



Size  $\phi 0.2 \sim \phi 12$

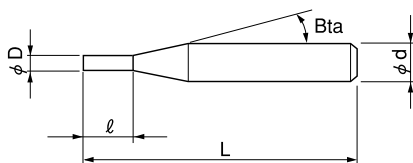
# C-CES2000S



Material Applications (☆ Highly Recommended ○ Recommended ○ Suggested)

Work Material															
Carbon Steels S45C S55C	Alloy Steels SK / SCM SUS	Prehardened Steels NAK HPM	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										
○	○	○	○			○			○			○	○		

**Features** 2 flute C-CES with a sharp corner design.  
 Broad application range from Carbon Steels up to Hardened Steels (55HRC).  
 Excellent performance/quality to price ratio.  
 Refer to page 98 for 4 flute C-CES-S.



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 35 models

Unit (mm)

Model Number	Outside Diameter $\phi D$	Length of Cut $l$	Shank Taper Angle $Bta$	Overall Length $L$	Shank Diameter $\phi d$	Price (¥)
C-CES 2002-0030S	0.2	0.3	16°	45	4	4,680
C-CES 2002-0060S		0.6		45	4	4,680
C-CES 2003-0045S	0.3	0.45	16°	45	4	4,080
C-CES 2003-0090S		0.9		45	4	4,080
C-CES 2004-0060S	0.4	0.6	16°	45	4	4,560
C-CES 2004-0120S		1.2		45	4	4,560
C-CES 2005-0075S	0.5	0.75	16°	45	4	2,280
C-CES 2005-0150S		1.5		45	4	2,280
C-CES 2006-0090S	0.6	0.9	16°	45	4	3,480
C-CES 2007-0105S	0.7	1.05	16°	45	4	3,840
C-CES 2008-0120S	0.8	1.2	16°	45	4	2,280
C-CES 2008-0240S		2.4		45	4	2,280
C-CES 2009-0135S	0.9	1.35	16°	45	4	3,840
C-CES 2010-0150S	1	1.5	16°	45	4	2,040
C-CES 2010-0300S		3		45	4	2,040
C-CES 2012-0180S		1.8		45	4	2,280
C-CES 2012-0360S	1.2	3.6	16°	45	4	2,280

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Unit (mm)

Model Number	Outside Diameter $\phi D$	Length of Cut $\ell$	Shank Taper Angle $\beta$	Overall Length L	Shank Diameter $\phi d$	Price (¥)
C-CES 2015-0225S	1.5	2.25	16°	45	4	2,040
C-CES 2015-0450S		4.5		45	4	2,040
C-CES 2018-0270S	1.8	2.7	16°	45	4	2,280
C-CES 2018-0540S		5.4		45	4	2,280
C-CES 2020-0300S	2	3	16°	45	4	2,040
C-CES 2020-0600S		6		45	4	2,040
C-CES 2025-0375S	2.5	3.75	16°	45	4	2,040
C-CES 2030-0450S	3	4.5	16°	45	6	2,640
C-CES 2030-0900S		9		45	6	2,640
C-CES 2040-0600S	4	6	16°	50	6	2,880
C-CES 2040-1200S		12		50	6	2,880
C-CES 2050-0750S	5	7.5	16°	50	6	3,120
C-CES 2050-1500S		15		50	6	3,120
C-CES 2060-0900S	6	9	—	50	6	3,360
C-CES 2060-1800S		18		50	6	3,360
C-CES 2080-2400S	8	24	—	80	8	6,320
C-CES 2100-3000S	10	30	—	80	10	7,580
C-CES 2120-3600S	12	36	—	90	12	11,170

## Milling Conditions for C-CES-S (2 Flutes)

WORK MATERIAL		CARBON STEELS S45C / S50C (~225HB)			ALLOY STEELS SK / SCM / SUS (225~325HB)			PREHARDENED STEELS NAK / SKD (30~45HRC)			HARDENED STEELS SKD11 / 61 / SKT (45~55HRC)		
Model Number	Outside Diameter (mm)	Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)
2002	0.2	27,000	(15~35)	60	27,000	(15~35)	60	24,000	(15~25)	21	24,000	(15~15)	18
2003	0.3	27,000		77	27,000		77	24,000		39	17,600		18
2004	0.4	27,000		84	27,000		84	21,600		42	13,600		18
2005	0.5	27,000		84	26,100		84	17,200		42	10,400		18
2006	0.6	27,000		84	21,600		84	14,400		42	8,800		18
2007	0.7	24,750	84	18,900	84	12,400	42	8,000	18				
2008	0.8	21,600	84	17,100	84	11,040	42	7,040	21				
2009	0.9	19,350	(40~60)	88	14,850	(40~45)	84	9,600	(25~30)	46	6,240	(15~20)	21
2010	1	18,000		88	13,500		84	8,800		46	5,680		21
2012	1.2	15,030		91	11,250		84	7,520		46	4,800		21
2015	1.5	12,150		91	9,000		84	6,400		49	4,080		25
2018	1.8	10,350		91	7,920		84	5,600		49	3,520		25
2020	2	9,900	(60~75)	91	7,650	(50~60)	84	5,120	(30~35)	49	3,200	(20~25)	28
2025	2.5	7,920		137	6,300		95	4,000		49	2,560		28
2030	3	6,660		137	5,760		102	3,600		56	2,240		32
2040	4	5,310		161	4,500		133	2,800		63	1,720		35
2050	5	4,770		217	3,780		161	2,360		63	1,480		39
2060	6	3,960		214	3,150		161	1,960		70	1,200		39
2080	8	2,970		203	2,340		161	1,480		67	960		35
2100	10	2,340		193	1,890		158	1,160		67	760		35
2120	12	1,980		193	1,575		158	960		63	640		32

Square

Square  
Long Neck  
Square

Radius

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

Taper

Spiral  
V CutterDrill  
Thread Mill

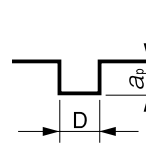
EURO Series

Technical Data

## Milling Conditions for C-CES-S (2 Flutes)

Milling amount for slotting (mm)  
 $D < \phi 1$

Work Material	Length of Cut	
	Less than 2D	Less than 3D
Less than 45HRC	$a_p = 0.1D$	$a_p = 0.05D$
More than 45HRC	$a_p = 0.02D$	$a_p = 0.01D$



$\phi 1 \leq D < \phi 3$

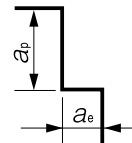
Work Material	Length of Cut	
	Less than 2D	Less than 3D
Less than 45HRC	$a_p = 0.25D$	$a_p = 0.125D$
More than 45HRC	$a_p = 0.05D$	$a_p = 0.02D$

$\phi 3 \leq D$

Work Material	Length of Cut	
	Less than 2D	Less than 3D
Less than 45HRC	$a_p = 0.5D$	$a_p = 0.3D$
More than 45HRC	$a_p = 0.05D$	$a_p = 0.02D$

Milling amount for side milling (mm)

Work Material	Length of Cut	
	Less than 2D	Less than 3D
Less than 45HRC	$a_e = 0.1D$	$a_e = 0.05D$
	$a_p = 1.5D$	$a_p = 2.5D$
More than 45HRC	$a_e = 0.05D$	$a_e = 0.02D$
	$a_p = 1D$	$a_p = 2D$



D : Outside Diameter

Ex.) Less than 2D, Flute Length = Less than Diameter x 2

$a_p$  : Axial Depth (mm)

$a_e$  : Radial Depth (mm)

Note:

- Recommend water soluble or oil coolant.
- Recommend oil coolant for Titanium Alloys and Heat Resistant Alloys.