

## MUGEN COATING PREMIUM

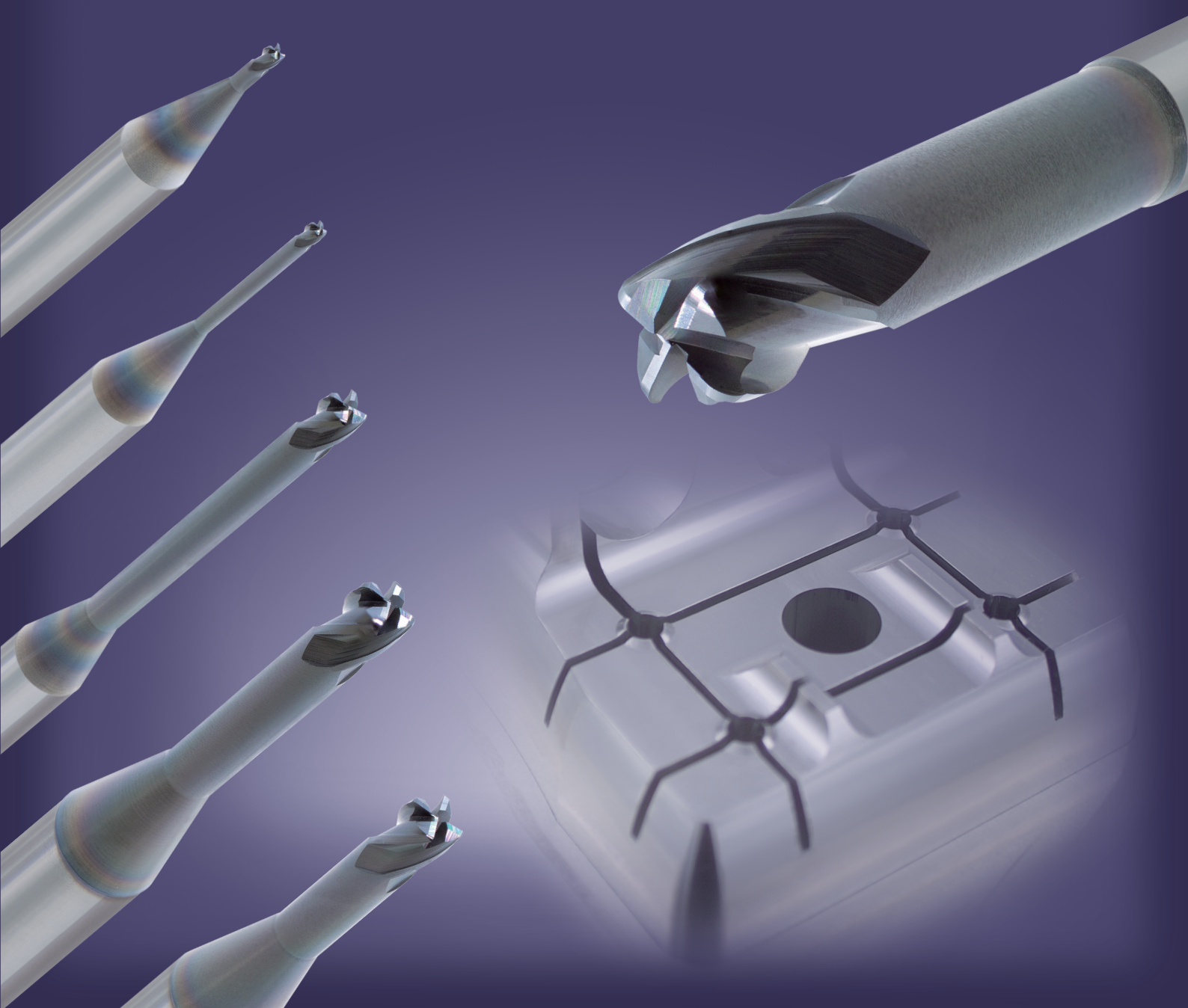
### 4-Flute Long Neck Corner Radius End Mill for Hardened Steel

**MHRH430R**

Lineup Expansion

114 sizes added  
Total 450 sizes

P H



Long neck corner radius end mill supports machining from prehardened steels to hardened steels (~65HRC)  
 Abundant size variations with total 450 sizes

MUGEN COATING PREMIUM  
 4-Flute Long Neck Corner Radius End Mill for Hardened Steel

**MHRH430R** Lineup Expansion


φ 0.1 × R0.01 ~ φ 6 × R1 Total 450 sizes



Features

Feature 1	Coating	Performance of MUGEN COATING PREMIUM
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MUGEN COATING PREMIUM is a further improvement of the conventional MUGEN COATING that dramatically extends tool life during direct milling on hardened steels

It is effective in machining work materials with hardness from 40 to 65 HRC



Feature

2

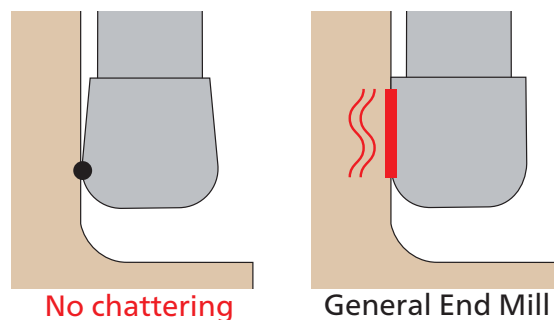
## Cutting edge shape

Peripheral edge with back taper shape • 4-Flute type from  $\phi 0.1$ 

2-1

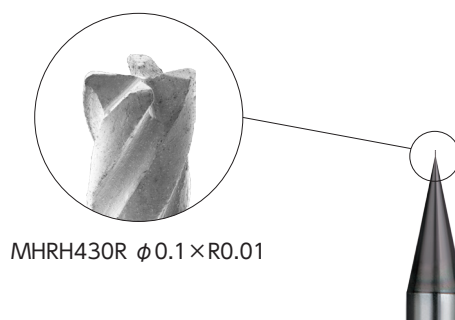
Adopt back taper shape for the peripheral edge to suppress chattering that occurs due to increasing cutting load

The cutting load is reduced by point cutting that realizes stable machining surface



2-2

Even with a very small outer diameter of  $\phi 0.1$  with corner radius R0.01, the 4-flute shape provides a lineup that can support the needs of micro precision machining



Feature

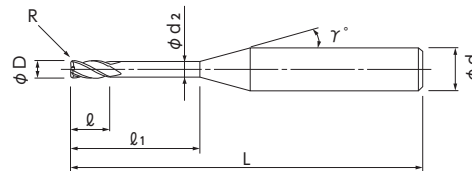
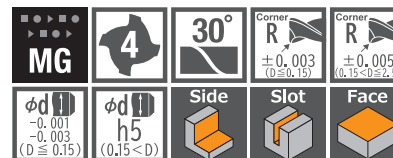
3

## Abundant line up

MUGEN COATING PREMIUM Series

	Square End Mill	Ball End Mill	Corner Radius End Mill
Full Cutting Length Type	<b>MXH225, MXH230, MXH235</b> <b>MXH240, MXH245</b> All round type with L/D 1~5 times	<b>MSBH230</b> Multi-purpose from roughing to finishing	<b>MHDH445R</b> <b>MHDH645R</b> Corner radius end mill suitable for hardened steels (~65HRC)
	<b>MXH225P, MXH230P, MXH235P</b> Sharp edge type with L/D 1~3 times	<b>MSBH345</b> 3-flute strong helix angle ball end mill	
	<b>MHDH445</b> <b>MHDH645</b> Suitable for finishing on hardened steels (~65HRC)		
Long Neck Type	<b>MHRH230</b> <b>MHRH430</b> Suitable for deep milling on prehardened steels and hardened steels (~65HRC)	<b>MRBH230</b> Ball end mill suitable for hardened steels (~65HRC)	<b>MHRH230R</b> <b>MHRH430R</b> Support to machining on prehardened steels and hardened steels (~65HRC)
		<b>MACH225</b> <b>MACH225SF</b> Sharp cutting edge reduces cutting load	
		<b>MRBTNH230</b> <b>MRBTNH345</b> Taper neck shape significantly increases tool rigidity	

Long neck corner radius end mill supports machining from prehardened steels to hardened steels ( $\sim 65\text{HRC}$ )  
Abundant size variations with total 450 sizes



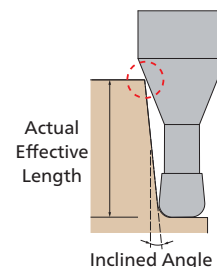
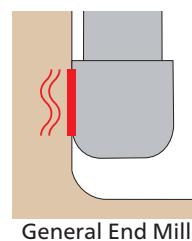
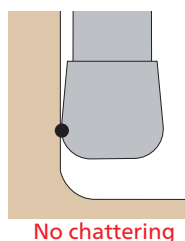
Please be aware of stock since there is no cutting edge from the center to the bottom.

- MUGEN COATING PREMIUM for hardened steels and unique new design excel in chipping prevention and resolve chattering to realize excellent finished surface.
- 4-flute end mill for high efficiency machining.
- 4-flute end mill has 450 sizes in total that lineup from the smallest diameter  $\phi 0.1$  to  $\phi 6$ .

Size	Diameter Tolerance	Corner R Tolerance	Shank Dia. Tolerance
$D \leq 0.15$	0 -0.007	$\pm 0.003$	-0.001 -0.003
$0.15 < D < 0.5$	0 -0.01	$\pm 0.005$	h5
$0.5 \leq D \leq 2.5$	0 -0.02		
$D > 2.5$		$\pm 0.01$	

### Work Material

Prehardened Steel P	Hardened Steel H	
	40~60HRC	$\sim 65\text{HRC}$



◆ Released in Jul, 2023.

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length ( $l_1$ )	Length of Cut ( $l$ )	Neck Dia. (d2)	Neck Taper Angle ( $\gamma$ )	Shank Dia. (d)	Overall Length (L)	Actual effective length depending on inclined angle of workpiece											
									30°	1°	1°30'	2°	3°							
08-00237-01013	0.1	R0.01	0.3	0.08	0.085	12°	4	45	0.34	0.36	0.38	0.39	0.44							
08-00237-01015			0.5						0.55	0.58	0.60	0.63	0.70							
08-00237-01512	0.15	R0.01	0.3	0.12	0.135	12°	4	45	0.34	0.36	0.38	0.39	0.44							
08-00237-01513			0.5						0.55	0.58	0.60	0.63	0.70							
08-00237-01515			0.75						0.81	0.85	0.89	0.93	1.03							
08-00237-01517			1						1.07	1.12	1.17	1.23	1.37							
08-00237-01522			0.3						0.34	0.36	0.37	0.39	0.43							
08-00237-01523		R0.02	0.5						0.55	0.58	0.60	0.63	0.70							
08-00237-01525			0.75						0.81	0.85	0.89	0.93	1.03							
08-00237-01527			1						1.07	1.12	1.17	1.23	1.36							
◆ 08-00237-02020			0.2						R0.02	0.3	0.15	0.18	12°	4	45	0.36	0.37	0.39	0.41	0.45
08-00237-02021										0.5						0.56	0.59	0.62	0.65	0.71
08-00237-02023	1	1.09		1.13	1.19	1.24	1.38													
08-00237-02025	1.5	1.61		1.68	1.76	1.84	2.04													
08-00237-02027	2	2.13		2.22	2.33	2.44	2.71													
◆ 08-00237-02050	R0.05	0.3		0.35	0.37	0.38	0.40	0.44												
08-00237-02051		0.5		0.56	0.59	0.61	0.64	0.71												
08-00237-02053		1		1.08	1.13	1.18	1.24	1.37												
08-00237-02055		1.5		1.61	1.68	1.75	1.84	2.03												
08-00237-02057		2		2.13	2.22	2.32	2.43	2.70												
◆ 08-00237-03020		0.3	R0.02	0.5	0.25	0.28	12°	4	45	0.56	0.59	0.62	0.65	0.71						
08-00237-03021				1						1.09	1.13	1.19	1.24	1.38						
08-00237-03022	1.5			1.61						1.68	1.76	1.84	2.04							

### How to Order

When you order, indicate MHRH430R (D) $\times$ (R) $\times$ ( $l_1$ ).

※( $\gamma$ ) is reference value.

## MUGEN COATING PREMIUM 4-Flute Long Neck Corner Radius End Mill for Hardened Steel

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ <sub>1</sub> )	Length of Cut (ℓ)	Neck Dia. (d <sub>2</sub> )	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)	Actual effective length depending on inclined angle of workpiece									
									30°	1°	1°30′	2°	3°					
08-00237-03023	0.3	R0.02	2	0.25	0.28	12°	4	45	2.13	2.22	2.33	2.44	2.71					
08-00237-03024			2.5					45	2.65	2.77	2.90	3.04	3.37					
08-00237-03025			3					45	3.17	3.31	3.47	3.64	4.03					
08-00237-03050		R0.05	0.5					45	0.56	0.59	0.61	0.64	0.71					
08-00237-03051			1					45	1.08	1.13	1.18	1.24	1.37					
08-00237-03052			1.5					45	1.61	1.68	1.75	1.84	2.03					
08-00237-03053			2					45	2.13	2.22	2.32	2.43	2.70					
08-00237-03054			2.5					45	2.65	2.77	2.89	3.03	3.36					
08-00237-03055			3					45	3.17	3.31	3.46	3.63	4.02					
08-00237-04020			0.4					R0.02	0.5	0.3	0.37	12°	4	45	0.59	0.61	0.64	0.67
08-00237-04021	1	45		1.11	1.16	1.21	1.27		1.41									
08-00237-04022	1.5	45		1.63	1.70	1.78	1.87		2.07									
08-00237-04023	2	45		2.15	2.25	2.35	2.47		2.74									
08-00237-04024	2.5	45		2.67	2.79	2.92	3.07		3.40									
08-00237-04025	3	45		3.20	3.34	3.49	3.67		4.06									
08-00237-04027	4	45		4.24	4.43	4.63	4.86		5.39									
08-00237-04050	R0.05	0.5		45	0.59	0.61	0.64	0.67	0.74									
08-00237-04051		1		45	1.11	1.16	1.21	1.27	1.40									
08-00237-04052		1.5		45	1.63	1.70	1.78	1.86	2.06									
08-00237-04053		2		45	2.15	2.25	2.35	2.46	2.73									
08-00237-04054		2.5		45	2.67	2.79	2.92	3.06	3.39									
08-00237-04055		3		45	3.19	3.34	3.49	3.66	4.05									
08-00237-04057		4		45	4.24	4.43	4.63	4.86	5.38									
08-00237-04101	R0.1	1		45	1.11	1.15	1.20	1.26	1.38									
08-00237-04103		2		45	2.15	2.24	2.34	2.45	2.71									
08-00237-04105		3		45	3.19	3.33	3.48	3.65	4.04									
08-00237-04107		4		45	4.24	4.42	4.62	4.85	5.37									
08-00237-05021	0.5	R0.02		1	0.4	0.46	12°	4	45					1.14	1.19	1.24	1.30	1.44
08-00237-05022				2					45					2.18	2.27	2.38	2.50	2.77
08-00237-05023			3	45					3.22	3.36	3.52	3.69	4.10					
08-00237-05024			4	45					4.26	4.45	4.66	4.89	5.42					
08-00237-05025			5	45					5.31	5.54	5.80	6.09	6.75					
08-00237-05026			6	45					6.35	6.63	6.94	7.28	8.08					
08-00237-05051		R0.05	1	45					1.13	1.18	1.24	1.29	1.43					
08-00237-05052			2	45					2.18	2.27	2.38	2.49	2.76					
08-00237-05053			3	45					3.22	3.36	3.52	3.69	4.09					
08-00237-05054			4	45					4.26	4.45	4.66	4.88	5.41					
08-00237-05055			5	45					5.31	5.54	5.80	6.08	6.74					
08-00237-05056			6	45					6.35	6.63	6.94	7.28	8.07					
08-00237-05101		R0.1	1	45					1.13	1.18	1.23	1.28	1.42					
08-00237-05102			2	45					2.17	2.27	2.37	2.48	2.74					
08-00237-05103			3	45					3.22	3.36	3.51	3.68	4.07					
08-00237-05104			4	45					4.26	4.45	4.65	4.87	5.40					
08-00237-05105			5	45					5.30	5.54	5.79	6.07	6.72					
08-00237-05106			6	45					6.35	6.63	6.93	7.27	8.05					
08-00237-06021		0.6	R0.02	2					0.5	0.56	12°	4	45	2.18	2.27	2.38	2.50	2.77
08-00237-06023				4									45	4.26	4.45	4.66	4.89	5.42
08-00237-06025				6									45	6.35	6.63	6.94	7.28	8.08
08-00237-06027				8									50	8.43	8.81	9.22	9.68	10.73
08-00237-06029				10									50	10.52	10.99	11.50	12.07	13.39
08-00237-06051			R0.05	2									45	2.18	2.27	2.38	2.49	2.76
08-00237-06053				4									45	4.26	4.45	4.66	4.88	5.41
08-00237-06055				6									45	6.35	6.63	6.94	7.28	8.07
08-00237-06057				8									50	8.43	8.81	9.22	9.67	10.72
08-00237-06059				10									50	10.52	10.99	11.50	12.06	13.38
08-00237-06101		R0.1	2	45					2.17	2.27	2.37	2.48	2.74					
08-00237-06103			4	45					4.26	4.45	4.65	4.87	5.40					
08-00237-06105	6		45	6.35	6.63	6.93	7.27	8.05										
08-00237-06107	8		50	8.43	8.80	9.21	9.66	10.71										
08-00237-06109	10		50	10.52	10.98	11.49	12.05	13.36										

## MUGEN COATING PREMIUM 4-Flute Long Neck Corner Radius End Mill for Hardened Steel

◆ Released in Jul, 2023.

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length ( $\ell_1$ )	Length of Cut ( $\ell$ )	Neck Dia. (d2)	Neck Taper Angle ( $\gamma$ )	Shank Dia. (d)	Overall Length (L)	Actual effective length depending on inclined angle of workpiece									
									30°	1°	1°30'	2°	3°					
08-00237-07020	0.7	R0.02	2	0.55	0.66	12°	4	45	2.18	2.27	2.38	2.50	2.77					
08-00237-07021			4					45	4.26	4.45	4.66	4.89	5.42					
08-00237-07023			6					45	6.35	6.63	6.94	7.28	8.08					
08-00237-07050		R0.05	2					45	2.18	2.27	2.38	2.49	2.76					
08-00237-07051			4					45	4.26	4.45	4.66	4.88	5.41					
08-00237-07053			6					45	6.35	6.63	6.94	7.28	8.07					
08-00237-07100		R0.1	2					45	2.17	2.27	2.37	2.48	2.74					
08-00237-07101			4					45	4.26	4.45	4.65	4.87	5.40					
08-00237-07103			6					45	6.35	6.63	6.93	7.27	8.05					
08-00237-08020	0.8	R0.02	2	0.65	0.76	12°	4	45	2.18	2.27	2.38	2.50	2.77					
08-00237-08021			4					45	4.26	4.45	4.66	4.89	5.42					
08-00237-08023			6					45	6.35	6.63	6.94	7.28	8.08					
08-00237-08025		8	50					8.43	8.81	9.22	9.68	10.73						
08-00237-08050		R0.05	2					45	2.18	2.27	2.38	2.49	2.76					
08-00237-08051			4					45	4.26	4.45	4.66	4.88	5.41					
08-00237-08053			6					45	6.35	6.63	6.94	7.28	8.07					
08-00237-08055			8					50	8.43	8.81	9.22	9.67	10.72					
08-00237-08059		12	50					12.60	13.17	13.78	14.46	16.03						
08-00237-08100		R0.1	2					45	2.17	2.27	2.37	2.48	2.74					
08-00237-08101			4					45	4.26	4.45	4.65	4.87	5.40					
08-00237-08103			6					45	6.35	6.63	6.93	7.27	8.05					
08-00237-08105			8					50	8.43	8.80	9.21	9.66	10.71					
08-00237-08109			12					50	12.60	13.16	13.77	14.45	16.01					
08-00237-08200			R0.2					2	45	2.17	2.26	2.36	2.46	2.71				
08-00237-08201								4	45	4.26	4.44	4.64	4.86	5.37				
08-00237-08203								6	45	6.34	6.62	6.92	7.25	8.02				
08-00237-08205								8	50	8.43	8.80	9.20	9.64	10.67				
08-00237-08209		12						50	12.60	13.15	13.76	14.43	15.98					
08-00237-09101		R0.1						4	45	4.28	4.47	4.68	4.90	5.43				
08-00237-09105			8					50	8.46	8.83	9.24	9.69	10.74					
◆ 08-00237-10024		1	R0.02					1.5	0.8	0.95	12°	4	50	1.68	1.76	1.84	1.93	2.14
08-00237-10028								2					50	2.20	2.30	2.41	2.53	2.80
◆ 08-00237-10026								2.5					50	2.72	2.85	2.98	3.12	3.46
08-00237-10020								3					50	3.25	3.39	3.55	3.72	4.13
08-00237-10021								4					50	4.29	4.48	4.69	4.92	5.45
08-00237-10022								5					50	5.33	5.57	5.83	6.11	6.78
08-00237-10023	6			50	6.37	6.66	6.97	7.31					8.11					
08-00237-10025	8			50	8.46	8.84	9.25	9.70					10.76					
08-00237-10027	10			50	10.54	11.02	11.53	12.10					13.42					
◆ 08-00237-10054	R0.05			1.5	50	1.68	1.75	1.83					1.91	2.11				
08-00237-10058			2	50	2.20	2.30	2.40	2.52					2.79					
◆ 08-00237-10056			2.5	50	2.72	2.84	2.97	3.12					3.45					
08-00237-10050			3	50	3.24	3.39	3.54	3.72					4.12					
08-00237-10051			4	50	4.29	4.48	4.68	4.91					5.44					
08-00237-10052			5	50	5.33	5.57	5.82	6.11					6.77					
08-00237-10053			6	50	6.37	6.66	6.97	7.31					8.10					
08-00237-10055			8	50	8.46	8.83	9.25	9.70					10.75					
08-00237-10057			10	50	10.54	11.01	11.53	12.09					13.41					
◆ 08-00237-10104			R0.1	1.5	50	1.67	1.74	1.81					1.89	2.08				
08-00237-10108	2			50	2.19	2.28	2.38	2.49					2.74					
◆ 08-00237-10106	2.5			50	2.72	2.83	2.95	3.09					3.41					
08-00237-10100	3			50	3.24	3.38	3.54	3.71					4.10					
08-00237-10101	4			50	4.28	4.47	4.68	4.90					5.43					
08-00237-10102	5			50	5.33	5.56	5.82	6.10					6.76					
08-00237-10103	6			50	6.37	6.65	6.96	7.30					8.08					
08-00237-10105	8			50	8.46	8.83	9.24	9.69					10.74					
08-00237-10107	10			50	10.54	11.01	11.52	12.08					13.39					
◆ 08-00237-10204	R0.2	1.5		50	3.24	3.37	3.52	3.69	4.07									
08-00237-10208		2	50	4.28	4.47	4.68	4.90	5.43										
◆ 08-00237-10206		2.5	50	5.33	5.56	5.82	6.10	6.76										
08-00237-10200		3	50	6.37	6.65	6.96	7.30	8.08										

**How to Order**

When you order, indicate MHRH430R (D)×(R)×( $\ell_1$ ).

※( $\gamma$ ) is reference value.

## MUGEN COATING PREMIUM 4-Flute Long Neck Corner Radius End Mill for Hardened Steel

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ1)	Length of Cut (ℓ)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)	Actual effective length depending on inclined angle of workpiece										
									30°	1°	1°30′	2°	3°						
08-00237-10201	1	R0.2	4	0.8	0.95	12°	4	50	4.28	4.46	4.66	4.88	5.40						
08-00237-10202			5					50	5.32	5.55	5.80	6.08	6.72						
08-00237-10203			6					50	6.37	6.64	6.94	7.28	8.05						
08-00237-10205			8					50	8.45	8.82	9.23	9.67	10.71						
08-00237-10207			10					50	10.54	11.00	11.51	12.06	13.36						
◆ 08-00237-10304		R0.3	1.5					50	1.67	1.73	1.80	1.87	2.05						
08-00237-10308			2					50	2.19	2.28	2.37	2.47	2.71						
◆ 08-00237-10306			2.5					50	2.71	2.82	2.94	3.07	3.37						
08-00237-10300			3					50	3.23	3.36	3.51	3.67	4.04						
08-00237-10301			4					50	4.28	4.45	4.65	4.86	5.36						
08-00237-10302			5					50	5.32	5.54	5.79	6.06	6.69						
08-00237-10303			6					50	6.36	6.63	6.93	7.26	8.02						
08-00237-10305			8					50	8.45	8.81	9.21	9.65	10.67						
08-00237-10307			10					50	10.53	10.99	11.49	12.04	13.33						
08-00237-12101			1.2					R0.1	5	1	1.14	12°	4	50	5.35	5.59	5.84	6.13	6.79
08-00237-12103									10					50	10.57	11.03	11.55	12.11	13.42
08-00237-12201								R0.2	5					50	5.35	5.58	5.83	6.11	6.75
08-00237-12203	10	50		10.56	11.03	11.53	12.09		13.39										
08-00237-12301	R0.3	5		50	5.34	5.57	5.82	6.09	6.72										
08-00237-12303		10		50	10.56	11.02	11.52	12.07	13.36										
08-00237-15020	1.5	R0.02	3	1.2	1.43	12°	4	50	3.29	3.44	3.60	3.77	4.18						
08-00237-15021			4					50	4.34	4.53	4.74	4.97	5.52						
08-00237-15023			6					50	6.42	6.71	7.02	7.37	8.17						
08-00237-15025			8					50	8.51	8.89	9.30	9.76	10.83						
◆ 08-00237-15026			10					50	10.59	11.07	11.59	12.15	13.48						
08-00237-15027			12					50	12.68	13.25	13.87	14.55	16.13						
08-00237-15029			15					50	15.81	16.51	17.29	18.14	20.12						
08-00237-15050			R0.05					3	50	3.29	3.44	3.60	3.77	4.18					
08-00237-15051								4	50	4.34	4.53	4.74	4.97	5.51					
08-00237-15053		6						50	6.42	6.71	7.02	7.36	8.16						
08-00237-15055		8						50	8.51	8.89	9.30	9.76	10.82						
◆ 08-00237-15056		10						50	10.59	11.06	11.58	12.15	13.47						
08-00237-15057		12						50	12.68	13.24	13.86	14.54	16.12						
08-00237-15059		15						50	15.81	16.51	17.28	18.13	20.11						
08-00237-15100		R0.1						3	50	3.29	3.43	3.59	3.76	4.16					
08-00237-15101								4	50	4.33	4.52	4.73	4.96	5.49					
08-00237-15103			6					50	6.42	6.70	7.01	7.35	8.15						
08-00237-15105			8					50	8.50	8.88	9.29	9.75	10.80						
◆ 08-00237-15106			10					50	10.59	11.06	11.57	12.14	13.45						
08-00237-15107			12					50	12.68	13.24	13.85	14.53	16.11						
08-00237-15109			15					60	15.80	16.51	17.28	18.12	20.09						
08-00237-15200			R0.2					3	50	3.29	3.43	3.58	3.74	4.13					
08-00237-15201								4	50	4.33	4.51	4.72	4.94	5.46					
08-00237-15203		6						50	6.42	6.69	7.00	7.33	8.11						
08-00237-15205		8						50	8.50	8.87	9.28	9.73	10.77						
◆ 08-00237-15206		10						50	10.59	11.05	11.56	12.12	13.42						
08-00237-15207		12						50	12.67	13.23	13.84	14.51	16.08						
08-00237-15209		15						60	15.80	16.50	17.26	18.10	20.06						
08-00237-15300		R0.3						3	50	3.28	3.42	3.56	3.72	4.10					
08-00237-15301								4	50	4.33	4.51	4.70	4.92	5.43					
08-00237-15303			6					50	6.41	6.68	6.98	7.31	8.08						
08-00237-15305			8					50	8.50	8.86	9.27	9.71	10.74						
◆ 08-00237-15306			10					50	10.58	11.04	11.55	12.10	13.39						
08-00237-15307	12		50	12.67	13.22	13.83	14.49	16.04											
08-00237-15309	15		60	15.80	16.49	17.25	18.08	20.03											
08-00237-15500	R0.5		3	50	3.27	3.40	3.53	3.69	4.04										
08-00237-15501			4	50	4.32	4.49	4.68	4.88	5.36										
08-00237-15503		6	50	6.40	6.67	6.96	7.27	8.02											
08-00237-15505		8	50	8.49	8.85	9.24	9.67	10.67											
◆ 08-00237-15506		10	50	10.57	11.02	11.52	12.06	13.33											
08-00237-15507		12	50	12.66	13.20	13.80	14.45	15.98											
08-00237-15509		15	60	15.79	16.47	17.22	18.04	19.96											

## MUGEN COATING PREMIUM 4-Flute Long Neck Corner Radius End Mill for Hardened Steel

◆ Released in Jul, 2023.

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ1)	Length of Cut (ℓ)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)	Actual effective length depending on inclined angle of workpiece									
									30°	1°	1°30′	2°	3°					
◆ 08-00237-20022	2	R0.02	3	1.6	1.91	12°	4	50	3.34	3.49	3.66	3.83	4.25					
08-00237-20020			4					50	4.39	4.58	4.80	5.03	5.58					
08-00237-20021			6					50	6.47	6.76	7.08	7.42	8.23					
08-00237-20023			8					50	8.56	8.94	9.36	9.82	10.89					
◆ 08-00237-20024			10					50	10.64	11.12	11.64	12.21	13.54					
08-00237-20025			12					50	12.73	13.30	13.92	14.60	16.20					
08-00237-20027			16					60	16.90	17.66	18.48	19.39	Free					
08-00237-20029			20					60	21.07	22.01	23.04	24.18	Free					
◆ 08-00237-20052		R0.05	3					50	3.34	3.49	3.65	3.83	4.24					
08-00237-20050			4					50	4.38	4.58	4.79	5.03	5.57					
08-00237-20051			6					50	6.47	6.76	7.07	7.42	8.22					
08-00237-20053			8					50	8.56	8.94	9.35	9.81	10.88					
◆ 08-00237-20054			10					50	10.64	11.12	11.63	12.20	13.53					
08-00237-20055			12					50	12.73	13.29	13.92	14.60	16.19					
08-00237-20057			16					60	16.90	17.65	18.48	19.38	Free					
08-00237-20059			20					60	21.07	22.01	23.04	24.17	Free					
◆ 08-00237-20102		R0.1	3					50	3.34	3.49	3.64	3.82	4.23					
08-00237-20100			4					50	4.38	4.57	4.78	5.02	5.55					
08-00237-20101			6					50	6.47	6.75	7.07	7.41	8.21					
08-00237-20103			8					50	8.55	8.93	9.35	9.80	10.86					
◆ 08-00237-20104			10					50	10.64	11.11	11.63	12.19	13.52					
08-00237-20105			12					50	12.73	13.29	13.91	14.59	16.17					
08-00237-20107			16					60	16.90	17.65	18.47	19.37	Free					
08-00237-20109			20					60	21.07	22.01	23.03	24.16	Free					
◆ 08-00237-20202		R0.2	3					50	3.34	3.48	3.63	3.80	4.19					
08-00237-20200			4					50	4.38	4.57	4.77	5.00	5.52					
08-00237-20201			6					50	6.46	6.74	7.05	7.39	8.18					
08-00237-20203			8					50	8.55	8.92	9.33	9.78	10.83					
◆ 08-00237-20204			10					50	10.64	11.10	11.61	12.18	13.48					
08-00237-20205			12					50	12.72	13.28	13.89	14.57	16.14					
08-00237-20207			16					60	16.89	17.64	18.46	19.36	Free					
08-00237-20209			20					60	21.06	22.00	23.02	24.14	Free					
◆ 08-00237-20302		R0.3	3					50	3.33	3.47	3.62	3.78	4.16					
08-00237-20300			4					50	4.37	4.56	4.76	4.98	5.49					
08-00237-20301			6					50	6.46	6.74	7.04	7.37	8.14					
08-00237-20303			8					50	8.55	8.91	9.32	9.76	10.80					
◆ 08-00237-20304			10					50	10.63	11.09	11.60	12.16	13.45					
08-00237-20305			12					50	12.72	13.27	13.88	14.55	16.11					
08-00237-20307			16					60	16.89	17.63	18.44	19.34	Free					
08-00237-20309			20					60	21.06	21.99	23.00	24.12	Free					
◆ 08-00237-20502		R0.5	3					50	3.32	3.45	3.59	3.74	4.10					
08-00237-20500			4					50	4.37	4.54	4.73	4.94	5.43					
08-00237-20501			6					50	6.45	6.72	7.01	7.33	8.08					
08-00237-20503			8					50	8.54	8.90	9.29	9.72	10.73					
◆ 08-00237-20504			10					50	10.62	11.08	11.57	12.12	13.39					
08-00237-20505			12					50	12.71	13.25	13.85	14.51	16.04					
08-00237-20507			16					60	16.88	17.61	18.42	19.30	Free					
08-00237-20509			20					60	21.05	21.97	22.98	24.08	Free					
◆ 08-00237-25100		2.5	R0.1					5	2	2.39	12°	4	50	5.47	5.72	5.98	6.27	6.94
08-00237-25101								10					50	10.69	11.16	11.68	12.25	13.58
◆ 08-00237-25102								15					60	15.90	16.61	17.38	18.23	Free
08-00237-25103								20					60	21.12	22.06	23.09	Free	Free
08-00237-25105								30					70	31.55	32.95	Free	Free	Free
◆ 08-00237-25200			R0.2					5					50	5.47	5.71	5.96	6.25	6.91
08-00237-25201								10					50	10.68	11.15	11.67	12.23	13.55
◆ 08-00237-25202								15					60	15.90	16.60	17.37	18.21	Free
08-00237-25203								20					60	21.11	22.05	23.07	Free	Free
08-00237-25205								30					70	31.54	32.94	Free	Free	Free
◆ 08-00237-25300			R0.3					5					50	5.47	5.70	5.95	6.23	6.88
08-00237-25301								10					50	10.68	11.14	11.65	12.21	13.52
◆ 08-00237-25302								15					60	15.89	16.59	17.36	18.20	Free

**How to Order**

When you order, indicate MHRH430R (D)×(R)×(ℓ1).

※(γ) is reference value.



## MUGEN COATING PREMIUM 4-Flute Long Neck Corner Radius End Mill for Hardened Steel

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ1)	Length of Cut (ℓ)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)	Actual effective length depending on inclined angle of workpiece					
									30°	1°	1°30'	2°	3°	
08-00237-25303	2.5	R0.3	20	2	2.39	12°	4	60	21.11	22.04	23.06	Free	Free	
08-00237-25305			30					70	31.54	32.93	Free	Free	Free	
◆ 08-00237-25500		R0.5	5					50	5.46	5.68	5.92	6.19	6.82	
08-00237-25501			10					50	10.67	11.13	11.63	12.17	13.45	
◆ 08-00237-25502			15					60	15.89	16.57	17.33	18.16	Free	
08-00237-25503			20					60	21.10	22.02	23.03	Free	Free	
08-00237-25505			30					70	31.53	32.92	Free	Free	Free	
08-00237-30058	3	R0.05	4	2.5	2.85	12°	6	50	4.53	4.73	4.95	5.19	5.76	
08-00237-30050			6					50	6.62	6.91	7.23	7.59	8.41	
08-00237-30051			8					50	8.70	9.09	9.51	9.98	11.07	
◆ 08-00237-30052			10					50	10.79	11.27	11.80	12.37	13.72	
08-00237-30053			12					50	12.87	13.45	14.08	14.77	16.37	
◆ 08-00237-30054			14					50	14.96	15.63	16.36	17.16	19.03	
08-00237-30055			16					60	17.05	17.81	18.64	19.55	21.68	
08-00237-30057			20					60	21.22	22.16	23.20	24.34	26.99	
08-00237-30112			R0.1					4	50	4.53	4.73	4.95	5.18	5.74
08-00237-30100								6	50	6.62	6.91	7.23	7.58	8.39
08-00237-30101								8	50	8.70	9.09	9.51	9.97	11.05
◆ 08-00237-30102		10						50	10.79	11.27	11.79	12.36	13.70	
08-00237-30103		12						50	12.87	13.44	14.07	14.76	16.36	
◆ 08-00237-30104		14						50	14.96	15.62	16.35	17.15	19.01	
08-00237-30105		16						60	17.04	17.80	18.63	19.54	21.67	
08-00237-30107		20						60	21.21	22.16	23.19	24.33	26.98	
08-00237-30109		25						70	26.43	27.61	28.90	30.31	Free	
08-00237-30111		30						70	31.64	33.05	34.60	36.30	Free	
08-00237-30212		R0.2						4	50	4.53	4.72	4.93	5.16	5.71
08-00237-30200			6					50	6.61	6.90	7.21	7.56	8.36	
08-00237-30201			8					50	8.70	9.08	9.49	9.95	11.02	
◆ 08-00237-30202			10					50	10.78	11.26	11.77	12.34	13.67	
08-00237-30203			12					50	12.87	13.44	14.06	14.74	16.33	
◆ 08-00237-30204			14					50	14.95	15.61	16.34	17.13	18.98	
08-00237-30205			16					60	17.04	17.79	18.62	19.52	21.64	
08-00237-30207			20					60	21.21	22.15	23.18	24.31	26.94	
08-00237-30209			25					70	26.42	27.60	28.88	30.29	Free	
08-00237-30211			30					70	31.64	33.05	34.58	36.28	Free	
08-00237-30312			R0.3					4	50	4.52	4.71	4.92	5.15	5.68
08-00237-30300		6						50	6.61	6.89	7.20	7.54	8.33	
08-00237-30301		8						50	8.69	9.07	9.48	9.93	10.99	
◆ 08-00237-30302		10						50	10.78	11.25	11.76	12.33	13.64	
08-00237-30303		12						50	12.86	13.43	14.04	14.72	16.29	
◆ 08-00237-30304	14	50		14.95	15.61	16.32	17.11	18.95						
08-00237-30305	16	60		17.04	17.78	18.60	19.50	21.60						
08-00237-30307	20	60		21.21	22.14	23.17	24.29	26.91						
08-00237-30309	25	70		26.42	27.59	28.87	30.27	Free						
08-00237-30311	30	70		31.63	33.04	34.57	36.26	Free						
08-00237-30512	R0.5	4		50	4.51	4.69	4.89	5.11	5.61					
08-00237-30500		6	50	6.60	6.87	7.17	7.50	8.27						
08-00237-30501		8	50	8.68	9.05	9.45	9.89	10.92						
◆ 08-00237-30502		10	50	10.77	11.23	11.73	12.29	13.58						
08-00237-30503		12	50	12.86	13.41	14.01	14.68	16.23						
◆ 08-00237-30504		14	50	14.94	15.59	16.30	17.07	18.89						
08-00237-30505		16	60	17.03	17.77	18.58	19.47	21.54						
08-00237-30507		20	60	21.20	22.12	23.14	24.25	26.85						
08-00237-30509		25	70	26.41	27.57	28.84	30.24	Free						
08-00237-30511		30	70	31.63	33.02	34.54	36.22	Free						
◆ 08-00237-31000		R1	6	50	6.58	6.83	7.10	7.40	8.11					
08-00237-31001	8		50	8.66	9.01	9.38	9.80	10.76						
◆ 08-00237-31002	10		50	10.75	11.19	11.66	12.19	13.42						
08-00237-31003	12		50	12.83	13.36	13.94	14.58	16.07						
◆ 08-00237-31004	14		50	14.92	15.54	16.23	16.98	18.73						
08-00237-31005	16	60	17.01	17.72	18.51	19.37	21.38							

## MUGEN COATING PREMIUM 4-Flute Long Neck Corner Radius End Mill for Hardened Steel

◆ Released in Jul, 2023.

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ1)	Length of Cut (ℓ)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)	Actual effective length depending on inclined angle of workpiece				
									30°	1°	1°30'	2°	3°
08-00237-31007	3	R1	20	2.5	2.85	12°	6	60	21.18	22.08	23.07	24.16	26.69
08-00237-31009			25					70	26.39	27.53	28.77	30.14	Free
08-00237-31011			30					70	31.60	32.97	34.47	36.12	Free
◆ 08-00237-40051	4	R0.05	8	3.2	3.8	12°	6	60	8.83	9.22	9.65	10.12	11.22
◆ 08-00237-40053			12					60	13.00	13.58	14.21	14.91	16.53
◆ 08-00237-40054			16					60	17.17	17.93	18.77	19.69	Free
◆ 08-00237-40055			20					65	21.34	22.29	23.33	24.48	Free
◆ 08-00237-40056			24					70	25.51	26.65	27.90	Free	Free
◆ 08-00237-40057			28					70	29.68	31.01	32.46	Free	Free
◆ 08-00237-40058			32					70	33.85	35.37	37.02	Free	Free
08-00237-40106			R0.1					8	60	8.82	9.21	9.64	10.11
◆ 08-00237-40107		10						60	10.91	11.39	11.92	12.50	13.86
08-00237-40100		12						60	13.00	13.57	14.20	14.90	16.51
08-00237-40101		16						60	17.17	17.93	18.77	19.68	Free
◆ 08-00237-40102		20						65	21.34	22.29	23.33	24.47	Free
08-00237-40103		24						70	25.51	26.65	27.89	Free	Free
◆ 08-00237-40104		28						70	29.68	31.00	32.45	Free	Free
08-00237-40105		32						70	33.85	35.36	37.01	Free	Free
◆ 08-00237-40108		40	80					42.19	44.08	Free	Free	Free	
08-00237-40206		R0.2	8					60	8.82	9.21	9.63	10.09	11.17
◆ 08-00237-40207			10					60	10.91	11.38	11.91	12.49	13.83
08-00237-40200			12					60	12.99	13.56	14.19	14.88	16.48
08-00237-40201			16					60	17.16	17.92	18.75	19.66	Free
◆ 08-00237-40202			20					65	21.33	22.28	23.31	24.45	Free
08-00237-40203			24					70	25.50	26.64	27.88	Free	Free
◆ 08-00237-40204			28					70	29.68	30.99	32.44	Free	Free
08-00237-40205			32					70	33.85	35.35	37.00	Free	Free
◆ 08-00237-40208		40	80					42.19	44.07	Free	Free	Free	
08-00237-40306		R0.3	8					60	8.82	9.20	9.61	10.07	11.14
◆ 08-00237-40307			10					60	10.90	11.38	11.90	12.47	13.80
08-00237-40300			12					60	12.99	13.55	14.18	14.86	16.45
08-00237-40301			16					60	17.16	17.91	18.74	19.65	Free
◆ 08-00237-40302			20					65	21.33	22.27	23.30	24.43	Free
08-00237-40303			24					70	25.50	26.63	27.86	Free	Free
◆ 08-00237-40304			28					70	29.67	30.99	32.42	Free	Free
08-00237-40305			32					70	33.84	35.34	36.99	Free	Free
◆ 08-00237-40308		40	80					42.19	44.06	Free	Free	Free	
08-00237-40506		R0.5	8					60	8.81	9.18	9.59	10.03	11.08
◆ 08-00237-40507			10					60	10.89	11.36	11.87	12.43	13.73
08-00237-40500			12					60	12.98	13.54	14.15	14.82	16.39
08-00237-40501			16					60	17.15	17.89	18.71	19.61	Free
◆ 08-00237-40502			20					65	21.32	22.25	23.27	24.39	Free
08-00237-40503			24					70	25.49	26.61	27.83	Free	Free
◆ 08-00237-40504	28		70	29.66	30.97	32.40	Free	Free					
08-00237-40505	32		70	33.83	35.33	36.96	Free	Free					
◆ 08-00237-40508	40	80	42.18	44.04	Free	Free	Free						
08-00237-41006	R1	8	60	8.79	9.13	9.52	9.94	10.92					
◆ 08-00237-41007		10	60	10.87	11.31	11.80	12.33	13.57					
08-00237-41000		12	60	12.96	13.49	14.08	14.72	16.23					
08-00237-41001		16	60	17.13	17.85	18.64	19.51	Free					
◆ 08-00237-41002		20	65	21.30	22.21	23.20	24.30	Free					
08-00237-41003		24	70	25.47	26.57	27.77	29.08	Free					
◆ 08-00237-41004		28	70	29.64	30.92	32.33	Free	Free					
08-00237-41005		32	70	33.81	35.28	36.89	Free	Free					
◆ 08-00237-41008	40	80	42.16	44.00	Free	Free	Free						
◆ 08-00237-50104	5	R0.1	10	4	4.75	12°	6	70	11.03	11.52	12.06	12.65	Free
08-00237-50100			15					70	16.25	16.97	17.76	Free	Free
08-00237-50101			20					70	21.46	22.42	Free	Free	Free
◆ 08-00237-50102			30					80	31.89	Free	Free	Free	Free
08-00237-50103			40					90	42.32	Free	Free	Free	Free

**How to Order**

When you order, indicate MHRH430R (D)×(R)×(ℓ1).

※(γ) is reference value.

## MUGEN COATING PREMIUM 4-Flute Long Neck Corner Radius End Mill for Hardened Steel

Unit [Size : mm]

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ1)	Length of Cut (ℓ)	Neck Dia. (d2)	Neck Taper Angle (γ)	Shank Dia. (d)	Overall Length (L)	Actual effective length depending on inclined angle of workpiece									
									30°	1°	1°30'	2°	3°					
◆ 08-00237-50204	5	R0.2	10	4	4.75	12°	6	70	11.03	11.51	12.04	12.63	Free					
08-00237-50200			15					70	16.24	16.96	17.75	Free	Free					
08-00237-50201			20					70	21.46	22.41	Free	Free	Free					
◆ 08-00237-50202			30					80	31.88	Free	Free	Free	Free					
08-00237-50203			40					90	42.31	Free	Free	Free	Free					
◆ 08-00237-50304			R0.3					10	70	11.02	11.50	12.03	12.61	Free				
08-00237-50300		15						70	16.24	16.95	17.73	Free	Free					
08-00237-50301		20						70	21.45	22.40	Free	Free	Free					
◆ 08-00237-50302		30						80	31.88	Free	Free	Free	Free					
08-00237-50303		40						90	42.31	Free	Free	Free	Free					
◆ 08-00237-50504		R0.5						10	70	11.02	11.49	12.00	12.57	Free				
08-00237-50500			15					70	16.23	16.93	17.70	Free	Free					
08-00237-50501			20					70	21.44	22.38	Free	Free	Free					
◆ 08-00237-50502			30					80	31.87	Free	Free	Free	Free					
08-00237-50503			40					90	42.30	Free	Free	Free	Free					
◆ 08-00237-51004			R1					10	70	10.99	11.44	11.93	12.47	Free				
08-00237-51000		15						70	16.21	16.89	17.63	Free	Free					
08-00237-51001		20						70	21.42	22.34	Free	Free	Free					
◆ 08-00237-51002		30						80	31.85	Free	Free	Free	Free					
08-00237-51003		40						90	42.28	Free	Free	Free	Free					
◆ 08-00237-60051		6						R0.05	12	5	5.7	-	6	70	Free	Free	Free	Free
08-00237-60052			15						70					Free	Free	Free	Free	Free
08-00237-60053			18						90					Free	Free	Free	Free	Free
08-00237-60054			24						90					Free	Free	Free	Free	Free
08-00237-60055			30						90					Free	Free	Free	Free	Free
08-00237-60056			40						100					Free	Free	Free	Free	Free
08-00237-60057			48					110	Free					Free	Free	Free	Free	
08-00237-60104			R0.1					12	70					Free	Free	Free	Free	Free
08-00237-60105								15	70					Free	Free	Free	Free	Free
08-00237-60100								18	90					Free	Free	Free	Free	Free
08-00237-60101	24			90	Free	Free	Free	Free	Free									
08-00237-60102	30			90	Free	Free	Free	Free	Free									
08-00237-60106	40			100	Free	Free	Free	Free	Free									
08-00237-60103	48		110	Free	Free	Free	Free	Free										
08-00237-60204	R0.2		12	70	Free	Free	Free	Free	Free									
08-00237-60205			15	70	Free	Free	Free	Free	Free									
08-00237-60200			18	90	Free	Free	Free	Free	Free									
08-00237-60201			24	90	Free	Free	Free	Free	Free									
08-00237-60202			30	90	Free	Free	Free	Free	Free									
08-00237-60206			40	100	Free	Free	Free	Free	Free									
08-00237-60203	48		110	Free	Free	Free	Free	Free										
08-00237-60304	R0.3		12	70	Free	Free	Free	Free	Free									
08-00237-60305			15	70	Free	Free	Free	Free	Free									
08-00237-60300			18	90	Free	Free	Free	Free	Free									
08-00237-60301			24	90	Free	Free	Free	Free	Free									
08-00237-60302			30	90	Free	Free	Free	Free	Free									
08-00237-60306			40	100	Free	Free	Free	Free	Free									
08-00237-60303	48		110	Free	Free	Free	Free	Free										
08-00237-60504	R0.5		12	70	Free	Free	Free	Free	Free									
08-00237-60505			15	70	Free	Free	Free	Free	Free									
08-00237-60500		18	90	Free	Free	Free	Free	Free										
08-00237-60501		24	90	Free	Free	Free	Free	Free										
08-00237-60502		30	90	Free	Free	Free	Free	Free										
08-00237-60506		40	100	Free	Free	Free	Free	Free										
08-00237-60503	48	110	Free	Free	Free	Free	Free											
08-00237-61004	R1	12	70	Free	Free	Free	Free	Free										
08-00237-61005		15	70	Free	Free	Free	Free	Free										
08-00237-61000		18	90	Free	Free	Free	Free	Free										
08-00237-61001		24	90	Free	Free	Free	Free	Free										
08-00237-61002		30	90	Free	Free	Free	Free	Free										
08-00237-61006		40	100	Free	Free	Free	Free	Free										
08-00237-61003	48	110	Free	Free	Free	Free	Free											







## Recommended Milling Conditions

Work Material				Prehardened Steels HPM·NAK (~42HRC)				Hardened Steels HPM38·STAVAX·SKD61 (~55HRC)				Hardened Steels SKD11·PD613 (~62HRC)				High Speed Steels SKH (~65HRC)					
Dia.	Corner Radius	Under Neck Length	L/D	Spindle Speed	Feed	Depth of Cut		Spindle Speed	Feed	Depth of Cut		Spindle Speed	Feed	Depth of Cut		Spindle Speed	Feed	Depth of Cut			
				min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min	ap mm	ae mm	min <sup>-1</sup>	mm/min
3	1	20	6.7	10,000	1,400	0.12	1	8,000	1,100	0.05	0.8	7,000	950	0.04	0.7	5,500	700	0.02	0.6		
		25	8.3	9,000	1,200	0.08	1	7,500	1,000	0.04	0.8	6,500	850	0.02	0.7	5,000	600	0.01	0.6		
		30	10.0	8,000	800	0.06	1	6,500	650	0.03	0.8	5,500	550	0.02	0.7	4,500	400	0.007	0.6		
4	0.05	8	2.0	12,000	2,600	0.25	1.4	10,000	2,100	0.15	1.2	8,500	1,800	0.08	1	7,000	1,300	0.06	0.8		
		12	3.0	12,000	2,600	0.25	1.4	10,000	2,100	0.15	1.2	8,500	1,800	0.08	1	7,000	1,300	0.06	0.8		
		16	4.0	10,000	2,200	0.17	1.4	8,000	1,800	0.1	1.2	7,000	1,500	0.06	1	5,500	1,100	0.05	0.8		
		20	5.0	9,000	1,900	0.15	1.4	7,200	1,500	0.09	1.2	6,300	1,300	0.06	1	5,000	950	0.04	0.8		
		24	6.0	8,000	1,600	0.14	1.4	6,500	1,300	0.08	1.2	5,500	1,100	0.05	1	4,500	750	0.03	0.8		
		28	7.0	7,200	1,400	0.11	1.4	6,000	1,200	0.05	1.2	5,000	1,000	0.03	1	4,000	700	0.02	0.8		
		32	8.0	6,500	1,300	0.08	1.4	5,500	1,100	0.04	1.2	4,500	950	0.02	1	3,500	650	0.01	0.8		
	0.1 0.2 0.3 0.5 1	8	2.0	12,000	2,600	0.25	1.4	10,000	2,100	0.15	1.2	8,500	1,800	0.08	1	7,000	1,300	0.06	0.8		
		10	2.5	12,000	2,600	0.25	1.4	10,000	2,100	0.15	1.2	8,500	1,800	0.08	1	7,000	1,300	0.06	0.8		
		12	3.0	12,000	2,600	0.25	1.4	10,000	2,100	0.15	1.2	8,500	1,800	0.08	1	7,000	1,300	0.06	0.8		
		16	4.0	10,000	2,200	0.17	1.4	8,000	1,800	0.1	1.2	7,000	1,500	0.06	1	5,500	1,100	0.05	0.8		
		20	5.0	9,000	1,900	0.15	1.4	7,200	1,500	0.09	1.2	6,300	1,300	0.06	1	5,000	950	0.04	0.8		
		24	6.0	8,000	1,600	0.14	1.4	6,500	1,300	0.08	1.2	5,500	1,100	0.05	1	4,500	750	0.03	0.8		
		28	7.0	7,200	1,400	0.11	1.4	6,000	1,200	0.05	1.2	5,000	1,000	0.03	1	4,000	700	0.02	0.8		
		32	8.0	6,500	1,300	0.08	1.4	5,500	1,100	0.04	1.2	4,500	950	0.02	1	3,500	650	0.01	0.8		
		40	10.0	5,500	1,000	0.05	1.4	4,600	830	0.025	1.2	3,600	640	0.01	1	2,400	420	0.005	0.8		
		5	0.1	10	2.0	9,800	2,500	0.3	2.2	8,500	2,100	0.18	2	7,400	1,800	0.08	1.6	6,000	1,400	0.06	1.2
			0.2	15	3.0	9,500	2,400	0.25	2.2	8,000	2,000	0.15	2	7,000	1,700	0.08	1.6	5,500	1,200	0.06	1.2
0.3	20		4.0	8,000	2,000	0.18	2.2	6,500	1,600	0.1	2	5,500	1,400	0.07	1.6	4,500	1,000	0.05	1.2		
0.5	30		6.0	6,400	1,600	0.14	2.2	5,300	1,300	0.07	2	4,500	1,100	0.03	1.6	3,800	850	0.02	1.2		
1	40		8.0	5,000	1,200	0.09	2.2	4,000	1,000	0.05	2	3,500	850	0.02	1.6	3,000	600	0.01	1.2		
6	0.05	12	2.0	8,000	2,500	0.35	2.7	6,500	2,100	0.18	2.5	5,500	1,800	0.08	2	4,500	1,300	0.06	1.5		
	0.1	15	2.5	7,700	2,400	0.32	2.7	6,000	1,900	0.18	2.5	5,000	1,600	0.08	2	4,000	1,200	0.06	1.5		
	0.2	18	3.0	7,000	2,200	0.3	2.7	5,500	1,800	0.18	2.5	4,500	1,500	0.08	2	3,500	1,100	0.06	1.5		
	0.3	24	4.0	6,000	1,800	0.2	2.7	5,000	1,500	0.15	2.5	4,000	1,300	0.07	2	3,000	900	0.05	1.5		
	0.5	30	5.0	5,300	1,600	0.16	2.7	4,300	1,300	0.13	2.5	3,600	1,080	0.06	2	2,700	870	0.04	1.5		
	1	40	6.7	4,300	1,300	0.12	2.7	3,200	960	0.08	2.5	2,700	800	0.04	2	2,300	700	0.03	1.5		
		48	8.0	3,000	900	0.1	2.7	2,500	750	0.05	2.5	2,000	650	0.03	2	2,000	450	0.02	1.5		
Notes				<p>※1 Adjust milling conditions according to milling shape and machine type.</p> <p>※2 ap : Axial Depth of Cut, ae : Radial Depth of Cut.</p> <p>※3 Recommend to use oil mist coolant for machining hardened steels.</p> <p>※4 Recommend to apply helical or ramping for approaching into axial direction.</p> <p>※5 Adjust feed rate 50% lower and cutting depth (ae) 30% lower for milling deep wall area when L/D exceeds 8 for stable milling.</p> <p>※6 For slotting, recommend reciprocating milling by adjusting feed &amp; ap in below 50% of recommended milling condition.</p> <p>※7 Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.</p>																	

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### CAUTION

### Attention on Safety

- 1) When removing tools from cases, be careful of getting-out of tools and don't touch directly the cutting edges.
- 2) Never touch the cutting edges directly with bare hand.
- 3) Use safety covers and eye protection, as tools may be broken.
- 4) Use holders, etc. that match the tools and nature of the processing operations. The tool should be firmly attached to the holder to prevent shaking.
- 5) The work materials clamp firmly.
- 6) Make sure of dimensions of tools and work pieces before starting operation.
- 7) It is necessary to adjust conditions according to the dimensions of work materials and the machine.
- 8) Select a cutting fluid appropriate to the particular usage. Using a non-water cutting fluid could lead to fires due to sparks generated during processing or heat caused by breakage. Ensure that you take proper fire-prevention measures.
- 9) If abnormal sound, etc. occurs during processing, stop the machine immediately.
- 10) Don't modify tools.