

4 Flutes UTCOAT



Size $\phi 6 \sim \phi 12$

CNRS



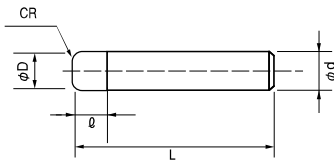
$\phi 6$ $\phi 8 \sim \phi 12$

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
			~50HRC	~55HRC	~60HRC	~65HRC	~70HRC										
●	●	●	●	●				○	○		●			★	★		

Features

4 flute high efficient corner radius designed for Titanium Alloys and Heat Resistant Alloys.
UTCOAT is recommended for heat-resistant hard materials to achieve longer tool life.
Variable pitch, high helix and positive rake angle offer stable milling.
Reduced cutting force when using a helical approach or inclined angles.



Total 12 models

Unit (mm)

Model Number	Outside Diameter ϕD	Corner Radius CR	Length of Cut ℓ	Overall Length L	Shank Diameter ϕd	Suggested Retail Price ¥
CNRS 4060-05-16	6	R0.5	16	90	6	15,000
CNRS 4060-10-16		R1		90	6	15,000
CNRS 4080-05-16	8	R0.5	16	100	8	17,800
CNRS 4080-10-16		R1		100	8	17,800
CNRS 4100-05-26	10	R0.5	26	110	10	21,800
CNRS 4100-10-26		R1		110	10	21,800
CNRS 4100-15-26		R1.5		110	10	21,800
CNRS 4100-20-26		R2		110	10	21,800
CNRS 4120-05-26	12	R0.5	26	120	12	27,700
CNRS 4120-10-26		R1		120	12	27,700
CNRS 4120-15-26		R1.5		120	12	27,700
CNRS 4120-20-26		R2		120	12	27,700

Milling Conditions for CNRS

◆Side Milling

WORK MATERIAL			CARBON STEELS S45C / S50C				ALLOY STEELS SK / SCM				STAINLESS STEELS SUS			
Model Number	Outside Diameter (mm)	Corner Radius (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
4060-05-16	6	R0.5	5,180	1,330	9.6	0.9	4,920	1,330	7.2	0.6	3,520	740	4.8	0.3
4060-10-16		R1	5,180	1,330	9.6	0.9	5,180	1,330	7.2	0.6	3,700	740	4.8	0.3
4080-05-16	8	R0.5	3,920	1,260	12.8	1.2	3,720	1,260	9.6	0.8	2,660	700	6.4	0.4
4080-10-16		R1	3,920	1,260	12.8	1.2	3,920	1,260	9.6	0.8	2,800	700	6.4	0.4
4100-05-26	10	R0.5	2,770	1,225	16	1.5	2,630	1,220	12	1	1,880	680	8	0.5
4100-10-26		R1	2,770	1,225	16	1.5	2,770	1,220	12	1	1,980	680	8	0.5
4100-15-26		R1.5	2,770	1,225	16	1.5	2,930	1,220	12	1	2,090	680	8	0.5
4100-20-26		R2	2,770	1,225	16	1.5	3,080	1,220	12	1	2,200	680	8	0.5
4120-05-26	12	R0.5	2,330	1,170	19.2	1.8	2,210	1,170	14.4	1.2	1,580	650	9.6	0.6
4120-10-26		R1	2,330	1,170	19.2	1.8	2,330	1,170	14.4	1.2	1,670	650	9.6	0.6
4120-15-26		R1.5	2,330	1,170	19.2	1.8	2,470	1,170	14.4	1.2	1,760	650	9.6	0.6
4120-20-26		R2	2,330	1,170	19.2	1.8	2,590	1,170	14.4	1.2	1,850	650	9.6	0.6

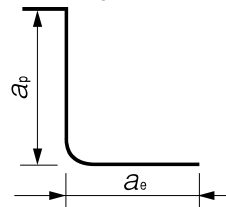
WORK MATERIAL			TITANIUM / TITANIUM ALLOYS Ti-6Al-4V				HEAT RESISTANT ALLOYS Inconel718			
Model Number	Outside Diameter (mm)	Corner Radius (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
4060-05-16	6	R0.5	3,520	740	4.8	0.3	1,710	300	4.8	0.3
4060-10-16		R1	3,700	740	4.8	0.3	1,800	300	4.8	0.3
4080-05-16	8	R0.5	2,660	700	6.4	0.4	1,570	280	6.4	0.4
4080-10-16		R1	2,800	700	6.4	0.4	1,650	280	6.4	0.4
4100-05-26	10	R0.5	1,880	680	8	0.5	1,110	250	8	0.5
4100-10-26		R1	1,980	680	8	0.5	1,170	250	8	0.5
4100-15-26		R1.5	2,090	680	8	0.5	1,240	250	8	0.5
4100-20-26		R2	2,200	680	8	0.5	1,300	250	8	0.5
4120-05-26	12	R0.5	1,580	650	9.6	0.6	940	220	9.6	0.6
4120-10-26		R1	1,670	650	9.6	0.6	990	220	9.6	0.6
4120-15-26		R1.5	1,760	650	9.6	0.6	1,050	220	9.6	0.6
4120-20-26		R2	1,850	650	9.6	0.6	1,100	220	9.6	0.6

Please adjust milling parameters referring following table.

D : $\phi 6 \sim \phi 12$

Overhang Length	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a_p Axial Depth (mm)	a_e Radial Depth (mm)
$\sim D \times 4$	$\times 1$	$\times 1$	$\times 1$	$\times 1$
$\sim D \times 5$	$\times 0.7$	$\times 0.7$	$\times 0.7$	$\times 0.8$
$\sim D \times 6$	$\times 0.5$	$\times 0.5$	$\times 0.6$	$\times 0.7$

Side Milling



4 Flutes

φ3mm Shank
V Series

UDC-PCD
Series

CBN
Series

Square
Square
Long Neck
Square

Radius
Long Neck
Radius
Taper Neck
Radius

Ball / Long
Shank Ball
Long Neck
Ball
Taper Neck
Ball

Taper

Barrel

Spiral
V Cutter

Drill

Technical Data

Milling Conditions for CNRS

◆ Slotting

WORK MATERIAL			CARBON STEELS S45C / S50C			ALLOY STEELS SK / SCM			STAINLESS STEELS SUS		
Model Number	Outside Diameter (mm)	Corner Radius (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p Axial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p Axial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p Axial Depth (mm)
4060-05-16	6	R0.5	2,035	250	6	1,930	360	3	1,760	330	1.5
4060-10-16		R1	2,035	250	6	2,040	360	3	1,850	330	1.5
4080-05-16	8	R0.5	1,550	210	8	1,470	300	4	1,340	270	2
4080-10-16		R1	1,550	210	8	1,550	300	4	1,410	270	2
4100-05-26	10	R0.5	1,260	210	10	1,200	300	5	1,090	270	2.5
4100-10-26		R1	1,260	210	10	1,260	300	5	1,150	270	2.5
4100-15-26		R1.5	1,260	210	10	1,330	300	5	1,210	270	2.5
4100-20-26		R2	1,260	210	10	1,400	300	5	1,270	270	2.5
4120-05-26	12	R0.5	1,020	200	12	970	290	6	880	260	3
4120-10-26		R1	1,020	200	12	1,020	290	6	930	260	3
4120-15-26		R1.5	1,020	200	12	1,080	290	6	980	260	3
4120-20-26		R2	1,020	200	12	1,140	290	6	1,030	260	3

WORK MATERIAL			TITANIUM / TITANIUM ALLOYS Ti-6Al-4V			HEAT RESISTANT ALLOYS Inconel718		
Model Number	Outside Diameter (mm)	Corner Radius (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p Axial Depth (mm)	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p Axial Depth (mm)
4060-05-16	6	R0.5	1,600	300	0.6	810	100	0.6
4060-10-16		R1	1,680	300	0.6	850	100	0.6
4080-05-16	8	R0.5	1,220	250	0.8	620	90	0.8
4080-10-16		R1	1,280	250	0.8	650	90	0.8
4100-05-26	10	R0.5	990	250	1	460	80	1
4100-10-26		R1	1,040	250	1	490	80	1
4100-15-26		R1.5	1,100	250	1	520	80	1
4100-20-26		R2	1,160	250	1	540	80	1
4120-05-26	12	R0.5	800	240	1.2	380	70	1.2
4120-10-26		R1	840	240	1.2	410	70	1.2
4120-15-26		R1.5	890	240	1.2	430	70	1.2
4120-20-26		R2	940	240	1.2	450	70	1.2

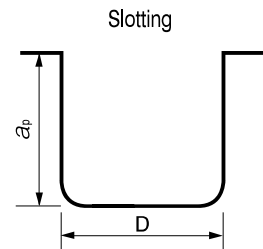
Please adjust milling parameters referring following table.

D : φ 6 ~ φ 12

Overhang Length	Spindle Speed (min ⁻¹)	Feed Rate (mm/min)	a _p Axial Depth (mm)	a _r Radial Depth (mm)
~D×4	×1	×1	×1	×1
~D×5	×0.7	×0.7	×0.7	×0.8
~D×6	×0.5	×0.5	×0.6	×0.7

Note:

- Decrease both spindle speed and feed rate proportionally when the milling parameters exceed the machine's maximum spindle speed.
- Recommend water soluble or oil coolant.



D : Outside Diameter (mm)

- φ3mm Shark V Series
- UDC-PCD Series
- CBN Series
- Square
- Long Neck Square
- Radius
- Long Neck Radius
- Taper Neck Radius
- Ball / Long Shank Ball
- Long Neck Ball
- Taper Neck Ball
- Taper
- Barrel
- Spiral V Cutter
- Drill
- Technical Data

Pocket Milling Example: Milling with CNRS $\phi 10 \times CR2$

Ti6Al-4V (30HRC)

4 Flutes



Stable milling on hard-to-cut materials

Spindle Speed	Feed Rate	a_p	a_e	Overhang Length	Cycle Time	Coolant	Pocket Size
1,820 min ⁻¹ $V_c = 57$ m/min	700 mm/min $f_z = 0.096$ mm/t	0.5 mm	5 mm	45 mm (4.5D)	30 min	Water Soluble (Through Spindle)	70 × 44 × 13 mm

CNRS

Continuous cutting is possible after 60 min milling.

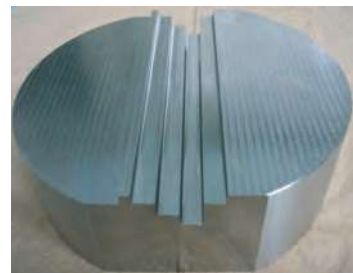
Competitor's Tool

Corner radius is broken after 30min (one pocket) milling.

Slotting Example: Milling with CNRS $\phi 8 \times CR1$

Inconel718 (40HRC)

Milling Process	Roughing		Finishing
	Slotting	Side Milling	
Spindle Speed	576 min ⁻¹ ($V_c = 14.5$ m/min)	1,650 min ⁻¹ ($V_c = 41.5$ m/min)	
Feed Rate	72 mm/min ($f_z = 0.03$ mm/t)	280 mm/min ($f_z = 0.04$ mm/t)	200 mm/min ($f_z = 0.03$ mm/t)
a_p	0.8 mm	6.4 mm	0.1 mm
a_e	—	0.4 mm	0.1 mm
Overhang Length	30 mm (3.75D)		
Coolant	Water Soluble (Nozzle)		
Cycle Time	105 min		10 min



Reduces burrs in step milling process. Offers better surface finish with unique cutting edge.

- Ø3mm Shank V Series
- UDC-PCD Series
- CBN Series
- Square
- Long Neck Square
- Radius
- Radius
- Long Neck Radius
- Taper Neck Radius
- Ball / Long Shank Ball
- Ball
- Long Neck Ball
- Taper Neck Ball
- Taper
- Barrel
- Spiral V Cutter
- Drill
- Technical Data