

Size  $\phi 0.1 \sim \phi 20$

# C-CES2000

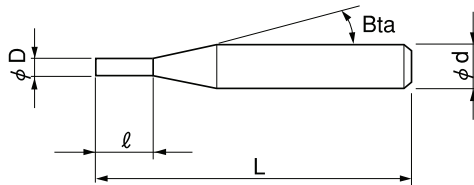


Material Applications (☆ Highly Recommended ○ Recommended ○ Suggested)

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**

Broad application range from Copper and Carbon Steels up to Hardened Steels (55HRC).  
Excellent performance/quality to price ratio.  
Refer to page 156 for 4 flute C-CES.



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 207 models

Unit (mm)

Model Number	Outside Diameter $\phi D$	Length of Cut $\ell$	Shank Taper Angle $Bta$	Overall Length $L$	Shank Diameter $\phi d$	Price $\yen$
C-CES 2001-0015	0.1	0.15	16°	45	4	7,800
C-CES 2001-0020		0.2		45	4	7,800
C-CES 2001-0030		0.3		45	4	7,800
C-CES 2002-0030	0.2	0.3	16°	45	4	4,680
C-CES 2002		0.4		38	3	4,680
C-CES 2002-0040		0.4		45	4	4,680
C-CES 2002-0050		0.5		45	4	4,680
C-CES 2002-0060		0.6		45	4	4,680
C-CES 2002-0080		0.8		45	4	7,930

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Unit (mm)

Model Number	Outside Diameter $\phi D$	Length of Cut $\ell$	Shank Taper Angle $B\alpha$	Overall Length L	Shank Diameter $\phi d$	Price ¥
C-CES 2003-0045	0.3	0.45	16°	45	4	4,080
C-CES 2003		0.6		38	3	4,080
C-CES 2003-0060		0.6		45	4	4,080
C-CES 2003-0075		0.75		45	4	4,080
C-CES 2003-0090		0.9		45	4	4,080
C-CES 2003-0120		1.2		45	4	6,120
C-CES 2004-0060	0.4	0.6	16°	45	4	4,560
C-CES 2004		0.8		38	3	4,560
C-CES 2004-0080		0.8		45	4	4,560
C-CES 2004-0100		1		45	4	4,560
C-CES 2004-0120		1.2		45	4	4,560
C-CES 2004-0160		1.6		45	4	6,120
C-CES 2005-0075	0.5	0.75	16°	45	4	2,280
C-CES 2005		0.8		38	3	2,280
C-CES 2005-0100		1		45	4	2,280
C-CES 2005-0125		1.25		45	4	2,280
C-CES 2005-0150		1.5		45	4	2,280
C-CES 2005-0200		2		45	4	3,840
C-CES 2006-0090	0.6	0.9	16°	45	4	3,480
C-CES 2006		1		38	3	3,480
C-CES 2006-0120		1.2		45	4	3,480
C-CES 2006-0150		1.5		45	4	3,480
C-CES 2006-0180		1.8		45	4	3,480
C-CES 2006-0240		2.4		45	4	3,480
C-CES 2007	0.7	1	16°	38	3	3,840
C-CES 2007-0140		1.4		45	4	3,840
C-CES 2007-0175		1.75		45	4	3,840
C-CES 2007-0210		2.1		45	4	3,840
C-CES 2007-0280		2.8		45	4	3,840
C-CES 2008		0.8		1.2	16°	38
C-CES 2008-0120	1.2		45	4		2,280
C-CES 2008-0160	1.6		45	4		2,280
C-CES 2008-0200	2		45	4		2,280
C-CES 2008-0240	2.4		45	4		2,280
C-CES 2008-0320	3.2		45	4		3,840
C-CES 2009	0.9	1.2	16°	38	3	3,840
C-CES 2009-0180		1.8		45	4	3,840
C-CES 2009-0225		2.25		45	4	3,840
C-CES 2009-0270		2.7		45	4	3,840
C-CES 2009-0360		3.6		45	4	3,840

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UDC Series

Square

Long Neck Square

Radius

Long Neck Radius

Taper Neck Radius

Ball / Long Shank Ball

Long Neck Ball

Taper Neck Ball

Taper

Spiral V Cutter

Drill

EURO Series

Technical Data

Unit (mm)

Model Number	Outside Diameter $\phi D$	Length of Cut $\ell$	Shank Taper Angle Bta	Overall Length L	Shank Diameter $\phi d$	Price ¥
<b>C-CES 2010-0150</b>	1	1.5	16°	45	4	2,040
<b>C-CES 2010-0200</b>		2		45	4	2,040
<b>C-CES 2010</b>		2.5		45	4	2,040
<b>C-CES 2010-0300</b>		3		45	4	2,040
<b>C-CES 2010-0400</b>		4		45	4	3,480
<b>C-CES 2011</b>	1.1	2.5	16°	45	4	4,320
<b>C-CES 2012-0180</b>	1.2	1.8	16°	45	4	2,280
<b>C-CES 2012-0240</b>		2.4		45	4	2,280
<b>C-CES 2012-0300</b>		3		45	4	2,280
<b>C-CES 2012-0360</b>		3.6		45	4	2,280
<b>C-CES 2012</b>		4		45	4	2,280
<b>C-CES 2012-0480</b>		4.8		45	4	3,480
<b>C-CES 2013</b>	1.3	4	16°	45	4	4,320
<b>C-CES 2014</b>	1.4	4	16°	45	4	4,320
<b>C-CES 2015-0225</b>	1.5	2.25	16°	45	4	2,040
<b>C-CES 2015-0300</b>		3		45	4	2,040
<b>C-CES 2015-0375</b>		3.75		45	4	2,040
<b>C-CES 2015</b>		4		45	4	2,040
<b>C-CES 2015-0450</b>		4.5		45	4	2,040
<b>C-CES 2015-0600</b>		6		45	4	3,480
<b>C-CES 2016</b>	1.6	5	16°	45	4	4,320
<b>C-CES 2017</b>	1.7	5	16°	45	4	4,320
<b>C-CES 2018-0270</b>	1.8	2.7	16°	45	4	2,280
<b>C-CES 2018-0360</b>		3.6		45	4	2,280
<b>C-CES 2018-0450</b>		4.5		45	4	2,280
<b>C-CES 2018</b>		5		45	4	2,280
<b>C-CES 2018-0540</b>		5.4		45	4	2,280
<b>C-CES 2018-0720</b>		7.2		45	4	4,200
<b>C-CES 2019</b>	1.9	5	16°	45	4	4,440
<b>C-CES 2020-0300</b>	2	3	16°	45	4	2,040
<b>C-CES 2020-0400</b>		4		45	4	2,040
<b>C-CES 2020-0500</b>		5		45	4	2,040
<b>C-CES 2020</b>		6		45	4	2,040
<b>C-CES 2020-0800</b>		8		45	4	3,480
<b>C-CES 2021</b>	2.1	6	16°	45	4	4,320
<b>C-CES 2022</b>	2.2	6	16°	45	4	4,320
<b>C-CES 2023</b>	2.3	6	16°	45	4	4,320
<b>C-CES 2024</b>	2.4	8	16°	45	4	4,320

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Unit (mm)

Model Number	Outside Diameter $\phi D$	Length of Cut $\ell$	Shank Taper Angle $B\alpha$	Overall Length L	Shank Diameter $\phi d$	Price ¥
C-CES 2025-0375	2.5	3.75	16°	45	4	2,040
C-CES 2025-0500		5		45	4	2,040
C-CES 2025-0625		6.25		45	4	2,040
C-CES 2025-0750		7.5		45	4	2,040
C-CES 2025		8		45	4	2,040
C-CES 2025-1000		10		50	4	3,480
C-CES 2026	2.6	8	16°	45	6	5,520
C-CES 2027	2.7	8	16°	45	6	5,520
C-CES 2028	2.8	8	16°	45	6	5,520
C-CES 2029	2.9	8	16°	45	6	5,520
C-CES 2030-0450	3	4.5	16°	45	6	2,640
C-CES 2030-0600		6		45	6	2,640
C-CES 2030-0750		7.5		45	6	2,640
C-CES 2030		8		45	6	2,640
C-CES 2030-0900		9		45	6	2,640
C-CES 2030-1200		12		50	6	4,320
C-CES 2031	3.1	10	16°	45	6	5,760
C-CES 2032	3.2	10	16°	45	6	5,760
C-CES 2033	3.3	10	16°	45	6	5,760
C-CES 2034	3.4	10	16°	45	6	5,760
C-CES 2035	3.5	10	16°	45	6	4,680
C-CES 2036	3.6	10	16°	45	6	5,760
C-CES 2037	3.7	10	16°	45	6	5,760
C-CES 2038	3.8	11	16°	45	6	5,760
C-CES 2039	3.9	11	16°	45	6	5,760
C-CES 2040-0600	4	6	16°	50	6	2,880
C-CES 2040-0800		8		50	6	2,880
C-CES 2040-1000		10		50	6	2,880
C-CES 2040		11		45	6	2,880
C-CES 2040-1200		12		50	6	2,880
C-CES 2040-1600		16		60	6	4,680
C-CES 2041	4.1	11	16°	45	6	5,760
C-CES 2042	4.2	11	16°	45	6	5,760
C-CES 2043	4.3	11	16°	45	6	5,760
C-CES 2044	4.4	11	16°	45	6	5,760
C-CES 2045	4.5	11	16°	45	6	5,400
C-CES 2046	4.6	11	16°	45	6	6,600
C-CES 2047	4.7	11	16°	45	6	6,600
C-CES 2048	4.8	13	16°	50	6	6,600
C-CES 2049	4.9	13	16°	50	6	6,600

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UDC Series

Square  
Long Neck SquareRadius  
Long Neck Radius  
Taper Neck RadiusBall / Long Shank Ball  
Long Neck Ball  
Taper Neck BallTaper  
Taper

Spiral V Cutter

Drill

EURO Series

Technical Data

Unit (mm)

Model Number	Outside Diameter $\phi D$	Length of Cut $\ell$	Shank Taper Angle Bta	Overall Length L	Shank Diameter $\phi d$	Price ¥
<b>C-CES 2050-0750</b>	5	7.5	16°	50	6	3,120
<b>C-CES 2050-1000</b>		10		50	6	3,120
<b>C-CES 2050-1250</b>		12.5		50	6	3,120
<b>C-CES 2050</b>		13		50	6	3,120
<b>C-CES 2050-1500</b>		15		50	6	3,120
<b>C-CES 2050-2000</b>		20		60	6	5,280
<b>C-CES 2051</b>	5.1	13	16°	50	6	6,600
<b>C-CES 2052</b>	5.2	13	16°	50	6	6,600
<b>C-CES 2053</b>	5.3	13	16°	50	6	6,600
<b>C-CES 2054</b>	5.4	13	16°	50	6	6,600
<b>C-CES 2055</b>	5.5	13	16°	50	6	5,640
<b>C-CES 2056</b>	5.6	13	16°	50	6	5,640
<b>C-CES 2057</b>	5.7	13	16°	50	6	5,640
<b>C-CES 2058</b>	5.8	13	16°	50	6	5,640
<b>C-CES 2059</b>	5.9	13	16°	50	6	5,640
<b>C-CES 2060-0900</b>	6	9	—	50	6	3,360
<b>C-CES 2060-1200</b>		12		50	6	3,360
<b>C-CES 2060</b>		13		50	6	3,360
<b>C-CES 2060-1500</b>		15		50	6	3,360
<b>C-CES 2060-1800</b>		18		50	6	3,360
<b>C-CES 2060-2400</b>		24		60	6	5,400
<b>C-CES 2061</b>	6.1	16	16°	60	8	10,340
<b>C-CES 2062</b>	6.2	16	16°	60	8	10,340
<b>C-CES 2063</b>	6.3	16	16°	60	8	10,340
<b>C-CES 2064</b>	6.4	16	16°	60	8	10,340
<b>C-CES 2065</b>	6.5	16	16°	60	8	9,280
<b>C-CES 2066</b>	6.6	16	16°	60	8	10,340
<b>C-CES 2067</b>	6.7	16	16°	60	8	10,340
<b>C-CES 2068</b>	6.8	16	16°	60	8	10,340
<b>C-CES 2069</b>	6.9	16	16°	60	8	10,340
<b>C-CES 2070</b>	7	16	16°	60	8	8,700
<b>C-CES 2071</b>	7.1	16	16°	60	8	10,340
<b>C-CES 2072</b>	7.2	16	16°	60	8	10,340
<b>C-CES 2073</b>	7.3	16	16°	60	8	10,340
<b>C-CES 2074</b>	7.4	16	16°	60	8	10,340
<b>C-CES 2075</b>	7.5	16	16°	60	8	10,360
<b>C-CES 2076</b>	7.6	19	16°	60	8	11,550
<b>C-CES 2077</b>	7.7	19	16°	60	8	11,550
<b>C-CES 2078</b>	7.8	19	16°	60	8	11,550
<b>C-CES 2079</b>	7.9	19	16°	60	8	11,550

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Unit (mm)

Model Number	Outside Diameter $\phi D$	Length of Cut $\ell$	Shank Taper Angle $B\alpha$	Overall Length L	Shank Diameter $\phi d$	Price ¥
C-CES 2080-1600	8	16	—	60	8	6,320
C-CES 2080		19		60	8	6,320
C-CES 2080-2000		20		60	8	6,320
C-CES 2080-2400		24		80	8	6,320
C-CES 2080-3200		32		80	8	11,520
C-CES 2081	8.1	19	16°	70	10	13,860
C-CES 2082	8.2	19	16°	70	10	13,860
C-CES 2083	8.3	19	16°	70	10	13,860
C-CES 2084	8.4	19	16°	70	10	13,860
C-CES 2085	8.5	19	16°	70	10	12,420
C-CES 2086	8.6	19	16°	70	10	13,860
C-CES 2087	8.7	19	16°	70	10	13,860
C-CES 2088	8.8	19	16°	70	10	13,860
C-CES 2089	8.9	19	16°	70	10	13,860
C-CES 2090	9	19	16°	70	10	12,420
C-CES 2091	9.1	19	16°	70	10	13,860
C-CES 2092	9.2	19	16°	70	10	13,860
C-CES 2093	9.3	19	16°	70	10	13,860
C-CES 2094	9.4	19	16°	70	10	13,860
C-CES 2095	9.5	19	16°	70	10	12,870
C-CES 2096	9.6	22	16°	70	10	14,300
C-CES 2097	9.7	22	16°	70	10	14,300
C-CES 2098	9.8	22	16°	70	10	14,300
C-CES 2099	9.9	22	16°	70	10	14,300
C-CES 2100-2000	10	20	—	70	10	7,580
C-CES 2100		22		70	10	7,580
C-CES 2100-2500		25		70	10	7,580
C-CES 2100-3000		30		80	10	7,580
C-CES 2100-4000		40		90	10	12,600
C-CES 2105	10.5	22	16°	75	12	18,920
C-CES 2110	11	22	16°	75	12	17,160
C-CES 2115	11.5	22	16°	75	12	19,580
C-CES 2120-2400	12	24	—	75	12	11,170
C-CES 2120		26		75	12	11,170
C-CES 2120-3000		30		75	12	11,170
C-CES 2120-3600		36		90	12	11,170
C-CES 2120-4800		48		100	12	22,490
C-CES 2160	16	32	—	110	16	35,530
C-CES 2180	18	32	16°	110	20	55,880
C-CES 2200	20	38	—	110	20	60,500

UDC Series

Square

Square

Long Neck Square

Radius

Radius

Long Neck Radius

Taper Neck Radius

Ball / Long Shank Ball

Ball

Long Neck Ball

Taper Neck Ball

Taper

Taper

Spiral V Cutter

Drill

EURO Series

Technical Data

Milling Conditions for C-CES (2 Flutes)

WORK MATERIAL				CARBON STEELS S45C / S50C (~225HB)						ALLOY STEELS SK / SCM / SUS (225~325HB)					
Model Number	Outside Diameter (mm)	Length of Cut (mm)	L/D	Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Slotting a <sub>p</sub> (mm)	Side Milling a <sub>p</sub> (mm)	Side Milling a <sub>e</sub> (mm)	Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Slotting a <sub>p</sub> (mm)	Side Milling a <sub>p</sub> (mm)	Side Milling a <sub>e</sub> (mm)
2001	0.1	0.15	1.5	30,000	10~20	30	0.01	0.15	0.01	30,000	10~20	30	0.01	0.15	0.01
		0.2	2	30,000		30	0.01	0.15	0.01	30,000		30	0.01	0.15	0.01
		0.3	3	30,000		30	0.05	0.25	0.005	30,000		30	0.05	0.25	0.005
2002	0.2	0.3	1.5	30,000	20~40	85	0.02	0.3	0.02	30,000	20~40	85	0.02	0.3	0.02
		0.4	2	30,000		85	0.02	0.3	0.02	30,000		85	0.02	0.3	0.02
		0.5	2.5	30,000		85	0.014	0.4	0.014	30,000		85	0.014	0.4	0.014
		0.6	3	30,000		85	0.01	0.5	0.01	30,000		85	0.01	0.5	0.01
		0.8	4	30,000		85	0.004	0.7	0.004	30,000		85	0.004	0.7	0.004
		0.45	1.5	30,000		110	0.03	0.45	0.03	30,000		110	0.03	0.45	0.03
2003	0.3	0.6	2	30,000	20~40	110	0.03	0.45	0.03	30,000	20~40	110	0.03	0.45	0.03
		0.75	2.5	30,000		110	0.021	0.6	0.021	30,000		110	0.021	0.6	0.021
		0.9	3	30,000		110	0.015	0.75	0.015	30,000		110	0.015	0.75	0.015
		1.2	4	30,000		110	0.006	1.05	0.006	30,000		110	0.006	1.05	0.006
2004	0.4	0.6	1.5	30,000	20~40	120	0.04	0.6	0.04	30,000	20~40	120	0.04	0.6	0.04
		0.8	2	30,000		120	0.04	0.6	0.04	30,000		120	0.04	0.6	0.04
		1	2.5	30,000		120	0.028	0.8	0.028	30,000		120	0.028	0.8	0.028
		1.2	3	30,000		120	0.02	1	0.02	30,000		120	0.02	1	0.02
		1.6	4	30,000		120	0.008	1.4	0.008	30,000		120	0.008	1.4	0.008
2005	0.5	0.75	1.5	30,000	20~40	120	0.05	0.75	0.05	29,000	20~40	120	0.05	0.75	0.05
		0.8	1.6	30,000		120	0.05	0.75	0.05	29,000		120	0.05	0.75	0.05
		1	2	30,000		120	0.05	0.75	0.05	29,000		120	0.05	0.75	0.05
		1.25	2.5	30,000		120	0.035	1	0.035	29,000		120	0.035	1	0.035
		1.5	3	30,000		120	0.025	1.25	0.025	29,000		120	0.025	1.25	0.025
		2	4	30,000		120	0.01	1.75	0.01	29,000		120	0.01	1.75	0.01
		0.9	1.5	30,000		120	0.06	0.9	0.06	24,000		120	0.06	0.9	0.06
2006	0.6	1	1.7	30,000	20~40	120	0.06	0.9	0.06	24,000	20~40	120	0.06	0.9	0.06
		1.2	2	30,000		120	0.06	0.9	0.06	24,000		120	0.06	0.9	0.06
		1.5	2.5	30,000		120	0.042	1.2	0.042	24,000		120	0.042	1.2	0.042
		1.8	3	30,000		120	0.03	1.5	0.03	24,000		120	0.03	1.5	0.03
		2.4	4	30,000		120	0.012	2.1	0.012	24,000		120	0.012	2.1	0.012
2007	0.7	1	1.4	27,500	20~40	120	0.07	1.05	0.07	21,000	20~40	120	0.07	1.05	0.07
		1.4	2	27,500		120	0.07	1.05	0.07	21,000		120	0.07	1.05	0.07
		1.75	2.5	27,500		120	0.049	1.4	0.049	21,000		120	0.049	1.4	0.049
		2.1	3	27,500		120	0.035	1.75	0.035	21,000		120	0.035	1.75	0.035
		2.8	4	27,500		120	0.014	2.45	0.014	21,000		120	0.014	2.45	0.014
2008	0.8	1.2	1.5	24,000	45~65	120	0.08	1.2	0.08	19,000	45~50	120	0.08	1.2	0.08
		1.6	2	24,000		120	0.08	1.2	0.08	19,000		120	0.08	1.2	0.08
		2	2.5	24,000		120	0.056	1.6	0.056	19,000		120	0.056	1.6	0.056
		2.4	3	24,000		120	0.04	2	0.04	19,000		120	0.04	2	0.04
		3.2	4	24,000		120	0.016	2.8	0.016	19,000		120	0.016	2.8	0.016
2009	0.9	1.2	1.3	21,500	45~65	125	0.09	1.35	0.09	16,500	45~50	120	0.09	1.35	0.09
		1.8	2	21,500		125	0.09	1.35	0.09	16,500		120	0.09	1.35	0.09
		2.25	2.5	21,500		125	0.063	1.8	0.063	16,500		120	0.063	1.8	0.063
		2.7	3	21,500		125	0.045	2.25	0.045	16,500		120	0.045	2.25	0.045
		3.6	4	21,500		125	0.018	3.15	0.018	16,500		120	0.018	3.15	0.018
2010	1	1.5	1.5	20,000	45~65	125	0.25	1.5	0.1	15,000	45~50	120	0.25	1.5	0.1
		2	2	20,000		125	0.25	1.5	0.1	15,000		120	0.25	1.5	0.1
		2.5	2.5	20,000		125	0.2	2	0.07	15,000		120	0.2	2	0.07
		3	3	20,000		125	0.125	2.5	0.05	15,000		120	0.125	2.5	0.05
		4	4	20,000		125	0.075	3.5	0.02	15,000		120	0.075	3.5	0.02
2012	1.2	1.8	1.5	16,700	45~65	130	0.3	1.8	0.12	12,500	45~50	120	0.3	1.8	0.12
		2.4	2	16,700		130	0.3	1.8	0.12	12,500		120	0.3	1.8	0.12
		3	2.5	16,700		130	0.24	2.4	0.084	12,500		120	0.24	2.4	0.084
		3.6	3	16,700		130	0.15	3	0.06	12,500		120	0.15	3	0.06
		4	3.3	16,700		130	0.09	4	0.024	12,500		120	0.09	4	0.024
		4.8	4	16,700		130	0.09	4.2	0.024	12,500		120	0.09	4.2	0.024

- UDC Series
- Square
- Long Neck Square
- Radius
- Long Neck Radius
- Taper Neck Radius
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- Taper Neck Ball
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- Spiral V Cutter
- Drill
- EURO Series
- Technical Data

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

WORK MATERIAL				PREHARDENED STEELS HARDENED STEELS NAK / SKD (30~45HRC)						HARDENED STEELS SKD11 / 61 / SKT (45~55HRC)									
Model Number	Outside Diameter (mm)	Length of Cut (mm)	L/D	Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Slotting	Side Milling		Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Slotting	Side Milling					
							a <sub>p</sub> (mm)	a <sub>p</sub> (mm)	a <sub>e</sub> (mm)				a <sub>p</sub> (mm)	a <sub>p</sub> (mm)	a <sub>e</sub> (mm)				
2001	0.1	0.15	1.5	30,000	10~20	15	0.01	0.15	0.01	30,000	10	10	0.002	0.1	0.005				
		0.2	2	30,000		15	0.01	0.15	0.01	30,000		10	0.002	0.1	0.005				
		0.3	3	30,000		15	0.05	0.25	0.005	30,000		10	0.001	0.2	0.002				
2002	0.2	0.3	1.5	30,000	20~40	30	0.02	0.3	0.02	30,000	20	25	0.004	0.2	0.01				
		0.4	2	30,000		30	0.02	0.3	0.02	30,000		25	0.004	0.2	0.01				
		0.5	2.5	30,000		30	0.014	0.4	0.014	30,000		25	0.004	0.3	0.006				
		0.6	3	30,000		30	0.01	0.5	0.01	30,000		25	0.002	0.4	0.004				
		0.8	4	30,000		30	0.004	0.7	0.004	30,000		25	0.002	0.6	0.002				
2003	0.3	0.45	1.5	30,000		20~40	55	0.03	0.45	0.03		22,000	20	25	0.006	0.3	0.015		
		0.6	2	30,000			55	0.03	0.45	0.03		22,000		25	0.006	0.3	0.015		
		0.75	2.5	30,000			55	0.021	0.6	0.021		22,000		25	0.006	0.45	0.009		
		0.9	3	30,000			55	0.015	0.75	0.015		22,000		25	0.003	0.6	0.006		
2004	0.4	1.2	4	30,000			20~40	55	0.006	1.05		0.006		22,000	20	25	0.003	0.9	0.003
		0.6	1.5	27,000	60			0.04	0.6	0.04	17,000	25		0.008		0.4	0.02		
		0.8	2	27,000	60			0.04	0.6	0.04	17,000	25		0.008		0.4	0.02		
		1	2.5	27,000	60			0.028	0.8	0.028	17,000	25		0.008		0.6	0.012		
2005	0.5	1.2	3	27,000	20~40			60	0.02	1	0.02	17,000		20		25	0.004	0.8	0.008
		1.6	4	27,000				60	0.008	1.4	0.008	17,000				25	0.004	1.2	0.004
		0.75	1.5	21,500		60		0.05	0.75	0.05	13,000	25	0.01			0.5	0.025		
		0.8	1.6	21,500		60		0.05	0.75	0.05	13,000	25	0.01			0.5	0.025		
2006	0.6	1	2	21,500		20~40		60	0.05	0.75	0.05	13,000	20			25	0.01	0.5	0.025
		1.25	2.5	21,500				60	0.035	1	0.035	13,000				25	0.01	0.75	0.015
		1.5	3	21,500			60	0.025	1.25	0.025	13,000	25			0.005	1	0.01		
		2	4	21,500			60	0.01	1.75	0.01	13,000	25			0.005	1.5	0.005		
		0.9	1.5	18,000			60	0.06	0.9	0.06	11,000	25			0.012	0.6	0.03		
		1	1.7	18,000			60	0.06	0.9	0.06	11,000	25			0.012	0.6	0.03		
2007	0.7	1.2	2	18,000	20~40		60	0.06	0.9	0.06	11,000	20		25	0.012	0.6	0.03		
		1.5	2.5	18,000			60	0.042	1.2	0.042	11,000			25	0.012	0.9	0.018		
		1.8	3	18,000			60	0.03	1.5	0.03	11,000			25	0.006	1.2	0.012		
		2.4	4	18,000			60	0.012	2.1	0.012	11,000			25	0.006	1.8	0.006		
		1	1.4	15,500		60	0.07	1.05	0.07	10,000	25		0.014	0.7	0.035				
		1.4	2	15,500		60	0.07	1.05	0.07	10,000	25		0.014	0.7	0.035				
2008	0.8	1.75	2.5	15,500		20~40	60	0.049	1.4	0.049	10,000		20	25	0.014	1.05	0.021		
		2.1	3	15,500			60	0.035	1.75	0.035	10,000			25	0.007	1.4	0.014		
		2.8	4	15,500			60	0.014	2.45	0.014	10,000			25	0.007	2.1	0.007		
		1.2	1.5	13,800			60	0.08	1.2	0.08	8,800			30	0.016	0.8	0.04		
2009	0.9	1.6	2	13,800	20~40		60	0.08	1.2	0.08	8,800	20		30	0.016	0.8	0.04		
		2	2.5	13,800			60	0.056	1.6	0.056	8,800			30	0.016	1.2	0.024		
		2.4	3	13,800			60	0.04	2	0.04	8,800			30	0.008	1.6	0.016		
		3.2	4	13,800			60	0.016	2.8	0.016	8,800			30	0.008	2.4	0.008		
2010	1	1.2	1.3	12,000			20~40	65	0.09	1.35	0.09			7,800	20	30	0.018	0.9	0.045
		1.8	2	12,000				65	0.09	1.35	0.09			7,800		30	0.018	0.9	0.045
		2.25	2.5	12,000		65		0.063	1.8	0.063	7,800		30	0.018		1.35	0.027		
		2.7	3	12,000		65		0.045	2.25	0.045	7,800		30	0.009		1.8	0.018		
		3.6	4	12,000		65		0.018	3.15	0.018	7,800		30	0.009		2.7	0.009		
2011	1.2	1.5	1.5	11,000		20~40		65	0.25	1.5	0.1		7,100	20		30	0.05	1	0.05
		2	2	11,000	65			0.25	1.5	0.1	7,100	30	0.05			1	0.05		
		2.5	2.5	11,000	65			0.2	2	0.07	7,100	30	0.03			1.5	0.03		
		3	3	11,000	65			0.125	2.5	0.05	7,100	30	0.02			2	0.02		
		4	4	11,000	65			0.075	3.5	0.02	7,100	30	0.01			3	0.01		
2012	1.2	1.8	1.5	9,400	20~40		65	0.3	1.8	0.12	6,000	20	30		0.06	1.2	0.06		
		2.4	2	9,400			65	0.3	1.8	0.12	6,000		30		0.06	1.2	0.06		
		3	2.5	9,400			65	0.24	2.4	0.084	6,000		30		0.036	1.8	0.036		
		3.6	3	9,400			65	0.15	3	0.06	6,000		30		0.024	2.4	0.024		
		4	3.3	9,400			65	0.09	4	0.024	6,000		30		0.012	3.6	0.012		
		4.8	4	9,400		65	0.09	4.2	0.024	6,000	30		0.012	3.6	0.012				

UDC Series

Square

Long Neck Square

Radius

Long Neck Radius

Taper Neck Radius

Ball / Long Shank Ball

Long Neck Ball

Taper Neck Ball

Taper

Spiral V Cutter

Drill

EURO Series

Technical Data



Milling Conditions for C-CES (2 Flutes)

WORK MATERIAL				CARBON STEELS S45C / S50C (~225HB)						ALLOY STEELS SK / SCM / SUS (225~325HB)						
Model Number	Outside Diameter (mm)	Length of Cut (mm)	L/D	Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Slotting a <sub>p</sub> (mm)	Side Milling a <sub>p</sub> (mm)	Side Milling a <sub>e</sub> (mm)	Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Slotting a <sub>p</sub> (mm)	Side Milling a <sub>p</sub> (mm)	Side Milling a <sub>e</sub> (mm)	
2015	1.5	2.25	1.5	13,500	45~65	130	0.375	2.25	0.15	10,000	45~50	120	0.375	2.25	0.15	
		3	2	13,500		130	0.375	2.25	0.15	10,000		120	0.375	2.25	0.15	
		3.75	2.5	13,500		130	0.3	3	0.105	10,000		120	0.3	3	0.105	
		4	2.7	13,500		130	0.1875	3.75	0.075	10,000		120	0.1875	3.75	0.075	
		4.5	3	13,500		130	0.1875	3.75	0.075	10,000		120	0.1875	3.75	0.075	
		6	4	13,500		130	0.1125	5.25	0.03	10,000		120	0.1125	5.25	0.03	
	2018	1.8	2.7	1.5		11,500	130	0.45	2.7	0.18		8,800	120	0.45	2.7	0.18
			3.6	2		11,500	130	0.45	2.7	0.18		8,800	120	0.45	2.7	0.18
			4.5	2.5		11,500	130	0.36	3.6	0.126		8,800	120	0.36	3.6	0.126
			5	2.8		11,500	130	0.225	4.5	0.09		8,800	120	0.225	4.5	0.09
			5.4	3		11,500	130	0.225	4.5	0.09		8,800	120	0.225	4.5	0.09
			7.2	4		11,500	130	0.135	6.3	0.036		8,800	120	0.135	6.3	0.036
2020	2	3	1.5	11,000	70~84	130	0.5	3	0.2	8,500	55~65	120	0.5	3	0.2	
		4	2	11,000		130	0.5	3	0.2	8,500		120	0.5	3	0.2	
		5	2.5	11,000		130	0.4	4	0.14	8,500		120	0.4	4	0.14	
		6	3	11,000		130	0.25	5	0.1	8,500		120	0.25	5	0.1	
		8	4	11,000		130	0.15	7	0.04	8,500		120	0.15	7	0.04	
		3.75	1.5	8,800		195	0.625	3.75	0.25	7,000		135	0.625	3.75	0.25	
2025	2.5	5	2	8,800		195	0.625	3.75	0.25	7,000		135	0.625	3.75	0.25	
		6.25	2.5	8,800		195	0.5	5	0.175	7,000		135	0.5	5	0.175	
		7.5	3	8,800		195	0.3125	6.25	0.125	7,000		135	0.3125	6.25	0.125	
		8	3.2	8,800		195	0.1875	8	0.05	7,000		135	0.1875	8	0.05	
		10	4	8,800		195	0.1875	8.75	0.05	7,000		135	0.1875	8.75	0.05	
		4.5	1.5	7,400		195	1.5	4.5	0.3	6,400		145	1.5	4.5	0.3	
2030	3	6	2	7,400	195	1.5	4.5	0.3	6,400	145	1.5	4.5	0.3			
		7.5	2.5	7,400	195	1.2	6	0.21	6,400	145	1.2	6	0.21			
		8	2.7	7,400	195	0.9	7.5	0.15	6,400	145	0.9	7.5	0.15			
		9	3	7,400	195	0.9	7.5	0.15	6,400	145	0.9	7.5	0.15			
		12	4	7,400	195	0.45	10.5	0.06	6,400	145	0.45	10.5	0.06			
		6	1.5	5,900	230	2	6	0.4	5,000	190	2	6	0.4			
2040	4	8	2	5,900	230	2	6	0.4	5,000	190	2	6	0.4			
		10	2.5	5,900	230	1.6	8	0.28	5,000	190	1.6	8	0.28			
		11	2.8	5,900	230	1.2	10	0.2	5,000	190	1.2	10	0.2			
		12	3	5,900	230	1.2	10	0.2	5,000	190	1.2	10	0.2			
		16	4	5,900	230	0.6	14	0.08	5,000	190	0.6	14	0.08			
		7.5	1.5	5,300	310	2.5	7.5	0.5	4,200	230	2.5	7.5	0.5			
2050	5	10	2	5,300	310	2.5	7.5	0.5	4,200	230	2.5	7.5	0.5			
		12.5	2.5	5,300	310	2	10	0.35	4,200	230	2	10	0.35			
		13	2.6	5,300	310	1.5	12.5	0.25	4,200	230	1.5	12.5	0.25			
		15	3	5,300	310	1.5	12.5	0.25	4,200	230	1.5	12.5	0.25			
		20	4	5,300	310	0.75	17.5	0.1	4,200	230	0.75	17.5	0.1			
		9	1.5	4,400	305	3	9	0.6	3,500	230	3	9	0.6			
2060	6	12	2	4,400	305	3	9	0.6	3,500	230	3	9	0.6			
		13	2.2	4,400	305	2.4	12	0.42	3,500	230	2.4	12	0.42			
		15	2.5	4,400	305	2.4	15	0.42	3,500	230	2.4	12	0.42			
		18	3	4,400	305	1.8	15	0.3	3,500	230	1.8	15	0.3			
		24	4	4,400	305	0.9	21	0.12	3,500	230	0.9	21	0.12			
		16	2	3,300	290	4	12	0.8	2,600	230	4	12	0.8			
2080	8	19	2.4	3,300	290	3.2	16	0.56	2,600	230	3.2	16	0.56			
		20	2.5	3,300	290	3.2	16	0.56	2,600	230	3.2	16	0.56			
		24	3	3,300	290	2.4	20	0.4	2,600	230	2.4	20	0.4			
		32	4	3,300	290	1.2	28	0.16	2,600	230	1.2	28	0.16			
		20	2	2,600	275	5	15	1	2,100	225	5	15	1			
		2100	10	22	2.2	2,600	275	4	20	0.7	2,100	225	4	20	0.7	
25	2.5			2,600	275	4	20	0.7	2,100	225	4	20	0.7			
30	3			2,600	275	3	25	0.5	2,100	225	3	25	0.5			
40	4			2,600	275	1.5	35	0.2	2,100	225	1.5	35	0.2			
24	2			2,200	275	6	18	1.2	1,750	225	6	18	1.2			
2120	12			26	2.2	2,200	275	4.8	24	0.84	1,750	225	4.8	24	0.84	
		30	2.5	2,200	275	4.8	24	0.84	1,750	225	4.8	24	0.84			
		36	3	2,200	275	3.6	30	0.6	1,750	225	3.6	30	0.6			
		48	4	2,200	275	1.8	42	0.24	1,750	225	1.8	42	0.24			

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

WORK MATERIAL				PREHARDENED STEELS HARDENED STEELS NAK / SKD (30~45HRC)						HARDENED STEELS SKD11 / 61 / SKT (45~55HRC)							
Model Number	Outside Diameter (mm)	Length of Cut (mm)	L/D	Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Slotting			Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Side Milling				
							a <sub>p</sub> (mm)	a <sub>p</sub> (mm)	a <sub>e</sub> (mm)				a <sub>p</sub> (mm)	a <sub>p</sub> (mm)	a <sub>e</sub> (mm)		
2015	1.5	2.25	1.5	8,000	35~40	70	0.375	2.25	0.15	5,100	20~25	35	0.075	1.5	0.075		
		3	2	8,000		70	0.375	2.25	0.15	5,100		35	0.075	1.5	0.075		
		3.75	2.5	8,000		70	0.3	3	0.105	5,100		35	0.045	2.25	0.045		
		4	2.7	8,000		70	0.1875	3.75	0.075	5,100		35	0.03	3	0.03		
		4.5	3	8,000		70	0.1875	3.75	0.075	5,100		35	0.03	3	0.03		
		6	4	8,000		70	0.1125	5.25	0.03	5,100		35	0.015	4.5	0.015		
2018	1.8	2.7	1.5	7,000		70	0.45	2.7	0.18	4,400		35	0.09	1.8	0.09		
		3.6	2	7,000		70	0.45	2.7	0.18	4,400		35	0.09	1.8	0.09		
		4.5	2.5	7,000		70	0.36	3.6	0.126	4,400		35	0.054	2.7	0.054		
		5	2.8	7,000		70	0.225	4.5	0.09	4,400		35	0.036	3.6	0.036		
		5.4	3	7,000		70	0.225	4.5	0.09	4,400		35	0.036	3.6	0.036		
		7.2	4	7,000		70	0.135	6.3	0.036	4,400		35	0.018	5.4	0.018		
2020	2	3	1.5	6,400		40~45	70	0.5	3	0.2		4,000	25~30	40	0.1	2	0.1
		4	2	6,400			70	0.5	3	0.2		4,000		40	0.1	2	0.1
		5	2.5	6,400			70	0.4	4	0.14		4,000		40	0.06	3	0.06
		6	3	6,400			70	0.25	5	0.1		4,000		40	0.04	4	0.04
		8	4	6,400			70	0.15	7	0.04		4,000		40	0.02	6	0.02
		3.75	1.5	5,000			70	0.625	3.75	0.25		3,200		40	0.125	2.5	0.125
2025	2.5	5	2	5,000	70		0.625	3.75	0.25	3,200	40	0.125		2.5	0.125		
		6.25	2.5	5,000	70		0.5	5	0.175	3,200	40	0.075		3.75	0.075		
		7.5	3	5,000	70		0.3125	6.25	0.125	3,200	40	0.05		5	0.05		
		8	3.2	5,000	70		0.1875	8	0.05	3,200	40	0.025		7.5	0.025		
		10	4	5,000	70		0.1875	8.75	0.05	3,200	40	0.025		7.5	0.025		
		4.5	1.5	4,500	80		1.5	4.5	0.3	2,800	45	0.15		3	0.15		
2030	3	6	2	4,500	80		1.5	4.5	0.3	2,800	45	0.15		3	0.15		
		7.5	2.5	4,500	80		1.2	6	0.21	2,800	45	0.09		4.5	0.09		
		8	2.7	4,500	80		0.9	7.5	0.15	2,800	45	0.06		6	0.06		
		9	3	4,500	80		0.9	7.5	0.15	2,800	45	0.06		6	0.06		
		12	4	4,500	80		0.45	10.5	0.06	2,800	45	0.03		9	0.03		
		6	1.5	3,500	90		2	6	0.4	2,150	50	0.2		4	0.2		
2040	4	8	2	3,500	90	2	6	0.4	2,150	50	0.2	4	0.2				
		10	2.5	3,500	90	1.6	8	0.28	2,150	50	0.12	6	0.12				
		11	2.8	3,500	90	1.2	10	0.2	2,150	50	0.08	8	0.08				
		12	3	3,500	90	1.2	10	0.2	2,150	50	0.08	8	0.08				
		16	4	3,500	90	0.6	14	0.08	2,150	50	0.04	12	0.04				
		7.5	1.5	2,950	90	2.5	7.5	0.5	1,850	55	0.25	5	0.25				
2050	5	10	2	2,950	90	2.5	7.5	0.5	1,850	55	0.25	5	0.25				
		12.5	2.5	2,950	90	2	10	0.35	1,850	55	0.15	7.5	0.15				
		13	2.6	2,950	90	1.5	12.5	0.25	1,850	55	0.1	10	0.1				
		15	3	2,950	90	1.5	12.5	0.25	1,850	55	0.1	10	0.1				
		20	4	2,950	90	0.75	17.5	0.1	1,850	55	0.05	15	0.05				
		9	1.5	2,450	100	3	9	0.6	1,500	55	0.3	6	0.3				
2060	6	12	2	2,450	100	3	9	0.6	1,500	55	0.3	6	0.3				
		13	2.2	2,450	100	2.4	12	0.42	1,500	55	0.18	9	0.18				
		15	2.5	2,450	100	2.4	12	0.42	1,500	55	0.18	9	0.18				
		18	3	2,450	100	1.8	15	0.3	1,500	55	0.12	12	0.12				
		24	4	2,450	100	0.9	21	0.12	1,500	55	0.06	18	0.06				
		16	2	1,850	95	4	12	0.8	1,200	50	0.4	8	0.4				
2080	8	19	2.4	1,850	95	3.2	16	0.56	1,200	50	0.24	12	0.24				
		20	2.5	1,850	95	3.2	16	0.56	1,200	50	0.24	12	0.24				
		24	3	1,850	95	2.4	20	0.4	1,200	50	0.16	16	0.16				
		32	4	1,850	95	1.2	28	0.16	1,200	50	0.08	24	0.08				
		20	2	1,450	95	5	15	1	950	50	0.5	10	0.5				
		22	2.2	1,450	95	4	20	0.7	950	50	0.3	15	0.3				
2100	10	25	2.5	1,450	95	4	20	0.7	950	50	0.3	15	0.3				
		30	3	1,450	95	3	25	0.5	950	50	0.2	20	0.2				
		40	4	1,450	95	1.5	35	0.2	950	50	0.1	30	0.1				
		24	2	1,200	90	6	18	1.2	800	45	0.6	12	0.6				
2120	12	26	2.2	1,200	90	4.8	24	0.84	800	45	0.36	18	0.36				
		30	2.5	1,200	90	4.8	24	0.84	800	45	0.36	18	0.36				
		36	3	1,200	90	3.6	30	0.6	800	45	0.24	24	0.24				
		48	4	1,200	90	1.8	42	0.24	800	45	0.12	36	0.12				

UDC Series

Square

Square

Long Neck Square

Radius

Radius

Long Neck Radius

Taper Neck Radius

Ball / Long Shank Ball

Ball

Long Neck Ball

Taper Neck Ball

Taper

Taper

Spiral V Cutter

Drill

EURO Series

Technical Data

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

◆High speed milling

WORK MATERIAL				CARBON STEELS S45C / S50C (~225HB)						ALLOY STEELS SK / SCM / SUS (225~325HB)					
Model Number	Outside Diameter (mm)	Length of Cut (mm)	L/D	Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Slotting			Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Side Milling		
							a <sub>p</sub> (mm)	a <sub>p</sub> (mm)	a <sub>e</sub> (mm)				a <sub>p</sub> (mm)	a <sub>p</sub> (mm)	a <sub>e</sub> (mm)
2030	3	4.5	1.5	30,000	300	790	1.5	4.5	0.3	26,500	250	600	1.5	4.5	0.3
		6	2	30,000		790	1.5	4.5	0.3	26,500		600	1.5	4.5	0.3
		7.5	2.5	30,000		790	1.2	6	0.21	26,500		600	1.2	6	0.21
		8	2.7	30,000		790	0.9	7.5	0.15	26,500		600	0.9	7.5	0.15
		9	3	30,000		790	0.9	7.5	0.15	26,500		600	0.9	7.5	0.15
		12	4	30,000		790	0.45	10.5	0.06	26,500		600	0.45	10.5	0.06
2040	4	6	1.5	23,800		930	2	6	0.4	19,800		750	2	6	0.4
		8	2	23,800		930	2	6	0.4	19,800		750	2	6	0.4
		10	2.5	23,800		930	1.6	8	0.28	19,800		750	1.6	8	0.28
		11	2.8	23,800		930	1.2	10	0.2	19,800		750	1.2	10	0.2
		12	3	23,800		930	1.2	10	0.2	19,800		750	1.2	10	0.2
		16	4	23,800		930	0.6	14	0.08	19,800		750	0.6	14	0.08
2050	5	7.5	1.5	19,000		1,110	2.5	7.5	0.5	15,800		865	2.5	7.5	0.5
		10	2	19,000		1,110	2.5	7.5	0.5	15,800		865	2.5	7.5	0.5
		12.5	2.5	19,000		1,110	2	10	0.35	15,800		865	2	10	0.35
		13	2.6	19,000		1,110	1.5	12.5	0.25	15,800		865	1.5	12.5	0.25
		15	3	19,000		1,110	1.5	12.5	0.25	15,800		865	1.5	12.5	0.25
		20	4	19,000		1,110	0.75	17.5	0.1	15,800		865	0.75	17.5	0.1
2060	6	9	1.5	15,900	1,110	3	9	0.6	13,200	865	3	9	0.6		
		12	2	15,900	1,110	3	9	0.6	13,200	865	3	9	0.6		
		13	2.2	15,900	1,110	2.4	12	0.42	13,200	865	2.4	12	0.42		
		15	2.5	15,900	1,110	2.4	12	0.42	13,200	865	2.4	12	0.42		
		18	3	15,900	1,110	1.8	15	0.3	13,200	865	1.8	15	0.3		
		24	4	15,900	1,110	0.9	21	0.12	13,200	865	0.9	21	0.12		
2080	8	16	2	11,900	1,045	4	12	0.8	9,900	875	4	12	0.8		
		19	2.4	11,900	1,045	3.2	16	0.56	9,900	875	3.2	16	0.56		
		20	2.5	11,900	1,045	3.2	16	0.56	9,900	875	3.2	16	0.56		
		24	3	11,900	1,045	2.4	20	0.4	9,900	875	2.4	20	0.4		
		32	4	11,900	1,045	1.2	28	0.16	9,900	875	1.2	28	0.16		
		20	2	9,500	1,005	5	15	1	7,900	845	5	15	1		
2100	10	22	2.2	9,500	1,005	4	20	0.7	7,900	845	4	20	0.7		
		25	2.5	9,500	1,005	4	20	0.7	7,900	845	4	20	0.7		
		30	3	9,500	1,005	3	25	0.5	7,900	845	3	25	0.5		
		24	2	7,900	1,000	6	18	1.2	6,600	850	6	18	1.2		
2120	12	26	2.2	7,900	1,000	4.8	24	0.84	6,600	850	4.8	24	0.84		
		30	2.5	7,900	1,000	4.8	24	0.84	6,600	850	4.8	24	0.84		
		36	3	7,900	1,000	3.6	30	0.6	6,600	850	3.6	30	0.6		
		48	4	7,900	1,000	1.8	42	0.24	6,600	850	1.8	42	0.24		

- UDC Series
- Square
- Long Neck Square
- Radius
- Long Neck Radius
- Taper Neck Radius
- Ball / Long Shank Ball
- Long Neck Ball
- Taper Neck Ball
- Taper
- Spiral V Cutter
- Drill
- EURO Series
- Technical Data

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

WORK MATERIAL				PREHARDENED STEELS HARDENED STEELS NAK / SKD (30~45HRC)						HARDENED STEELS SKD11 / 61 / SKT (45~55HRC)					
Model Number	Outside Diameter (mm)	Length of Cut (mm)	L/D	Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Slotting			Spindle Speed (min <sup>-1</sup> )	Velocity (m/min)	Feed Rate (mm/min)	Side Milling		
							a <sub>p</sub> (mm)	a <sub>p</sub> (mm)	a <sub>e</sub> (mm)				a <sub>p</sub> (mm)	a <sub>p</sub> (mm)	a <sub>e</sub> (mm)
2030	3	4.5	1.5	21,200	200	375	1.5	4.5	0.3	15,800	150	255	0.15	3	0.15
		6	2	21,200		375	1.5	4.5	0.3			255	0.15	3	0.15
		7.5	2.5	21,200		375	1.2	6	0.21			255	0.09	4.5	0.09
		8	2.7	21,200		375	0.9	7.5	0.15			255	0.06	6	0.06
		9	3	21,200		375	0.9	7.5	0.15			255	0.06	6	0.06
		12	4	21,200		375	0.45	10.5	0.06			255	0.03	9	0.03
2040	4	6	1.5	15,800	200	405	2	6	0.4	11,900	150	275	0.2	4	0.2
		8	2	15,800		405	2	6	0.4			275	0.2	4	0.2
		10	2.5	15,800		405	1.6	8	0.28			275	0.12	6	0.12
		11	2.8	15,800		405	1.2	10	0.2			275	0.08	8	0.08
		12	3	15,800		405	1.2	10	0.2			275	0.08	8	0.08
		16	4	15,800		405	0.6	14	0.08			275	0.04	12	0.04
2050	5	7.5	1.5	12,700	200	385	2.5	7.5	0.5	9,500	150	280	0.25	5	0.25
		10	2	12,700		385	2.5	7.5	0.5			280	0.25	5	0.25
		12.5	2.5	12,700		385	2	10	0.35			280	0.15	7.5	0.15
		13	2.6	12,700		385	1.5	12.5	0.25			280	0.1	10	0.1
		15	3	12,700		385	1.5	12.5	0.25			280	0.1	10	0.1
		20	4	12,700		385	0.75	17.5	0.1			280	0.05	15	0.05
2060	6	9	1.5	10,600	200	435	3	9	0.6	7,900	150	290	0.3	6	0.3
		12	2	10,600		435	3	9	0.6			290	0.3	6	0.3
		13	2.2	10,600		435	2.4	12	0.42			290	0.18	9	0.18
		15	2.5	10,600		435	2.4	12	0.42			290	0.18	9	0.18
		18	3	10,600		435	1.8	15	0.3			290	0.12	12	0.12
		24	4	10,600		435	0.9	21	0.12			290	0.06	18	0.06
2080	8	16	2	7,900	200	405	4	12	0.8	5,900	150	245	0.4	8	0.4
		19	2.4	7,900		405	3.2	16	0.56			245	0.24	12	0.24
		20	2.5	7,900		405	3.2	16	0.56			245	0.24	12	0.24
		24	3	7,900		405	2.4	20	0.4			245	0.16	16	0.16
		32	4	7,900		405	1.2	28	0.16			245	0.08	24	0.08
2100	10	20	2	6,300	200	415	5	15	1	4,700	150	245	0.5	10	0.5
		22	2.2	6,300		415	4	20	0.7			245	0.3	15	0.3
		25	2.5	6,300		415	4	20	0.7			245	0.3	15	0.3
		30	3	6,300		415	3	25	0.5			245	0.2	20	0.2
2120	12	24	2	5,300	200	400	6	18	1.2	3,900	150	219	0.6	12	0.6
		26	2.2	5,300		400	4.8	24	0.84			219	0.36	18	0.36
		30	2.5	5,300		400	4.8	24	0.84			219	0.36	18	0.36
		36	3	5,300		400	3.6	30	0.6			219	0.24	24	0.24
		48	4	5,300		400	1.8	42	0.24			219	0.12	36	0.12

UDC Series

Square

Square

Long Neck Square

Radius

Radius

Long Neck Radius

Taper Neck Radius

Ball / Long Shank Ball

Ball

Long Neck Ball

Taper Neck Ball

Taper

Taper

Spiral V Cutter

Drill

EURO Series

Technical Data

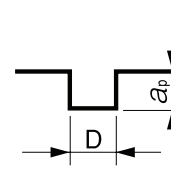
Milling Conditions for C-CES (2 Flutes)

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

Length of Cut Work Material	2D or below	2.5D or below	3D or below	4D or below
	45HRC or below	$a_p=0.1D$	$a_p=0.07D$	$a_p=0.05D$
45HRC or above	$a_p=0.02D$	$a_p=0.02D$	$a_p=0.01D$	$a_p=0.01D$

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

Length of Cut Work Material	2D or below	2.5D or below	3D or below	4D or below
	45HRC or below	$a_p=0.25D$	$a_p=0.2D$	$a_p=0.125D$
45HRC or above	$a_p=0.05D$	$a_p=0.03D$	$a_p=0.02D$	$a_p=0.01D$

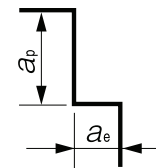


$\phi 3 \leq D$

Length of Cut Work Material	2D or below	2.5D or below	3D or below	4D or below
	45HRC or below	$a_p=0.5D$	$a_p=0.4D$	$a_p=0.3D$
45HRC or above	$a_p=0.05D$	$a_p=0.03D$	$a_p=0.02D$	$a_p=0.01D$

Milling amount for side milling (mm)

Length of Cut Work Material	2D or below	2.5D or below	3D or below	4D or below
	45HRC or below	$a_e=0.1D$ $a_p=1.5D$	$a_e=0.07D$ $a_p=2D$	$a_e=0.05D$ $a_p=2.5D$
45HRC or above	$a_e=0.05D$ $a_p=1D$	$a_e=0.03D$ $a_p=1.5D$	$a_e=0.02D$ $a_p=2D$	$a_e=0.01D$ $a_p=3D$



D : Outside Diameter (mm)

Ex.) 2D or below : Flute Length = Diameter × 2 or below

$a_p$  : 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.

- UDC Series
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- Long Neck Square
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- Long Neck Radius
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