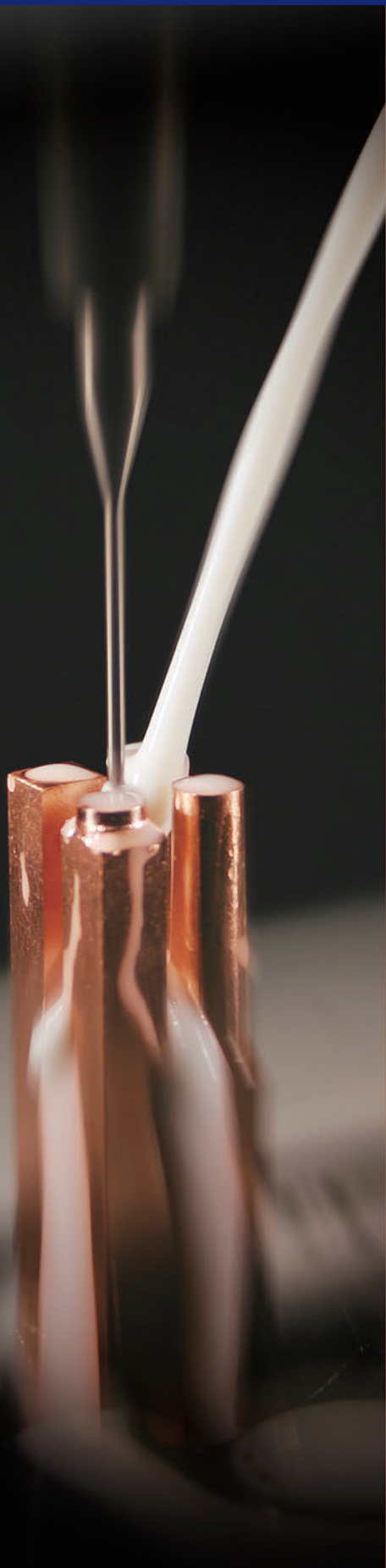


CRN ENDMILL FOR COPPER ELECTRODE

**Series expansion,
Corner Radius type
now included!
A great variety of products.
Total sizes of 308 in 7 series.**



Copper Electrode End Mill Series

CRN

Series expansion,
Corner Radius type now included!
A great variety of products.
Total sizes of 308 in 7 series.

■ Features

High adhesion and high hardness

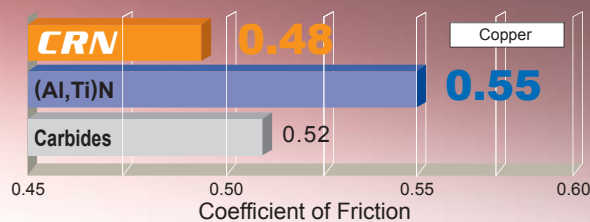
We have developed CRN Coating which boasts higher hardness and adhesion. As a result, it displays superior wear resistance and retains sharp edge for a long time.

	CRN	(Al,Ti)N	Carbides
Micro hardness (HV)	2,000	2,800	1,500
Adhesion	80	80	—

Adhesion : Critical load of scratch test.

Superior lubricity

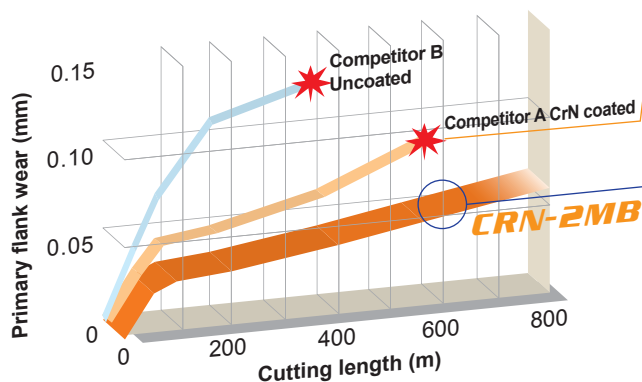
With friction coefficient against copper reduced in high temperature, CRN coating obtained excellent adhesion resistance. As a result, it displays superior lubricity in high-speed dry cutting of copper and provides high finish surface accuracy for a long time.



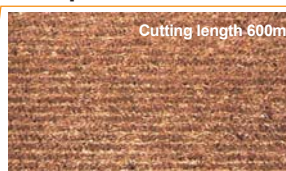
The friction coefficient in high temperature (600°C)

■ Machining example 1

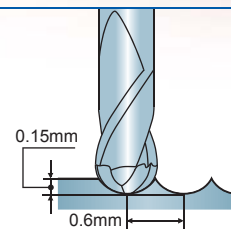
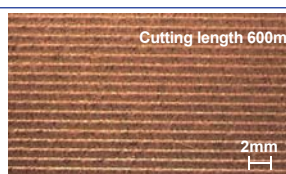
Excellent Surface Finish



Competitor A



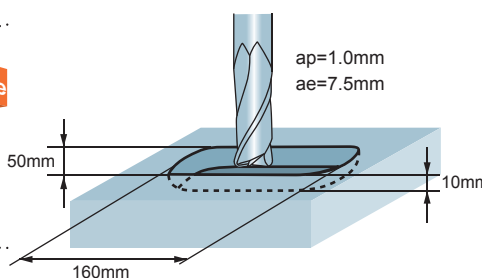
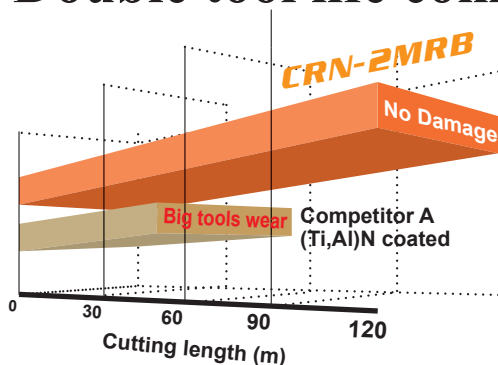
CRN-2MB



End mill	CRN-2MB R3
Work material	Copper
Revolution	13,000min ⁻¹ (77m/min)
Feed rate	3,900mm/min (0.15mm/t)
Cutting method	Climb cut, Air blow

■ Machining example 2

Double tool life compared to competitors end mills.



End mill	CRN-2MRB $\phi 10 \times R0.5$
Work material	Copper
Revolution	4,500min ⁻¹ (141m/min)
Feed rate	900mm/min (0.1mm/t)
Cutting method	Contour, Emulsion

CRN-2MS

For Copper Electrodes,
Medium, 2 flute

$\phi 0.2 - \phi 12$

35 different sizes available.



CRN-4JC

For Copper Electrodes,
Semi Long, 4 flute

$\phi 3 - \phi 12$

7 different sizes available.



CRN-2XL

For Copper Electrodes,
Long Neck, 2 flute

$\phi 0.2 - \phi 6$

68 different sizes available.



CRN-2MB

For Copper Electrodes,
Ball Nose, Medium, 2 flute

R0.2 - R6

22 different sizes available.



CRN-2XLB

For Copper Electrodes,
Ball Nose, Long Neck, 2 flute

Expand

R0.1 - R3

118 different sizes available.



CRN-2MRB

For Copper Electrodes,
Corner radius, Medium, 2 flute

NEW

$\phi 6 - \phi 12$

13 different sizes available.



CRN-2XLRB

For Copper Electrodes,
Corner radius, Short, 2 flute, Long neck

NEW

$\phi 0.5 \times R0.05 - \phi 6 \times R1$

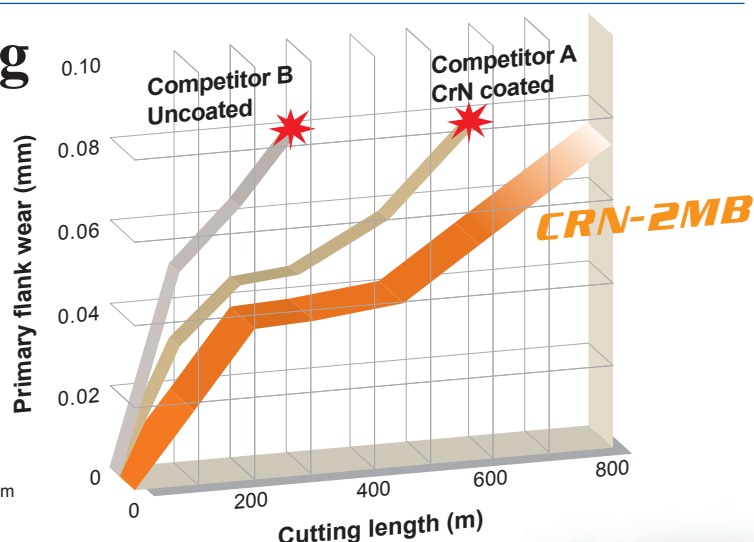
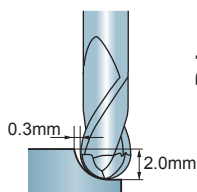
45 different sizes available.



Machining Example 3

Comparison of cutting performance in high speed dry milling.

End mill	CRN-2MB R3
Work material	Copper
Revolution	13,000min ⁻¹ (231m/min)
Feed rate	2,600mm/min (0.1mm/t)
Cutting method	Climb cut, Air blow

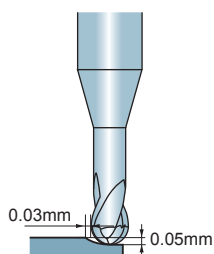
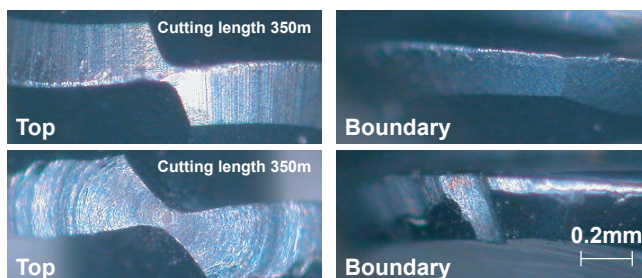


Machining Example 4

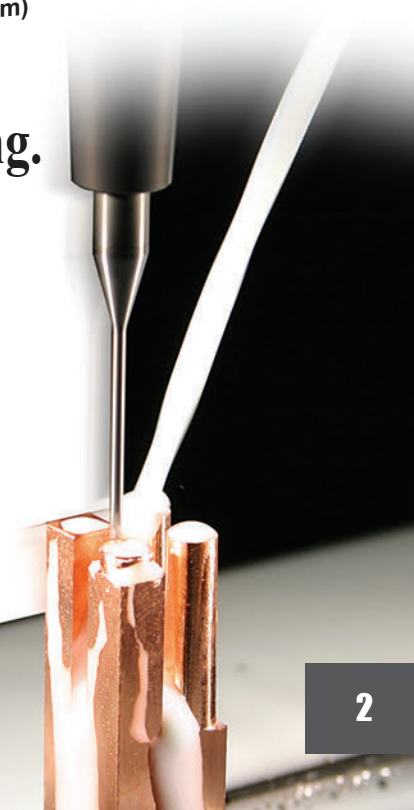
Comparison of cutting performance in wet cutting.

CRN-2XLB

Competitor A
CrN coated



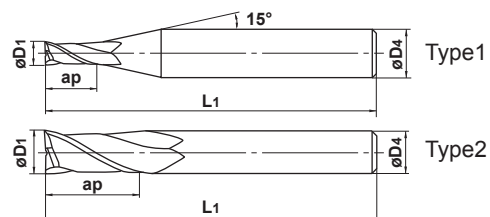
End mill	CRN-2XLB R1
Work material	Copper
Revolution	16,000min ⁻¹ (MAX101m/min)
Feed rate	1,600mm/min (0.05mm/t)
Cutting method	Climb cut, Emulsion



CRN END MILLS

CRN-2MS

End mill, Medium cut length, 2 flute



● 2 flute end mill with CRN coating for copper electrode machining.

Unit : mm

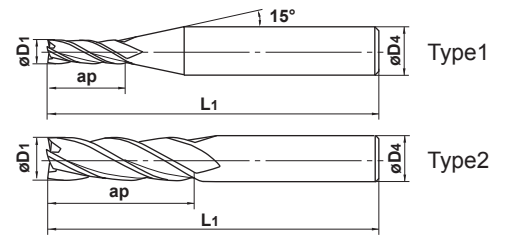
Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	Stock	Type
CRN2MSD0020S04	0.2	0.4	40	4	●	1
D0020S06	0.2	0.4	45	6	●	1
D0030S04	0.3	0.6	40	4	●	1
D0030S06	0.3	0.6	45	6	●	1
D0040S04	0.4	0.8	40	4	●	1
D0040S06	0.4	0.8	45	6	●	1
D0050S04	0.5	1	40	4	●	1
D0050S06	0.5	1	45	6	●	1
D0060S04	0.6	1.2	40	4	●	1
D0070S04	0.7	1.4	40	4	●	1
D0080S04	0.8	1.6	40	4	●	1
D0080S06	0.8	1.6	45	6	●	1
D0090S04	0.9	2	40	4	●	1
D0100S04	1	2.5	40	4	●	1
D0100S06	1	2.5	45	6	●	1
D0110S04	1.1	2.5	40	4	●	1
D0120S04	1.2	3	40	4	●	1
D0120S06	1.2	3	45	6	●	1
D0130S04	1.3	3	40	4	●	1
D0140S04	1.4	3	40	4	●	1
D0150S04	1.5	4	40	4	●	1
D0150S06	1.5	4	45	6	●	1
D0160S04	1.6	4	40	4	●	1
D0170S04	1.7	4	40	4	●	1
D0180S04	1.8	5	40	4	●	1
D0190S04	1.9	5	40	4	●	1
D0200S06	2	6	45	6	●	1
D0250S06	2.5	8	45	6	●	1
D0300S06	3	8	45	6	●	1
D0400S06	4	11	45	6	●	1
D0500S06	5	13	50	6	●	1
D0600S06	6	13	50	6	●	2
D0800S08	8	19	60	8	●	2
D1000S10	10	22	70	10	●	2
D1200S12	12	26	75	12	●	2

CRN-4JC

End mill, Semi long cut length, 4 flute



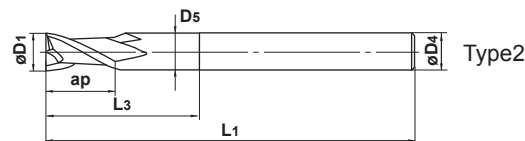
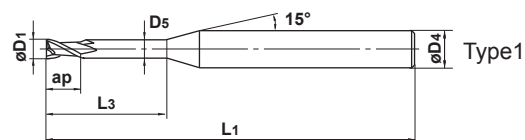
0 - -0.02



● 4 flute end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	Stock	Type
CRN4JCD0300	3	12	50	6	●	1
D0400	4	15	50	6	●	1
D0500	5	20	60	6	●	1
D0600	6	20	60	6	●	2
D0800	8	25	70	8	●	2
D1000	10	30	90	10	●	2
D1200	12	30	90	12	●	2



- 2 flute long neck end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	Stock	Type
CRN2XLD0020N005S04	0.2	0.3	0.5	0.17	50	4	●	1
D0020N005S06	0.2	0.3	0.5	0.17	50	6	●	1
D0020N010S04	0.2	0.3	1	0.17	50	4	●	1
D0020N010S06	0.2	0.3	1	0.17	50	6	●	1
D0020N015S04	0.2	0.3	1.5	0.17	50	4	●	1
D0020N015S06	0.2	0.3	1.5	0.17	50	6	●	1
D0030N010S04	0.3	0.5	1	0.27	50	4	●	1
D0030N010S06	0.3	0.5	1	0.27	50	6	●	1
D0030N030S04	0.3	0.5	3	0.27	50	4	●	1
D0030N030S06	0.3	0.5	3	0.27	50	6	●	1
D0040N020S04	0.4	0.6	2	0.36	50	4	●	1
D0040N020S06	0.4	0.6	2	0.36	50	6	●	1
D0040N040S04	0.4	0.6	4	0.36	50	4	●	1
D0040N040S06	0.4	0.6	4	0.36	50	6	●	1
D0040N060S04	0.4	0.6	6	0.36	50	4	●	1
D0040N060S06	0.4	0.6	6	0.36	50	6	●	1
D0050N020S04	0.5	0.8	2	0.46	50	4	●	1
D0050N020S06	0.5	0.8	2	0.46	50	6	●	1
D0050N040S04	0.5	0.8	4	0.46	50	4	●	1
D0050N040S06	0.5	0.8	4	0.46	50	6	●	1
D0050N060S04	0.5	0.8	6	0.46	50	4	●	1
D0050N060S06	0.5	0.8	6	0.46	50	6	●	1
D0050N080S04	0.5	0.8	8	0.46	50	4	●	1
D0050N080S06	0.5	0.8	8	0.46	50	6	●	1
D0080N040S04	0.8	1.2	4	0.76	50	4	●	1
D0080N040S06	0.8	1.2	4	0.76	50	6	●	1
D0080N060S04	0.8	1.2	6	0.76	50	4	●	1
D0080N060S06	0.8	1.2	6	0.76	50	6	●	1
D0080N080S04	0.8	1.2	8	0.76	50	4	●	1
D0080N080S06	0.8	1.2	8	0.76	50	6	●	1
D0080N100S04	0.8	1.2	10	0.76	50	4	●	1
D0080N100S06	0.8	1.2	10	0.76	50	6	●	1
D0100N060S04	1	1.5	6	0.94	50	4	●	1
D0100N060S06	1	1.5	6	0.94	50	6	●	1
D0100N080S04	1	1.5	8	0.94	50	4	●	1
D0100N080S06	1	1.5	8	0.94	50	6	●	1
D0100N100S04	1	1.5	10	0.94	50	4	●	1
D0100N100S06	1	1.5	10	0.94	50	6	●	1

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Overall Length L1	Shank Dia. D4	Stock	Type
CRN2XLD0100N120S04	1	1.5	12	0.94	50	4	●	1
D0100N120S06	1	1.5	12	0.94	50	6	●	1
D0100N160S04	1	1.5	16	0.94	55	4	●	1
D0100N160S06	1	1.5	16	0.94	55	6	●	1
D0150N060S04	1.5	2.3	6	1.44	50	4	●	1
D0150N060S06	1.5	2.3	6	1.44	50	6	●	1
D0150N080S04	1.5	2.3	8	1.44	50	4	●	1
D0150N080S06	1.5	2.3	8	1.44	50	6	●	1
D0150N100S04	1.5	2.3	10	1.44	50	4	●	1
D0150N100S06	1.5	2.3	10	1.44	50	6	●	1
D0150N120S04	1.5	2.3	12	1.44	50	4	●	1
D0150N120S06	1.5	2.3	12	1.44	50	6	●	1
D0150N160S04	1.5	2.3	16	1.44	55	4	●	1
D0150N160S06	1.5	2.3	16	1.44	55	6	●	1
D0150N200S04	1.5	2.3	20	1.44	60	4	●	1
D0150N200S06	1.5	2.3	20	1.44	60	6	●	1
D0200N060S06	2	3.0	6	1.90	50	6	●	1
D0200N080S06	2	3.0	8	1.90	50	6	●	1
D0200N100S06	2	3.0	10	1.90	50	6	●	1
D0200N120S06	2	3.0	12	1.90	50	6	●	1
D0200N160S06	2	3.0	16	1.90	55	6	●	1
D0200N200S06	2	3.0	20	1.90	60	6	●	1
D0250N080S06	2.5	3.8	8	2.40	50	6	●	1
D0250N120S06	2.5	3.8	12	2.40	55	6	●	1
D0250N160S06	2.5	3.8	16	2.40	60	6	●	1
D0250N200S06	2.5	3.8	20	2.40	65	6	●	1
D0300N200S06	3	4.5	20	2.90	65	6	●	1
D0400N200S06	4	6.0	20	3.90	65	6	●	1
D0500N250S06	5	7.5	25	4.90	70	6	●	1
D0600N300S06	6	9.0	30	5.85	70	6	●	2

CRN END MILLS

CRN-2MB

Expand

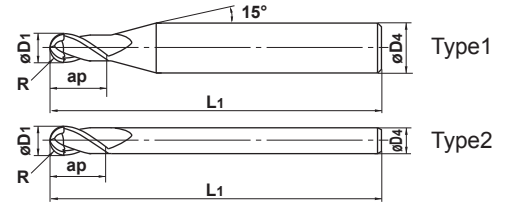
Ball nose end mill, Medium cut length, 2 flute



±0.01



0 - -0.02



- 2 flute ball nose end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	Stock	Type
CRN2MBR0020S04	0.2	0.4	0.8	45	4	●	1
R0020S06	0.2	0.4	0.8	50	6	●	1
R0030S04	0.3	0.6	1.2	45	4	●	1
R0030S06	0.3	0.6	1.2	50	6	●	1
R0040S04	0.4	0.8	1.6	45	4	●	1
R0040S06	0.4	0.8	1.6	50	6	●	1
R0050S04	0.5	1	2.5	45	4	●	1
R0050S06	0.5	1	2.5	50	6	●	1
R0075S04	0.75	1.5	4	45	4	●	1
R0075S06	0.75	1.5	4	50	6	●	1
R0100S06	1	2	6	50	6	●	1
R0125S06	1.25	2.5	6	50	6	●	1
* R0150S03	1.5	3	8	70	3	●	2
R0150S06	1.5	3	8	70	6	●	1
R0175S06	1.75	3.5	8	70	6	●	1
* R0200S04	2	4	8	70	4	●	2
R0200S06	2	4	8	70	6	●	1
R0250S06	2.5	5	12	80	6	●	1
R0300S06	3	6	12	80	6	●	2
R0400S08	4	8	14	90	8	●	2
R0500S10	5	10	18	100	10	●	2
R0600S12	6	12	22	110	12	●	2

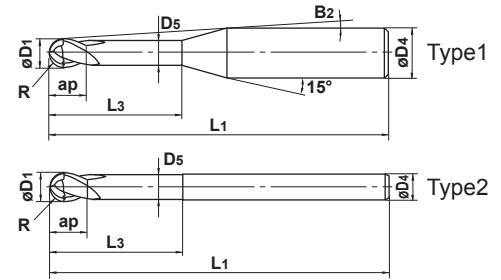
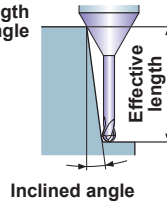
* Expand

CRN-2XLB

Ball nose end mill, Short cut length, 2 flute, Long neck



Effective length
for inclined angle



- 2 flute long neck ball nose end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle			
												30°	1°	2°	3°
CRN2XLB0010N005S04	0.1	0.2	0.2	0.5	0.17	13.7°	50	4	2	●	1	0.7	0.8	0.9	0.9
R0010N005S06	0.1	0.2	0.2	0.5	0.17	14.1°	50	6	2	●	1	0.7	0.8	0.9	0.9
R0010N010S04	0.1	0.2	0.2	1	0.17	12.9°	50	4	2	●	1	1.3	1.3	1.5	1.6
R0010N010S06	0.1	0.2	0.2	1	0.17	13.6°	50	6	2	●	1	1.3	1.3	1.5	1.6
R0010N015S04	0.1	0.2	0.2	1.5	0.17	12.2°	50	4	2	●	1	1.8	1.9	2	2.2
R0010N015S06	0.1	0.2	0.2	1.5	0.17	13.1°	50	6	2	●	1	1.8	1.9	2	2.2
R0015N010S04	0.15	0.3	0.3	1	0.27	12.9°	50	4	2	●	1	1.3	1.3	1.4	1.6
R0015N010S06	0.15	0.3	0.3	1	0.27	13.6°	50	6	2	●	1	1.3	1.3	1.4	1.6
R0015N015S04	0.15	0.3	0.3	1.5	0.27	12.2°	50	4	2	●	1	1.8	1.9	2	2.2
R0015N015S06	0.15	0.3	0.3	1.5	0.27	13.1°	50	6	2	●	1	1.8	1.9	2	2.2
R0015N020S04	0.15	0.3	0.3	2	0.27	11.6°	50	4	2	●	1	2.3	2.4	2.6	2.8
R0015N020S06	0.15	0.3	0.3	2	0.27	12.6°	50	6	2	●	1	2.3	2.4	2.6	2.8
R0020N010S04	0.2	0.4	0.4	1	0.36	12.9°	50	4	2	●	1	1.3	1.4	1.5	1.6
R0020N010S06	0.2	0.4	0.4	1	0.36	13.6°	50	6	2	●	1	1.3	1.4	1.5	1.6
R0020N015S04	0.2	0.4	0.4	1.5	0.36	12.2°	50	4	2	●	1	1.8	1.9	2	2.2
R0020N015S06	0.2	0.4	0.4	1.5	0.36	13.1°	50	6	2	●	1	1.8	1.9	2	2.2
R0020N020S04	0.2	0.4	0.4	2	0.36	11.5°	50	4	2	●	1	2.3	2.4	2.6	2.8
R0020N020S06	0.2	0.4	0.4	2	0.36	12.6°	50	6	2	●	1	2.3	2.4	2.6	2.8
R0020N030S04	0.2	0.4	0.4	3	0.36	10.4°	50	4	2	●	1	3.4	3.5	3.8	4.1
R0020N030S06	0.2	0.4	0.4	3	0.36	11.7°	50	6	2	●	1	3.4	3.5	3.8	4.1
R0025N015S04	0.25	0.5	0.5	1.5	0.46	12.2°	50	4	2	●	1	1.8	1.9	2	2.2
R0025N015S06	0.25	0.5	0.5	1.5	0.46	13.1°	50	6	2	●	1	1.8	1.9	2	2.2
R0025N020S04	0.25	0.5	0.5	2	0.46	11.5°	50	4	2	●	1	2.3	2.4	2.6	2.8
R0025N020S06	0.25	0.5	0.5	2	0.46	12.6°	50	6	2	●	1	2.3	2.4	2.6	2.8
R0025N030S04	0.25	0.5	0.5	3	0.46	10.3°	50	4	2	●	1	3.4	3.5	3.8	4
R0025N030S06	0.25	0.5	0.5	3	0.46	11.7°	50	6	2	●	1	3.4	3.5	3.8	4
R0025N040S04	0.25	0.5	0.5	4	0.46	9.4°	50	4	2	●	1	4.4	4.6	4.9	5.3
R0025N040S06	0.25	0.5	0.5	4	0.46	10.9°	50	6	2	●	1	4.4	4.6	4.9	5.3
R0025N060S04	0.25	0.5	0.5	6	0.46	7.9°	50	4	2	●	1	6.5	6.7	7.2	7.8
R0025N060S06	0.25	0.5	0.5	6	0.46	9.6°	50	6	2	●	1	6.5	6.7	7.2	7.8
R0025N080S04	0.25	0.5	0.5	8	0.46	6.9°	50	4	2	●	1	8.6	8.9	9.5	10.3
R0025N080S06	0.25	0.5	0.5	8	0.46	8.6°	50	6	2	●	1	8.6	8.9	9.5	10.3
R0025N100S04	0.25	0.5	0.5	10	0.46	6.1°	50	4	2	●	1	10.6	11	11.8	12.7
R0025N100S06	0.25	0.5	0.5	10	0.46	7.7°	50	6	2	●	1	10.6	11	11.8	12.7
R0030N020S04	0.3	0.6	0.6	2	0.56	11.5°	50	4	2	●	1	2.3	2.4	2.6	2.8
R0030N020S06	0.3	0.6	0.6	2	0.56	12.6°	50	6	2	●	1	2.3	2.4	2.6	2.8
R0030N040S04	0.3	0.6	0.6	4	0.56	9.3°	50	4	2	●	1	4.4	4.6	4.9	5.3
R0030N040S06	0.3	0.6	0.6	4	0.56	10.9°	50	6	2	●	1	4.4	4.6	4.9	5.3

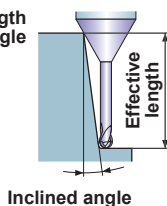
CRN END MILLS

CRN-2XLB

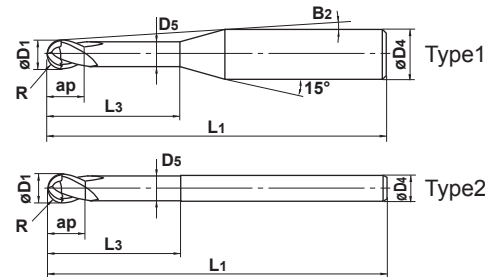
Ball nose end mill, Short cut length, 2 flute, Long neck



Effective length
for inclined angle



Inclined angle



- 2 flute long neck ball nose end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle			
												30°	1°	2°	3°
CRN2XLB0030N060S04	0.3	0.6	0.6	6	0.56	7.9°	50	4	2	●	1	6.5	6.7	7.2	7.8
R0030N060S06	0.3	0.6	0.6	6	0.56	9.5°	50	6	2	●	1	6.5	6.7	7.2	7.8
R0030N080S04	0.3	0.6	0.6	8	0.56	6.8°	50	4	2	●	1	8.6	8.8	9.5	10.2
R0030N080S06	0.3	0.6	0.6	8	0.56	8.5°	50	6	2	●	1	8.6	8.8	9.5	10.2
R0030N100S04	0.3	0.6	0.6	10	0.56	6.0°	50	4	2	●	1	10.6	11	11.8	12.7
R0030N100S06	0.3	0.6	0.6	10	0.56	7.7°	50	6	2	●	1	10.6	11	11.8	12.7
R0040N020S04	0.4	0.8	0.8	2	0.76	11.4°	50	4	2	●	1	2.3	2.4	2.6	2.8
R0040N020S06	0.4	0.8	0.8	2	0.76	12.6°	50	6	2	●	1	2.3	2.4	2.6	2.8
R0040N040S04	0.4	0.8	0.8	4	0.76	9.2°	50	4	2	●	1	4.4	4.6	4.9	5.2
R0040N040S06	0.4	0.8	0.8	4	0.76	10.8°	50	6	2	●	1	4.4	4.6	4.9	5.2
R0040N060S04	0.4	0.8	0.8	6	0.76	7.7°	50	4	2	●	1	6.5	6.7	7.2	7.7
R0040N060S06	0.4	0.8	0.8	6	0.76	9.5°	50	6	2	●	1	6.5	6.7	7.2	7.7
R0040N080S04	0.4	0.8	0.8	8	0.76	6.6°	50	4	2	●	1	8.6	8.8	9.5	10.2
R0040N080S06	0.4	0.8	0.8	8	0.76	8.4°	50	6	2	●	1	8.6	8.8	9.5	10.2
R0040N100S04	0.4	0.8	0.8	10	0.76	5.8°	50	4	2	●	1	10.6	11	11.8	12.7
R0040N100S06	0.4	0.8	0.8	10	0.76	7.6°	50	6	2	●	1	10.6	11	11.8	12.7
R0050N030S04	0.5	1	1	3	0.94	9.9°	50	4	2	●	1	3.5	3.7	3.9	4.2
R0050N030S06	0.5	1	1	3	0.94	11.5°	50	6	2	●	1	3.5	3.7	3.9	4.2
R0050N040S04	0.5	1	1	4	0.94	8.9°	50	4	2	●	1	4.6	4.7	5.1	5.4
R0050N040S06	0.5	1	1	4	0.94	10.6°	50	6	2	●	1	4.6	4.7	5.1	5.4
R0050N050S04	0.5	1	1	5	0.94	8.1°	50	4	2	●	1	5.6	5.8	6.2	6.7
R0050N050S06	0.5	1	1	5	0.94	9.9°	50	6	2	●	1	5.6	5.8	6.2	6.7
R0050N060S04	0.5	1	1	6	0.94	7.4°	50	4	2	●	1	6.7	6.9	7.4	7.9
R0050N060S06	0.5	1	1	6	0.94	9.3°	50	6	2	●	1	6.7	6.9	7.4	7.9
R0050N070S04	0.5	1	1	7	0.94	6.8°	50	4	2	●	1	7.7	7.9	8.5	9.2
R0050N070S06	0.5	1	1	7	0.94	8.7°	50	6	2	●	1	7.7	7.9	8.5	9.2
R0050N080S04	0.5	1	1	8	0.94	6.3°	50	4	2	●	1	8.7	9	9.7	10.4
R0050N080S06	0.5	1	1	8	0.94	8.2°	50	6	2	●	1	8.7	9	9.7	10.4
R0050N100S04	0.5	1	1	10	0.94	5.5°	50	4	2	●	1	10.8	11.2	12	12.9
R0050N100S06	0.5	1	1	10	0.94	7.4°	50	6	2	●	1	10.8	11.2	12	12.9
R0050N120S04	0.5	1	1	12	0.94	4.9°	50	4	2	●	1	12.9	13.3	14.3	15.4
R0050N120S06	0.5	1	1	12	0.94	6.7°	50	6	2	●	1	12.9	13.3	14.3	15.4
R0050N140S04	0.5	1	1	14	0.94	4.4°	50	4	2	●	1	14.9	15.4	16.6	17.9
R0050N140S06	0.5	1	1	14	0.94	6.2°	55	6	2	●	1	14.9	15.4	16.6	17.9
R0050N160S04	0.5	1	1	16	0.94	4.0°	55	4	2	●	1	17	17.6	18.9	20.4
R0050N160S06	0.5	1	1	16	0.94	5.7°	55	6	2	●	1	17	17.6	18.9	20.4
R0050N180S04	0.5	1	1	18	0.94	3.7°	55	4	2	●	1	19.1	19.7	21.2	22.8
R0050N180S06	0.5	1	1	18	0.94	5.3°	60	6	2	●	1	19.1	19.7	21.2	22.8

● : Inventory maintained.

Order Number	Radius of Ball Nose R	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	No. of Flutes N	Stock	Type	Effective length for inclined angle			
												30°	1°	2°	3°
CRN2XLBR0050N200S04	0.5	1	1	20	0.94	3.4°	55	4	2	●	1	21.1	21.9	23.5	25.3
R0050N200S06	0.5	1	1	20	0.94	4.9°	60	6	2	●	1	21.1	21.9	23.5	25.3
R0075N080S04	0.75	1.5	1.5	8	1.44	5.8°	50	4	2	●	1	8.7	9	9.6	10.3
R0075N080S06	0.75	1.5	1.5	8	1.44	8.0°	50	6	2	●	1	8.7	9	9.6	10.3
R0075N100S04	0.75	1.5	1.5	10	1.44	5.0°	50	4	2	●	1	10.8	11.1	11.9	12.8
R0075N100S06	0.75	1.5	1.5	10	1.44	7.1°	50	6	2	●	1	10.8	11.1	11.9	12.8
R0075N120S04	0.75	1.5	1.5	12	1.44	4.4°	50	4	2	●	1	12.9	13.3	14.2	15.3
R0075N120S06	0.75	1.5	1.5	12	1.44	6.4°	50	6	2	●	1	12.9	13.3	14.2	15.3
R0075N140S04	0.75	1.5	1.5	14	1.44	3.9°	50	4	2	●	1	14.9	15.4	16.5	17.8
R0075N140S06	0.75	1.5	1.5	14	1.44	5.8°	55	6	2	●	1	14.9	15.4	16.5	17.8
R0075N160S04	0.75	1.5	1.5	16	1.44	3.5°	55	4	2	●	1	17	17.6	18.8	20.3
R0075N160S06	0.75	1.5	1.5	16	1.44	5.4°	55	6	2	●	1	17	17.6	18.8	20.3
R0075N180S04	0.75	1.5	1.5	18	1.44	3.2°	55	4	2	●	1	19.1	19.7	21.1	22.8
R0075N180S06	0.75	1.5	1.5	18	1.44	5.0°	60	6	2	●	1	19.1	19.7	21.1	22.8
R0075N200S04	0.75	1.5	1.5	20	1.44	3.0°	55	4	2	●	1	21.1	21.8	23.4	25.3
R0075N200S06	0.75	1.5	1.5	20	1.44	4.6°	60	6	2	●	1	21.1	21.8	23.4	25.3
R0100N080S04	1	2	2	8	1.90	5.1°	50	4	2	●	1	8.8	9.1	9.7	10.4
R0100N080S06	1	2	2	8	1.90	7.6°	50	6	2	●	1	8.8	9.1	9.7	10.4
R0100N100S04	1	2	2	10	1.90	4.3°	50	4	2	●	1	10.9	11.2	12	12.9
R0100N100S06	1	2	2	10	1.90	6.7°	50	6	2	●	1	10.9	11.2	12	12.9
R0100N120S04	1	2	2	12	1.90	3.8°	50	4	2	●	1	12.9	13.3	14.3	15.4
R0100N120S06	1	2	2	12	1.90	6.0°	50	6	2	●	1	12.9	13.3	14.3	15.4
R0100N140S04	1	2	2	14	1.90	3.4°	50	4	2	●	1	15	15.5	16.6	17.8
R0100N140S06	1	2	2	14	1.90	5.5°	55	6	2	●	1	15	15.5	16.6	17.8
R0100N160S04	1	2	2	16	1.90	3.0°	55	4	2	●	1	17.1	17.6	18.9	20.3
R0100N160S06	1	2	2	16	1.90	5.0°	55	6	2	●	1	17.1	17.6	18.9	20.3
R0100N200S04	1	2	2	20	1.90	2.5°	60	4	2	●	1	21.2	21.9	23.5	No interference
R0100N200S06	1	2	2	20	1.90	4.3°	60	6	2	●	1	21.2	21.9	23.5	25.3
R0100N250S06	1	2	2	25	1.90	3.6°	65	6	2	●	1	26.4	27.2	29.2	31.5
R0100N300S06	1	2	2	30	1.90	3.1°	70	6	2	●	1	31.5	32.6	35	37.7
R0150N160S06	1.5	3	3	16	2.90	4.2°	60	6	2	●	1	17	17.6	18.8	20.2
R0150N250S06	1.5	3	3	25	2.90	2.9°	70	6	2	●	1	26.3	27.2	29.1	No interference
R0150N350S06	1.5	3	3	35	2.90	2.2°	80	6	2	●	1	36.7	37.9	40.6	No interference
R0200N160S06	2	4	4	16	3.90	3.2°	70	6	2	●	1	17	17.5	18.7	20.1
R0200N200S06	2	4	4	20	3.90	2.6°	70	6	2	●	1	21.2	21.8	23.3	No interference
R0200N300S06	2	4	4	30	3.90	1.8°	70	6	2	●	1	31.5	32.5	No interference	No interference
R0200N400S06	2	4	4	40	3.90	1.4°	90	6	2	●	1	41.8	43.2	No interference	No interference
R0200N500S06	2	4	4	50	3.90	1.1°	100	6	2	●	1	52.2	53.9	No interference	No interference
R0250N200S06	2.5	5	5	20	4.90	1.5°	70	6	2	●	1	21.1	21.8	No interference	No interference
R0250N300S06	2.5	5	5	30	4.90	1.0°	80	6	2	●	1	31.5	32.5	No interference	No interference
R0300N300S06	3	6	6	30	5.85	0.0°	80	6	2	●	1	No interference	No interference	No interference	No interference
R0300N500S06	3	6	6	50	5.85	0.0°	100	6	2	●	1	No interference	No interference	No interference	No interference

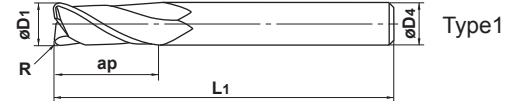
CRN END MILLS

CRN-2MRB NEW

Corner radius end mill, Medium cut length, 2 flute



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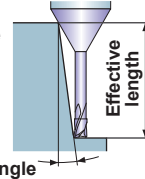
- 2 flute corner radius end mill with CRN coating for copper electrode machining.

Unit : mm

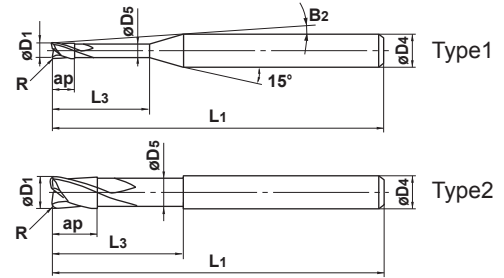
Order Number	Dia. D1	Length of Cut ap	Overall Length L1	Shank Dia. D4	Corner R R	No. of Flutes N	Stock	Type
CRN2MRBD0600R020	6	13	50	6	0.2	2	●	1
D0600R030	6	13	50	6	0.3	2	●	1
D0600R050	6	13	50	6	0.5	2	●	1
D0600R100	6	13	50	6	1	2	●	1
D0800R030	8	19	60	8	0.3	2	●	1
D0800R050	8	19	60	8	0.5	2	●	1
D0800R100	8	19	60	8	1	2	●	1
D1000R030	10	22	70	10	0.3	2	●	1
D1000R050	10	22	70	10	0.5	2	●	1
D1000R100	10	22	70	10	1	2	●	1
D1200R030	12	26	75	12	0.3	2	●	1
D1200R050	12	26	75	12	0.5	2	●	1
D1200R100	12	26	75	12	1	2	●	1



Effective length
for inclined angle



Inclined angle



- 2 flute long neck corner radius end mill with CRN coating for copper electrode machining.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	Corner R R	No. of Flutes N	Stock	Type	Effective length for inclined angle			
												30°	1°	2°	3°
CRN2XLRBD0050R005N04	0.5	0.5	4	0.46	9.2°	50	4	0.05	2	●	1	4.4	4.6	4.9	5.3
D0050R010N04	0.5	0.5	4	0.46	9.3°	50	4	0.1	2	●	1	4.4	4.6	4.9	5.3
D0050R005N06	0.5	0.5	6	0.46	7.8°	50	4	0.05	2	●	1	6.5	6.7	7.2	7.8
D0050R010N06	0.5	0.5	6	0.46	7.8°	50	4	0.1	2	●	1	6.5	6.7	7.2	7.8
D0080R005N06	0.8	0.8	6	0.76	7.5°	50	4	0.05	2	●	1	6.5	6.7	7.2	7.8
D0080R010N06	0.8	0.8	6	0.76	7.5°	50	4	0.1	2	●	1	6.5	6.7	7.2	7.8
D0080R005N08	0.8	0.8	8	0.76	6.5°	50	4	0.05	2	●	1	8.6	8.9	9.5	10.3
D0080R010N08	0.8	0.8	8	0.76	6.5°	50	4	0.1	2	●	1	8.6	8.9	9.5	10.3
D0100R010N08	1	1	8	0.94	6.2°	50	4	0.1	2	●	1	8.7	9	9.7	10.5
D0100R030N08	1	1	8	0.94	6.2°	50	4	0.3	2	●	1	8.7	9	9.7	10.5
D0100R010N10	1	1	10	0.94	5.4°	55	4	0.1	2	●	1	10.8	11.2	12	13
D0100R030N10	1	1	10	0.94	5.5°	55	4	0.3	2	●	1	10.8	11.2	12	12.9
D0100R010N12	1	1	12	0.94	4.8°	55	4	0.1	2	●	1	12.9	13.3	14.3	15.5
D0100R030N12	1	1	12	0.94	4.9°	55	4	0.3	2	●	1	12.9	13.3	14.3	15.4
D0150R010N12	1.5	1.5	12	1.44	4.2°	55	4	0.1	2	●	1	12.9	13.3	14.3	15.5
D0150R020N12	1.5	1.5	12	1.44	4.3°	55	4	0.2	2	●	1	12.9	13.3	14.3	15.5
D0150R030N12	1.5	1.5	12	1.44	4.3°	55	4	0.3	2	●	1	12.9	13.3	14.3	15.4
D0150R010N20	1.5	1.5	20	1.44	2.9°	60	4	0.1	2	●	1	21.1	21.9	23.5	No interference
D0150R020N20	1.5	1.5	20	1.44	2.9°	60	4	0.2	2	●	1	21.1	21.9	23.5	No interference
D0150R030N20	1.5	1.5	20	1.44	2.9°	60	4	0.3	2	●	1	21.1	21.9	23.5	No interference
D0200R010N12	2	2	12	1.9	3.6°	55	4	0.1	2	●	1	13	13.4	14.4	15.6
D0200R020N12	2	2	12	1.9	3.6°	55	4	0.2	2	●	1	12.9	13.4	14.4	15.5
D0200R030N12	2	2	12	1.9	3.6°	55	4	0.3	2	●	1	12.9	13.4	14.4	15.5
D0200R050N12	2	2	12	1.9	3.7°	55	4	0.5	2	●	1	12.9	13.4	14.3	15.5
D0200R010N16	2	2	16	1.9	2.9°	55	4	0.1	2	●	1	17.1	17.7	19	No interference
D0200R020N16	2	2	16	1.9	2.9°	55	4	0.2	2	●	1	17.1	17.7	19	No interference
D0200R030N16	2	2	16	1.9	2.9°	55	4	0.3	2	●	1	17.1	17.7	19	No interference
D0200R050N16	2	2	16	1.9	2.9°	55	4	0.5	2	●	1	17.1	17.7	18.9	No interference
D0200R010N20	2	2	20	1.9	2.4°	60	4	0.1	2	●	1	21.2	22	23.6	No interference
D0200R020N20	2	2	20	1.9	2.4°	60	4	0.2	2	●	1	21.2	22	23.6	No interference
D0200R030N20	2	2	20	1.9	2.4°	60	4	0.3	2	●	1	21.2	21.9	23.6	No interference
D0200R050N20	2	2	20	1.9	2.5°	60	4	0.5	2	●	1	21.2	21.9	23.5	No interference
D0300R020N20	3	3	20	2.9	3.4°	65	6	0.2	2	●	1	21.2	22	23.6	25.5
D0300R030N20	3	3	20	2.9	3.4°	65	6	0.3	2	●	1	21.2	21.9	23.6	25.5
D0300R050N20	3	3	20	2.9	3.4°	65	6	0.5	2	●	1	21.2	21.9	23.5	25.4
D0400R020N20	4	4	20	3.9	2.4°	65	6	0.2	2	●	1	21.2	22	23.6	No interference
D0400R030N20	4	4	20	3.9	2.4°	65	6	0.3	2	●	1	21.2	21.9	23.6	No interference
D0400R050N20	4	4	20	3.9	2.5°	65	6	0.5	2	●	1	21.2	21.9	23.5	No interference

CRN END MILLS

CRN-2XLRB NEW

Corner radius end mill, Short cut length, 2 flute, Long neck

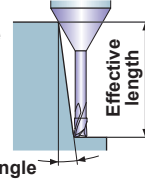


$D1 < 3$

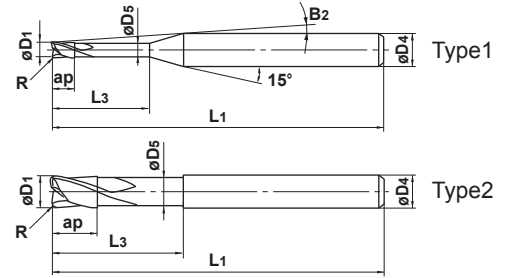


$3 \leq D1$

Effective length
for inclined angle



Inclined angle



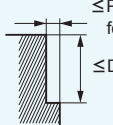
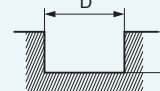
- 2 flute long neck corner radius end mill
with CRN coating for copper electrode machining.

Unit : mm

Order Number	Dia. D1	Length of Cut ap	Neck Length L3	Neck Dia. D5	Cutting Edge to Shank Angle B2	Overall Length L1	Shank Dia. D4	Corner R R	No. of Flutes N	Stock	Type	Effective length for inclined angle			
												30°	1°	2°	3°
CRN2XLRBD0500R020N25	5	5	25	4.9	1.1°	65	6	0.2	2	●	1	26.4	27.3	No interference	No interference
D0500R030N25	5	5	25	4.9	1.1°	65	6	0.3	2	●	1	26.4	27.3	No interference	No interference
D0500R050N25	5	5	25	4.9	1.1°	65	6	0.5	2	●	1	26.4	27.3	No interference	No interference
D0600R020N30	6	6	30	5.85	—	70	6	0.2	2	●	2	No interference	No interference	No interference	No interference
D0600R030N30	6	6	30	5.85	—	70	6	0.3	2	●	2	No interference	No interference	No interference	No interference
D0600R050N30	6	6	30	5.85	—	70	6	0.5	2	●	2	No interference	No interference	No interference	No interference
D0600R100N30	6	6	30	5.85	—	70	6	1	2	●	2	No interference	No interference	No interference	No interference

CRN-2MS

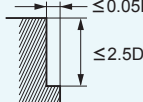
End mill, Medium cut length, 2 flute

Work material	Copper, Copper alloys		
Dia. (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut ap (mm)
0.2	40,000	600	0.01
0.3	40,000	600	0.01
0.4	40,000	800	0.01
0.5	40,000	960	0.015
0.6	40,000	1,200	0.02
0.7	40,000	1,400	0.02
0.8	40,000	1,600	0.03
0.9	40,000	1,800	0.04
1	40,000	2,000	0.06
1.5	40,000	3,000	0.12
2	30,000	3,000	0.18
2.5	24,000	2,600	0.25
3	20,000	2,300	0.30
4	15,000	2,000	0.40
5	12,000	1,600	0.50
6	10,000	1,400	0.60
8	8,000	1,000	0.80
10	6,400	900	1.00
12	5,400	820	1.00
Depth of cut	  D: Dia.		

- 1) If the rigidity of the machine or the workpiece installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.
- 2) When drilling, please set the feed rate at 1/3 or below of the values above.

CRN-4JC

End mill, Semi long cut length, 4 flute

Work material	Copper, Copper alloys	
Dia. (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)
3	10,600	280
4	8,000	330
5	6,400	380
6	5,300	420
8	4,000	460
10	3,200	460
12	2,700	460
Depth of cut	 D: Dia.	

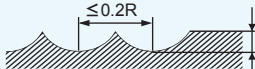
- 1) If the rigidity of the machine or the workpiece installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.
- 2) If the depth of cut is shallow, the revolution and feed rate can be increased.
- 3) When cutting copper tungsten alloy, please set the revolution and the feed rate at under 70% of the table value.
- 4) Water-soluble cutting fluid is recommended.

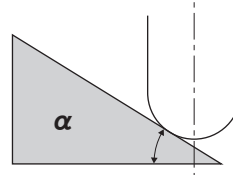
Work material		Copper, Copper alloys		
Dia. (mm)	Neck length (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut ap (mm)
0.2	0.5	40,000	800	0.004
	1.0	40,000	700	0.003
	1.5	40,000	600	0.002
0.3	1	40,000	800	0.007
	3	40,000	600	0.002
0.4	2	40,000	950	0.007
	4	40,000	800	0.003
	6	40,000	600	0.001
0.5	2	40,000	950	0.01
	4	40,000	800	0.005
	6	40,000	700	0.002
0.8	4	40,000	1,200	0.02
	6	40,000	1,200	0.015
	8	40,000	1,000	0.01
1	6	40,000	2,000	0.04
	8	40,000	2,000	0.03
	10	30,000	1,200	0.02
	12	30,000	1,000	0.015
1.5	6	40,000	2,400	0.10
	8	40,000	2,200	0.09
	10	40,000	2,000	0.08
	12	30,000	1,800	0.05
	16	20,000	1,200	0.03
	20	15,000	800	0.02
2	6	40,000	2,400	0.18
	8	40,000	2,200	0.15
	10	40,000	2,000	0.12
	12	30,000	1,500	0.10
	16	30,000	1,000	0.06
	20	15,000	600	0.03
2.5	8	40,000	3,000	0.20
	12	40,000	2,800	0.15
	16	30,000	2,100	0.10
	20	20,000	1,000	0.08
3	20	20,000	2,000	0.12
4	20	15,000	2,000	0.30
5	25	12,000	1,500	0.35
6	30	10,000	1,200	0.40

- 1) If chattering and noise occur, reduce the revolution and the feed rate proportionately.
- 2) When high machining accuracy is needed, we recommend lowering the feed rate. Cutting condition may differ considerably due to the overhang (milling depth and neck length), depth of cut, and machine tool conditions. Please use the above table as a standard starting point.
- 3) If the depth of cut is shallow, the revolution and feed rate can be increased.
- 4) Water-soluble cutting fluid is recommended.

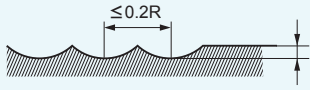
CRN-2MB

Ball nose end mill, Medium cut length, 2 flute

Work material	Copper, Copper alloys				
R (mm)	$\alpha \leq 15^\circ$		$\alpha > 15^\circ$		Depth of cut ap (mm)
	Revolution (min ⁻¹)	Feed rate (mm/min)	Revolution (min ⁻¹)	Feed rate (mm/min)	
R0.2	40,000	1,600	40,000	1,200	0.02
R0.3	40,000	3,200	40,000	1,600	0.03
R0.4	40,000	6,400	40,000	2,400	0.05
R 0.5	40,000	8,000	40,000	3,200	0.06
R0.75	40,000	9,600	40,000	4,000	0.09
R 1	40,000	9,600	39,000	4,700	0.11
R1.25	40,000	12,000	30,000	4,500	0.12
R1.5	40,000	12,000	27,000	4,300	0.13
R 2	32,000	11,000	20,000	3,600	0.15
R2.5	25,000	9,000	16,000	2,900	0.20
R 3	21,000	8,400	13,000	2,600	0.25
R 4	16,000	6,400	10,000	2,000	0.30
R 5	13,000	5,200	8,000	1,700	0.50
R 6	9,000	3,600	6,000	1,300	0.50
Depth of cut	Please select a pick feed based on the required surface finishes in reference to "Pitch Selection of Pick Feed" on page F023.  ≤ 0.2R Please refer to the list above for depth of cut. R:Radius				



- 1) α is the inclination of the machined surface.
- 2) If the rigidity of the machine or the workpiece installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately.
- 3) When applying a lower revolution, reduce the revolution and the feed rate proportionately.
- 4) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.

Work material		Copper, Copper alloys		
R (mm)	Neck length (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut ap (mm)
R0.1	0.5	40,000	800	0.003
	1.0	40,000	600	0.002
	1.5	40,000	400	0.001
R0.15	1	40,000	1,200	0.007
	2	40,000	800	0.003
R0.2	1	40,000	2,000	0.015
	2	40,000	1,300	0.01
	3	40,000	800	0.005
R0.25	2	40,000	2,000	0.02
	4	40,000	1,200	0.01
	6	36,000	600	0.006
	10	26,000	200	0.002
R0.3	2	40,000	3,200	0.03
	6	40,000	1,200	0.008
	10	30,000	500	0.003
R0.4	4	40,000	4,000	0.02
	6	40,000	2,500	0.02
	10	30,000	700	0.008
R0.5	4	40,000	6,400	0.05
	6	40,000	4,800	0.03
	8	40,000	3,000	0.02
	10	33,000	2,000	0.01
	16	18,000	500	0.008
	20	13,000	250	0.005
R0.75	8	40,000	8,000	0.07
	12	35,000	4,500	0.04
	16	20,000	2,000	0.03
	20	12,000	900	0.02
R1	8	40,000	9,600	0.10
	10	40,000	6,400	0.08
	12	40,000	6,000	0.08
	16	30,000	3,000	0.05
	20	20,000	2,000	0.04
	30	10,000	800	0.02
R1.5	16	40,000	12,000	0.10
	25	25,000	6,000	0.08
	35	6,000	700	0.06
R 2	16	32,000	11,000	0.15
	20	32,000	9,000	0.15
	30	20,000	4,500	0.10
	40	15,000	3,000	0.08
	50	8,000	1,000	0.05
R2.5	20	25,000	9,500	0.20
	30	20,000	3,300	0.15
R3	30	21,000	8,400	0.20
	50	20,000	3,000	0.15
Depth of cut		Please select a pick feed based on the required surface finishes in reference to "Pitch Selection of Pick Feed" on page F023. 		

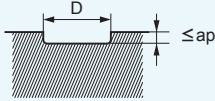
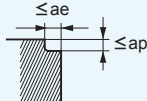
- 1) If the rigidity of the machine or the workpiece installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately. When high machining accuracy is needed, we recommend lowering the feed rate.
- 2) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.
- 3) If the depth of cut is shallow, the revolution and feed rate can be increased.

CRN-2XLRB

Corner radius end mill, Short cut length, 2 flute, Long neck

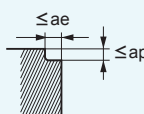
Slotting

Contour Cutting

Work material			Copper, Copper alloys			Copper, Copper alloys			
Dia. (mm)	Corner radius (mm)	Neck length (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut	
								ap (mm)	ae (mm)
0.5	R0.05, R0.1	4	40,000	800	0.005	40,000	1,500	0.01	0.1
		6	40,000	700	0.003	40,000	1,000	0.005	0.1
0.8	R0.05, R0.1	6	40,000	1,200	0.02	40,000	2,500	0.02	0.15
		8	40,000	1,200	0.015	40,000	1,600	0.01	0.15
1	R0.1, R0.3	8	40,000	2,000	0.03	40,000	3,000	0.03	0.2
		10	35,000	1,600	0.025	35,000	2,000	0.025	0.2
		12	30,000	1,200	0.02	30,000	1,800	0.02	0.2
1.5	R0.1, R0.2, R0.3	12	30,000	1,500	0.05	40,000	4,500	0.04	0.3
		20	20,000	1,000	0.02	20,000	2,000	0.02	0.3
2	R0.1, R0.2 R0.3, R0.5	12	30,000	1,500	0.1	40,000	4,500	0.08	0.4
		16	30,000	1,000	0.06	30,000	3,000	0.05	0.4
		20	20,000	600	0.04	20,000	2,000	0.04	0.4
3	R0.2, R0.3	20	20,000	2,000	0.12	35,000	6,000	0.1	0.6
	R0.5	20	20,000	2,200	0.12	35,000	8,000	0.1	0.6
4	R0.2, R0.3	20	15,000	2,000	0.25	32,000	5,000	0.15	0.8
	R0.5	20	15,000	2,200	0.25	32,000	7,000	0.15	0.8
5	R0.2, R0.3	25	12,000	1,500	0.3	22,000	5,000	0.2	1.0
	R0.5	25	12,000	1,700	0.3	22,000	7,000	0.2	1.0
6	R0.2, R0.3, R0.5	30	10,000	1,200	0.4	20,000	5,000	0.25	1.2
	R1	30	10,000	1,500	0.4	20,000	7,000	0.25	1.2
Depth of cut									

D: Dia.

- 1) If the rigidity of the machine or the workpiece installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately. When high machining accuracy is needed, we recommend lowering the feed rate.
- 2) When applying a lower revolution, reduce the revolution and the feed rate proportionately.
- 3) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.

Work material		Copper, Copper alloys			
Dia. (mm)	Corner radius (mm)	Revolution (min ⁻¹)	Feed rate (mm/min)	Depth of cut	
				ap (mm)	ae (mm)
6	R0.2, R0.3, R0.5	10,000	1,400	6	0.6
	R1	10,000	1,700	6	0.6
8	R0.3, R0.5	8,000	1,000	8	0.8
	R1	8,000	1,200	8	0.8
10	R0.3, R0.5	6,400	900	10	1.0
	R1	6,400	1,100	10	1.0
12	R0.3, R0.5	5,400	800	12	1.0
	R1	5,400	1,000	12	1.0
Depth of cut					

- 1) If the rigidity of the machine or the workpiece installation is very low, or chattering and noise are generated, please reduce the revolution and the feed rate proportionately. When high machining accuracy is needed, we recommend lowering the feed rate.
- 2) When applying a lower revolution, reduce the revolution and the feed rate proportionately.
- 3) Cutting condition may be considerably different due to the overhang (milling depth), depth of cut, and machine tools. Please see the above table as a standard.

For Your Safety

●Cutting flutes and chips have sharp edges. Never touch these with your bare hands. ●Use these products within their recommended range of conditions, and make sure to replace tools before excessive wear occurs. ●Lathes may scatter hot chips or eject long chips. Make sure to use protective equipment such as safety cover and protective eye wear to prevent injury. ●Always take appropriate fire protection measures if non-water-soluble cutting fluid is used. ●If the tool is to be rotated for use, always make sure to perform a test run to check for shaking, vibrations, and unusual sounds.

MITSUBISHI MATERIALS CORPORATION

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(Tools specifications subject to change without notice.)