



Size $\phi 0.1 \sim \phi 12$

CSS

Super
MG

UT
COAT

30°

40°

Flatland

Shank Dia
0/-0.005

Additional 41 models
Launching in January 2015

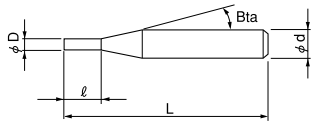
*1 Helix angle 30°: $\phi D < 0.6, 1 \leq \phi D$ (length of cut 2.5D-3D)
*2 Helix angle 40°: $0.6 \leq \phi D < 1, 1 \leq \phi D$ (length of cut-2D)

Material Applications (☆ Highly Recommended ○ Recommended ○ Suggested)

Work Material															
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels			Cast Iron	Aluminum Alloys	Graphite	Copper	Plastics	Glass Filled Plastics	Titanium Alloys	Heat Resistant Alloys	Cemented Carbide	Hard Brittle (Non-Metallic) Materials
			~55HRC	~60HRC	~70HRC										
S45C S55C	SK / SCM SUS	NAK HPM													
○	○	○	○			○	○		○			○	○		

Features

The new flute design offers excellent chip evacuation. Resistance to breakage and wear has been improved by combining a special carbide grade with a new version of UT-COAT.



The shank taper angle shown is not an exact value and to avoid contact with the work piece, we recommend the user controls the precise value of this angle. Shank taper angle should not make contact with the work piece.

Total 78 models

Unit (mm)

Model Number	Outside Diameter ϕD	Length of Cut l	Shank Taper Angle B_{ta}	Overall Length L	Shank Diameter ϕd	Price (¥)
※ CSS 2001-0015	0.1	0.15	16°	45	4	7,800
※ CSS 2001-0020		0.2		45	4	7,800
※ CSS 2001-0030		0.3		45	4	7,800
※ CSS 2002-0030	0.2	0.3	16°	45	4	4,680
※ CSS 2002-0040-3		0.4		38	3	4,680
※ CSS 2002-0040-4		0.4		45	4	4,680
※ CSS 2002-0050		0.5		45	4	4,680
※ CSS 2002-0060	0.3	0.6	16°	45	4	4,680
※ CSS 2003-0045		0.45		45	4	4,080
※ CSS 2003-0060-3		0.6		38	3	4,080
※ CSS 2003-0060-4		0.6		45	4	4,080
※ CSS 2003-0075		0.75		45	4	4,080
※ CSS 2003-0090	0.4	0.9	16°	45	4	4,080
※ CSS 2004-0060		0.6		45	4	4,560
※ CSS 2004-0080-3		0.8		38	3	4,560
※ CSS 2004-0080-4		0.8		45	4	4,560
※ CSS 2004-0100		1		45	4	4,560
※ CSS 2004-0120		1.2		45	4	4,560
※ CSS 2005-0075	0.5	0.75	16°	45	4	2,280
※ CSS 2005-0080		0.8		38	3	2,280
※ CSS 2005-0100		1		45	4	2,280
※ CSS 2005-0125		1.25		45	4	2,280
※ CSS 2005-0150	0.6	1.5	16°	45	4	2,280
※ CSS 2006-0090		0.9		45	4	3,480
※ CSS 2006-0100		1		38	3	3,480
※ CSS 2006-0120		1.2		45	4	3,480
※ CSS 2006-0150		1.5		45	4	3,480
※ CSS 2006-0180	0.7	1.8	16°	45	4	3,480
※ CSS 2007-0100		1		38	3	3,840
※ CSS 2007-0140		1.4		45	4	3,840
※ CSS 2007-0175		1.75		45	4	3,840
※ CSS 2007-0210	0.8	2.1	16°	45	4	3,840
※ CSS 2008-0120-3		1.2		38	3	2,280
※ CSS 2008-0120-4		1.2		45	4	2,280

※Additional model

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Model Number	Outside Diameter ϕD	Length of Cut ℓ	Shank Taper Angle Bta	Overall Length L	Shank Diameter ϕd	Price (¥)
※ CSS 2008-0160	0.8	1.6	16°	45	4	2,280
※ CSS 2008-0200		2		45	4	2,280
※ CSS 2008-0240		2.4		45	4	2,280
※ CSS 2009-0120	0.9	1.2	16°	38	3	3,840
※ CSS 2009-0180		1.8		45	4	3,840
※ CSS 2009-0225		2.25		45	4	3,840
※ CSS 2009-0270	1	2.7	16°	45	4	3,840
※ CSS 2010-0150		1.5		45	4	2,040
※ CSS 2010-0200		2		45	4	2,040
※ CSS 2010-0250	1.5	2.5	16°	45	4	2,040
※ CSS 2010-0300		3		45	4	2,040
※ CSS 2015-0225		2.25		45	4	2,040
※ CSS 2015-0300	2	3	16°	45	4	2,040
※ CSS 2015-0375		3.75		45	4	2,040
※ CSS 2015-0450		4.5		45	4	2,040
※ CSS 2020-0300	3	3	16°	45	4	2,040
※ CSS 2020-0400		4		45	4	2,040
※ CSS 2020-0500		5		45	4	2,040
※ CSS 2020-0600	4	6	16°	45	4	2,040
※ CSS 2030-0450		4.5		50	6	2,640
※ CSS 2030-0600		6		50	6	2,640
※ CSS 2030-0750	5	7.5	16°	50	6	2,640
※ CSS 2030-0900		9		50	6	2,640
※ CSS 2040-0600		6		50	6	2,880
※ CSS 2040-0800	6	8	16°	50	6	2,880
※ CSS 2040-1000		10		50	6	2,880
※ CSS 2040-1200		12		50	6	2,880
※ CSS 2050-0750	7	7.5	16°	50	6	3,120
※ CSS 2050-1000		10		50	6	3,120
※ CSS 2050-1250		12.5		60	6	3,120
※ CSS 2050-1500	8	15	16°	60	6	3,120
※ CSS 2060-0900		9		50	6	3,360
※ CSS 2060-1200		12		50	6	3,360
※ CSS 2060-1500	9	15	—	60	6	3,360
※ CSS 2060-1800		18		60	6	3,360
※ CSS 2080-1600		16		70	8	6,320
※ CSS 2080-2000	10	20	—	70	8	6,320
※ CSS 2080-2400		24		80	8	6,320
※ CSS 2100-2000		20		70	10	7,580
※ CSS 2100-2500	11	25	—	80	10	7,580
※ CSS 2100-3000		30		80	10	7,580
※ CSS 2120-2400		24		80	12	11,170
※ CSS 2120-3000	12	30	—	80	12	11,170
※ CSS 2120-3600		36		90	12	11,170

Square

Square

Long Neck
Square

Radius

Radius

Long Neck
RadiusBall / Long
Shank BallLong Neck
BallTaper Neck
Ball

Taper

Taper

Spiral
V CutterSpiral
V CutterDrill
Thread MillDrill
Thread Mill

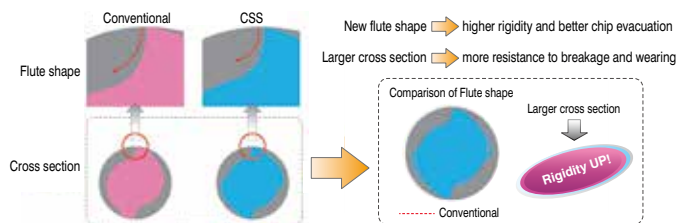
EURO Series

EURO Series

Technical Data

Technical Data

Original Cross Section



Milling Example: STAVAX (53HRC) Slotting Comparison

Tool	$\phi 6 \times 12\text{mm}$ Length of Cut
Spindle Speed	$1,100\text{min}^{-1}$
Feed Rate	40mm/min
Axial Depth	1.8mm
Coolant	Air Blow (Through Spindle)
Cycle Time	28min

CSS

Competitor



Milling Conditions for CSS

◆ 1.5D flute length type

WORK MATERIAL			CARBON STEELS S45C / S50C (~225HB)			ALLOY STEELS SK / SCM (225~325HB)			STAINLESS STEELS SUS304 * Use water soluble coolant		
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	
				Slotting	Side Milling		Slotting	Side Milling		Slotting	Side Milling
2010-0150	1	1.5	18,000	100	600	14,500	75	450	14,500	125	500
2015-0225	1.5	2.25	16,000	275	900	13,000	200	600	13,000	135	750
2020-0300	2	3	12,000	275	900	10,000	200	600	10,000	135	750
2030-0450	3	4.5	8,500	475	900	6,800	325	600	6,800	150	750
2040-0600	4	6	7,200	475	675	5,700	325	500	5,700	175	575
2050-0750	5	7.5	6,000	500	750	4,800	350	550	4,800	200	650
2060-0900	6	9	5,000	500	800	4,000	350	600	4,000	200	650
Milling Amount (mm)				$a_p: 1D$	$a_e: \text{All flute}$ $a_e: 0.075D (D \leq 3)$ $a_e: 0.15D (3 < D)$		$a_p: 1D$	$a_e: \text{All flute}$ $a_e: 0.075D (D \leq 3)$ $a_e: 0.15D (3 < D)$		$a_p: 1D$	$a_e: \text{All flute}$ $a_e: 0.05D (D \leq 3)$ $a_e: 0.1D (3 < D)$

WORK MATERIAL			PREHARDENED STEELS HPM / NAK (30~45HRC)			HARDENED STEELS SKD / SKT / STAVAX (45~55HRC)		
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	
				Slotting	Side Milling		Slotting	Side Milling
2010-0150	1	1.5	14,500	60	300	6,550	35	80
2015-0225	1.5	2.25	12,000	160	450	4,400	35	100
2020-0300	2	3	9,000	160	450	3,300	35	115
2030-0450	3	4.5	6,800	260	450	2,200	35	130
2040-0600	4	6	5,100	260	350	1,650	40	150
2050-0750	5	7.5	4,050	260	425	1,300	40	160
2060-0900	6	9	3,300	260	500	1,100	40	180
Milling Amount (mm)				$a_p: 1D$	$a_e: \text{All flute}$ $a_e: 0.05D (D \leq 3)$ $a_e: 0.1D (3 < D)$		$a_p: 0.2D$	$a_e: 1D$ $a_e: 0.045D$

◆ 2D flute length type

WORK MATERIAL			CARBON STEELS S45C / S50C (~225HB)			ALLOY STEELS SK / SCM (225~325HB)			STAINLESS STEELS SUS304 * Use water soluble coolant		
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	
				Slotting	Side Milling		Slotting	Side Milling		Slotting	Side Milling
2010-0200	1	2	18,000	100	600	14,500	75	450	14,500	125	500
2015-0300	1.5	3	16,000	275	900	13,000	200	600	13,000	135	750
2020-0400	2	4	12,000	275	900	10,000	200	600	10,000	135	750
2030-0600	3	6	8,500	475	900	6,800	325	600	6,800	150	750
2040-0800	4	8	7,200	475	675	5,700	325	500	5,700	175	575
2050-1000	5	10	6,000	500	750	4,800	350	550	4,800	200	650
2060-1200	6	12	5,000	500	800	4,000	350	600	4,000	200	650
2080-1600	8	16	3,500	475	700	2,700	350	525	2,400	150	600
2100-2000	10	20	2,300	450	600	1,900	325	450	1,400	100	500
2120-2400	12	24	1,850	425	550	1,550	300	400	1,250	90	450
Milling Amount (mm)				$a_p: 0.8D$	$a_e: 1.5D$ $a_e: 0.09D (D \leq 3)$ $a_e: 0.15D (3 < D)$		$a_p: 0.8D$	$a_e: 1.5D$ $a_e: 0.09D (D \leq 3)$ $a_e: 0.15D (3 < D)$		$a_p: 0.8D$	$a_e: 1.5D$ $a_e: 0.06D (D \leq 3)$ $a_e: 0.1D (3 < D)$

WORK MATERIAL			PREHARDENED STEELS HPM / NAK (30~45HRC)			HARDENED STEELS SKD / SKT / STAVAX (45~55HRC)		
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	
				Slotting	Side Milling		Slotting	Side Milling
2010-0200	1	2	14,500	60	300	6,550	35	80
2015-0300	1.5	3	12,000	160	450	4,400	35	100
2020-0400	2	4	9,000	160	450	3,300	35	115
2030-0600	3	6	6,800	260	450	2,200	35	130
2040-0800	4	8	5,100	260	350	1,650	40	150
2050-1000	5	10	4,050	260	425	1,300	40	160
2060-1200	6	12	3,300	260	500	1,100	40	180
2080-1600	8	16	2,300	235	450	800	40	130
2100-2000	10	20	1,500	225	450	690	40	110
2120-2400	12	24	1,200	210	400	550	40	110
Milling Amount (mm)				$a_p: 0.8D (D \leq 6)$ $a_p: 0.4D (6 < D)$	$a_e: 1.5D$ $a_e: 0.06D (D \leq 3)$ $a_e: 0.1D (3 < D)$		$a_p: 0.15D$	$a_e: 1.5D$ $a_e: 0.045D$

Milling Conditions for CSS

◆ 2.5D flute length type

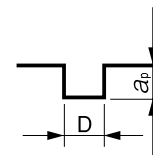
WORK MATERIAL			CARBON STEELS S45C / S50C (~225HB)			ALLOY STEELS SK / SCM (225~325HB)			STAINLESS STEELS SUS304 * Use water soluble coolant		
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	
				Slotting	Side Milling		Slotting	Side Milling		Slotting	Side Milling
2010-0250	1	2.5	20,000	130	700	15,000	60	500	11,000	120	200
2015-0375	1.5	3.75	12,800	170	710	10,000	100	500	7,000	120	210
2020-0500	2	5	9,300	210	720	7,500	140	510	5,000	120	230
2030-0750	3	7.5	5,900	260	730	5,000	180	520	3,200	120	275
2040-1000	4	10	4,200	300	740	3,750	220	520	2,250	120	300
2050-1250	5	12.5	3,200	340	750	3,000	260	530	1,700	120	330
2060-1500	6	15	2,500	380	750	2,500	300	530	1,350	120	350
2080-2000	8	20	2,100	320	660	2,100	250	470	1,000	90	350
2100-2500	10	25	1,800	280	580	1,800	200	410	810	75	350
2120-3000	12	30	1,500	250	520	1,500	160	350	670	65	320
Milling Amount (mm)			$a_p: 0.5D$ $a_e: \text{All flute}$ $a_e: 0.05D (D \leq 3)$ $a_e: 0.1D (3 < D)$			$a_p: 0.5D$ $a_e: \text{All flute}$ $a_e: 0.05D (D \leq 3)$ $a_e: 0.1D (3 < D)$			$a_p: 0.25D$ $a_e: \text{All flute}$ $a_e: 0.05D$		

WORK MATERIAL			PREHARDENED STEELS HPM / NAK (30~45HRC)			HARDENED STEELS SKD / SKT / STAVAX (45~55HRC)								
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)							
				Slotting	Side Milling		Slotting	Side Milling						
2010-0250	1	2.5	11,000	60	200	5,500	20	60						
2015-0375	1.5	3.75	7,500	90	210	3,750	25	65						
2020-0500	2	5	5,700	120	230	2,850	30	70						
2030-0750	3	7.5	3,900	150	250	1,950	35	75						
2040-1000	4	10	2,900	180	270	1,450	40	80						
2050-1250	5	12.5	2,400	210	290	1,200	45	90						
2060-1500	6	15	2,000	240	300	1,000	55	100						
2080-2000	8	20	1,350	220	270	675	55	70						
2100-2500	10	25	960	200	240	480	55	50						
2120-3000	12	30	750	180	200	375	55	40						
Milling Amount (mm)			$a_p: 0.25D (D \leq 6)$ $a_p: \sim 1.5\text{mm}$ $(6 < D)$			$a_p: \text{All flute}$ $a_e: 0.05D (D \leq 3)$ $a_e: 0.075D (3 < D)$			$a_p: 0.05D (D \leq 6)$ $a_p: \sim 0.3\text{mm}$ $(6 < D)$			$a_p: \text{All flute}$ $a_e: 0.05D (D \leq 3)$ $a_e: 0.075D (3 < D)$		

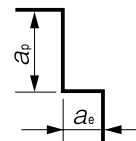
◆ 3D flute length type

WORK MATERIAL			CARBON STEELS S45C / S50C (~225HB)			ALLOY STEELS SK / SCM (225~325HB)			STAINLESS STEELS SUS304 * Use water soluble coolant		
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	
				Slotting	Side Milling		Slotting	Side Milling		Slotting	Side Milling
2010-0300	1	3	20,000	130	700	15,000	60	500	11,000	120	200
2015-0450	1.5	4.5	12,800	170	710	10,000	100	500	7,000	120	210
2020-0600	2	6	9,300	210	720	7,500	140	510	5,000	120	230
2030-0900	3	9	5,900	260	730	5,000	180	520	3,200	120	275
2040-1200	4	12	4,200	300	740	3,750	220	520	2,250	120	300
2050-1500	5	15	3,200	340	750	3,000	260	530	1,700	120	330
2060-1800	6	18	2,500	380	750	2,500	300	530	1,350	120	350
2080-2400	8	24	2,100	320	660	2,100	250	470	1,000	90	350
2100-3000	10	30	1,800	280	580	1,800	200	410	810	75	350
2120-3600	12	36	1,500	250	520	1,500	160	350	670	65	320
Milling Amount (mm)			$a_p: 0.5D$ $a_e: \text{All flute}$ $a_e: 0.05D (D \leq 3)$ $a_e: 0.1D (3 < D)$			$a_p: 0.5D$ $a_e: \text{All flute}$ $a_e: 0.05D (D \leq 3)$ $a_e: 0.1D (3 < D)$			$a_p: 0.25D$ $a_e: \text{All flute}$ $a_e: 0.05D$		

WORK MATERIAL			PREHARDENED STEELS HPM / NAK (30~45HRC)			HARDENED STEELS SKD / SKT / STAVAX (45~55HRC)								
Model Number	Outside Diameter (mm)	Length of Cut (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)		Spindle Speed (min ⁻¹)	Feed Rate (mm/min)							
				Slotting	Side Milling		Slotting	Side Milling						
2010-0300	1	3	11,000	60	200	5,500	15	60						
2015-0450	1.5	4.5	7,500	90	210	3,750	20	65						
2020-0600	2	6	5,700	120	230	2,850	25	70						
2030-0900	3	9	3,900	150	250	1,950	35	75						
2040-1200	4	12	2,900	180	270	1,450	40	80						
2050-1500	5	15	2,400	210	290	1,200	45	90						
2060-1800	6	18	2,000	240	300	1,000	55	100						
2080-2400	8	24	1,350	220	270	675	55	70						
2100-3000	10	30	960	200	240	480	55	50						
2120-3600	12	36	750	180	200	375	55	40						
Milling Amount (mm)			$a_p: 0.25D (D \leq 6)$ $a_p: \sim 1.5\text{mm}$ $(6 < D)$			$a_p: \text{All flute}$ $a_e: 0.05D (D \leq 3)$ $a_e: 0.075D (3 < D)$			$a_p: 0.05D (D \leq 6)$ $a_p: \sim 0.3\text{mm}$ $(6 < D)$			$a_p: \text{All flute}$ $a_e: 0.05D (D \leq 3)$ $a_e: 0.075D (3 < D)$		



Slotting
 a_p : Axial Depth (mm)
 D : Outside Diameter (mm)



Side Milling
 a_p : Axial Depth (mm)
 a_e : Radial Depth (mm)

Note:

- Decrease both spindle speed and feed rate proportionally in case of chattering.
- These milling parameters are calculated based on the shortest overhang length. Longer overhangs may require an adjustment to the milling parameters.
- Reduce the milling amount and feed rate in accordance with required milling precision.
- Recommend water soluble or oil coolant.
- Recommend oil coolant for Titanium Alloys and Heat Resistant Alloys.

Square

Square
Long Neck
Square

Radius

Radius
Long Neck
RadiusBall / Long
Shank BallLong Neck
BallTaper Neck
Ball

Taper

Spiral
V CutterDrill
Thread Mill

EURO Series

Technical Data