

THE NEW VALUE FRONTIER



Solid End Mill | **66M Series**

Multi-edge Design / High Efficiency Finishing

66M Series



Multi-edge Design with Large Core Diameter, High Efficiency and Excellent Surface Finish at Shouldering

Multi-edge Type, 7/9/11 Flutes

High Rigidity with Large Core Diameter, Excellent Surface Finish

Applicable to Machining for Stainless Steel, Titanium Alloy



Multi-edge Design / High Efficiency Finishing

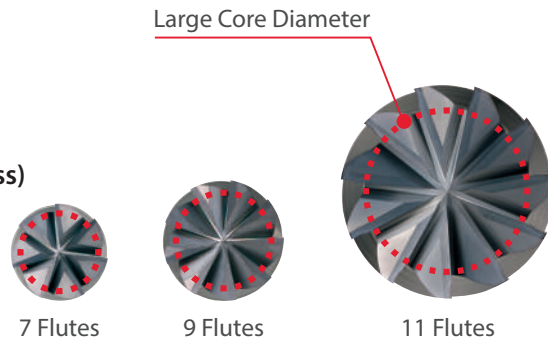
66M Series

High Efficiency Finishing at Shouldering with Multi-edge Type, 7/9/11 Flutes

High Rigidity Diameter, Excellent Surface Finish for Stainless Steel and Titanium Alloy Machining

1 Multi-edge Design, High Efficiency Finishing

Applicable for High Feed Machining, 7/9/11 Flutes
High Efficiency Finishing (Machining with $a_e=0.05D$ or Less)



2 High Quality Surface Finish

High Rigidity with Large Core Diameter
Excellent Surface Finish

Cutting Performance Comparison (In-house Evaluation)

Cutting Conditions : $n = 3,100 \text{ min}^{-1}$, $f_z = 0.065 \text{ mm/t}$, $a_{pxae} = 12 \times 0.6 \text{ mm}$
Cutting Dia. $\phi 12$, Shouldering, Wet, Workpiece : SUS304

66MCR (9 flutes / Radius)

$V_f = 1,815 \text{ mm/min}$

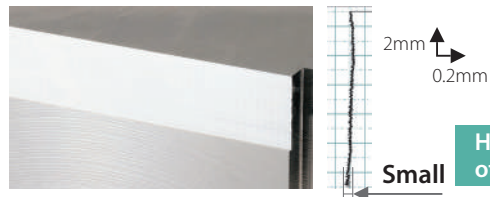
x1.5
Machining Efficiency

Competitor A (Multi-edge Type : 6 Flutes, Radius)

$V_f = 1,210 \text{ mm/min}$

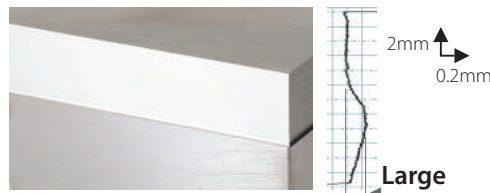
1.5 Times Machining Efficiency (Same Surface Finish)

66MCR



Surface Finish : $0.36 \mu\text{mRa}$

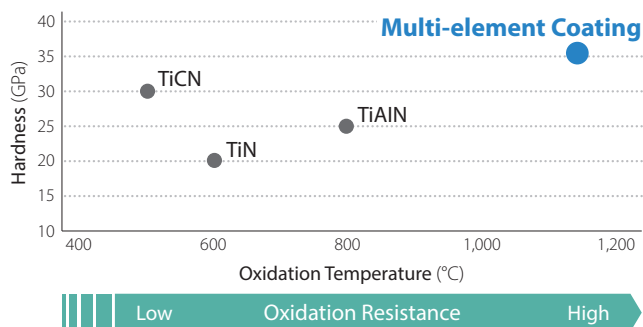
Competitor A



Surface Finish : $0.37 \mu\text{mRa}$

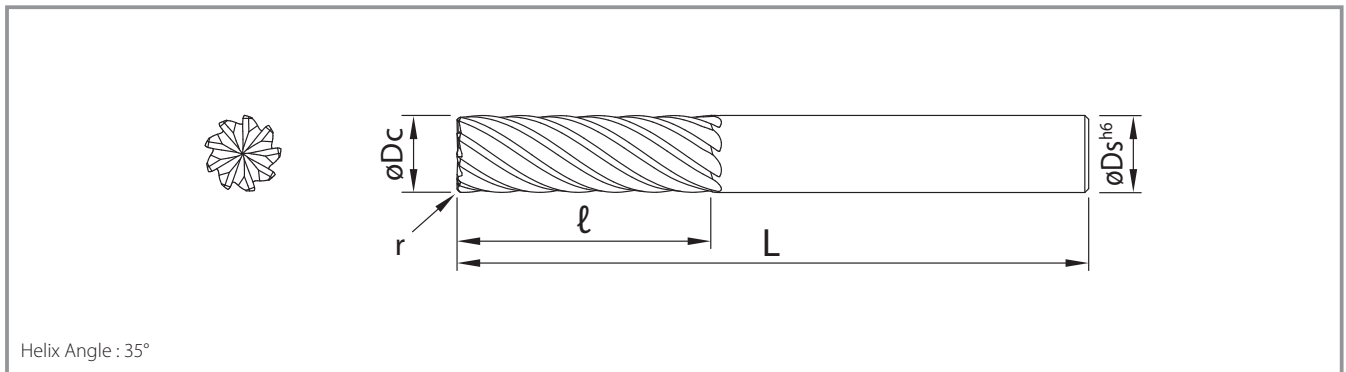
3 Applicable for Variety of Workpieces

Coating Properties (In-house Evaluation)



New Multi-element Coating with Excellent Heat Resistance
Long Tool Life at Stainless Steel and Titanium Alloy Machining

Lineup (Square / Radius)



66M (Square)

(Unit : mm)

Description	*Code	Stock	Outside Dia.	Mill Dia. Tolerance	Length of Cut	Shank Dia.	Overall Length	No. of Inserts
			øDc		ℓ	øDs	L	Z
66M060-190	46620	●	6	0 -0.050	19	6	63	7
66M080-200	46621	●	8	0 -0.050	20	8	63	7
66M100-220	46622	●	10	0 -0.050	22	10	75	7
66M120-260	46623	●	12	0 -0.050	26	12	83	9
66M160-320	46624	●	16	0 -0.050	32	16	92	9
66M200-380	46625	●	20	0 -0.050	38	20	104	11
66M250-380	46626	●	25	0 -0.050	38	25	104	11

*The code is a reference number that is listed on the product. When ordering, please refer to "Description" in the table.

● : Standard Stock

66MCR (Radius)

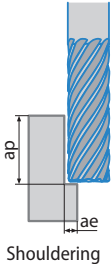
(Unit : mm)

Description	*Code	Stock	Outside Dia.	Mill Dia. Tolerance	Corner Radius	Length of Cut	Shank Dia.	Overall Length	No. of Inserts
			øDc		r	ℓ	øDs	L	Z
66MCR060-190-R05	46627	●	6	0 -0.050	0.5	19	6	63	7
66MCR080-200-R05	46629	●	8	0 -0.050	0.5	20	8	63	7
66MCR100-220-R05	46632	●	10	0 -0.050	0.5	22	10	75	7
66MCR120-260-R10	46636	●	12	0 -0.050	1.0	26	12	83	9
66MCR120-260-R20	46638	●			2.0				
66MCR120-260-R30	46640	●			3.0				
66MCR160-320-R10	46641	●	16	0 -0.050	1.0	32	16	92	9
66MCR160-320-R20	46643	●			2.0				
66MCR160-320-R30	46645	●			3.0				

*The code is a reference number that is listed on the product. When ordering, please refer to "Description" in the table.

● : Standard Stock

Cutting Conditions

Applications	Workpiece	Application	Depth of Cut($a_p \times a_e$)(mm)	Outside Dia.Dc(mm)	$\phi 6$	$\phi 8$	$\phi 10$	$\phi 12$	$\phi 16$	$\phi 20$	$\phi 25$	
	Carbon Steel S45C	Shouldering	1Dc×0.05Dc	Spindle Revolution(min ⁻¹)	10,300	7,700	6,200	5,100	3,800	3,100	2,500	
				Feed Rate(mm/min)	2,070	2,530	2,530	3,320	3,280	3,430	2,840	
				2Dc×0.02Dc (Finishing)	Spindle Revolution(min ⁻¹)	12,300	9,200	7,400	6,200	4,600	3,700	3,000
					Feed Rate(mm/min)	1,990	2,430	2,430	3,190	3,150	3,290	2,730
	Alloy Steel SCM, SNCM	Shouldering	1Dc×0.05Dc	Spindle Revolution(min ⁻¹)	5,800	4,400	3,500	2,900	2,200	1,700	1,400	
				Feed Rate(mm/min)	880	1,110	1,110	1,450	1,460	1,540	1,230	
				2Dc×0.02Dc (Finishing)	Spindle Revolution(min ⁻¹)	7,000	5,200	4,200	3,500	2,600	2,100	1,700
					Feed Rate(mm/min)	840	1,060	1,060	1,390	1,400	1,470	1,180
	Pre-hardened Steel $\leq 40\text{HRC}$	Shouldering	1Dc×0.05Dc	Spindle Revolution(min ⁻¹)	4,700	3,500	2,800	2,300	1,800	1,400	1,100	
				Feed Rate(mm/min)	470	630	630	810	810	870	680	
				2Dc×0.02Dc (Finishing)	Spindle Revolution(min ⁻¹)	5,600	4,200	3,400	2,800	2,100	1,700	1,300
					Feed Rate(mm/min)	450	610	610	780	780	830	650
	Stainless Steel SUS303, SUS416	Shouldering	1Dc×0.05Dc	Spindle Revolution(min ⁻¹)	9,000	6,800	5,400	4,500	3,400	2,700	2,200	
				Feed Rate(mm/min)	1,370	1,720	1,720	2,250	2,270	2,390	1,910	
				2Dc×0.02Dc (Finishing)	Spindle Revolution(min ⁻¹)	7,200	5,400	4,300	3,600	2,700	2,200	1,700
					Feed Rate(mm/min)	880	1,100	1,100	1,440	1,450	1,530	1,220
	Stainless Steel SUS304, SUS316	Shouldering	1Dc×0.05Dc	Spindle Revolution(min ⁻¹)	6,200	4,700	3,700	3,100	2,300	1,900	1,500	
				Feed Rate(mm/min)	730	980	980	1,210	1,240	1,310	1,070	
				2Dc×0.02Dc (Finishing)	Spindle Revolution(min ⁻¹)	7,500	5,600	4,500	3,700	2,800	2,200	1,800
					Feed Rate(mm/min)	700	940	940	1,160	1,190	1,260	1,030
	Stainless Steel 13-8PH, 15-5PH	Shouldering	1Dc×0.05Dc	Spindle Revolution(min ⁻¹)	5,700	4,300	3,400	2,900	2,200	1,700	1,400	
				Feed Rate(mm/min)	670	900	900	1,120	1,140	1,210	980	
				2Dc×0.02Dc (Finishing)	Spindle Revolution(min ⁻¹)	6,900	5,200	4,100	3,400	2,600	2,100	1,700
					Feed Rate(mm/min)	650	860	860	1,070	1,090	1,160	950
	Titanium Alloy Ti-6Al-4V	Shouldering	1Dc×0.05Dc	Spindle Revolution(min ⁻¹)	6,300	4,700	3,800	3,200	2,400	1,900	1,500	
				Feed Rate(mm/min)	850	1,060	1,060	1,430	1,420	1,500	1,210	
				2Dc×0.02Dc (Finishing)	Spindle Revolution(min ⁻¹)	7,600	5,700	4,500	3,800	2,800	2,300	1,800
					Feed Rate(mm/min)	810	1,020	1,020	1,370	1,360	1,440	1,160
Titanium Alloy Ti-10Al-2Fe-3Al	Shouldering	1Dc×0.05Dc	Spindle Revolution(min ⁻¹)	2,300	1,700	1,400	1,100	800	700	500		
			Feed Rate(mm/min)	300	380	380	510	510	540	430		
			2Dc×0.02Dc (Finishing)	Spindle Revolution(min ⁻¹)	2,700	2,000	1,600	1,400	1,000	800	700	
				Feed Rate(mm/min)	290	370	370	490	490	520	420	
Super Alloy Inconel®625	Shouldering	1Dc×0.05Dc	Spindle Revolution(min ⁻¹)	1,700	1,300	1,000	800	600	500	400		
			Feed Rate(mm/min)	200	270	210	330	340	360	290		
			2Dc×0.02Dc (Finishing)	Spindle Revolution(min ⁻¹)	2,000	1,500	1,200	1,000	800	600	500	
				Feed Rate(mm/min)	190	260	260	320	320	340	280	
Super Alloy Inconel®718	Shouldering	1Dc×0.05Dc	Spindle Revolution(min ⁻¹)	1,400	1,000	800	700	500	400	300		
			Feed Rate(mm/min)	120	140	140	160	170	180	150		
			2Dc×0.02Dc (Finishing)	Spindle Revolution(min ⁻¹)	1,600	1,200	1,000	800	600	500	400	
				Feed Rate(mm/min)	110	130	130	160	160	170	140	
Cast Iron FC, FCD $\leq 19\text{HRC}$	Shouldering	1Dc×0.05Dc	Spindle Revolution(min ⁻¹)	11,400	8,500	6,800	5,700	4,300	3,400	2,700		
			Feed Rate(mm/min)	2,300	2,810	2,810	3,690	3,640	3,810	3,160		
			2Dc×0.02Dc (Finishing)	Spindle Revolution(min ⁻¹)	13,700	10,300	8,200	6,800	5,100	4,100	3,300	
				Feed Rate(mm/min)	2,200	2,700	2,690	3,540	3,500	3,660	3,030	
Cast Iron FC, FCD $\leq 26\text{HRC}$	Shouldering	1Dc×0.05Dc	Spindle Revolution(min ⁻¹)	8,700	6,500	5,200	4,400	3,300	2,600	2,100		
			Feed Rate(mm/min)	1,320	1,660	1,660	2,170	2,190	2,300	1,840		
			2Dc×0.02Dc (Finishing)	Spindle Revolution(min ⁻¹)	10,500	7,900	6,300	5,200	3,900	3,100	2,500	
				Feed Rate(mm/min)	1,270	1,600	1,600	2,080	2,100	2,210	1,770	

Water soluble coolant is recommended for stainless steel, titanium alloy, and super alloy. Machining with $a_e=0.05D$ or less

Slotting is not recommended.