 006 S3	0.6	1.2	40	3
WE502 007 S3	0.7	1.4	40	3
WE502 008 S3	0.8	1.6	40	3
WE502 009 S3	0.9	1.8	40	3
WE502 010 S3	1.0	2.5	50	3
WE502 012 S3	1.2	3.0	50	3
WE502 015 S3	1.5	4.0	50	3
WE502 020 S3	2.0	6.0	50	3
WE502 025 S3	2.5	7.0	50	3
WE502 030 S3	3.0	8.0	50	3

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

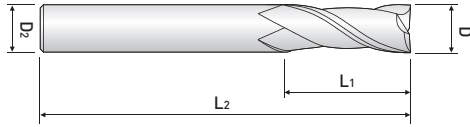
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0--0,012	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE FOR POWERFUL CUTTING

- Designed Gash touch shape to prevent flute chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

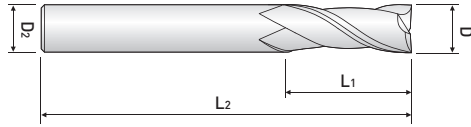
## WE502 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE502 001 001	0.1	0.1	40	4
WE502 001		0.2		
WE502 001 003		0.3		
WE502 002 002	0.2	0.2	40	4
WE502 002		0.4		
WE502 002 006		0.6		
WE502 003 003	0.3	0.3	40	4
WE502 003		0.6		
WE502 003 009		0.9		
WE502 004 004	0.4	0.4	40	4
WE502 004		0.8		
WE502 004 012		1.2		
WE502 005 005	0.5	0.5	40	4
WE502 005		1.0		
WE502 005 015		1.5		
WE502 006 006	0.6	0.6	40	4
WE502 006		1.2		
WE502 006 018		1.8		
WE502 007 007	0.7	0.7	40	4
WE502 007		1.4		
WE502 007 021		2.1		
WE502 008 008	0.8	0.8	40	4
WE502 008		1.6		
WE502 008 024		2.4		
WE502 009 009	0.9	0.9	40	4
WE502 009		1.8		
WE502 009 027		2.7		
WE502 010 01	1.0	1.0	40	6
WE502 010 02		2.0		
WE502 010		2.5		
WE502 010 03		3.0	50	
WE502 010 04		4.0		
WE502 010 06	6.0			
WE502 012 02	1.2	2.0	40	6
WE502 012		3.0	50	
WE502 012 04		4.0		
WE502 012 06		6.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE FOR POWERFUL CUTTING

- Designed Gash touch shape to prevent flute chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

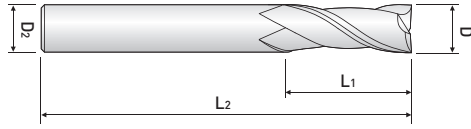
## WE502 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE502 015 015	1.5	1.5	40	6
WE502 015 03		3.0		
WE502 015		4.0	50	
WE502 015 06		6.0		
WE502 015 08		8.0		
WE502 015 10		10.0		
WE502 020 02	2.0	2.0	40	6
WE502 020 04		4.0		
WE502 020		6.0	50	
WE502 020 08		8.0		
WE502 020 10		10.0		
WE502 020 12		12.0		
WE502 025 025	2.5	2.5	40	6
WE502 025 05		5.0		
WE502 025		7.0	50	
WE502 025 10		10.0		
WE502 025 12		12.0		
WE502 030 03		3.0		
WE502 030 06	6.0			
WE502 030	8.0		50	
WE502 030 10	10.0			
WE502 030 12	12.0			
WE502 030 14	14.0			
WE502 040 04	4.0	4.0	40	6
WE502 040 08		8.0		
WE502 040		10.0	50	
WE502 040 12		12.0		
WE502 040 14		14.0		
WE502 040 16		16.0		
WE502 050 05	5.0	5.0	50	6
WE502 050 10		10.0		
WE502 050		15.0	60	
WE502 050 20		20.0		
WE502 050 25		25.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE FOR POWERFUL CUTTING

- Designed Gash touch shape to prevent flute chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

## WE502 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE502 060 06	6.0	6.0	50	6
WE502 060 12		12.0		
WE502 060		15.0	60	
WE502 060 20		20.0		
WE502 060 25		25.0		
WE502 080 16	8.0	16.0	60	8
WE502 080		20.0	70	
WE502 080 25		25.0		
WE502 080 30		30.0		
WE502 100 22	10.0	22.0	65	10
WE502 100		25.0	75	
WE502 100 30		30.0		
WE502 100 35		35.0		
WE502 120 26	12.0	26.0	70	12
WE502 120		30.0	80	
WE502 120 35		35.0		
WE502 120 40		40.0		
WE502 140	14.0	35.0	100	16
WE502 160	16.0	32.0	100	16
WE502 160 40		40.0		
WE502 180	18.0	45.0	100	20
WE502 200	20.0	45.0	100	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

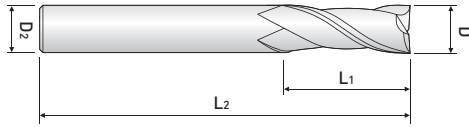
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	h6
over 6	0~-0.015	

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE LONG

- 2 Flute long type with a variety of flute length sizes
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

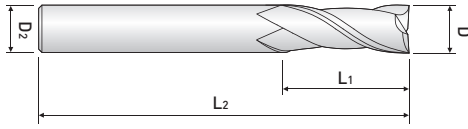
## WE522 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE522 010 03	1.0	3.0	60	6
WE522 010 04		4.0		
WE522 010 05		5.0		
WE522 010 06		6.0		
WE522 010 07		7.0		
WE522 010 08		8.0		
WE522 010 10		10.0		
WE522 010 12		12.0		
WE522 012 04	1.2	4.0	60	6
WE522 012 06		6.0		
WE522 012 08		8.0		
WE522 012 10		10.0		
WE522 012 12		12.0		
WE522 015 06	1.5	6.0	60	6
WE522 015 08		8.0		
WE522 015 10		10.0		
WE522 015 12		12.0		
WE522 015 14		14.0		
WE522 015 16		16.0		
WE522 020 08	2.0	8.0	60	6
WE522 020 10		10.0		
WE522 020 12		12.0		
WE522 020 14		14.0		
WE522 020 16		16.0		
WE522 025 10	2.5	10.0	60	6
WE522 025 12		12.0		
WE522 025 16		16.0		
WE522 025 20		20.0		
WE522 025 26		26.0		
WE522 030 16 S3		3.0		
WE522 030 10	10.0			
WE522 030 12	12.0			
WE522 030 14	14.0			
WE522 030 16	16.0		70	6
WE522 030 20	20.0			
WE522 030 26	26.0			
WE522 030 30	30.0			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE LONG

- 2 Flute long type with a variety of flute length sizes
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

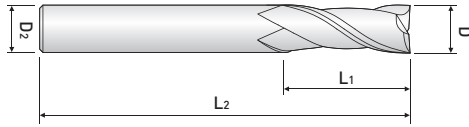
## WE522 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE522 040 20 S4	4.0	20.0	100	4
WE522 040 12		12.0	70	
WE522 040 16		16.0		
WE522 040 20		20.0		
WE522 040 26		26.0		
WE522 040 30		30.0		
WE522 050 20	5.0	20.0	70	6
WE522 050 25		25.0	70	
WE522 050 25 100		30.0	100	
WE522 050 30		30.0	80	
WE522 050 35		35.0	90	
WE522 050 40		40.0	100	
WE522 060 15	6.0	15.0	60	6
WE522 060 15 080		15.0	80	
WE522 060 20		20.0	70	
WE522 060 20 090		20.0	90	
WE522 060 25		25.0	75	
WE522 060 30		30.0	80	
WE522 060 30 100		30.0	100	
WE522 060 30 150		30.0	150	
WE522 060 35		35.0	90	
WE522 060 40		40.0	90	
WE522 060 40 120	40.0	120		
WE522 060 45	45.0	150		
WE522 080 25	8.0	25.0	80	8
WE522 080 30		30.0	80	
WE522 080 30 100		30.0	100	
WE522 080 35		35.0	90	
WE522 080 40		40.0	90	
WE522 080 40 120		40.0	120	
WE522 080 40 150		40.0	150	
WE522 080 45		45.0	100	
WE522 080 50		50.0	100	
WE522 080 50 150		50.0	150	
WE522 100 30	10.0	30.0	80	10
WE522 100 30 100		30.0	100	
WE522 100 35		35.0	90	

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE LONG

- 2 Flute long type with a variety of flute length sizes
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

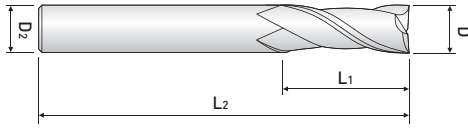
## WE522 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE522 100 40	10.0	40.0	90	10
WE522 100 40 120			120	
WE522 100 45		45.0	100	
WE522 100 50		50.0	100	
WE522 100 50 150			150	
WE522 100 50 200			200	
WE522 100 55		55.0	150	
WE522 100 60		60.0	110	
WE522 100 60 200			200	
WE522 120 35	12.0	35.0	90	12
WE522 120 40		40.0	100	
WE522 120 40 120			120	
WE522 120 45		45.0	130	
WE522 120 50		50.0	100	
WE522 120 50 150			150	
WE522 120 55			55.0	
WE522 120 60		60.0	110	
WE522 120 60 150			150	
WE522 120 60 200		200		
WE522 120 65		65.0	150	
WE522 120 70	70.0	120		
WE522 120 70 200		200		
WE522 140 50	14.0	50.0	110	16
WE522 140 60		60.0	150	
WE522 160 40	16.0	40.0	150	16
WE522 160 50		50.0	110	
WE522 160 50 150			150	
WE522 160 60		60.0	120	
WE522 160 70			130	
WE522 160 70 150			150	
WE522 160 70 200		200		
WE522 160 80		80.0	150	
WE522 160 90		90.0	150	
WE522 160 110		110.0	200	
WE522 160 120		120.0	250	

NEXT &gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE LONG

- 2 Flute long type with a variety of flute length sizes
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WE522 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE522 180 50	18.0	50.0	120	20
WE522 180 70		70.0	130	
WE522 180 100		100.0	200	
WE522 200 50	20.0	50.0	110	20
WE522 200 50 150			150	
WE522 200 60		60.0	130	
WE522 200 70		70.0	130	
WE522 200 80		80.0	150	
WE522 200 90		90.0	150	
WE522 200 90 200			200	
WE522 200 110		110.0	200	
WE522 200 120		120.0	250	
WE522 220 75		22.0	75.0	
WE522 220 110	110.0		200	
WE522 250 70	25.0	70.0	150	25
WE522 250 90		90.0	150	
WE522 250 110		110.0	200	
WE522 250 120		120.0	250	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

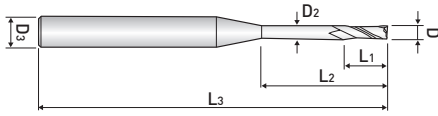
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.03	h6

※: These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE LONG NECK

- Double neck below  $1\theta$  lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

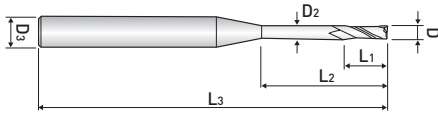
## WE512 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WE512 001 003	0.1	0.15	0.3	40	4
WE512 001 005			0.5		
WE512 001 01			1.0		
WE512 002 005	0.2	0.3	0.5	40	4
WE512 002 01			1.0		
WE512 002 015			1.5		
WE512 002 02			2.0		
WE512 003 01	0.3	0.5	1.0	40	4
WE512 003 015			1.5		
WE512 003 02			2.0		
WE512 003 025			2.5		
WE512 003 03			3.0		
WE512 003 04			4.0		
WE512 003 05	5.0				
WE512 004 01	0.4	0.6	1.0	40	4
WE512 004 015			1.5		
WE512 004 02			2.0		
WE512 004 025			2.5		
WE512 004 03			3.0		
WE512 004 04			4.0		
WE512 004 05			5.0		
WE512 004 06			6.0		
WE512 004 08			8.0		
WE512 004 10			10.0		
WE512 005 01	0.5	0.7	1.0	45	4
WE512 005 015			1.5		
WE512 005 02			2.0		
WE512 005 025			2.5		
WE512 005 03			3.0		
WE512 005 04			4.0		
WE512 005 05			5.0		
WE512 005 06			6.0		
WE512 005 08			8.0		
WE512 005 10			10.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE LONG NECK

- Double neck below 10° lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

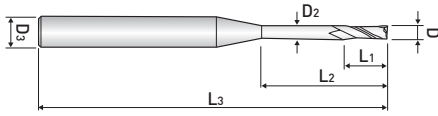
## WE512 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WE512 005 12	0.5	0.7	12.0	45	4
WE512 005 14			14.0		
WE512 005 16			16.0		
WE512 006 02	0.6	0.9	2.0	45	4
WE512 006 03			3.0		
WE512 006 04			4.0		
WE512 006 05			5.0		
WE512 006 06			6.0		
WE512 006 08			8.0		
WE512 006 10			10.0		
WE512 006 12			12.0		
WE512 006 14			14.0		
WE512 006 16			16.0		
WE512 007 02	0.7	1.2	2.0	45	4
WE512 007 04			4.0		
WE512 007 06			6.0		
WE512 007 08			8.0		
WE512 007 10			10.0		
WE512 007 12			12.0		
WE512 008 02	0.8	1.2	2.0	45	4
WE512 008 03			3.0		
WE512 008 04			4.0		
WE512 008 05			5.0		
WE512 008 06			6.0		
WE512 008 08			8.0		
WE512 008 10			10.0		
WE512 008 12			12.0		
WE512 008 14			14.0		
WE512 008 16			16.0		
WE512 008 20	20.0				
WE512 009 06	0.9	1.3	6.0	45	4
WE512 009 08			8.0		
WE512 009 10			10.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE LONG NECK

- Double neck below 10° lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

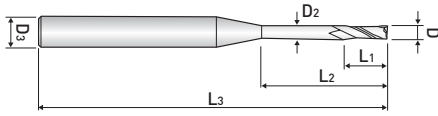
## WE512 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>			
WE512 010 02	1.0	1.5	2.0	50	4			
WE512 010 03			3.0					
WE512 010 04			4.0					
WE512 010 05			5.0					
WE512 010 06			6.0					
WE512 010 07			7.0					
WE512 010 08			8.0					
WE512 010 10			10.0					
WE512 010 12			12.0					
WE512 010 14			14.0					
WE512 010 16			16.0					
WE512 010 18			18.0					
WE512 010 20			20.0					
WE512 010 22			22.0	60				
WE512 010 26			26.0					
WE512 010 30			30.0	70				
WE512 010 40			40.0	80				
WE512 010 50			50.0	100				
WE512 012 04			1.2	1.8		4.0	50	4
WE512 012 06						6.0		
WE512 012 08	8.0							
WE512 012 10	10.0							
WE512 012 12	12.0							
WE512 012 14	14.0							
WE512 012 16	16.0							
WE512 012 20	20.0							
WE512 012 26	26.0	60						
WE512 012 30	30.0	70						
WE512 014 06	1.4	2.1	6.0	50	4			
WE512 014 08			8.0					
WE512 014 10			10.0					
WE512 014 14			14.0					
WE512 014 16			16.0					
WE512 014 20			20.0					

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE LONG NECK

- Double neck below  $1\phi$  lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

## WE512 ...series



ULTRA FINE



HELIX



W Coating

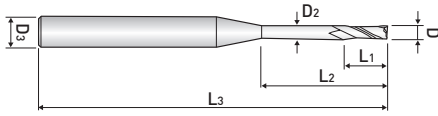


p.1023~1026

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WE512 015 04	1.5	2.3	4.0	50	4
WE512 015 05			5.0		
WE512 015 06			6.0		
WE512 015 07			7.0		
WE512 015 08			8.0		
WE512 015 10			10.0		
WE512 015 12			12.0		
WE512 015 14			14.0		
WE512 015 16			16.0		
WE512 015 18			18.0		
WE512 015 20			20.0		
WE512 015 22			22.0	60	
WE512 015 26			26.0		
WE512 015 30	30.0	70			
WE512 016 08	1.6	2.3	8.0	50	4
WE512 016 10			10.0		
WE512 016 12			12.0		
WE512 016 16			16.0		
WE512 016 20			20.0		
WE512 018 08	1.8	2.7	8.0	50	4
WE512 018 10			10.0		
WE512 018 12			12.0		
WE512 018 16			16.0		
WE512 018 20			20.0		
WE512 020 06	2.0	3.0	6.0	50	4
WE512 020 08			8.0		
WE512 020 10			10.0		
WE512 020 12			12.0		
WE512 020 14			14.0		
WE512 020 16			16.0		
WE512 020 18			18.0		
WE512 020 20			20.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE LONG NECK

- Double neck below 10° lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

## WE512 ...series



ULTRA FINE

HELIX

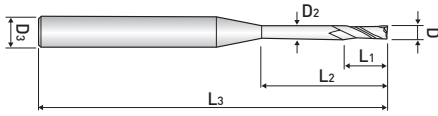
W Coating

p.1023~1026

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WE512 020 22	2.0	3.0	22.0	60	4
WE512 020 26			26.0		
WE512 020 30			30.0	70	
WE512 020 35			35.0		
WE512 020 40			40.0	80	
WE512 020 45			45.0	90	
WE512 020 50			50.0	100	
WE512 020 60			60.0	110	
WE512 025 08	2.5	4.0	8.0	50	4
WE512 025 10			10.0		
WE512 025 12			12.0		
WE512 025 14			14.0		
WE512 025 16			16.0		
WE512 025 18			18.0		
WE512 025 20			20.0	60	
WE512 025 22			22.0		
WE512 025 26			26.0	70	
WE512 025 30			30.0		
WE512 025 35			35.0	80	
WE512 025 40			40.0	90	
WE512 025 45			45.0	100	
WE512 025 50			50.0	100	
WE512 030 06	3.0	4.5	6.0	50	6
WE512 030 08			8.0		
WE512 030 10			10.0		
WE512 030 12			12.0		
WE512 030 14			14.0	60	
WE512 030 16			16.0		
WE512 030 18			18.0		
WE512 030 20			20.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE LONG NECK

- Double neck below 10° lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

## WE512 ...series



ULTRA FINE

HELIX

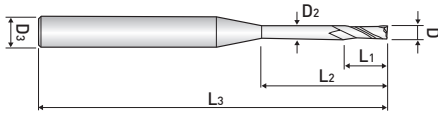
W Coating

p.1023~1026

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WE512 030 22	3.0	4.5	22.0	65	6
WE512 030 26			26.0		
WE512 030 30			30.0	70	
WE512 030 35			35.0		
WE512 030 40			40.0	80	
WE512 030 45			45.0	90	
WE512 030 50			50.0	100	
WE512 030 60			60.0		
WE512 040 08	4.0	6.0	8.0	50	6
WE512 040 10			10.0		
WE512 040 12			12.0		
WE512 040 14			14.0	60	
WE512 040 16			16.0		
WE512 040 18			18.0		
WE512 040 20			20.0		
WE512 040 22			22.0	65	
WE512 040 26			26.0		
WE512 040 30			30.0	70	
WE512 040 35			35.0		
WE512 040 40			40.0	80	
WE512 040 45			45.0	90	
WE512 040 50			50.0	100	
WE512 040 60			60.0		
WE512 050 16			5.0	8.0	
WE512 050 20	20.0				
WE512 050 26	26.0	65			
WE512 050 30	30.0	70			
WE512 050 35	35.0	75			
WE512 050 40	40.0	80			
WE512 050 50	50.0	90			
WE512 050 60	60.0	100			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 2 FLUTE LONG NECK

- Double neck below 10° lead to strengthened hardness and machining RIB with a various effective length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Prehardened Steel, Alloy Steel, Carbon Steel

## WE512 ...series



ULTRA FINE



HELIX



W Coating



p.1023~1026

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>3</sub>
WE512 060 15	6.0	9.0	15.0	60	6
WE512 060 20			20.0		
WE512 060 30			30.0		
WE512 060 32			32.0		
WE512 080 25	8.0	12.0	25.0	70	8
WE512 080 30			30.0		
WE512 080 42			42.0		
WE512 100 30	10.0	15.0	30.0	75	10
WE512 100 35			35.0		
WE512 100 45			45.0		
WE512 120 35	12.0	20.0	35.0	80	12
WE512 120 40			40.0		
WE512 120 50			50.0		

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

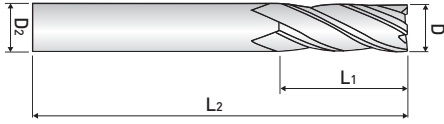
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)		Shank Dia.
Diameter	Tolerance	
up to 6	0~-0.012	
over 6	0~-0.015	

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## VARIABLE INDEX 4 FLUTE SQUARE

- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

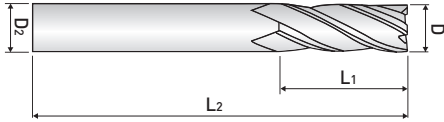
## WME504 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WME504 008	0.8	1.6	40	4
WME504 009	0.9	1.8	40	4
WME504 010	1.0	2.5	50	6
WME504 012	1.2	3.0	50	6
WME504 015	1.5	4.0	50	6
WME504 020	2.0	6.0	50	6
WME504 025	2.5	7.0	50	6
WME504 030	3.0	8.0	50	6
WME504 035	3.5	10.0	50	6
WME504 040	4.0	10.0	50	6
WME504 045	4.5	14.0	50	6
WME504 050	5.0	15.0	60	6
WME504 055	5.5	15.0	60	6
WME504 060	6.0	15.0	60	6
WME504 065	6.5	18.0	60	8
WME504 070	7.0	20.0	60	8
WME504 075	7.5	20.0	60	8
WME504 080	8.0	20.0	70	8
WME504 085	8.5	22.0	70	10
WME504 090	9.0	22.0	70	10
WME504 095	9.5	24.0	70	10
WME504 100	10.0	25.0	75	10
WME504 105	10.5	26.0	75	12
WME504 110	11.0	30.0	75	12
WME504 115	11.5	30.0	80	12
WME504 120	12.0	30.0	80	12
WME504 130	13.0	35.0	100	12
WME504 140 S12	14.0	35.0	100	12
WME504 140 S14				14
WME504 140				16
WME504 150	15.0	38.0	100	16
WME504 160	16.0	40.0	100	16
WME504 170	17.0	42.0	100	16
WME504 180 S16	18.0	45.0	100	16
WME504 180				18
WME504 190	19.0	45.0	100	20
WME504 200	20.0	45.0	100	20
WME504 210	21.0	45.0	100	20

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## VARIABLE INDEX 4 FLUTE SQUARE

- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

## WME504 ...series



ULTRA FINE



HELIX



HELIX



W Coating



p.1027

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WME504 220	22.0	45.0	100	20
WME504 230	23.0	50.0	120	25
WME504 240	24.0	50.0	120	25
WME504 250	25.0	50.0	120	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

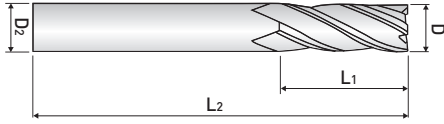
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.03	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## VARIABLE INDEX 4 FLUTE FOR POWERFUL CUTTING

- Excellent surface roughness with a variable index geometry for more than  $3\phi$
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Gash touch shape applied to prevent flute chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

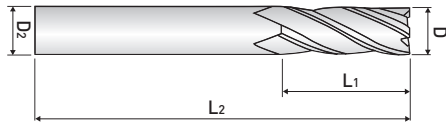
## WXE504 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WXE504 010 01	1.0	1.0	40	6
WXE504 010 02		2.0		
WXE504 010		2.5		
WXE504 010 03		3.0	50	
WXE504 010 04		4.0		
WXE504 010 06		6.0		
WXE504 012 02	1.2	2.0	40	6
WXE504 012		3.0	50	
WXE504 012 04		4.0		
WXE504 012 06		6.0		
WXE504 015 015	1.5	1.5	40	6
WXE504 015 03		3.0		
WXE504 015		4.0		
WXE504 015 06		6.0	50	
WXE504 015 08		8.0		
WXE504 015 10		10.0		
WXE504 020 02	2.0	2.0	40	6
WXE504 020 04		4.0		
WXE504 020		6.0	50	
WXE504 020 08		8.0		
WXE504 020 10		10.0		
WXE504 020 12		12.0		
WXE504 025 025	2.5	2.5	40	6
WXE504 025 05		5.0		
WXE504 025		7.0		
WXE504 025 10		10.0		
WXE504 025 12		12.0		
WXE504 030 03		3.0	3.0	
WXE504 030 06	6.0			
WXE504 030	8.0		50	
WXE504 030 10	10.0			
WXE504 030 12	12.0			
WXE504 030 14	14.0			
WXE504 040 04	4.0	4.0	40	6
WXE504 040 08		8.0		
WXE504 040		10.0	50	
WXE504 040 12		12.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## VARIABLE INDEX 4 FLUTE FOR POWERFUL CUTTING

- Excellent surface roughness with a variable index geometry for more than 30
- Increased tool life with a reduced chatter vibration and resonance by irregular exciting force
- Gash touch shape applied to prevent flute chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating

## WXE504 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WXE504 040 14	4.0	14.0	50	6
WXE504 040 16		16.0		
WXE504 050 05	5.0	5.0	50	6
WXE504 050 10		10.0		
WXE504 050		15.0	60	
WXE504 050 20		20.0		
WXE504 050 25	25.0			
WXE504 060 06	6.0	6.0	50	6
WXE504 060 12		12.0		
WXE504 060		15.0	60	
WXE504 060 20		20.0		
WXE504 060 25		25.0		
WXE504 080 16	8.0	16.0	60	8
WXE504 080		20.0		
WXE504 080 25		25.0	70	
WXE504 080 30		30.0		
WXE504 100 22	10.0	22.0	65	10
WXE504 100		25.0		
WXE504 100 30		30.0	75	
WXE504 100 35		35.0		
WXE504 120 26	12.0	26.0	70	12
WXE504 120		30.0		
WXE504 120 35		35.0	80	
WXE504 120 40		40.0		
WXE504 140	14.0	35.0	100	16
WXE504 160 32	16.0	32.0	100	16
WXE504 160		40.0		
WXE504 180	18.0	45.0	100	20
WXE504 200	20.0	45.0	100	20

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

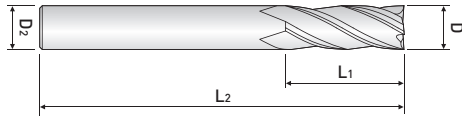
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0--0.030	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## 4 FLUTE LONG

- A wide range of choices due to a variety of sizes of cutting length and overall length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

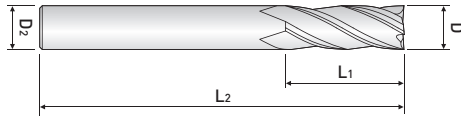
## WE524 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE524 010 03	1.0	3.0	60	6
WE524 010 04		4.0		
WE524 010 05		5.0		
WE524 010 06		6.0		
WE524 010 07		7.0		
WE524 010 08		8.0		
WE524 010 10		10.0		
WE524 010 12		12.0		
WE524 012 04	1.2	4.0	60	6
WE524 012 06		6.0		
WE524 012 08		8.0		
WE524 012 10		10.0		
WE524 012 12		12.0		
WE524 015 06	1.5	6.0	60	6
WE524 015 08		8.0		
WE524 015 10		10.0		
WE524 015 12		12.0		
WE524 015 14		14.0		
WE524 015 16		16.0		
WE524 020 08	2.0	8.0	60	6
WE524 020 10		10.0		
WE524 020 12		12.0		
WE524 020 14		14.0		
WE524 020 16		16.0		
WE524 025 10	2.5	10.0	60	6
WE524 025 12		12.0		
WE524 025 16		16.0		
WE524 025 20		20.0		
WE524 025 26		26.0		
WE524 030 16 S3	3.0	16.0	100	3
WE524 030 10		10.0		
WE524 030 12		12.0	70	6
WE524 030 14		14.0		
WE524 030 16		16.0		
WE524 030 20		20.0		
WE524 030 26		26.0		
WE524 030 30		30.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 4 FLUTE LONG

- A wide range of choices due to a variety of sizes of cutting length and overall length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

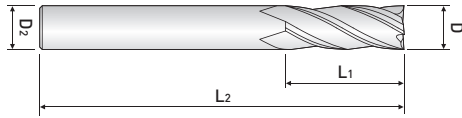
## WE524 ...series



EDP. No.	D	L1	L2	D2		
WE524 040 20 S4	4.0	20.0	100	4		
WE524 040 12		12.0	70			
WE524 040 16		16.0				
WE524 040 20		20.0				
WE524 040 26		26.0				
WE524 040 30		30.0				
WE524 050 20	5.0	20.0	70	6		
WE524 050 25		25.0	70			
WE524 050 25 100		25.0	100			
WE524 050 30		30.0	80			
WE524 050 35		35.0	90			
WE524 050 40		40.0	100			
WE524 060 15	6.0	15.0	60	6		
WE524 060 15 080			80			
WE524 060 20		20.0	70			
WE524 060 20 090			90			
WE524 060 25		25.0	75			
WE524 060 30		30.0	80			
WE524 060 30 100			100			
WE524 060 30 150			150			
WE524 060 35			35.0		90	
WE524 060 40		40.0	90			
WE524 060 40 120			120			
WE524 060 45			45.0		150	
WE524 080 25			8.0		25.0	80
WE524 080 30		30.0			80	
WE524 080 30 100	100					
WE524 080 35	35.0			90		
WE524 080 40	40.0	90				
WE524 080 40 120		120				
WE524 080 40 150		150				
WE524 080 45		45.0		100		
WE524 080 50	50.0	100				
WE524 080 50 150		150				

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 4 FLUTE LONG

- A wide range of choices due to a variety of sizes of cutting length and overall length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

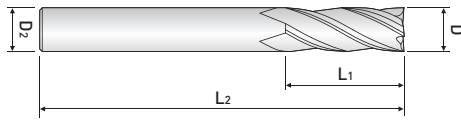
## WE524 ...series



EDP. No.	D	L1	L2	D2
WE524 100 30	10.0	30.0	80	10
WE524 100 30 100			100	
WE524 100 35		35.0	90	
WE524 100 40			90	
WE524 100 40 120		40.0	120	
WE524 100 45			100	
WE524 100 50		50.0	100	
WE524 100 50 150			150	
WE524 100 50 200		55.0	200	
WE524 100 55			150	
WE524 100 60		60.0	110	
WE524 100 60 200			200	
WE524 120 35	12.0	35.0	90	12
WE524 120 40			40.0	
WE524 120 40 120		120		
WE524 120 45		45.0	130	
WE524 120 50			100	
WE524 120 50 150		50.0	150	
WE524 120 55			55.0	
WE524 120 60		60.0		
WE524 120 60 150			65.0	
WE524 120 60 200		70.0		
WE524 120 65			70.0	
WE524 120 70		200		
WE524 140 50	14.0	50.0	110	16
WE524 140 60		60.0	150	
WE524 160 40	16.0	40.0	150	16
WE524 160 50			50.0	
WE524 160 50 150		60.0		
WE524 160 60			60.0	
WE524 160 70		70.0		
WE524 160 70 150			70.0	
WE524 160 70 200		80.0		
WE524 160 80			80.0	
WE524 160 90		90.0		
WE524 160 110			110.0	
WE524 160 120		120.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 4 FLUTE LONG

- A wide range of choices due to a variety of sizes of cutting length and overall length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WE524 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE524 180 50	18.0	50.0	120	20
WE524 180 70		70.0	130	
WE524 180 100		100.0	200	
WE524 200 50	20.0	50.0	110	20
WE524 200 50 150			150	
WE524 200 60		60.0	130	
WE524 200 70		70.0	130	
WE524 200 80		80.0	150	
WE524 200 90		90.0	150	
WE524 200 90 200			200	
WE524 200 110		110.0	200	
WE524 200 120		120.0	250	
WE524 220 75		22.0	75.0	
WE524 220 110	110.0		200	
WE524 250 70	25.0	70.0	150	25
WE524 250 90		90.0	150	
WE524 250 110		110.0	200	
WE524 250 120		120.0	250	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

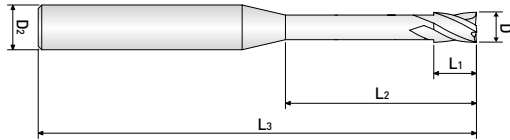
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0--0,030	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## 4 FLUTE LONG NECK

- Excellent effect in preventing breakage with a shape of neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

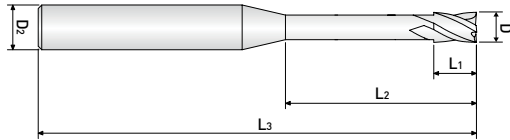
## WE514 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>	
WE514 010 02	1.0	1.5	2.0	50	4	
WE514 010 03			3.0			
WE514 010 04			4.0			
WE514 010 05			5.0			
WE514 010 06			6.0			
WE514 010 07			7.0			
WE514 010 08			8.0			
WE514 010 10			10.0			
WE514 010 12			12.0			
WE514 010 14			14.0			
WE514 010 16			16.0			
WE514 010 18			18.0			
WE514 010 20			20.0			
WE514 010 22			22.0			60
WE514 010 26			26.0			
WE514 010 30			30.0			70
WE514 010 40	40.0	80				
WE514 010 50	50.0	100				
WE514 012 04	1.2	1.8	4.0	50	4	
WE514 012 06			6.0			
WE514 012 08			8.0			
WE514 012 10			10.0			
WE514 012 12			12.0			
WE514 012 14			14.0			
WE514 012 16			16.0			
WE514 012 20			20.0			
WE514 012 26			26.0			60
WE514 012 30			30.0			70
WE514 015 04	1.5	2.3	4.0	50	4	
WE514 015 05			5.0			
WE514 015 06			6.0			
WE514 015 07			7.0			
WE514 015 08			8.0			
WE514 015 10			10.0			
WE514 015 12			12.0			
WE514 015 14			14.0			
WE514 015 16			16.0			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 4 FLUTE LONG NECK

- Excellent effect in preventing breakage with a shape of neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

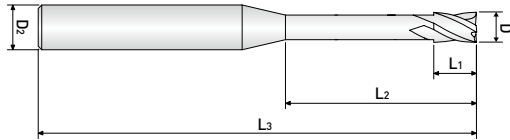
## WE514 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
WE514 015 18	1.5	2.3	18.0	50	4
WE514 015 20			20.0		
WE514 015 22			22.0	60	
WE514 015 26			26.0		
WE514 015 30			30.0		
WE514 020 06	2.0	3.0	6.0	50	4
WE514 020 08			8.0		
WE514 020 10			10.0		
WE514 020 12			12.0		
WE514 020 14			14.0		
WE514 020 16			16.0	60	
WE514 020 18			18.0		
WE514 020 20			20.0		
WE514 020 22			22.0	70	
WE514 020 26			26.0		
WE514 020 30			30.0	80	
WE514 020 35			35.0		
WE514 020 40			40.0		
WE514 020 45			45.0	90	
WE514 020 50			50.0		
WE514 020 60	60.0	110			
WE514 025 08	2.5	4.0	8.0	50	4
WE514 025 10			10.0		
WE514 025 12			12.0		
WE514 025 14			14.0		
WE514 025 16			16.0		
WE514 025 18			18.0	60	
WE514 025 20			20.0		
WE514 025 22			22.0		
WE514 025 26			26.0	70	
WE514 025 30			30.0		
WE514 025 35			35.0	80	
WE514 025 40			40.0		
WE514 025 45			45.0		
WE514 025 50			50.0	100	

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 4 FLUTE LONG NECK

- Excellent effect in preventing breakage with a shape of neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

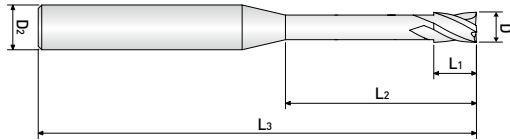
## WE514 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
WE514 030 06	3.0	4.5	6.0	50	6
WE514 030 08			8.0		
WE514 030 10			10.0		
WE514 030 12			12.0		
WE514 030 14			14.0		
WE514 030 16			16.0	60	
WE514 030 18			18.0		
WE514 030 20			20.0		
WE514 030 22			22.0	65	
WE514 030 26			26.0	70	
WE514 030 30			30.0		
WE514 030 35			35.0		
WE514 030 40			40.0		
WE514 030 45			45.0		
WE514 030 50			50.0	100	
WE514 030 60	60.0	100			
WE514 040 08	4.0	4.5	8.0	50	6
WE514 040 10			10.0		
WE514 040 12			12.0		
WE514 040 14			14.0	60	
WE514 040 16			16.0		
WE514 040 18			18.0		
WE514 040 20			20.0		
WE514 040 22			22.0		
WE514 040 26			26.0	70	
WE514 040 30			30.0		
WE514 040 35			35.0		
WE514 040 40			40.0		
WE514 040 45			45.0		
WE514 040 50			50.0	100	
WE514 040 60			60.0	100	
WE514 050 16	5.0	8.0	16.0	60	6
WE514 050 20			20.0		
WE514 050 26			26.0	65	
WE514 050 30			30.0	70	
WE514 050 35			35.0	75	
WE514 050 40			40.0	80	
WE514 050 40			40.0	80	

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 4 FLUTE LONG NECK

- Excellent effect in preventing breakage with a shape of neck without notch
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WE514 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>2</sub>
WE514 050 50	5.0	8.0	50.0	90	6
WE514 050 60			60.0	100	
WE514 060 15	6.0	9.0	15.0	60	6
WE514 060 20			20.0		
WE514 060 30			30.0	70	
WE514 060 32			32.0	90	
WE514 080 25	8.0	12.0	25.0	70	8
WE514 080 30			30.0	80	
WE514 080 42			42.0	100	
WE514 100 30	10.0	15.0	30.0	75	10
WE514 100 35			35.0	80	
WE514 100 45			45.0	100	
WE514 120 35	12.0	20.0	35.0	80	12
WE514 120 40			40.0	90	
WE514 120 50			50.0	110	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

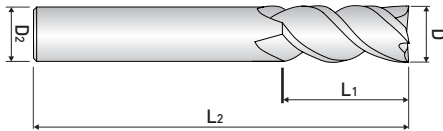
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.03	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## 4 FLUTE HIGH HELIX (45°)

- Reduce cutting load with 45° High Helix
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

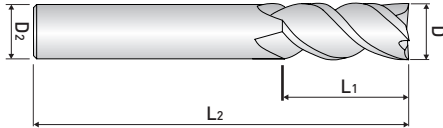
## WE504...H ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE504H 010	1.0	2.5	50	6
WE504H 010 04		4.0	60	
WE504H 010 06		6.0	60	
WE504H 015	1.5	4.0	50	6
WE504H 015 06		6.0	60	
WE504H 015 08		8.0	60	
WE504H 020	2.0	6.0	50	6
WE504H 020 08		8.0	60	
WE504H 020 10		10.0	60	
WE504H 030	3.0	8.0	50	6
WE504H 030 10		10.0	70	
WE504H 030 12		12.0		
WE504H 030 16		16.0	70	
WE504H 040	4.0	10.0	50	6
WE504H 040 12		12.0	70	
WE504H 040 16		16.0		
WE504H 040 20		20.0		
WE504H 050	5.0	15.0	50	6
WE504H 050 30		30.0	80	
WE504H 060	6.0	15.0	60	6
WE504H 060 20		20.0	70	
WE504H 060 30		30.0	80	
WE504H 080	8.0	20.0	70	8
WE504H 080 30		30.0	80	
WE504H 080 35		35.0	90	
WE504H 080 40		40.0	90	
WE504H 100	10.0	25.0	75	10
WE504H 100 30		30.0	80	
WE504H 100 40		40.0	90	
WE504H 100 50		50.0	100	
WE504H 120	12.0	30.0	80	12
WE504H 120 40		40.0	90	
WE504H 120 50		50.0	100	
WE504H 120 60		60.0	110	

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(square) WINNER Series



## 4 FLUTE HIGH HELIX (45°)

- Reduce cutting load with 45° High Helix
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WE504...H ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE504H 160	16.0	40.0	100	16
WE504H 160 50		50.0	110	
WE504H 160 60		60.0	120	
WE504H 160 110		110.0	200	
WE504H 200	20.0	45.0	100	20
WE504H 200 60		60.0	120	
WE504H 200 70		70.0	130	
WE504H 200 110		110.0	200	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

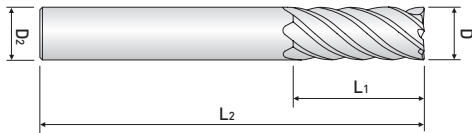
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0--0,030	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## 6 FLUTE HIGH HELIX (45°)

- Dramatically reduced cutting load using 6 flute with high helix
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel



## WE506 ...series

EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WE506 060	6.0	15.0	60	6
WE506 060 20		20.0	70	
WE506 060 30		30.0	80	
WE506 060 30 110			110	
WE506 080	8.0	20.0	70	8
WE506 080 30		30.0	80	
WE506 080 35		35.0	90	
WE506 080 40		40.0	90	
WE506 080 40 130			130	
WE506 100	10.0	25.0	75	10
WE506 100 30		30.0	80	
WE506 100 40		40.0	90	
WE506 100 50		50.0	100	
WE506 100 50 150			150	
WE506 120	12.0	30.0	80	12
WE506 120 40		40.0	90	
WE506 120 50		50.0	100	
WE506 120 60		60.0	110	
WE506 120 60 150			150	
WE506 160	16.0	40.0	100	16
WE506 160 50		50.0	110	
WE506 160 60		60.0	120	
WE506 160 90		90.0	150	
WE506 160 110			200	
WE506 160 110 250		110.0	250	
WE506 200	20.0	45.0	100	20
WE506 200 60		60.0	120	
WE506 200 70		70.0	130	
WE506 200 110			200	
WE506 200 110 250		110.0	250	
WE506 200 110 300			300	

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

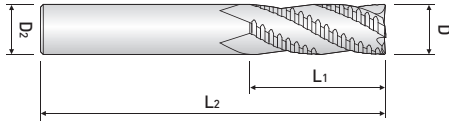
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~0.030	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(square) WINNER Series



## 3, 4, 5 FLUTE 20° ROUGHING

- Strengthen the hardness with Low Helix
- Effective cutting by reduction of chipping due to the shape of chamfer at the end of teeth
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WF61 ...series



EDP. No.	D	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	FLUTE
WF613 030	3.0	8.0	50	6	3
WF613 040	4.0	10.0	50	6	3
WF613 050	5.0	13.0	50	6	3
WF613 060	6.0	15.0	60	6	3
WF613 060 20		20.0			3
WF613 070	7.0	18.0	70	8	3
WF613 080	8.0	20.0	70	8	3
WF613 080 25		25.0			3
WF614 090	9.0	22.0	75	10	4
WF614 100	10.0	25.0	75	10	4
WF614 100 30		30.0			4
WF614 110	11.0	27.0	80	12	4
WF614 120	12.0	30.0	80	12	4
WF614 120 35		35.0			4
WF614 130	13.0	35.0	100	12	4
WF614 140	14.0	35.0	100	16	4
WF614 160	16.0	40.0	100	16	4
WF614 180	18.0	40.0	100	18	4
WF614 200	20.0	50.0	100	20	4
WF615 250	25.0	50.0	100	25	5

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

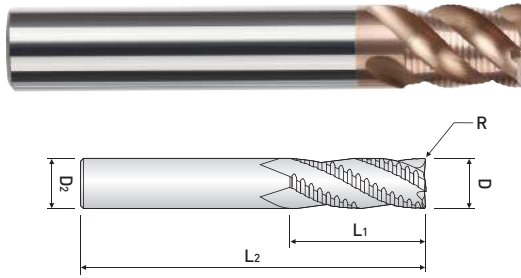
○:General Application ◎:The most suitable Application

### ■ Tolerance

Tolerance	Diameter	μm = 1/1000mm				
		from 1 to 3	over 3 to 6	over 6 to 10	over 10 to 18	over 18 to 30
Mill Dia(mm)(h10)	0	0	0	0	0	0
	-40	-48	-58	-70	-84	
Shank(h6)	0	0	0	0	0	0
	-6	-8	-9	-11	-13	

※: These tools are manufactured based on order received.

# Endmills for Mold & Die(roughing) WINNER Series



## VARIABLE INDEX 3, 4, 5 FLUTE ROUGHING

- Powerful cutting with variable index + Corner R
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WF60 ...series



ULTRA FINE



HELIX



HELIX



W Coating



p.1030

EDP. No.	D	R	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>	FLUTE
WF603 030	3.0	0.2	8.0	50	6	3
WF603 040	4.0	0.2	10.0	50	6	3
WF604 050	5.0	0.2	13.0	50	6	4
WF604 060	6.0	0.2	10.0	50	6	4
WF604 060 15			15.0	60		4
WF604 070	7.0	0.2	18.0	70	8	4
WF604 080	8.0	0.2	12.0	60	8	4
WF604 080 20			20.0	70		4
WF604 090	9.0	0.3	22.0	75	10	4
WF604 100	10.0	0.3	15.0	65	10	4
WF604 100 25			25.0	75		4
WF604 110	11.0	0.3	27.0	80	12	4
WF604 120	12.0	0.3	20.0	70	12	4
WF604 120 30			30.0	80		4
WF605 130	13.0	0.5	35.0	100	12	5
WF605 140	14.0	0.5	35.0	100	14	5
WF605 140 S16					16	5
WF605 160	16.0	1.0	25.0	80	16	5
WF605 160 40			40.0	100		5
WF605 180	18.0	1.0	40.0	100	18	5
WF605 180 S20					20	5
WF605 200	20.0	1.0	25.0	80	20	5
WF605 200 45			45.0	100		5
WF605 250	25.0	1.0	45.0	100	25	5

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

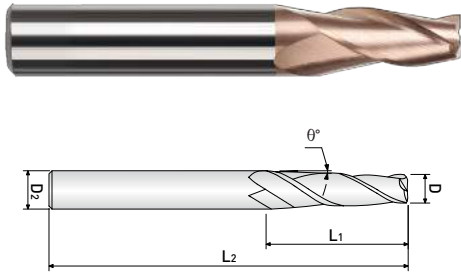
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.05	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(taper) WINNER Series



## 2 FLUTE TAPER

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

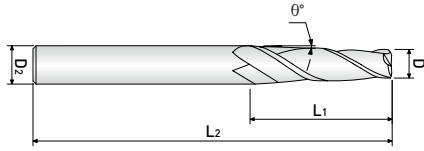
## WTE502 ...series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>			
WTE502 003 005	0.3	30°	1.2	40	4			
WTE502 003 01		1°	1.2					
WTE502 003 015		1°30'	1.2					
WTE502 003 02		2°	1.2					
WTE502 003 03		3°	1.5					
WTE502 003 05		5°	1.5					
WTE502 003 07		7°	1.5					
WTE502 003 10		10°	1.5					
WTE502 004 005		0.4	30°			1.6	40	4
WTE502 004 01			1°			1.6		
WTE502 004 015	1°30'		1.6					
WTE502 004 02	2°		1.6					
WTE502 004 03	3°		1.6					
WTE502 004 05	5°		2.0					
WTE502 004 07	7°		2.0					
WTE502 004 10	10°		2.0					
WTE502 005 005	0.5		30°	2.0	45	4		
WTE502 005 01			1°	2.0				
WTE502 005 015		1°30'	2.0					
WTE502 005 02		2°	2.0					
WTE502 005 03		3°	2.0					
WTE502 005 05		5°	2.5					
WTE502 005 07		7°	2.5					
WTE502 005 10		10°	2.5					
WTE502 006 005		0.6	30°	2.4			45	4
WTE502 006 01			1°	2.4				
WTE502 006 015	1°30'		2.4					
WTE502 006 02	2°		2.4					
WTE502 006 03	3°		2.4					
WTE502 006 05	5°		3.0					
WTE502 006 07	7°		3.0					
WTE502 006 10	10°		3.0					
WTE502 007 005	0.7		30°	2.8	45	4		
WTE502 007 01			1°	2.8				
WTE502 007 015		1°30'	2.8					
WTE502 007 02		2°	2.8					
WTE502 007 03		3°	2.8					
WTE502 007 05		5°	3.5					

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 2 FLUTE TAPER

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

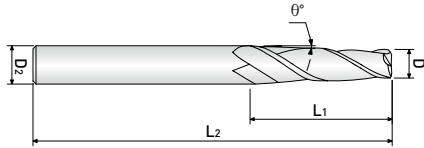
## WTE502 ...series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>			
WTE502 007 07	0.7	7°	3.5	45	4			
WTE502 007 10		10°	3.5					
WTE502 008 005	0.8	30°	3.2	45	4			
WTE502 008 01		1°	3.2					
WTE502 008 015		1°30'	3.2					
WTE502 008 02		2°	3.2					
WTE502 008 03		3°	3.2					
WTE502 008 05		5°	4.0					
WTE502 008 07		7°	4.0					
WTE502 008 10		10°	4.0					
WTE502 010 005		1.0	30°			4.0	50	4
WTE502 010 01			1°			4.0		
WTE502 010 015	1°30'		4.0					
WTE502 010 02	2°		6.0					
WTE502 010 03	3°		6.0					
WTE502 010 05	5°		8.0					
WTE502 010 07	7°		8.0					
WTE502 010 10	10°		8.0					
WTE502 015 005	1.5		30°	6.0	50	4		
WTE502 015 01			1°	6.0				
WTE502 015 015		1°30'	6.0					
WTE502 015 02		2°	8.0					
WTE502 015 03		3°	8.0					
WTE502 015 05		5°	10.0					
WTE502 015 07		7°	10.0					
WTE502 015 10		10°	10.0					
WTE502 015 10							6	
WTE502 020 005		2.0	30°	8.0		50	4	
WTE502 020 01	1°		8.0					
WTE502 020 015	1°30'		8.0					
WTE502 020 02	2°		10.0					
WTE502 020 03	3°		10.0					
WTE502 020 05	5°		12.0					
WTE502 020 07	7°		12.0					
WTE502 020 10	10°		12.0					
WTE502 020 10					6			
WTE502 020 10					8			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 2 FLUTE TAPER

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

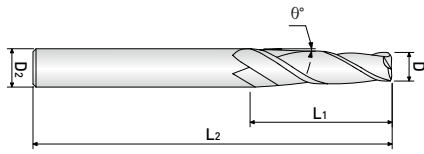
## WTE502 ...series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>			
WTE502 025 005	2.5	30°	10.0	50	6			
WTE502 025 01		1°	10.0					
WTE502 025 015		1°30'	10.0					
WTE502 025 02		2°	12.0					
WTE502 025 03		3°	12.0					
WTE502 025 05		5°	14.0					
WTE502 025 07		7°	14.0					
WTE502 025 10		10°	14.0					
WTE502 030 005		3.0	30°			12.0	50	6
WTE502 030 01			1°			12.0		
WTE502 030 015	1°30'		12.0					
WTE502 030 02	2°		14.0					
WTE502 030 03	3°		14.0					
WTE502 030 05	5°		16.0					
WTE502 030 07	7°		16.0					
WTE502 030 10	10°		16.0					
WTE502 040 005	4.0		30°	16.0	60	6		
WTE502 040 01			1°	16.0				
WTE502 040 015		1°30'	16.0					
WTE502 040 02		2°	16.0					
WTE502 040 03		3°	19.0					
WTE502 040 05		5°	22.0					
WTE502 040 07		7°	16.0					
WTE502 040 10		10°	17.0					
WTE502 060 005		6.0	30°	20.0			65	8
WTE502 060 01			1°	20.0				
WTE502 060 015	1°30'		20.0					
WTE502 060 02	2°		20.0					
WTE502 060 03	3°		19.0					
WTE502 060 05	5°		22.0					
WTE502 060 07	7°		24.0					
WTE502 060 10	10°		17.0					
WTE502 060 10					75	12		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) *WINNER Series*



## 2 FLUTE TAPER

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTE502 ...series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WTE502 070 005	7.0	30°	28.0	70	8
WTE502 070 01		1°	28.0		
WTE502 070 015		1°30'	28.0		
WTE502 070 02		2°	28.0	80	10
WTE502 070 03		3°	28.0		
WTE502 070 05		5°	28.0		
WTE502 080 005	8.0	30°	35.0	90	10
WTE502 080 01		1°	35.0		
WTE502 080 015		1°30'	35.0		
WTE502 080 02		2°	28.0		
WTE502 080 03		3°	38.0	100	12
WTE502 080 05		5°	45.0		
WTE502 080 07		7°	32.0		
WTE502 080 10		10°	34.0	100	16
WTE502 080 10 S25		10°	48.0		
WTE502 100 005		10.0	30°	40.0	90
WTE502 100 01	1°		40.0		
WTE502 100 015	1°30'		38.0		
WTE502 100 02	2°		40.0	75	16
WTE502 100 03	3°		40.0		
WTE502 100 05	5°		34.0		
WTE502 100 07	7°		40.0	100	20
WTE502 100 10	10°		42.0		

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

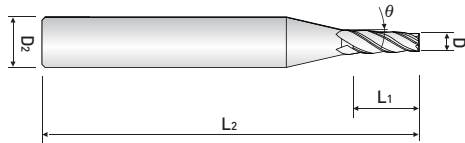
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0--0,030	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

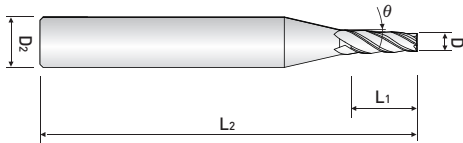
## WTE504 ...series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>			
WTE504 030 005	3.0	30°	12.0	50	6			
WTE504 030 01		1°	12.0					
WTE504 030 015		1°30'	12.0					
WTE504 030 02		2°	14.0					
WTE504 030 03		3°	14.0					
WTE504 030 05		5°	16.0					
WTE504 030 07		7°	16.0					
WTE504 030 10		10°	16.0					
WTE504 040 005		4.0	30°			16.0	60	6
WTE504 040 01			1°			16.0		
WTE504 040 015	1°30'		16.0					
WTE504 040 02	2°		16.0					
WTE504 040 03	3°		19.0					
WTE504 040 05	5°		22.0					
WTE504 040 07	7°		16.0					
WTE504 040 10	10°		17.0					
WTE504 060 005	6.0		30°	20.0	65	8		
WTE504 060 01			1°	20.0				
WTE504 060 015		1°30'	20.0					
WTE504 060 02		2°	20.0					
WTE504 060 03		3°	19.0					
WTE504 060 05		5°	22.0					
WTE504 060 07		7°	24.0					
WTE504 060 10		10°	17.0					
WTE504 070 005		7.0	30°	28.0			70	8
WTE504 070 01			1°	28.0				
WTE504 070 015	1°30'		28.0					
WTE504 070 02	2°		28.0					
WTE504 070 03	3°		28.0					
WTE504 070 05	5°		28.0					
WTE504 080 005	8.0		30°	35.0	90	10		
WTE504 080 01			1°	35.0				
WTE504 080 015			1°30'	35.0				
WTE504 080 02			2°	28.0				
WTE504 080 03		3°	38.0					
WTE504 080 05		5°	45.0					
WTE504 080 07		7°	32.0					
WTE504 080 10		10°	34.0					

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTE504 ...series



ULTRA FINE



HELIX



W Coating



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EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WTE504 100 005	10.0	30°	40.0	90	12
WTE504 100 01		1°	40.0		
WTE504 100 015		1°30'	38.0		
WTE504 100 02		2°	40.0		
WTE504 100 03		3°	40.0	100	16
WTE504 100 05		5°	34.0		
WTE504 100 07		7°	40.0		
WTE504 100 10		10°	42.0	90	20
				100	25

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

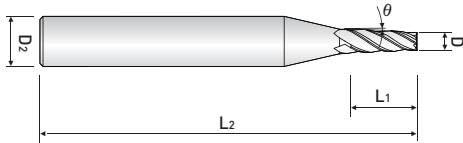
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.03	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER LONG RIB

- A wide range of choices due to a variety of taper angles & flute length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

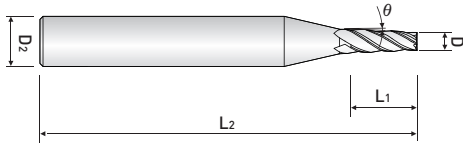
## WTE514 ...series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WTE514 008 005 04	0.8	30°	4.0	45	4
WTE514 008 005 06			6.0		
WTE514 008 005 08			8.0		
WTE514 008 005 10			10.0		
WTE514 008 005 12			12.0		
WTE514 008 010 04			4.0		
WTE514 008 010 06		6.0			
WTE514 008 010 08		8.0			
WTE514 008 010 10		10.0			
WTE514 008 010 12		12.0			
WTE514 008 015 04		1°30'	4.0		
WTE514 008 015 06			6.0		
WTE514 008 015 08			8.0		
WTE514 008 015 10			10.0		
WTE514 008 015 12			12.0		
WTE514 008 020 04			2°		
WTE514 008 020 06		6.0			
WTE514 008 020 08		8.0			
WTE514 008 020 10	10.0				
WTE514 008 020 12	12.0				
WTE514 010 005 04	1.0	30°		4.0	50
WTE514 010 005 06			6.0		
WTE514 010 005 08			8.0		
WTE514 010 005 10			10.0		
WTE514 010 005 12			12.0		
WTE514 010 005 16			16.0		
WTE514 010 010 04		1°	4.0		
WTE514 010 010 06			6.0		
WTE514 010 010 08			8.0		
WTE514 010 010 10			10.0		
WTE514 010 010 12			12.0		
WTE514 010 010 16			16.0		
WTE514 010 015 04		1°30'	4.0		
WTE514 010 015 06			6.0		
WTE514 010 015 08			8.0		
WTE514 010 015 10			10.0		
WTE514 010 015 12			12.0		
WTE514 010 015 16			16.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER LONG RIB

- A wide range of choices due to a variety of taper angles & flute length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTE514 ...series



ULTRA FINE



HELIX



W Coating

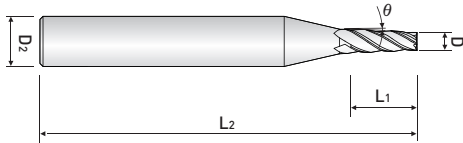


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EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WTE514 010 020 04	1.0	2°	4.0	50	4
WTE514 010 020 06			6.0		
WTE514 010 020 08			8.0		
WTE514 010 020 10			10.0		
WTE514 010 020 12			12.0		
WTE514 010 020 16			16.0		
WTE514 010 030 04		3°	4.0		
WTE514 010 030 06			6.0		
WTE514 010 030 08			8.0		
WTE514 010 030 10			10.0		
WTE514 010 030 12			12.0		
WTE514 010 030 16			16.0		
WTE514 012 005 06	1.2	30°	6.0	50	4
WTE514 012 005 08			8.0		
WTE514 012 005 10			10.0		
WTE514 012 005 12			12.0		
WTE514 012 005 16			16.0		
WTE514 012 010 06			1°		
WTE514 012 010 08		8.0			
WTE514 012 010 10		10.0			
WTE514 012 010 12		12.0			
WTE514 012 010 16		16.0			
WTE514 012 015 06		1°30'			
WTE514 012 015 08			8.0		
WTE514 012 015 10			10.0		
WTE514 012 015 12			12.0		
WTE514 012 015 16			16.0		
WTE514 012 020 06			2°		
WTE514 012 020 08		8.0			
WTE514 012 020 10		10.0			
WTE514 012 020 12		12.0			
WTE514 012 020 16		16.0			
WTE514 012 030 06		3°			
WTE514 012 030 08			8.0		
WTE514 012 030 10			10.0		
WTE514 012 030 12			12.0		
WTE514 012 030 16			16.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER LONG RIB

- A wide range of choices due to a variety of taper angles & flute length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTE514 ...series



ULTRA FINE



HELIX



W Coating

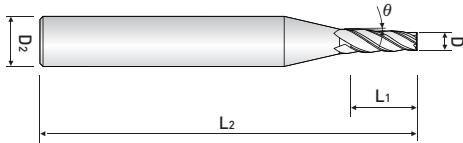


p.1031

EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WTE514 015 005 06	1.5	30°	6.0	50	4
WTE514 015 005 08			8.0		
WTE514 015 005 10			10.0		
WTE514 015 005 12			12.0		
WTE514 015 005 16			16.0		
WTE514 015 005 20			20.0		
WTE514 015 010 06		1°	6.0	50	
WTE514 015 010 08			8.0		
WTE514 015 010 10			10.0		
WTE514 015 010 12			12.0		
WTE514 015 010 16			16.0		
WTE514 015 010 20			20.0		
WTE514 015 015 06		1°30'	6.0	50	
WTE514 015 015 08			8.0		
WTE514 015 015 10			10.0		
WTE514 015 015 12			12.0		
WTE514 015 015 16			16.0		
WTE514 015 015 20			20.0		
WTE514 015 020 06		2°	6.0	50	
WTE514 015 020 08			8.0		
WTE514 015 020 10			10.0		
WTE514 015 020 12			12.0		
WTE514 015 020 16			16.0		
WTE514 015 020 20			20.0		
WTE514 015 030 06	3°	6.0	50		
WTE514 015 030 08		8.0			
WTE514 015 030 10		10.0			
WTE514 015 030 12		12.0			
WTE514 015 030 16		16.0			
WTE514 015 030 20		20.0			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) *WINNER Series*



## 4 FLUTE TAPER LONG RIB

- A wide range of choices due to a variety of taper angles & flute length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

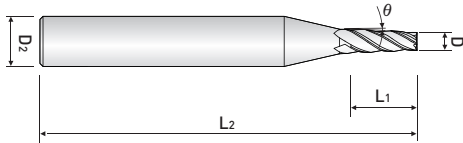
## WTE514 ...series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WTE514 020 005 08	2.0	30°	8.0	50	4
WTE514 020 005 10			10.0		
WTE514 020 005 12			12.0		
WTE514 020 005 16			16.0	60	
WTE514 020 005 20			20.0		
WTE514 020 005 25			25.0		
WTE514 020 010 08		1°	8.0	50	
WTE514 020 010 10			10.0		
WTE514 020 010 12			12.0		
WTE514 020 010 16			16.0	60	
WTE514 020 010 20			20.0		
WTE514 020 010 25			25.0		
WTE514 020 015 08		1°30'	8.0	50	
WTE514 020 015 10			10.0		
WTE514 020 015 12			12.0		
WTE514 020 015 16			16.0	60	
WTE514 020 015 20			20.0		
WTE514 020 015 25			25.0		
WTE514 020 020 08		2°	8.0	50	
WTE514 020 020 10			10.0		
WTE514 020 020 12			12.0		
WTE514 020 020 16			16.0	60	
WTE514 020 020 20			20.0		
WTE514 020 020 25			25.0		
WTE514 020 030 08	3°	8.0	50		
WTE514 020 030 10		10.0			
WTE514 020 030 12		12.0			
WTE514 020 030 16		16.0	60		
WTE514 020 030 20		20.0			
WTE514 020 030 25		25.0			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER LONG RIB

- A wide range of choices due to a variety of taper angles & flute length
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTE514 ...series



EDP. No.	D	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WTE514 025 005 10	2.5	30°	10.0	50	4
WTE514 025 005 12			12.0		
WTE514 025 005 16			16.0		
WTE514 025 005 20			20.0	60	
WTE514 025 005 25			25.0		
WTE514 025 005 30			30.0		
WTE514 025 010 10		1°	10.0	50	
WTE514 025 010 12			12.0		
WTE514 025 010 16			16.0		
WTE514 025 010 20			20.0	60	
WTE514 025 010 25			25.0		
WTE514 025 010 30			30.0		
WTE514 025 015 10		1°30'	10.0	50	
WTE514 025 015 12			12.0		
WTE514 025 015 16			16.0		
WTE514 025 015 20			20.0	60	
WTE514 025 015 25			25.0		
WTE514 025 015 30			30.0		
WTE514 025 020 10		2°	10.0	50	
WTE514 025 020 12			12.0		
WTE514 025 020 16			16.0		
WTE514 025 020 20			20.0	60	
WTE514 025 020 25			25.0		
WTE514 025 020 30			30.0		
WTE514 025 030 10		3°	10.0	50	
WTE514 025 030 12			12.0		
WTE514 025 030 16			16.0		
WTE514 025 030 20			20.0	60	
WTE514 025 030 25			25.0		
WTE514 025 030 30			30.0		

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

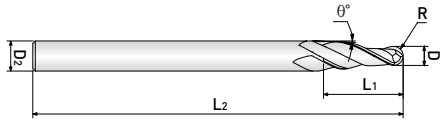
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.03	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(taper) *WINNER Series*



## 2 FLUTE TAPER BALL

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

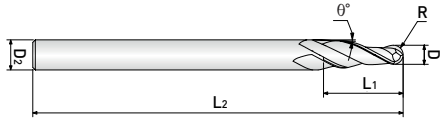
## WTB502 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>					
WTB502 003 005	0.3	0.15	30°	1.2	40	4					
WTB502 003 01			1°								
WTB502 003 015			1°30'								
WTB502 003 02			2°								
WTB502 003 03			3°								
WTB502 003 05			5°	1.5							
WTB502 003 07			7°								
WTB502 003 10			10°								
WTB502 004 005			0.4				0.2	30°	1.6	40	4
WTB502 004 01								1°			
WTB502 004 015	1°30'										
WTB502 004 02	2°										
WTB502 004 03	3°										
WTB502 004 05	5°	2									
WTB502 004 07	7°										
WTB502 004 10	10°										
WTB502 005 005	0.5			0.25	30°	2		45	4		
WTB502 005 01					1°						
WTB502 005 015		1°30'									
WTB502 005 02		2°									
WTB502 005 03		3°									
WTB502 005 05		5°	2.5								
WTB502 005 07		7°									
WTB502 005 10		10°									
WTB502 006 005		0.6			0.3	30°	2			45	4
WTB502 006 01						1°					
WTB502 006 015	1°30'										
WTB502 006 02	2°										
WTB502 006 03	3°										
WTB502 006 05	5°		2.5								
WTB502 006 07	7°										
WTB502 006 10	10°										
WTB502 007 005	0.7			0.35		30°	2.5	45	4		
WTB502 007 01						1°					
WTB502 007 015		1°30'									
WTB502 007 02		2°									
WTB502 007 03		3°									
WTB502 007 05		5°									

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 2 FLUTE TAPER BALL

- A wide range of choices due to a variety of taper angles
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTB502 ...series



EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>					
WTB502 007 07	0.7	0.35	7°	3	45	4					
WTB502 007 10			10°								
WTB502 008 005	0.8	0.4	30°	3.2	45	4					
WTB502 008 01			1°								
WTB502 008 015			1°30`								
WTB502 008 02			2°								
WTB502 008 03			3°								
WTB502 008 05			5°								
WTB502 008 07			7°								
WTB502 008 10			10°								
WTB502 010 005			1.0				0.5	30°	4.0	50	4
WTB502 010 01								1°			
WTB502 010 015	1°30`										
WTB502 010 02	2°										
WTB502 010 03	3°										
WTB502 010 05	5°										
WTB502 010 07	7°										
WTB502 010 10	10°										
WTB502 015 005	1.5	0.75		30°	6.0	50		4			
WTB502 015 01				1°							
WTB502 015 015			1°30`								
WTB502 015 02			2°								
WTB502 015 03			3°								
WTB502 015 05			5°								
WTB502 015 07			7°	10.0	6						
WTB502 015 10			10°								
WTB502 020 005			2.0				1	30°	6.0	50	4
WTB502 020 01								1°			
WTB502 020 015	1°30`										
WTB502 020 02	2°										
WTB502 020 03	3°										
WTB502 020 05	5°										
WTB502 020 07	7°	10.0		6							
WTB502 020 10	10°										

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

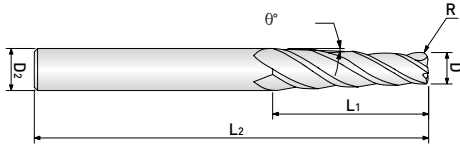
○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.03	h6

※ These tools are manufactured based on order received.

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTR504 ...series



ULTRA FINE



HELIX



All Sizes



W Coating

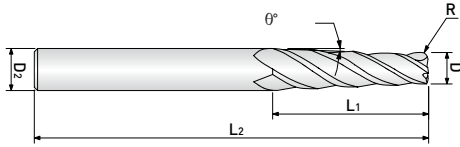


p.1032

EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WTR504 008 01 01 04	0.8	0.1	1°	4.0	45	4
WTR504 008 01 01 06				6.0		
WTR504 008 01 01 08				8.0		
WTR504 008 01 015 04			1°30'	4.0		
WTR504 008 01 015 06				6.0		
WTR504 008 01 015 08				8.0		
WTR504 008 02 01 04		0.2	1°	4.0		
WTR504 008 02 01 06				6.0		
WTR504 008 02 01 08				8.0		
WTR504 008 02 015 04			1°30'	4.0		
WTR504 008 02 015 06				6.0		
WTR504 008 02 015 08				8.0		
WTR504 010 01 01 04	1.0	0.1	1°	4.0	50	4
WTR504 010 01 01 06				6.0		
WTR504 010 01 01 08				8.0		
WTR504 010 01 01 10				10.0		
WTR504 010 01 01 12				12.0		
WTR504 010 01 015 04				1°30'		
WTR504 010 01 015 06			6.0			
WTR504 010 01 015 08			8.0			
WTR504 010 01 015 10			10.0			
WTR504 010 01 015 12			12.0			
WTR504 010 01 02 04			2°			
WTR504 010 01 02 06				6.0		
WTR504 010 01 02 08		8.0				
WTR504 010 01 02 10		10.0				
WTR504 010 01 02 12		12.0				
WTR504 010 01 03 04		3°		4.0		
WTR504 010 01 03 06			6.0			
WTR504 010 01 03 08			8.0			
WTR504 010 01 03 10			10.0			
WTR504 010 01 03 12			12.0			
WTR504 010 02 01 04			0.2	1°		
WTR504 010 02 01 06		6.0				
WTR504 010 02 01 08		8.0				
WTR504 010 02 01 10		10.0				
WTR504 010 02 01 12	12.0					
WTR504 010 02 015 04	1°30'	4.0				

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTR504 ...series



ULTRA FINE



HELIX



All Sizes



W Coating

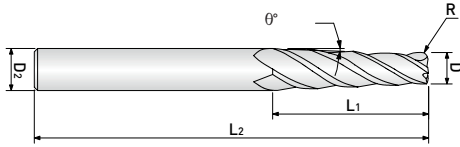


p.1032

EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WTR504 010 02 015 06	1.0	0.2	1°30'	6.0	50	4
WTR504 010 02 015 08				8.0		
WTR504 010 02 015 10				10.0		
WTR504 010 02 015 12				12.0		
WTR504 010 02 02 04			4.0			
WTR504 010 02 02 06			6.0			
WTR504 010 02 02 08			8.0			
WTR504 010 02 02 10			10.0			
WTR504 010 02 02 12			12.0			
WTR504 010 02 03 04			4.0			
WTR504 010 02 03 06			6.0			
WTR504 010 02 03 08			8.0			
WTR504 010 02 03 10	10.0					
WTR504 010 02 03 12	12.0					
WTR504 010 03 01 04	1.0	0.3	1°	4.0	50	4
WTR504 010 03 01 06				6.0		
WTR504 010 03 01 08				8.0		
WTR504 010 03 01 10				10.0		
WTR504 010 03 01 12			12.0			
WTR504 010 03 015 04			4.0			
WTR504 010 03 015 06			6.0			
WTR504 010 03 015 08			8.0			
WTR504 010 03 015 10			10.0			
WTR504 010 03 015 12			12.0			
WTR504 010 03 02 04			4.0			
WTR504 010 03 02 06			6.0			
WTR504 010 03 02 08	8.0					
WTR504 010 03 02 10	10.0					
WTR504 010 03 02 12	12.0					
WTR504 010 03 03 04	4.0					
WTR504 010 03 03 06	6.0					
WTR504 010 03 03 08	8.0					
WTR504 010 03 03 10	10.0					
WTR504 010 03 03 12	12.0					
WTR504 012 01 01 06	1.2	0.1	1°	6.0	50	4
WTR504 012 01 01 08				8.0		
WTR504 012 01 01 10				10.0		
WTR504 012 01 01 12				12.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTR504 ...series



ULTRA FINE



HELIX



All Sizes



W Coating

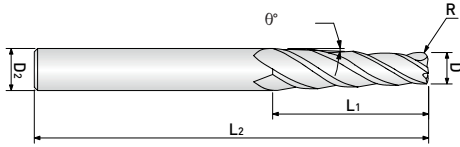


p.1032

EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WTR504 012 01 02 06	1.2	0.1	2°	6.0	50	4
WTR504 012 01 02 08				8.0		
WTR504 012 01 02 10				10.0		
WTR504 012 01 02 12				12.0		
WTR504 012 01 03 06			6.0			
WTR504 012 01 03 08			8.0			
WTR504 012 01 03 10			10.0			
WTR504 012 01 03 12			12.0			
WTR504 012 02 01 06		6.0				
WTR504 012 02 01 08		8.0				
WTR504 012 02 01 10		10.0				
WTR504 012 02 01 12		12.0				
WTR504 012 02 02 06		6.0				
WTR504 012 02 02 08		8.0				
WTR504 012 02 02 10		10.0				
WTR504 012 02 02 12		12.0				
WTR504 012 02 03 06		6.0				
WTR504 012 02 03 08		8.0				
WTR504 012 02 03 10		10.0				
WTR504 012 02 03 12		12.0				
WTR504 012 03 01 06		6.0				
WTR504 012 03 01 08		8.0				
WTR504 012 03 01 10		10.0				
WTR504 012 03 01 12		12.0				
WTR504 012 03 02 06	6.0					
WTR504 012 03 02 08	8.0					
WTR504 012 03 02 10	10.0					
WTR504 012 03 02 12	12.0					
WTR504 012 03 03 06	6.0					
WTR504 012 03 03 08	8.0					
WTR504 012 03 03 10	10.0					
WTR504 012 03 03 12	12.0					

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTR504 ...series



ULTRA FINE



HELIX



All Sizes



W Coating

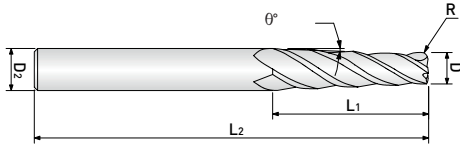


p.1032

EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>				
WTR504 015 01 01 06	1.5	0.1	1°	6.0	50	4				
WTR504 015 01 01 08				8.0						
WTR504 015 01 01 10				10.0						
WTR504 015 01 01 12				12.0						
WTR504 015 01 01 16				16.0						
WTR504 015 01 01 20				20.0						
WTR504 015 01 02 06			1.5	0.1	2°		6.0	50	4	
WTR504 015 01 02 08							8.0			
WTR504 015 01 02 10							10.0			
WTR504 015 01 02 12							12.0			
WTR504 015 01 02 16							16.0			
WTR504 015 01 02 20							20.0			
WTR504 015 01 03 06	1.5	0.1	3°	6.0	50	4				
WTR504 015 01 03 08				8.0						
WTR504 015 01 03 10				10.0						
WTR504 015 01 03 12				12.0						
WTR504 015 01 03 16				16.0						
WTR504 015 01 03 20				20.0						
WTR504 015 02 01 06	1.5	0.2	1°	6.0	50		4			
WTR504 015 02 01 08				8.0						
WTR504 015 02 01 10				10.0						
WTR504 015 02 01 12				12.0						
WTR504 015 02 01 16				16.0						
WTR504 015 02 01 20				20.0						
WTR504 015 02 02 06			1.5	0.2	2°	6.0		50	4	
WTR504 015 02 02 08						8.0				
WTR504 015 02 02 10						10.0				
WTR504 015 02 02 12						12.0				
WTR504 015 02 02 16						16.0				
WTR504 015 02 02 20						20.0				
WTR504 015 02 03 06		1.5	0.2	3°	6	50		4		
WTR504 015 02 03 08					8					
WTR504 015 02 03 10					10					
WTR504 015 02 03 12					12					
WTR504 015 02 03 16					16					
WTR504 015 02 03 20					20					
WTR504 015 03 01 06		1.5	0.3	1°	6	50				4
WTR504 015 03 01 08					8					
WTR504 015 03 01 10					10					
WTR504 015 03 01 10					10					

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) *WINNER Series*



## 4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTR504 ...series



ULTRA FINE



HELIX



All Sizes



W Coating

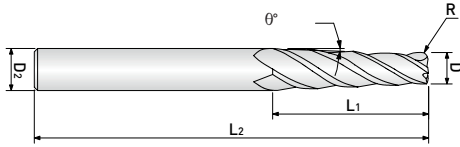


p.1032

EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WTR504 015 03 01 12	1.5	0.3	1°	12	50	4
WTR504 015 03 01 16				16		
WTR504 015 03 01 20				20		
WTR504 015 03 02 06			2°	6	50	
WTR504 015 03 02 08				8		
WTR504 015 03 02 10				10		
WTR504 015 03 02 12				12		
WTR504 015 03 02 16				16		
WTR504 015 03 02 20				20		
WTR504 015 03 03 06			3°	6	50	
WTR504 015 03 03 08				8		
WTR504 015 03 03 10				10		
WTR504 015 03 03 12				12		
WTR504 015 03 03 16				16		
WTR504 015 03 03 20	20					
WTR504 020 01 01 08	2.0	0.1	1°	8.0	50	4
WTR504 020 01 01 10				10.0		
WTR504 020 01 01 12				12.0		
WTR504 020 01 01 16				16.0		
WTR504 020 01 01 20				20.0		
WTR504 020 01 01 25				25.0		
WTR504 020 01 02 08			2°	8.0	50	
WTR504 020 01 02 10				10.0		
WTR504 020 01 02 12				12.0		
WTR504 020 01 02 16				16.0		
WTR504 020 01 02 20				20.0		
WTR504 020 01 02 25				25.0		
WTR504 020 01 03 08		3°	8.0	50	4	
WTR504 020 01 03 10			10.0			
WTR504 020 01 03 12			12.0			
WTR504 020 01 03 16			16.0		60	6
WTR504 020 01 03 20			20.0			
WTR504 020 01 03 25			25.0			
WTR504 020 02 01 08		0.2	1°	8.0	50	4
WTR504 020 02 01 10				10.0		
WTR504 020 02 01 12				12.0		
WTR504 020 02 01 16				16.0		
WTR504 020 02 01 20				20.0	60	
WTR504 020 02 01 25				25.0		

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
- Enhanced cutting effect and better wear resistance made from the finest raw material
- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTR504 ...series



ULTRA FINE



HELIX



All Sizes



W Coating

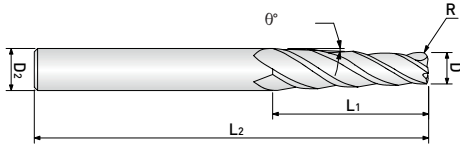


p.1032

EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>		
WTR504 020 02 02 08	2.0	0.2	2°	8.0	50	4		
WTR504 020 02 02 10				10.0				
WTR504 020 02 02 12				12.0				
WTR504 020 02 02 16				16.0				
WTR504 020 02 02 20				20.0				
WTR504 020 02 02 25				25.0				
WTR504 020 02 03 08			3°	8.0	50			
WTR504 020 02 03 10				10.0				
WTR504 020 02 03 12				12.0				
WTR504 020 02 03 16				16.0				
WTR504 020 02 03 20				20.0				
WTR504 020 02 03 25				25.0				
WTR504 020 03 01 08		0.3	1°	50	8.0	60	4	
WTR504 020 03 01 10					10.0			
WTR504 020 03 01 12					12.0			
WTR504 020 03 01 16					16.0			
WTR504 020 03 01 20					20.0			
WTR504 020 03 01 25					25.0			
WTR504 020 03 02 08			2°	50	60	8.0		50
WTR504 020 03 02 10						10.0		
WTR504 020 03 02 12						12.0		
WTR504 020 03 02 16						16.0		
WTR504 020 03 02 20						20.0		
WTR504 020 03 02 25						25.0		
WTR504 020 03 03 08	3°	50	60	8.0	50			
WTR504 020 03 03 10				10.0				
WTR504 020 03 03 12				12.0				
WTR504 020 03 03 16				16.0				
WTR504 020 03 03 20				20.0				
WTR504 020 03 03 25				25.0				

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
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## WTR504 ...series



ULTRA FINE



HELIX



All Sizes



W Coating

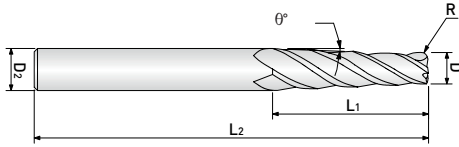


p.1032

EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>
WTR504 025 01 01 10	2.5	0.1	1°	10.0	50	4
WTR504 025 01 01 12				12.0		
WTR504 025 01 01 16				16.0		
WTR504 025 01 01 20				20.0		
WTR504 025 01 01 25				25.0		
WTR504 025 01 01 30				30.0		
WTR504 025 01 02 10			2°	10.0	50	
WTR504 025 01 02 12				12.0		
WTR504 025 01 02 16				16.0		
WTR504 025 01 02 20				20.0		
WTR504 025 01 02 25				25.0		
WTR504 025 01 02 30				30.0		
WTR504 025 01 03 10		3°	10.0	50	4	
WTR504 025 01 03 12			12.0			
WTR504 025 01 03 16			16.0			
WTR504 025 01 03 20			20.0			
WTR504 025 01 03 25			25.0			
WTR504 025 01 03 30			30.0			
WTR504 025 02 01 10		0.2	1°	10.0	50	4
WTR504 025 02 01 12				12.0		
WTR504 025 02 01 16				16.0		
WTR504 025 02 01 20				20.0		
WTR504 025 02 01 25				25.0		
WTR504 025 02 01 30				30.0		
WTR504 025 02 02 10	2°		10.0	50		
WTR504 025 02 02 12			12.0			
WTR504 025 02 02 16			16.0			
WTR504 025 02 02 20			20.0			
WTR504 025 02 02 25			25.0			
WTR504 025 02 02 30			30.0			

NEXT &gt;&gt;&gt;

# Endmills for Mold & Die(taper) WINNER Series



## 4 FLUTE TAPER CORNER RADIUS

- Strengthened hardness of flute by applying the minute corner R to prevent chipping
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- Longer tool life and improvement on stable machining with W coating
- Suitable for Mold & Die machining below HRC 55 Pre-hardened Steel, Alloy Steel, Carbon Steel

## WTR504 ...series



ULTRA FINE



HELIX



All Sizes



W Coating



p.1032

EDP. No.	D	R	$\theta$	L <sub>1</sub>	L <sub>2</sub>	D <sub>2</sub>		
WTR504 025 02 03 10	2.5	0.2	3°	10.0	50	4		
WTR504 025 02 03 12				12.0				
WTR504 025 02 03 16				16.0				
WTR504 025 02 03 20				20.0	60	6		
WTR504 025 02 03 25				25.0				
WTR504 025 02 03 30				30.0				
WTR504 025 03 01 10		0.3	1°	1°	10.0	50	4	
WTR504 025 03 01 12					12.0			
WTR504 025 03 01 16					16.0			
WTR504 025 03 01 20					20.0	60	4	
WTR504 025 03 01 25					25.0			
WTR504 025 03 01 30					30.0			
WTR504 025 03 02 10			2°	2°	2°	10.0	50	6
WTR504 025 03 02 12						12.0		
WTR504 025 03 02 16						16.0		
WTR504 025 03 02 20						20.0	60	6
WTR504 025 03 02 25						25.0		
WTR504 025 03 02 30						30.0		
WTR504 025 03 03 10		3°	3°	3°	10.0	50	4	
WTR504 025 03 03 12					12.0			
WTR504 025 03 03 16	16.0							
WTR504 025 03 03 20	20.0				60	6		
WTR504 025 03 03 25	25.0							
WTR504 025 03 03 30	30.0							

### ■ Applicable Working Material

Carbon Steels (S45C, S55C...) ~HB225	Alloy Steels (SCM, SK...) HB22 ~325	Prehardened Steels(NAK...) HRC30~50	Hardened Steels		Copper	Graphite	Cast Iron FCD400, 500~	Aluminum	Stainless Steels
			~HRC55 SKD61	~HRC55 SKD11					
○	○	◎	○				○		○

○:General Application ◎:The most suitable Application

### ■ Tolerance

Mill Dia. (mm)	Shank Dia.
0~-0.03	h6

※ These tools are manufactured based on order received.