

DHR237

Long Neck Square End Mill for Copper Electrode

DRB230

Long Neck Ball End Mill for Copper Electrode

DHR237R

Long Neck Corner Radius End Mill for Copper Electrode

DLC



Realized overwhelming long tool life and high quality burrless cutting performance

End Mill for Copper Electrode series with great size expansions from all 193 sizes to all 321 sizes.



Total 74 sizes
Long Neck Square End Mill

DHR237

$\phi 0.1 \sim \phi 6$



Total 94 sizes
Long Neck Ball End Mill

DRB230

R 0.05 ~ R 3



Total 153 sizes
Long Neck Corner Radius End Mill

DHR237R

$\phi 0.2 \times R 0.02 \sim \phi 6 \times R 1$



Features

Feature
1

Long tool life

Coating

DLC COATING

DLC Coating optimized for copper and copper alloy machining increases tool life compare to conventional tool

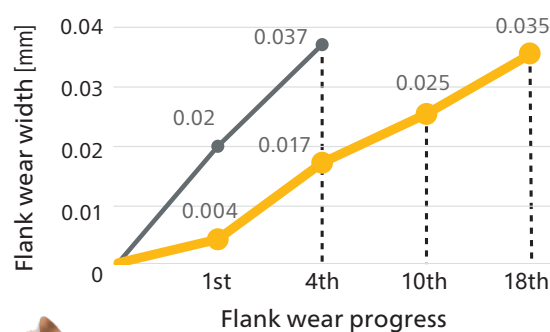
Tool life comparison with conventional tool

Conventional tool
R0.5 × 4
7 hr

DRB230
R0.5 × 4
31 hr 30 min

Machining time

4.5 times longer tool life than conventional tool

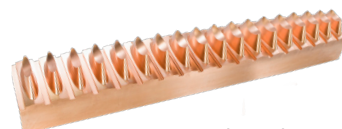


Material : Tough pitch copper (TPC)
Coolant : Water-soluble fluid

	After machining 4pcs 7hr	After machining 10pcs 17hr 30min	After machining 18pcs 31hr 30min
Conventional tool R0.5 × 4			
DRB230 R0.5 × 4			



Ended at the fourth work piece by excess wear width



DRB230 machined 18pieces (31 hr 30 min)

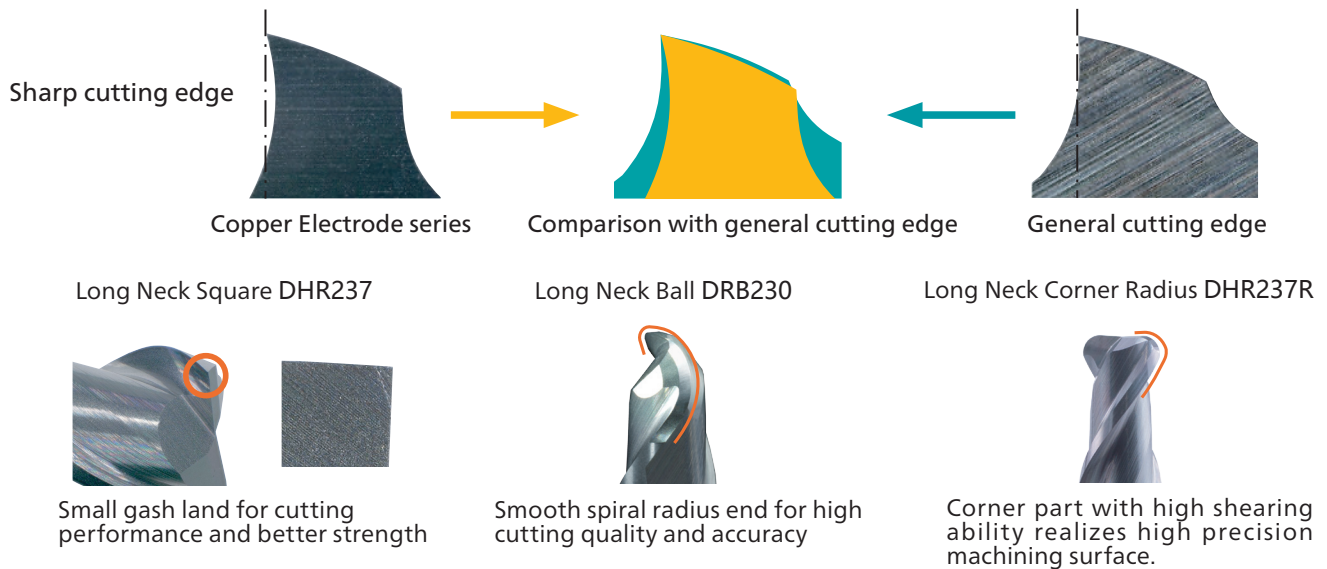
Feature
2

Burr suppression

Shape Sharp cutting edge

2-1 Shape of cutting edge

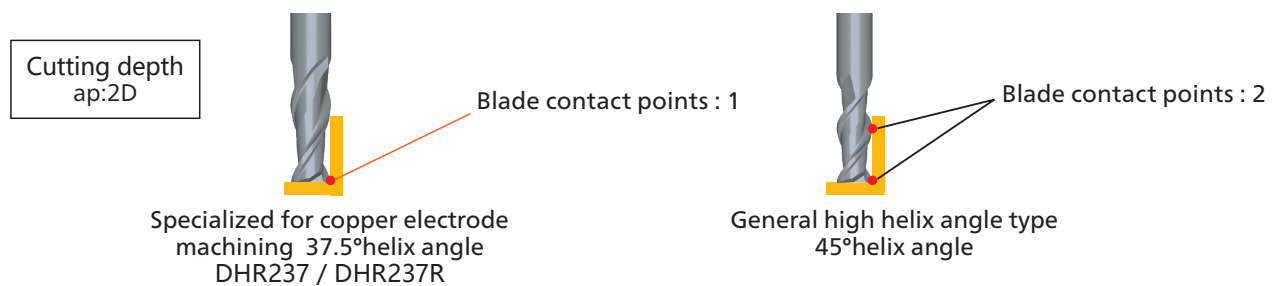
Adoption of sharper cutting edge to realize high precision machining by suppressing burr and deflection



2-2 Helix angle of peripheral flutes

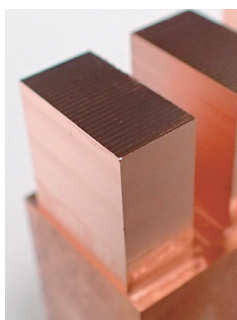
High helix angle improves shearing ability

Specialized 37.5°helix angle with high shearing ability and less contact point to reduce waviness



Comparison with conventional tool

Material:
Tough pitch copper (TPC)
Work size: 8 × 15 mm
Cutting depth: 12 mm
Coolant:
Water-insoluble fluid

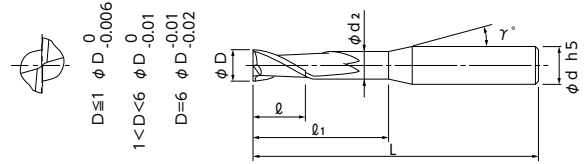
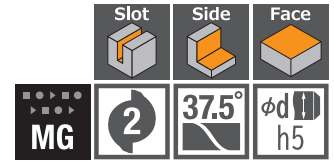


	DHR237 $\phi 3 \times 15$				Conventional tool $\phi 3 \times 14$			
	Beginning		After 10hr		Beginning		After 10hr	
	Top	Side	Top	Side	Top	Side	Top	Side
Burr height								
	0.002mm/0.002mm		0.003mm/0.013mm		0.003mm/0.016mm		0.012mm/0.018mm	
Roughness								
	Ra:0.075 μ m		Ra:0.076 μ m		Ra:0.120 μ m		Ra:0.350 μ m	

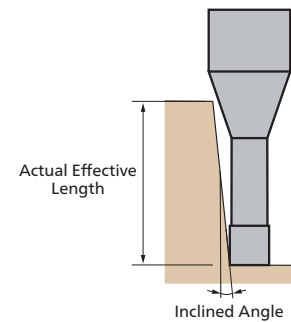
Long Neck Square End Mill for Copper Electrode

Total 74 sizes

Long neck square end mill specialized for machining copper alloy.
Sharpe cutting edge makes less burr and high quality surface.



- Long neck square end mill specialized for machining copper electrode.
- Helix angle 37.5 degrees to achieve both sharpness and finished surface quality that prevents scratches on cutting surface.
- High quality and stable milling performance with long tool life by optimized design and DLC COATING.
- Machining copper tungsten electrodes is also effective.



Work material

Copper	Copper Tungsten

Unit [Size : mm]

Code No.	Dia. (D)	Under Neck Length (ℓ_1)	Length of Cut (ℓ)	Neck Dia. (d_2)	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°
2.07-00100-01003	0.1	0.3	0.2	0.085	12°	4	45	0.34	0.36	0.38	0.40	0.44
2.07-00100-01005		0.5	0.2	0.085	12°	4	45	0.55	0.58	0.61	0.64	0.71
2.07-00100-01007		0.75	0.2	0.085	12°	4	45	0.81	0.85	0.89	0.93	1.04
2.07-00100-01010		1	0.2	0.085	12°	4	45	1.07	1.12	1.18	1.23	1.37
2.07-00100-02005	0.2	0.5	0.4	0.18	12°	4	45	0.57	0.59	0.62	0.65	0.72
2.07-00100-02010		1	0.4	0.18	12°	4	45	1.09	1.14	1.19	1.25	1.38
2.07-00100-02015		1.5	0.4	0.18	12°	4	45	1.61	1.68	1.76	1.85	2.05
2.07-00100-02020		2	0.4	0.18	12°	4	45	2.13	2.23	2.33	2.44	2.71
2.07-00100-03010	0.3	1	0.6	0.28	12°	4	45	1.09	1.14	1.19	1.25	1.38
2.07-00100-03015		1.5	0.6	0.28	12°	4	45	1.61	1.68	1.76	1.85	2.05
2.07-00100-03020		2	0.6	0.28	12°	4	45	2.13	2.23	2.33	2.44	2.71
2.07-00100-03030		3	0.6	0.28	12°	4	45	3.17	3.31	3.47	3.64	4.04
2.07-00100-04010	0.4	1	0.8	0.37	12°	4	45	1.11	1.16	1.22	1.28	1.42
2.07-00100-04020		2	0.8	0.37	12°	4	45	2.15	2.25	2.36	2.47	2.74
2.07-00100-04030		3	0.8	0.37	12°	4	45	3.20	3.34	3.50	3.67	4.07
2.07-00100-04040		4	0.8	0.37	12°	4	45	4.24	4.43	4.64	4.87	5.40
2.07-00100-05015	0.5	1.5	1	0.46	12°	4	45	1.66	1.73	1.81	1.90	2.11
2.07-00100-05020		2	1	0.46	12°	4	45	2.18	2.28	2.38	2.50	2.77
2.07-00100-05030		3	1	0.46	12°	4	45	3.22	3.37	3.52	3.70	4.10
2.07-00100-05040		4	1	0.46	12°	4	45	4.26	4.46	4.66	4.89	5.43
2.07-00100-05060	0.6	6	1	0.46	12°	4	45	6.35	6.63	6.95	7.29	8.08
2.07-00100-06020		2	1.2	0.56	12°	4	45	2.18	2.28	2.38	2.50	2.77
2.07-00100-06030		3	1.2	0.56	12°	4	45	3.22	3.37	3.52	3.70	4.10
2.07-00100-06040		4	1.2	0.56	12°	4	45	4.26	4.46	4.66	4.89	5.43
2.07-00100-06060		6	1.2	0.56	12°	4	45	6.35	6.63	6.95	7.29	8.08

How to order

When you order, indicate DHR237 (D)×(ℓ_1).※(γ) is reference value.

Long Neck Square End Mill for Copper Electrode

Code No.	Dia. (D)	Under Neck Length (ℓ_1)	Length of Cut (ℓ)	Neck Dia. (d_2)	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°
2.07-00100-08030	0.8	3	1.6	0.76	12°	4	45	3.22	3.37	3.52	3.70	4.10
2.07-00100-08040		4	1.6	0.76	12°	4	45	4.26	4.46	4.66	4.89	5.43
2.07-00100-08060		6	1.6	0.76	12°	4	45	6.35	6.63	6.95	7.29	8.08
2.07-00100-08080		8	1.6	0.76	12°	4	50	8.44	8.81	9.23	9.68	10.74
2.07-00100-10030	1	3	2	0.95	12°	4	45	3.25	3.39	3.55	3.73	4.13
2.07-00100-10040		4	2	0.95	12°	4	45	4.29	4.48	4.69	4.92	5.46
2.07-00100-10050		5	2	0.95	12°	4	45	5.33	5.57	5.83	6.12	6.79
2.07-00100-10060		6	2	0.95	12°	4	45	6.37	6.66	6.97	7.32	8.11
2.07-00100-10080		8	2	0.95	12°	4	50	8.46	8.84	9.25	9.71	10.77
2.07-00100-10100		10	2	0.95	12°	4	50	10.55	11.02	11.53	12.10	13.42
2.07-00100-10120	1.5	12	2	0.95	12°	4	50	12.63	13.20	13.82	14.49	16.08
2.07-00100-15040		4	3	1.45	12°	4	45	4.29	4.48	4.69	4.92	5.46
2.07-00100-15060		6	3	1.45	12°	4	50	6.37	6.66	6.97	7.32	8.11
2.07-00100-15080		8	3	1.45	12°	4	50	8.46	8.84	9.25	9.71	10.77
2.07-00100-15100		10	3	1.45	12°	4	50	10.55	11.02	11.53	12.10	13.42
2.07-00100-15120		12	3	1.45	12°	4	50	12.63	13.20	13.82	14.49	16.08
2.07-00100-15160	2	16	3	1.45	12°	4	60	16.80	17.55	18.38	19.28	21.39
2.07-00100-20060		6	4	1.94	12°	4	50	6.40	6.69	7.00	7.34	8.15
2.07-00100-20080		8	4	1.94	12°	4	50	8.48	8.86	9.28	9.74	10.80
2.07-00100-20100		10	4	1.94	12°	4	50	10.57	11.04	11.56	12.13	13.45
2.07-00100-20120		12	4	1.94	12°	4	50	12.66	13.22	13.84	14.52	16.11
2.07-00100-20140		14	4	1.94	12°	4	50	14.74	15.40	16.12	16.92	18.76
2.07-00100-20160	2.5	16	4	1.94	12°	4	60	16.83	17.58	18.40	19.31	Free
2.07-00100-20200		20	4	1.94	12°	4	60	21.00	21.94	22.97	24.10	Free
2.07-00100-25060	3	6	5	2.4	12°	4	45	6.50	6.79	7.11	7.46	8.27
2.07-00100-25080		8	5	2.4	12°	4	50	8.58	8.97	9.39	9.85	10.93
2.07-00100-25100		10	5	2.4	12°	4	50	10.67	11.15	11.67	12.24	13.58
2.07-00100-25120		12	5	2.4	12°	4	50	12.75	13.32	13.95	14.64	Free
2.07-00100-25140		14	5	2.4	12°	4	50	14.84	15.50	16.23	17.03	Free
2.07-00100-25160		16	5	2.4	12°	4	50	16.93	17.68	18.51	19.42	Free
2.07-00100-25200	4	20	5	2.4	12°	4	60	21.10	22.04	23.07	Free	Free
2.07-00100-30080		8	6	2.85	12°	6	50	8.71	9.10	9.52	9.99	11.08
2.07-00100-30100		10	6	2.85	12°	6	50	10.79	11.27	11.80	12.38	13.74
2.07-00100-30150		15	6	2.85	12°	6	60	16.01	16.72	17.50	18.37	20.37
2.07-00100-30200		20	6	2.85	12°	6	60	21.22	22.17	23.21	24.35	27.01
2.07-00100-30250		25	6	2.85	12°	6	70	26.43	27.62	28.91	30.33	Free
2.07-00100-40100	5	10	8	3.8	12°	6	50	10.91	11.40	11.94	12.52	13.89
2.07-00100-40150		15	8	3.8	12°	6	60	16.13	16.85	17.64	18.51	Free
2.07-00100-40200		20	8	3.8	12°	6	60	21.34	22.30	23.34	24.49	Free
2.07-00100-40250		25	8	3.8	12°	6	70	26.56	27.74	29.04	Free	Free
2.07-00100-40300		30	8	3.8	12°	6	70	31.77	33.19	34.75	Free	Free
2.07-00100-50150		15	10	4.8	12°	6	50	16.13	16.85	17.64	Free	Free
2.07-00100-50200	6	20	10	4.8	12°	6	60	21.34	22.30	Free	Free	Free
2.07-00100-50250		25	10	4.8	12°	6	60	26.56	27.74	Free	Free	Free
2.07-00100-50300		30	10	4.8	12°	6	70	31.77	Free	Free	Free	Free
2.07-00100-60150		15	12	5.8	—	6	50	Free	Free	Free	Free	Free
2.07-00100-60200	6	20	12	5.8	—	6	60	Free	Free	Free	Free	Free
2.07-00100-60300		30	12	5.8	—	6	70	Free	Free	Free	Free	Free
2.07-00100-60500		50	12	5.8	—	6	90	Free	Free	Free	Free	Free

Recommended Milling Conditions (Metric)

Work material			Copper							Copper tungsten (W70%-Cu30%)						
Dia.	Under neck length	L/D	Side Milling			Slotting				Side Milling			Slotting			
			Depth of cut		Feed	Spindle speed	Depth of cut	Feed		Depth of cut		Feed	Spindle speed	Depth of cut	Feed	
			a _p mm	a _e mm	mm/min	min ⁻¹	a _p mm	mm/min		a _p mm	a _e mm	mm/min	min ⁻¹	a _p mm	mm/min	
0.1	0.3	3	0.1	0.006	180	40,000	0.01	170	40,000	0.05	0.004	120	30,000	0.006	110	30,000
	0.5	5	0.1	0.004	140	40,000	0.007	130	40,000	0.05	0.003	80	30,000	0.004	70	30,000
	0.75	7.5	0.1	0.003	100	40,000	0.005	90	40,000	0.05	0.003	50	30,000	0.003	45	30,000
	1	10	0.1	0.003	80	40,000	0.003	70	40,000	0.05	0.003	40	30,000	0.002	35	30,000
0.2	0.5	2.5	0.2	0.008	400	40,000	0.02	380	40,000	0.1	0.006	260	30,000	0.01	250	30,000
	1	5	0.2	0.006	350	40,000	0.015	320	40,000	0.1	0.004	220	30,000	0.008	200	30,000
	1.5	7.5	0.2	0.004	300	40,000	0.01	250	40,000	0.1	0.003	200	30,000	0.005	130	30,000
	2	10	0.2	0.003	250	40,000	0.005	180	40,000	0.1	0.003	150	30,000	0.003	90	30,000
0.3	1	3.3	0.3	0.01	500	40,000	0.035	450	40,000	0.15	0.008	350	30,000	0.014	280	30,000
	1.5	5	0.3	0.008	450	40,000	0.025	400	40,000	0.15	0.006	300	30,000	0.012	250	30,000
	2	6.7	0.3	0.006	380	40,000	0.017	350	40,000	0.15	0.004	250	30,000	0.008	220	30,000
	3	10	0.3	0.004	300	35,000	0.01	250	35,000	0.15	0.003	200	30,000	0.005	150	30,000
0.4	1	2.5	0.4	0.02	700	40,000	0.045	650	40,000	0.2	0.014	500	30,000	0.025	450	30,000
	2	5	0.4	0.015	600	40,000	0.03	550	40,000	0.2	0.01	450	30,000	0.02	400	30,000
	3	7.5	0.4	0.01	500	35,000	0.02	450	35,000	0.2	0.007	350	26,000	0.015	300	26,000
	4	10	0.4	0.006	350	28,000	0.015	300	28,000	0.2	0.004	220	24,000	0.01	200	22,000
0.5	1.5	3	0.5	0.025	900	40,000	0.07	800	40,000	0.3	0.02	650	30,000	0.05	550	30,000
	2	4	0.5	0.02	800	38,000	0.055	700	35,000	0.3	0.016	550	28,000	0.04	450	26,000
	3	6	0.5	0.015	700	35,000	0.04	600	32,000	0.3	0.012	500	26,000	0.03	400	25,000
	4	8	0.5	0.008	550	28,000	0.03	500	26,000	0.3	0.005	400	24,000	0.02	300	22,000
	6	12	0.5	0.005	350	18,000	0.015	300	18,000	0.3	0.003	220	15,000	0.01	180	15,000
0.6	2	3.3	0.6	0.025	1,000	38,000	0.1	850	35,000	0.4	0.018	700	28,000	0.08	650	26,000
	3	5	0.6	0.02	800	32,000	0.08	700	30,000	0.4	0.014	550	24,000	0.06	500	22,000
	4	6.7	0.6	0.015	700	28,000	0.06	600	26,000	0.4	0.012	500	22,000	0.04	400	20,000
	6	10	0.6	0.01	450	20,000	0.03	400	20,000	0.4	0.008	350	18,000	0.02	300	16,000
0.8	3	3.8	0.8	0.04	1,300	30,000	0.15	1,200	28,000	0.6	0.03	1,000	24,000	0.1	900	22,000
	4	5	0.8	0.03	1,100	26,000	0.12	1,000	24,000	0.6	0.02	850	22,000	0.08	650	18,000
	6	7.5	0.8	0.02	900	22,000	0.08	650	18,000	0.6	0.014	600	16,000	0.06	500	14,000
	8	10	0.8	0.01	600	16,000	0.05	500	16,000	0.6	0.01	450	14,000	0.03	350	13,000
1	3	3	1	0.06	2,200	24,000	0.22	2,000	24,000	0.8	0.04	1,600	20,000	0.16	1,400	20,000
	4	4	1	0.05	2,000	24,000	0.2	1,800	22,000	0.8	0.035	1,400	20,000	0.14	1,100	18,000
	5	5	1	0.04	1,700	22,000	0.16	1,500	20,000	0.8	0.028	1,200	18,000	0.12	950	16,000
	6	6	1	0.03	1,500	20,000	0.14	1,200	18,000	0.8	0.02	1,000	16,000	0.1	800	14,000
	8	8	1	0.025	1,200	16,000	0.1	1,000	15,000	0.8	0.018	800	14,000	0.08	650	12,000
	10	10	1	0.02	1,000	14,000	0.07	800	12,000	0.8	0.014	650	12,000	0.05	550	11,000
	12	12	1	0.01	700	10,000	0.05	650	10,000	0.8	0.007	450	9,000	0.035	400	8,000
1.5	4	2.7	1.5	0.08	2,500	20,000	0.35	2,000	18,000	1	0.06	1,850	17,000	0.22	1,300	15,000
	6	4	1.5	0.08	2,200	18,000	0.3	1,800	16,000	1	0.05	1,600	15,000	0.2	1,200	14,000
	8	5.3	1.5	0.06	1,700	16,000	0.25	1,400	14,000	1	0.04	1,200	13,000	0.18	950	12,000
	10	6.7	1.5	0.05	1,450	14,000	0.2	1,150	12,000	1	0.035	950	11,000	0.15	750	10,000
	12	8	1.5	0.04	1,200	12,000	0.15	1,000	11,000	1	0.03	800	10,000	0.1	650	9,000
	16	10.7	1.5	0.02	900	10,000	0.08	800	10,000	1	0.015	600	8,000	0.06	500	7,000

Recommended Milling Conditions (Metric)

Work material			Copper							Copper tungsten (W70%-Cu30%)						
Dia.	Under neck length	L/D	Side Milling				Slotting			Side Milling				Slotting		
			Depth of cut		Feed	Spindle speed	Depth of cut	Feed	Spindle speed	Depth of cut		Feed	Spindle speed	Depth of cut	Feed	Spindle speed
			ap mm	ae mm	mm/min	min ⁻¹	ap mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹	ap mm	mm/min	min ⁻¹
2	6	3	2	0.1	2,500	18,000	0.45	2,200	16,000	1.5	0.08	1,800	14,000	0.3	1,500	12,000
	8	4	2	0.09	2,200	16,000	0.4	1,900	14,000	1.5	0.07	1,500	12,000	0.28	1,400	12,000
	10	5	2	0.08	1,900	14,000	0.35	1,600	12,000	1.5	0.06	1,200	10,000	0.24	1,000	10,000
	12	6	2	0.07	1,600	12,000	0.28	1,400	11,000	1.5	0.05	1,100	10,000	0.2	900	9,000
	14	7	2	0.06	1,400	11,000	0.24	1,200	10,000	1.5	0.04	950	9,000	0.16	800	8,000
	16	8	2	0.045	1,200	10,000	0.18	1,000	9,000	1.5	0.03	800	8,000	0.12	650	7,000
	20	10	2	0.03	1,000	9,000	0.12	850	8,000	1.5	0.02	700	7,000	0.08	550	6,000
2.5	6	2.4	2.5	0.13	2,450	17,000	0.55	2,100	15,000	2	0.1	1,800	13,000	0.4	1,600	12,000
	8	3.2	2.5	0.12	2,300	16,000	0.5	1,950	14,000	2	0.09	1,650	12,000	0.35	1,450	11,000
	10	4	2.5	0.1	2,100	15,000	0.4	1,700	13,000	2	0.07	1,500	11,000	0.3	1,300	10,000
	12	4.8	2.5	0.08	1,900	14,000	0.35	1,550	12,000	2	0.065	1,300	10,000	0.25	1,100	9,000
	14	5.6	2.5	0.07	1,700	13,000	0.3	1,350	11,000	2	0.06	1,250	10,000	0.2	1,050	9,000
	16	6.4	2.5	0.06	1,400	11,000	0.25	1,200	10,000	2	0.05	1,100	9,000	0.15	850	8,000
	20	8	2.5	0.05	1,250	10,000	0.2	1,000	9,000	2	0.04	950	8,000	0.12	700	7,000
3	8	2.7	3	0.15	2,400	16,000	0.75	2,000	14,000	2.4	0.11	1,800	12,000	0.55	1,500	11,000
	10	3.3	3	0.12	2,400	16,000	0.7	2,000	14,000	2.4	0.08	1,800	12,000	0.5	1,500	11,000
	15	5	3	0.1	2,100	14,000	0.6	1,600	12,000	2.4	0.07	1,600	11,000	0.4	1,100	9,000
	20	6.7	3	0.07	1,500	11,000	0.4	1,200	10,000	2.4	0.05	1,100	9,000	0.3	900	8,000
	25	8.3	3	0.05	1,300	10,000	0.2	1,000	9,000	2.4	0.03	900	8,000	0.15	700	7,000
4	10	2.5	4	0.2	2,400	12,000	1	2,000	10,000	3	0.15	1,600	9,000	0.8	1,400	8,000
	15	3.8	4	0.2	2,400	12,000	0.9	2,000	10,000	3	0.15	1,600	9,000	0.7	1,400	8,000
	20	5	4	0.15	2,000	10,000	0.7	1,600	8,000	3	0.1	1,400	8,000	0.5	1,000	6,000
	25	6.3	4	0.1	1,700	9,000	0.5	1,500	8,000	3	0.07	1,200	7,000	0.3	1,000	6,000
	30	7.5	4	0.07	1,500	8,000	0.3	1,300	7,000	3	0.05	1,000	6,000	0.2	800	5,000
5	15	3	5	0.25	2,600	9,500	1.1	2,200	8,500	3.5	0.18	1,800	7,000	0.8	1,400	6,000
	20	4	5	0.2	2,150	8,000	1	1,750	7,000	3.5	0.15	1,650	6,500	0.6	1,150	5,500
	25	5	5	0.15	1,800	7,000	0.9	1,400	6,000	3.5	0.12	1,300	5,800	0.5	1,000	4,800
	30	6	5	0.1	1,500	6,000	0.7	1,100	5,000	3.5	0.1	1,000	5,000	0.4	830	4,000
6	15	2.5	6	0.3	2,750	8,000	1.2	2,350	7,000	4	0.2	1,950	6,000	0.9	1,400	5,000
	20	3.3	6	0.3	2,400	7,000	1.2	2,000	6,000	4	0.2	1,600	5,000	0.8	1,200	4,500
	30	5	6	0.2	1,600	5,000	1	1,200	4,000	4	0.15	1,100	4,000	0.6	900	3,500
	50	8.3	6	0.1	800	3,500	0.4	650	3,000	4	0.07	600	3,000	0.25	500	3,000
Notes			※Recommended RPM based upon ideal conditions. RPM may be adjusted to match the capabilities of your machine while maintaining constant feed rate per cutting tooth. ※1 Recommend to use the milling condition as just reference. Adjust milling conditions according to machining shape and machine status. ※2 Depth of cut : ap=Axial Depth of cut / ae=Radial Depth of cut. ※3 Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine. ※4 Water-insoluble fluid is recommended.													

Recommended Milling Conditions (Inch)

Work material			Copper									Copper tungsten (W70%-Cu30%)									
Dia.	Under neck length	L/D	Side Milling					Slotting				Side Milling					Slotting				
			Depth of cut		Feed per tooth	Feed	Spindle speed	Depth of cut	Feed per tooth	Feed	Spindle speed	Depth of cut		Feed per tooth	Feed	Spindle speed	Depth of cut	Feed per tooth	Feed	Spindle speed	
			ap inch	ae inch	IPT fz	IPM	RPM	ap inch	IPT fz	IPM	RPM	ap inch	ae inch	IPT fz	IPM	RPM	ap inch	IPT fz	IPM	RPM	
0.1	0.3	3	.00394	.00024	.00009	7.09	40,000	.00039	.00008	6.69	40,000	.00197	.00016	.00008	4.72	30,000	.00024	.00007	4.33	30,000	
	0.5	5	.00394	.00016	.00007	5.51	40,000	.00028	.00006	5.12	40,000	.00197	.00012	.00005	3.15	30,000	.00016	.00005	2.76	30,000	
	0.75	7.5	.00394	.00012	.00005	3.94	40,000	.00020	.00004	3.54	40,000	.00197	.00012	.00003	1.97	30,000	.00012	.00003	1.77	30,000	
	1	10	.00394	.00012	.00004	3.15	40,000	.00012	.00003	2.76	40,000	.00197	.00012	.00003	1.57	30,000	.00008	.00002	1.38	30,000	
0.2	0.5	2.5	.00787	.00031	.00020	15.75	40,000	.00079	.00019	14.96	40,000	.00394	.00024	.00017	10.24	30,000	.00039	.00016	9.84	30,000	
	1	5	.00787	.00024	.00017	13.78	40,000	.00059	.00016	12.60	40,000	.00394	.00016	.00014	8.66	30,000	.00031	.00013	7.87	30,000	
	1.5	7.5	.00787	.00016	.00015	11.81	40,000	.00039	.00012	9.84	40,000	.00394	.00012	.00013	7.87	30,000	.00020	.00009	5.12	30,000	
	2	10	.00787	.00012	.00012	9.84	40,000	.00020	.00009	7.09	40,000	.00394	.00012	.00010	5.91	30,000	.00012	.00006	3.54	30,000	
0.3	1	3.3	.01181	.00039	.00025	19.69	40,000	.00138	.00022	17.72	40,000	.00591	.00031	.00023	13.78	30,000	.00055	.00018	11.02	30,000	
	1.5	5	.01181	.00031	.00022	17.72	40,000	.00098	.00020	15.75	40,000	.00591	.00024	.00020	11.81	30,000	.00047	.00016	9.84	30,000	
	2	6.7	.01181	.00024	.00019	14.96	40,000	.00067	.00017	13.78	40,000	.00591	.00016	.00016	9.84	30,000	.00031	.00014	8.66	30,000	
	3	10	.01181	.00016	.00017	11.81	35,000	.00039	.00014	9.84	35,000	.00591	.00012	.00013	7.87	30,000	.00020	.00010	5.91	30,000	
0.4	1	2.5	.01575	.00079	.00034	27.56	40,000	.00177	.00032	25.59	40,000	.00787	.00055	.00033	19.69	30,000	.00098	.00030	17.72	30,000	
	2	5	.01575	.00059	.00030	23.62	40,000	.00118	.00027	21.65	40,000	.00787	.00039	.00030	17.72	30,000	.00079	.00026	15.75	30,000	
	3	7.5	.01575	.00039	.00028	19.69	35,000	.00079	.00025	17.72	35,000	.00787	.00028	.00026	13.78	26,000	.00059	.00023	11.81	26,000	
	4	10	.01575	.00024	.00025	13.78	28,000	.00059	.00021	11.81	28,000	.00787	.00016	.00018	8.66	24,000	.00039	.00018	7.87	22,000	
0.5	1.5	3	.01969	.00098	.00044	35.43	40,000	.00276	.00039	31.50	40,000	.01181	.00079	.00043	25.59	30,000	.00197	.00036	21.65	30,000	
	2	4	.01969	.00079	.00041	31.50	38,000	.00217	.00039	27.56	35,000	.01181	.00063	.00039	21.65	28,000	.00157	.00034	17.72	26,000	
	3	6	.01969	.00059	.00039	27.56	35,000	.00157	.00037	23.62	32,000	.01181	.00047	.00038	19.69	26,000	.00118	.00031	15.75	25,000	
	4	8	.01969	.00031	.00039	21.65	28,000	.00118	.00038	19.69	26,000	.01181	.00020	.00033	15.75	24,000	.00079	.00027	11.81	22,000	
	6	12	.01969	.00020	.00038	13.78	18,000	.00059	.00033	11.81	18,000	.01181	.00012	.00029	8.66	15,000	.00039	.00024	7.09	15,000	
0.6	2	3.3	.02362	.00098	.00052	39.37	38,000	.00394	.00048	33.46	35,000	.01575	.00071	.00049	27.56	28,000	.00315	.00049	25.59	26,000	
	3	5	.02362	.00079	.00049	31.50	32,000	.00315	.00046	27.56	30,000	.01575	.00055	.00045	21.65	24,000	.00236	.00045	19.69	22,000	
	4	6.7	.02362	.00059	.00049	27.56	28,000	.00236	.00045	23.62	26,000	.01575	.00047	.00045	19.69	22,000	.00157	.00039	15.75	20,000	
	6	10	.02362	.00039	.00044	17.72	20,000	.00118	.00039	15.75	20,000	.01575	.00031	.00038	13.78	18,000	.00079	.00037	11.81	16,000	
0.8	3	3.8	.03150	.00157	.00085	51.18	30,000	.00591	.00084	47.24	28,000	.02362	.00118	.00082	39.37	24,000	.00394	.00081	35.43	22,000	
	4	5	.03150	.00118	.00083	43.31	26,000	.00472	.00082	39.37	24,000	.02362	.00079	.00076	33.46	22,000	.00315	.00071	25.59	18,000	
	6	7.5	.03150	.00079	.00081	35.43	22,000	.00315	.00071	25.59	18,000	.02362	.00055	.00074	23.62	16,000	.00236	.00070	19.69	14,000	
	8	10	.03150	.00039	.00074	23.62	16,000	.00197	.00062	19.69	16,000	.02362	.00039	.00063	17.72	14,000	.00118	.00053	13.78	13,000	
1	3	3	.03937	.00236	.00180	86.61	24,000	.00866	.00164	78.74	24,000	.03150	.00157	.00157	62.99	20,000	.00630	.00138	55.12	20,000	
	4	4	.03937	.00197	.00164	78.74	24,000	.00787	.00161	70.87	22,000	.03150	.00138	.00138	55.12	20,000	.00551	.00120	43.31	18,000	
	5	5	.03937	.00157	.00152	66.93	22,000	.00630	.00148	59.06	20,000	.03150	.00110	.00131	47.24	18,000	.00472	.00117	37.40	16,000	
	6	6	.03937	.00118	.00148	59.06	20,000	.00551	.00131	47.24	18,000	.03150	.00079	.00123	39.37	16,000	.00394	.00112	31.50	14,000	
	8	8	.03937	.00098	.00148	47.24	16,000	.00394	.00131	39.37	15,000	.03150	.00071	.00112	31.50	14,000	.00315	.00107	25.59	12,000	
	10	10	.03937	.00079	.00141	39.37	14,000	.00276	.00131	31.50	12,000	.03150	.00055	.00107	25.59	12,000	.00197	.00098	21.65	11,000	
	12	12	.03937	.00039	.00138	27.56	10,000	.00197	.00128	25.59	10,000	.03150	.00028	.00098	17.72	9,000	.00138	.00098	15.75	8,000	
1.5	4	2.7	.05906	.00315	.00246	98.43	20,000	.01378	.00219	78.74	18,000	.03937	.00236	.00214	72.83	17,000	.00866	.00171	51.18	15,000	
	6	4	.05906	.00315	.00241	86.61	18,000	.01181	.00221	70.87	16,000	.03937	.00197	.00210	62.99	15,000	.00787	.00169	47.24	14,000	
	8	5.3	.05906	.00236	.00209	66.93	16,000	.00984	.00197	55.12	14,000	.03937	.00157	.00182	47.24	13,000	.00709	.00156	37.40	12,000	
	10	6.7	.05906	.00197	.00204	57.09	14,000	.00787	.00189	45.28	12,000	.03937	.00138	.00170	37.40	11,000	.00591	.00148	29.53	10,000	
	12	8	.05906	.00157	.00197	47.24	12,000	.00591	.00179	39.37	11,000	.03937	.00118	.00157	31.50	10,000	.00394	.00142	25.59	9,000	
	16	10.7	.05906	.00079	.00177	35.43	10,000	.00315	.00157	31.50	10,000	.03937	.00059	.00148	23.62	8,000	.00236	.00141	19.69	7,000	

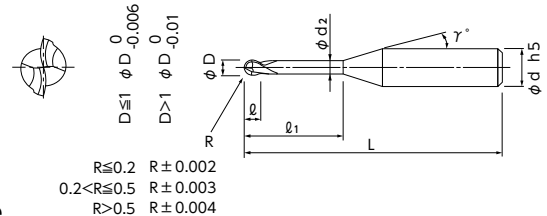
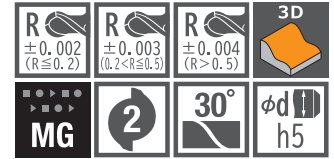
Recommended Milling Conditions (Inch)

Work material			Copper										Copper tungsten (W70%-Cu30%)									
Dia.	Under neck length	L/D	Side Milling					Slotting					Side Milling					Slotting				
			Depth of cut		Feed per tooth	Feed	Spindle speed	Depth of cut	Feed per tooth	Feed	Spindle speed	Depth of cut	Feed per tooth	Feed	Spindle speed	Depth of cut	Feed per tooth	Feed	Spindle speed			
			ap inch	ae inch	IPT fz	IPM	RPM	ap inch	IPT fz	IPM	RPM	ap inch	ae inch	IPT fz	IPM	RPM	ap inch	IPT fz	IPM	RPM		
2	6	3	.07874	.00394	.00273	98.43	18,000	.01772	.00271	86.61	16,000	.05906	.00315	.00253	70.87	14,000	.01181	.00246	59.06	12,000		
	8	4	.07874	.00354	.00271	86.61	16,000	.01575	.00267	74.80	14,000	.05906	.00276	.00246	59.06	12,000	.01102	.00230	55.12	12,000		
	10	5	.07874	.00315	.00267	74.80	14,000	.01378	.00262	62.99	12,000	.05906	.00236	.00236	47.24	10,000	.00945	.00197	39.37	10,000		
	12	6	.07874	.00276	.00262	62.99	12,000	.01102	.00251	55.12	11,000	.05906	.00197	.00217	43.31	10,000	.00787	.00197	35.43	9,000		
	14	7	.07874	.00236	.00251	55.12	11,000	.00945	.00236	47.24	10,000	.05906	.00157	.00208	37.40	9,000	.00630	.00197	31.50	8,000		
	16	8	.07874	.00177	.00236	47.24	10,000	.00709	.00219	39.37	9,000	.05906	.00118	.00197	31.50	8,000	.00472	.00183	25.59	7,000		
	20	10	.07874	.00118	.00219	39.37	9,000	.00472	.00209	33.46	8,000	.05906	.00079	.00197	27.56	7,000	.00315	.00180	21.65	6,000		
2.5	6	2.4	.09843	.00512	.00284	96.46	17,000	.02165	.00276	82.68	15,000	.07874	.00394	.00273	70.87	13,000	.01575	.00262	62.99	12,000		
	8	3.2	.09843	.00472	.00283	90.55	16,000	.01969	.00274	76.77	14,000	.07874	.00354	.00271	64.96	12,000	.01378	.00259	57.09	11,000		
	10	4	.09843	.00394	.00276	82.68	15,000	.01575	.00257	66.93	13,000	.07874	.00276	.00268	59.06	11,000	.01181	.00256	51.18	10,000		
	12	4.8	.09843	.00315	.00267	74.80	14,000	.01378	.00254	61.02	12,000	.07874	.00256	.00256	51.18	10,000	.00984	.00241	43.31	9,000		
	14	5.6	.09843	.00276	.00257	66.93	13,000	.01181	.00242	53.15	11,000	.07874	.00236	.00246	49.21	10,000	.00787	.00230	41.34	9,000		
	16	6.4	.09843	.00236	.00251	55.12	11,000	.00984	.00236	47.24	10,000	.07874	.00197	.00241	43.31	9,000	.00591	.00209	33.46	8,000		
	20	8	.09843	.00197	.00246	49.21	10,000	.00787	.00219	39.37	9,000	.07874	.00157	.00234	37.40	8,000	.00472	.00197	27.56	7,000		
3	8	2.7	.11811	.00591	.00295	94.49	16,000	.02953	.00281	78.74	14,000	.09449	.00433	.00295	70.87	12,000	.02165	.00268	59.06	11,000		
	10	3.3	.11811	.00472	.00295	94.49	16,000	.02756	.00281	78.74	14,000	.09449	.00315	.00295	70.87	12,000	.01969	.00268	59.06	11,000		
	15	5	.11811	.00394	.00295	82.68	14,000	.02362	.00262	62.99	12,000	.09449	.00276	.00286	62.99	11,000	.01575	.00241	43.31	9,000		
	20	6.7	.11811	.00276	.00268	59.06	11,000	.01575	.00236	47.24	10,000	.09449	.00197	.00241	43.31	9,000	.01181	.00221	35.43	8,000		
	25	8.3	.11811	.00197	.00256	51.18	10,000	.00787	.00219	39.37	9,000	.09449	.00118	.00221	35.43	8,000	.00591	.00197	27.56	7,000		
4	10	2.5	.15748	.00787	.00394	94.49	12,000	.03937	.00394	78.74	10,000	.11811	.00591	.00350	62.99	9,000	.03150	.00344	55.12	8,000		
	15	3.8	.15748	.00787	.00394	94.49	12,000	.03543	.00394	78.74	10,000	.11811	.00591	.00350	62.99	9,000	.02756	.00344	55.12	8,000		
	20	5	.15748	.00591	.00394	78.74	10,000	.02756	.00394	62.99	8,000	.11811	.00394	.00344	55.12	8,000	.01969	.00328	39.37	6,000		
	25	6.3	.15748	.00394	.00372	66.93	9,000	.01969	.00369	59.06	8,000	.11811	.00276	.00337	47.24	7,000	.01181	.00328	39.37	6,000		
	30	7.5	.15748	.00276	.00369	59.06	8,000	.01181	.00366	51.18	7,000	.11811	.00197	.00328	39.37	6,000	.00787	.00315	31.50	5,000		
5	15	3	.19685	.00984	.00539	102.36	9,500	.04331	.00509	86.61	8,500	.13780	.00709	.00506	70.87	7,000	.03150	.00459	55.12	6,000		
	20	4	.19685	.00787	.00529	84.65	8,000	.03937	.00492	68.90	7,000	.13780	.00591	.00500	64.96	6,500	.02362	.00412	45.28	5,500		
	25	5	.19685	.00591	.00506	70.87	7,000	.03543	.00459	55.12	6,000	.13780	.00472	.00441	51.18	5,800	.01969	.00410	39.37	4,800		
	30	6	.19685	.00394	.00492	59.06	6,000	.02756	.00433	43.31	5,000	.13780	.00394	.00394	39.37	5,000	.01575	.00408	32.68	4,000		
6	15	2.5	.23622	.01181	.00677	108.27	8,000	.04724	.00661	92.52	7,000	.15748	.00787	.00640	76.77	6,000	.03543	.00551	55.12	5,000		
	20	3.3	.23622	.01181	.00675	94.49	7,000	.04724	.00656	78.74	6,000	.15748	.00787	.00630	62.99	5,000	.03150	.00525	47.24	4,500		
	30	5	.23622	.00787	.0063	62.99	5,000	.03937	.00591	47.24	4,000	.15748	.00591	.00541	43.31	4,000	.02362	.00506	35.43	3,500		
	50	8.3	.23622	.00394	.0045	31.50	3,500	.01575	.00427	25.59	3,000	.15748	.00276	.00394	23.62	3,000	.00984	.00328	19.69	3,000		
Notes			※Recommended RPM based upon ideal conditions. RPM may be adjusted to match the capabilities of your machine while maintaining constant feed rate per cutting tooth.																			
			※1 Recommend to use the milling condition as just reference. Adjust milling conditions according to machining shape and machine status.																			
			※2 Depth of cut : ap=Axial Depth of cut / ae=Radial Depth of cut.																			
			※3 Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.																			
			※4 Water-insoluble fluid is recommended.																			

Long Neck Ball End Mill for Copper Electrode

Total 94 sizes

Long neck ball end mill specialized for machining copper alloy.
Sharpe cutting edge makes less burr and high quality surface.

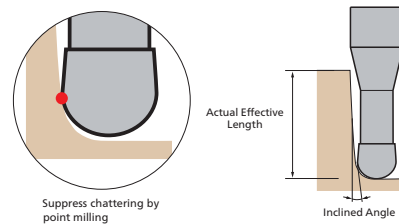


- Long neck ball end mill specialized for machining copper electrode.
- Sharp edge shearing ability and DLC coating realized high quality and stable a long life machining.
- Machining copper tungsten electrodes is also effective.

※ R accuracy of DRB230 is based on a half value of φD.

Work material

Copper	Copper Tungsten



Unit [Size : mm]

Code No.	Corner Radius (R)	Under Neck Length (ℓ ₁)	Length of Cut (ℓ)	Dia. (D)	Neck Dia. (d ₂)	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°
2.07-00530-00503	R0.05	0.3	0.07	0.1	0.085	12°	4	45	0.34	0.36	0.37	0.39	0.42
2.07-00530-00505		0.5	0.07	0.1	0.085	12°	4	45	0.55	0.57	0.60	0.63	0.69
2.07-00530-00703	R0.075	0.3	0.1	0.15	0.13	12°	4	45	0.35	0.37	0.38	0.40	0.43
2.07-00530-00705		0.5	0.1	0.15	0.13	12°	4	45	0.56	0.58	0.61	0.64	0.70
2.07-00530-00710		1	0.1	0.15	0.13	12°	4	45	1.08	1.13	1.18	1.23	1.36
2.07-00530-01005	R0.1	0.5	0.15	0.2	0.18	12°	4	45	0.56	0.58	0.61	0.63	0.69
2.07-00530-01007		0.75	0.15	0.2	0.18	12°	4	45	0.82	0.85	0.89	0.93	1.02
2.07-00530-01010		1	0.15	0.2	0.18	12°	4	45	1.08	1.13	1.18	1.23	1.35
2.07-00530-01015		1.5	0.15	0.2	0.18	12°	4	45	1.60	1.67	1.75	1.83	2.02
2.07-00530-01020		2	0.15	0.2	0.18	12°	4	45	2.13	2.22	2.32	2.43	2.68
2.07-00530-01505	R0.15	0.5	0.2	0.3	0.28	12°	4	45	0.56	0.58	0.60	0.62	0.67
2.07-00530-01510		1	0.2	0.3	0.28	12°	4	45	1.08	1.12	1.17	1.22	1.34
2.07-00530-01515		1.5	0.2	0.3	0.28	12°	4	45	1.60	1.67	1.74	1.82	2.00
2.07-00530-01520		2	0.2	0.3	0.28	12°	4	45	2.12	2.21	2.31	2.42	2.66
2.07-00530-02005	R0.2	0.5	0.3	0.4	0.37	12°	4	45	0.58	0.60	0.62	0.64	0.69
2.07-00530-02010		1	0.3	0.4	0.37	12°	4	45	1.10	1.14	1.19	1.24	1.35
2.07-00530-02015		1.5	0.3	0.4	0.37	12°	4	45	1.62	1.69	1.76	1.84	2.02
2.07-00530-02020		2	0.3	0.4	0.37	12°	4	45	2.15	2.23	2.33	2.43	2.68
2.07-00530-02030		3	0.3	0.4	0.37	12°	4	45	3.19	3.32	3.47	3.63	4.01
2.07-00530-02040		4	0.3	0.4	0.37	12°	4	45	4.23	4.41	4.61	4.83	5.33
2.07-00530-02050		5	0.3	0.4	0.37	12°	4	45	5.27	5.50	5.75	6.02	6.66
2.07-00530-02060		6	0.3	0.4	0.37	12°	4	45	6.32	6.59	6.89	7.22	7.99
2.07-00530-02510	R0.25	1	0.35	0.5	0.46	12°	4	45	1.13	1.16	1.21	1.26	1.37
2.07-00530-02515		1.5	0.35	0.5	0.46	12°	4	45	1.65	1.71	1.78	1.85	2.03
2.07-00530-02520		2	0.35	0.5	0.46	12°	4	45	2.17	2.25	2.35	2.45	2.69
2.07-00530-02530		3	0.35	0.5	0.46	12°	4	45	3.21	3.34	3.49	3.65	4.02
2.07-00530-02540		4	0.35	0.5	0.46	12°	4	45	4.25	4.43	4.63	4.85	5.35
2.07-00530-02550		5	0.35	0.5	0.46	12°	4	45	5.30	5.52	5.77	6.04	6.68
2.07-00530-02560		6	0.35	0.5	0.46	12°	4	45	6.34	6.61	6.91	7.24	8.00
2.07-00530-03010	R0.3	1	0.45	0.6	0.56	12°	4	45	1.12	1.16	1.20	1.25	1.35
2.07-00530-03015		1.5	0.45	0.6	0.56	12°	4	45	1.64	1.71	1.77	1.84	2.02
2.07-00530-03020		2	0.45	0.6	0.56	12°	4	45	2.17	2.25	2.34	2.44	2.68
2.07-00530-03030		3	0.45	0.6	0.56	12°	4	45	3.21	3.34	3.48	3.64	4.01
2.07-00530-03040		4	0.45	0.6	0.56	12°	4	45	4.25	4.43	4.62	4.84	5.33
2.07-00530-03050		5	0.45	0.6	0.56	12°	4	45	5.29	5.52	5.76	6.03	6.66
2.07-00530-03060		6	0.45	0.6	0.56	12°	4	45	6.34	6.61	6.90	7.23	7.99
2.07-00530-03080		8	0.45	0.6	0.56	12°	4	45	8.42	8.79	9.18	9.62	10.64
2.07-00530-03100		10	0.45	0.6	0.56	12°	4	50	10.51	10.97	11.47	12.02	13.30

How to order

When you order, indicate DRB230 (R)×(ℓ₁).

※ (γ) is reference value.

Long Neck Ball End Mill for Copper Electrode

Code No.	Corner Radius (R)	Under Neck Length (ℓ_1)	Length of Cut (ℓ)	Dia. (D)	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°
2.07-00530-04015	R0.4	1.5	0.6	0.8	0.76	12°	4	45	1.64	1.70	1.76	1.83	1.98
2.07-00530-04020		2	0.6	0.8	0.76	12°	4	45	2.16	2.24	2.33	2.42	2.65
2.07-00530-04030		3	0.6	0.8	0.76	12°	4	45	3.20	3.33	3.47	3.62	3.97
2.07-00530-04040		4	0.6	0.8	0.76	12°	4	45	4.25	4.42	4.61	4.82	5.30
2.07-00530-04050		5	0.6	0.8	0.76	12°	4	45	5.29	5.51	5.75	6.01	6.63
2.07-00530-04060		6	0.6	0.8	0.76	12°	4	45	6.33	6.60	6.89	7.21	7.96
2.07-00530-04080		8	0.6	0.8	0.76	12°	4	45	8.42	8.78	9.17	9.60	10.61
2.07-00530-04100		10	0.6	0.8	0.76	12°	4	50	10.50	10.96	11.45	12.00	13.26
2.07-00530-05020	R0.5	2	0.75	1	0.95	12°	4	45	2.18	2.26	2.34	2.43	2.65
2.07-00530-05030		3	0.75	1	0.95	12°	4	45	3.22	3.35	3.48	3.63	3.97
2.07-00530-05040		4	0.75	1	0.95	12°	4	45	4.27	4.44	4.62	4.83	5.30
2.07-00530-05050		5	0.75	1	0.95	12°	4	45	5.31	5.53	5.76	6.02	6.63
2.07-00530-05060		6	0.75	1	0.95	12°	4	45	6.35	6.62	6.90	7.22	7.96
2.07-00530-05080		8	0.75	1	0.95	12°	4	45	8.44	8.79	9.18	9.61	10.61
2.07-00530-05100		10	0.75	1	0.95	12°	4	45	10.52	10.97	11.46	12.01	13.26
2.07-00530-05120		12	0.75	1	0.95	12°	4	45	12.61	13.15	13.75	14.40	15.92
2.07-00530-05140	R0.75	14	0.75	1	0.95	12°	4	50	14.70	15.33	16.03	16.79	18.57
2.07-00530-05160		16	0.75	1	0.95	12°	4	50	16.78	17.51	18.31	19.18	21.23
2.07-00530-07504		4	1.1	1.5	1.45	12°	4	50	4.26	4.41	4.59	4.78	5.22
2.07-00530-07506		6	1.1	1.5	1.45	12°	4	50	6.34	6.59	6.87	7.17	7.88
2.07-00530-07508		8	1.1	1.5	1.45	12°	4	50	8.43	8.77	9.15	9.56	10.53
2.07-00530-07510		10	1.1	1.5	1.45	12°	4	50	10.51	10.95	11.43	11.96	13.18
2.07-00530-07512		12	1.1	1.5	1.45	12°	4	50	12.60	13.13	13.71	14.35	15.84
2.07-00530-07514		14	1.1	1.5	1.45	12°	4	50	14.69	15.31	15.99	16.74	18.49
2.07-00530-07516	R1	16	1.1	1.5	1.45	12°	4	50	16.77	17.49	18.27	19.14	21.15
2.07-00530-07518		18	1.1	1.5	1.45	12°	4	50	18.86	19.67	20.55	21.53	23.80
2.07-00530-10030		3	1.5	2	1.94	12°	4	50	3.23	3.33	3.44	3.56	3.85
2.07-00530-10040		4	1.5	2	1.94	12°	4	50	4.27	4.42	4.58	4.76	5.17
2.07-00530-10060		6	1.5	2	1.94	12°	4	50	6.36	6.60	6.86	7.15	7.83
2.07-00530-10080		8	1.5	2	1.94	12°	4	50	8.44	8.78	9.14	9.54	10.48
2.07-00530-10100		10	1.5	2	1.94	12°	4	50	10.53	10.95	11.42	11.94	13.14
2.07-00530-10120		12	1.5	2	1.94	12°	4	50	12.61	13.13	13.70	14.33	15.79
2.07-00530-10140	R1.5	14	1.5	2	1.94	12°	4	50	14.70	15.31	15.98	16.72	18.45
2.07-00530-10160		16	1.5	2	1.94	12°	4	50	16.78	17.49	18.27	19.12	Free
2.07-00530-10200		20	1.5	2	1.94	12°	4	60	20.96	21.85	22.83	23.90	Free
2.07-00530-10250		25	1.5	2	1.94	12°	4	60	26.17	27.30	28.53	Free	Free
2.07-00530-15060		6	2.5	3	2.85	12°	6	60	6.56	6.78	7.03	7.31	7.95
2.07-00530-15080		8	2.5	3	2.85	12°	6	60	8.64	8.96	9.31	9.70	10.60
2.07-00530-15100		10	2.5	3	2.85	12°	6	60	10.73	11.14	11.59	12.09	13.26
2.07-00530-15120		12	2.5	3	2.85	12°	6	60	12.81	13.32	13.88	14.49	15.91
2.07-00530-15150	R2	15	2.5	3	2.85	12°	6	70	15.94	16.59	17.30	18.08	19.89
2.07-00530-15200		20	2.5	3	2.85	12°	6	70	21.16	22.04	23.00	24.06	26.53
2.07-00530-15250		25	2.5	3	2.85	12°	6	70	26.37	27.48	28.70	30.04	Free
2.07-00530-15300		30	2.5	3	2.85	12°	6	70	31.58	32.93	34.40	36.03	Free
2.07-00530-20100		10	3	4	3.8	12°	6	60	10.83	11.22	11.66	12.14	13.25
2.07-00530-20120		12	3	4	3.8	12°	6	60	12.91	13.40	13.94	14.53	15.91
2.07-00530-20150		15	3	4	3.8	12°	6	60	16.04	16.67	17.36	18.12	19.89
2.07-00530-20200		20	3	4	3.8	12°	6	60	21.26	22.12	23.06	24.10	Free
2.07-00530-20250	R3	25	3	4	3.8	12°	6	70	26.47	27.57	28.77	30.09	Free
2.07-00530-20300		30	3	4	3.8	12°	6	70	31.68	33.01	34.47	Free	Free
2.07-00530-20400		40	3	4	3.8	12°	6	80	42.11	43.91	Free	Free	Free
2.07-00530-30200		20	6	6	5.7	—	6	70	Free	Free	Free	Free	Free
2.07-00530-30250		25	6	6	5.7	—	6	70	Free	Free	Free	Free	Free
2.07-00530-30300		30	6	6	5.7	—	6	80	Free	Free	Free	Free	Free
2.07-00530-30400		40	6	6	5.7	—	6	80	Free	Free	Free	Free	Free
2.07-00530-30500		50	6	6	5.7	—	6	100	Free	Free	Free	Free	Free

Recommended Milling Conditions (Metric)

Work material			Copper				Copper tungsten (W70% - Cu30%)			
Radius (R)	Under neck length	L/D	Depth of cut		Feed mm/min	Spindle speed min ⁻¹	Depth of cut		Feed mm/min	Spindle speed min ⁻¹
			ap mm	ae mm			ap mm	ae mm		
0.05	0.3	3	0.01	0.01	200	40,000	0.008	0.008	150	30,000
	0.5	5	0.007	0.007	150	40,000	0.005	0.005	100	30,000
0.075	0.3	2	0.015	0.02	250	40,000	0.01	0.015	180	30,000
	0.5	3.3	0.015	0.02	200	40,000	0.008	0.015	150	30,000
	1	6.7	0.007	0.01	150	40,000	0.005	0.008	100	30,000
0.1	0.5	2.5	0.025	0.05	500	40,000	0.02	0.04	350	30,000
	0.75	3.8	0.025	0.05	450	40,000	0.02	0.04	300	30,000
	1	5	0.02	0.04	400	40,000	0.015	0.03	250	30,000
	1.5	7.5	0.015	0.03	300	40,000	0.008	0.02	150	30,000
	2	10	0.008	0.015	200	40,000	0.005	0.01	100	30,000
0.15	0.5	1.7	0.03	0.07	700	40,000	0.03	0.07	500	30,000
	1	3.3	0.03	0.07	700	40,000	0.03	0.07	500	30,000
	1.5	5	0.025	0.05	500	40,000	0.02	0.05	300	30,000
	2	6.7	0.015	0.03	400	40,000	0.01	0.02	200	30,000
0.2	0.5	1.3	0.05	0.1	1,000	40,000	0.04	0.08	700	30,000
	1	2.5	0.05	0.1	1,000	40,000	0.04	0.08	700	30,000
	1.5	3.8	0.04	0.08	1,000	40,000	0.03	0.06	700	30,000
	2	5	0.035	0.06	600	40,000	0.02	0.05	350	30,000
	3	7.5	0.02	0.04	400	30,000	0.01	0.03	200	25,000
	4	10	0.008	0.015	250	25,000	0.005	0.01	100	18,000
	5	12.5	0.005	0.015	200	25,000	0.005	0.01	80	16,000
0.25	6	15	0.005	0.015	150	22,000	0.005	0.01	70	14,000
	1	2	0.08	0.15	800	40,000	0.08	0.15	500	30,000
	1.5	3	0.08	0.15	800	40,000	0.08	0.15	500	30,000
	2	4	0.08	0.15	800	40,000	0.08	0.15	500	30,000
	3	6	0.06	0.1	600	35,000	0.06	0.08	400	27,000
	4	8	0.04	0.08	400	30,000	0.025	0.05	200	22,000
	5	10	0.02	0.04	300	25,000	0.01	0.02	150	18,000
0.3	6	12	0.015	0.03	250	22,000	0.005	0.01	120	16,000
	1	1.7	0.12	0.2	1,600	40,000	0.12	0.2	1,200	30,000
	1.5	2.5	0.12	0.2	1,600	40,000	0.12	0.2	1,200	30,000
	2	3.3	0.12	0.2	1,600	40,000	0.12	0.2	1,200	30,000
	3	5	0.1	0.14	1,000	40,000	0.08	0.1	700	30,000
	4	6.7	0.07	0.1	700	30,000	0.04	0.06	400	25,000
	5	8.3	0.05	0.08	600	27,000	0.02	0.04	300	22,000
	6	10	0.04	0.06	500	25,000	0.01	0.03	200	20,000
0.4	8	13.3	0.015	0.05	400	22,000	0.005	0.02	150	18,000
	10	16.7	0.015	0.03	350	20,000	0.005	0.01	120	16,000
	1.5	1.9	0.15	0.3	2,000	40,000	0.15	0.3	1,400	30,000
	2	2.5	0.15	0.3	2,000	40,000	0.15	0.3	1,400	30,000
	3	3.8	0.15	0.3	2,000	40,000	0.15	0.3	1,400	30,000
	4	5	0.12	0.2	1,600	35,000	0.1	0.16	1,000	27,000
	5	6.3	0.1	0.18	1,200	32,000	0.08	0.12	750	24,000
	6	7.5	0.08	0.15	1,000	30,000	0.05	0.1	500	20,000
0.5	8	10	0.05	0.06	700	22,000	0.02	0.025	300	16,000
	10	12.5	0.02	0.05	600	20,000	0.01	0.02	200	14,000
	2	2	0.25	0.4	2,800	40,000	0.25	0.4	2,000	30,000
	3	3	0.25	0.4	2,800	40,000	0.25	0.4	2,000	30,000
	4	4	0.2	0.4	2,400	40,000	0.2	0.4	1,600	30,000
	5	5	0.16	0.3	2,000	35,000	0.12	0.25	1,400	27,000
	6	6	0.14	0.3	1,600	30,000	0.1	0.25	1,000	25,000

Recommended Milling Conditions (Metric)

Work material			Copper				Copper tungsten (W70% - Cu30%)			
Radius (R)	Under neck length	L/D	Depth of cut		Feed mm/min	Spindle speed min ⁻¹	Depth of cut		Feed mm/min	Spindle speed min ⁻¹
			ap mm	ae mm			ap mm	ae mm		
0.5	8	8	0.12	0.2	1,000	25,000	0.06	0.1	500	18,000
	10	10	0.08	0.15	800	20,000	0.03	0.05	300	16,000
	12	12	0.06	0.1	600	16,000	0.015	0.04	200	12,000
	14	14	0.04	0.08	500	14,000	0.01	0.035	160	10,000
	16	16	0.02	0.06	400	12,000	0.005	0.03	120	8,000
0.75	4	2.7	0.3	0.6	2,800	35,000	0.3	0.6	2,200	30,000
	6	4	0.3	0.6	2,400	30,000	0.3	0.6	1,800	25,000
	8	5.3	0.25	0.5	1,800	25,000	0.2	0.4	1,200	20,000
	10	6.7	0.2	0.4	1,400	20,000	0.15	0.3	800	16,000
	12	8	0.15	0.3	1,000	16,000	0.1	0.2	500	12,000
	14	9.3	0.12	0.2	800	14,000	0.08	0.1	350	10,000
	16	10.7	0.1	0.15	650	12,000	0.05	0.08	280	9,000
1	18	12	0.08	0.12	500	10,000	0.02	0.06	200	8,000
	3	1.5	0.45	0.8	4,000	30,000	0.45	0.8	2,400	25,000
	4	2	0.45	0.8	4,000	30,000	0.45	0.8	2,400	22,000
	6	3	0.45	0.8	3,000	27,000	0.45	0.8	1,800	20,000
	8	4	0.4	0.8	2,400	25,000	0.4	0.8	1,600	18,000
	10	5	0.3	0.6	2,000	22,000	0.25	0.5	1,400	16,000
	12	6	0.3	0.6	1,400	16,000	0.25	0.5	900	12,000
	14	7	0.25	0.6	1,200	14,000	0.2	0.5	700	10,000
	16	8	0.25	0.5	1,000	12,000	0.12	0.25	500	9,000
1.5	20	10	0.15	0.3	800	10,000	0.06	0.1	350	8,000
	25	12.5	0.08	0.15	600	8,000	0.03	0.05	200	6,000
	6	2	0.7	1.5	3,400	20,000	0.6	1.2	2,400	16,000
	8	2.7	0.7	1.5	3,400	20,000	0.6	1.2	2,400	16,000
	10	3.3	0.7	1.5	3,400	20,000	0.6	1.2	2,400	16,000
	12	4	0.6	1.2	3,400	20,000	0.6	1	2,400	16,000
	15	5	0.6	1	3,000	18,000	0.5	0.8	2,000	14,000
	20	6.7	0.5	0.8	2,400	16,000	0.4	0.6	1,400	12,000
2	25	8.3	0.4	0.6	1,800	12,000	0.2	0.3	900	10,000
	30	10	0.2	0.4	1,200	8,000	0.08	0.15	500	6,000
	10	2.5	1	1.6	4,000	16,000	0.8	1.6	2,800	12,000
	12	3	1	1.6	3,600	16,000	0.8	1.6	2,800	12,000
	15	3.8	0.8	1.6	3,400	16,000	0.8	1.6	2,400	12,000
	20	5	0.8	1.6	3,000	14,000	0.8	1.6	2,000	10,000
	25	6.3	0.6	1.2	3,000	14,000	0.5	1	2,000	10,000
3	30	7.5	0.5	1	2,400	12,000	0.3	0.5	1,200	7,000
	40	10	0.4	0.8	1,200	8,000	0.15	0.3	500	5,000
	20	3.3	1	2	3,600	12,000	1	2	2,400	9,000
	25	4.2	1	1.8	3,300	11,000	0.8	1.2	2,100	8,000
	30	5	0.8	1.6	3,000	10,000	0.4	0.8	1,800	7,000
	40	6.7	0.6	1.2	2,400	8,000	0.3	0.6	1,250	5,500
	50	8.3	0.5	1	1,800	6,000	0.25	0.5	800	4,000
Notes			※Recommended RPM based upon ideal conditions. RPM may be adjusted to match the capabilities of your machine while maintaining constant feed rate per cutting tooth. ※1 These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape and machine type. ※2 Depth of cut: ap=Axial Depth of cut / ae=Radial Depth of cut. ※3 Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine. ※4 Water-insoluble fluid is recommended.							

Recommended Milling Conditions (Inch)

Work material			Copper					Copper tungsten (W70% - Cu30%)				
Radius (R)	Under neck length	L/D	Depth of cut		Feed per tooth	Feed	Spindle speed	Depth of cut		Feed per tooth	Feed	Spindle speed
			a _p inch	a _e inch	IPT fz	IPM	RPM	a _p inch	a _e inch	IPT fz	IPM	RPM
0.05	0.3	3	.00039	.00039	.00010	7.87	40,000	.00031	.00031	.00010	5.91	30,000
	0.5	5	.00028	.00028	.00007	5.91	40,000	.00020	.00020	.00007	3.94	30,000
0.075	0.3	2	.00059	.00079	.00012	9.84	40,000	.00039	.00059	.00012	7.09	30,000
	0.5	3.3	.00059	.00079	.00010	7.87	40,000	.00031	.00059	.00010	5.91	30,000
	1	6.7	.00028	.00039	.00007	5.91	40,000	.00020	.00031	.00007	3.94	30,000
0.1	0.5	2.5	.00098	.00197	.00025	19.69	40,000	.00079	.00157	.00023	13.78	30,000
	0.75	3.8	.00098	.00197	.00022	17.72	40,000	.00079	.00157	.00020	11.81	30,000
	1	5	.00079	.00157	.00020	15.75	40,000	.00059	.00118	.00016	9.84	30,000
	1.5	7.5	.00059	.00118	.00015	11.81	40,000	.00031	.00079	.00010	5.91	30,000
0.15	2	10	.00031	.00059	.00010	7.87	40,000	.00020	.00039	.00007	3.94	30,000
	0.5	1.7	.00118	.00276	.00034	27.56	40,000	.00118	.00276	.00033	19.69	30,000
	1	3.3	.00118	.00276	.00034	27.56	40,000	.00118	.00276	.00033	19.69	30,000
	1.5	5	.00098	.00197	.00025	19.69	40,000	.00079	.00197	.00020	11.81	30,000
0.2	2	6.7	.00059	.00118	.00020	15.75	40,000	.00039	.00079	.00013	7.87	30,000
	0.5	1.3	.00197	.00394	.00049	39.37	40,000	.00157	.00315	.00046	27.56	30,000
	1	2.5	.00197	.00394	.00049	39.37	40,000	.00157	.00315	.00046	27.56	30,000
	1.5	3.8	.00157	.00315	.00049	39.37	40,000	.00118	.00236	.00046	27.56	30,000
	2	5	.00138	.00236	.00030	23.62	40,000	.00079	.00197	.00023	13.78	30,000
	3	7.5	.00079	.00157	.00026	15.75	30,000	.00039	.00118	.00016	7.87	25,000
	4	10	.00031	.00059	.00020	9.84	25,000	.00020	.00039	.00011	3.94	18,000
	5	12.5	.00020	.00059	.00016	7.87	25,000	.00020	.00039	.00010	3.15	16,000
0.25	6	15	.00020	.00059	.00013	5.91	22,000	.00020	.00039	.00010	2.76	14,000
	1	2	.00315	.00591	.00039	31.50	40,000	.00315	.00591	.00033	19.69	30,000
	1.5	3	.00315	.00591	.00039	31.50	40,000	.00315	.00591	.00033	19.69	30,000
	2	4	.00315	.00591	.00039	31.50	40,000	.00315	.00591	.00033	19.69	30,000
	3	6	.00236	.00394	.00034	23.62	35,000	.00236	.00315	.00029	15.75	27,000
	4	8	.00157	.00315	.00026	15.75	30,000	.00098	.00197	.00018	7.87	22,000
	5	10	.00079	.00157	.00024	11.81	25,000	.00039	.00079	.00016	5.91	18,000
0.3	6	12	.00059	.00118	.00022	9.84	22,000	.00020	.00039	.00015	4.72	16,000
	1	1.7	.00472	.00787	.00079	62.99	40,000	.00472	.00787	.00079	47.24	30,000
	1.5	2.5	.00472	.00787	.00079	62.99	40,000	.00472	.00787	.00079	47.24	30,000
	2	3.3	.00472	.00787	.00079	62.99	40,000	.00472	.00787	.00079	47.24	30,000
	3	5	.00394	.00551	.00049	39.37	40,000	.00315	.00394	.00046	27.56	30,000
	4	6.7	.00276	.00394	.00046	27.56	30,000	.00157	.00236	.00031	15.75	25,000
	5	8.3	.00197	.00315	.00044	23.62	27,000	.00079	.00157	.00027	11.81	22,000
	6	10	.00157	.00236	.00039	19.69	25,000	.00039	.00118	.00020	7.87	20,000
0.4	8	13.3	.00059	.00197	.00036	15.75	22,000	.00020	.00079	.00016	5.91	18,000
	10	16.7	.00059	.00118	.00034	13.78	20,000	.00020	.00039	.00015	4.72	16,000
	1.5	1.9	.00591	.01181	.00098	78.74	40,000	.00591	.01181	.00092	55.12	30,000
	2	2.5	.00591	.01181	.00098	78.74	40,000	.00591	.01181	.00092	55.12	30,000
	3	3.8	.00591	.01181	.00098	78.74	40,000	.00591	.01181	.00092	55.12	30,000
	4	5	.00472	.00787	.00090	62.99	35,000	.00394	.00630	.00073	39.37	27,000
	5	6.3	.00394	.00709	.00074	47.24	32,000	.00315	.00472	.00062	29.53	24,000
	6	7.5	.00315	.00591	.00066	39.37	30,000	.00197	.00394	.00049	19.69	20,000
0.5	8	10	.00197	.00236	.00063	27.56	22,000	.00079	.00098	.00037	11.81	16,000
	10	12.5	.00079	.00197	.00059	23.62	20,000	.00039	.00079	.00028	7.87	14,000
	2	2	.00984	.01575	.00138	110.24	40,000	.00984	.01575	.00131	78.74	30,000
	3	3	.00984	.01575	.00138	110.24	40,000	.00984	.01575	.00131	78.74	30,000
	4	4	.00787	.01575	.00118	94.49	40,000	.00787	.01575	.00105	62.99	30,000
	5	5	.00630	.01181	.00112	78.74	35,000	.00472	.00984	.00102	55.12	27,000
	6	6	.00551	.01181	.00105	62.99	30,000	.00394	.00984	.00079	39.37	25,000

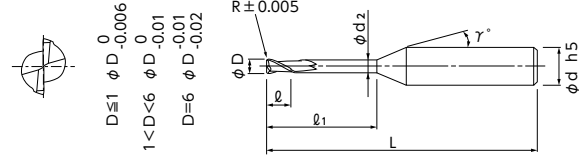
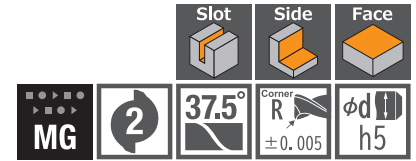
Recommended Milling Conditions (Inch)

Work material			Copper					Copper tungsten (W70% - Cu30%)				
Radius (R)	Under neck length	L/D	Depth of cut		Feed per tooth	Feed	Spindle speed	Depth of cut		Feed per tooth	Feed	Spindle speed
			ap inch	ae inch	IPT fz	IPM	RPM	ap inch	ae inch	IPT fz	IPM	RPM
0.5	8	8	.00472	.00787	.00079	39.37	25,000	.00236	.00394	.00055	19.69	18,000
	10	10	.00315	.00591	.00079	31.50	20,000	.00118	.00197	.00037	11.81	16,000
	12	12	.00236	.00394	.00074	23.62	16,000	.00059	.00157	.00033	7.87	12,000
	14	14	.00157	.00315	.00070	19.69	14,000	.00039	.00157	.00031	6.30	10,000
	16	16	.00079	.00236	.00066	15.75	12,000	.00020	.00118	.00030	4.72	8,000
0.75	4	2.7	.01181	.02362	.00157	110.24	35,000	.01181	.02362	.00144	86.61	30,000
	6	4	.01181	.02362	.00157	94.49	30,000	.01181	.02362	.00142	70.87	25,000
	8	5.3	.00984	.01969	.00142	70.87	25,000	.00787	.01575	.00118	47.24	20,000
	10	6.7	.00787	.01575	.00138	55.12	20,000	.00591	.01181	.00098	31.50	16,000
	12	8	.00591	.01181	.00123	39.37	16,000	.00394	.00787	.00082	19.69	12,000
	14	9.3	.00472	.00787	.00112	31.50	14,000	.00315	.00394	.00069	13.78	10,000
	16	10.7	.00394	.00591	.00107	25.59	12,000	.00197	.00315	.00061	11.02	9,000
	18	12	.00315	.00472	.00098	19.69	10,000	.00079	.00236	.00049	7.87	8,000
1	3	1.5	.01772	.03150	.00262	157.48	30,000	.01772	.03150	.00189	94.49	25,000
	4	2	.01772	.03150	.00262	157.48	30,000	.01772	.03150	.00215	94.49	22,000
	6	3	.01772	.03150	.00219	118.11	27,000	.01772	.03150	.00177	70.87	20,000
	8	4	.01575	.03150	.00189	94.49	25,000	.01575	.03150	.00175	62.99	18,000
	10	5	.01181	.02362	.00179	78.74	22,000	.00984	.01969	.00172	55.12	16,000
	12	6	.01181	.02362	.00172	55.12	16,000	.00984	.01969	.00148	35.43	12,000
	14	7	.00984	.02362	.00169	47.24	14,000	.00787	.01969	.00138	27.56	10,000
	16	8	.00984	.01969	.00164	39.37	12,000	.00472	.00984	.00109	19.69	9,000
	20	10	.00591	.01181	.00157	31.50	10,000	.00236	.00394	.00086	13.78	8,000
1.5	25	12.5	.00315	.00591	.00148	23.62	8,000	.00118	.00197	.00066	7.87	6,000
	6	2	.02756	.05906	.00335	133.86	20,000	.02362	.04724	.00295	94.49	16,000
	8	2.7	.02756	.05906	.00335	133.86	20,000	.02362	.04724	.00295	94.49	16,000
	10	3.3	.02756	.05906	.00335	133.86	20,000	.02362	.04724	.00295	94.49	16,000
	12	4	.02362	.04724	.00335	133.86	20,000	.02362	.03937	.00295	94.49	16,000
	15	5	.02362	.03937	.00328	118.11	18,000	.01969	.03150	.00281	78.74	14,000
	20	6.7	.01969	.03150	.00295	94.49	16,000	.01575	.02362	.00230	55.12	12,000
	25	8.3	.01575	.02362	.00295	70.87	12,000	.00787	.01181	.00177	35.43	10,000
2	30	10	.00787	.01575	.00295	47.24	8,000	.00315	.00591	.00164	19.69	6,000
	10	2.5	.03937	.06299	.00492	157.48	16,000	.03150	.06299	.00459	110.24	12,000
	12	3	.03937	.06299	.00443	141.73	16,000	.03150	.06299	.00459	110.24	12,000
	15	3.8	.03150	.06299	.00418	133.86	16,000	.03150	.06299	.00394	94.49	12,000
	20	5	.03150	.06299	.00422	118.11	14,000	.03150	.06299	.00394	78.74	10,000
	25	6.3	.02362	.04724	.00422	118.11	14,000	.01969	.03937	.00394	78.74	10,000
	30	7.5	.01969	.03937	.00394	94.49	12,000	.01181	.01969	.00337	47.24	7,000
3	40	10	.01575	.03150	.00295	47.24	8,000	.00591	.01181	.00197	19.69	5,000
	20	3.3	.03937	.07874	.00591	141.73	12,000	.03937	.07874	.00525	94.49	9,000
	25	4.2	.03937	.07087	.00591	129.92	11,000	.03150	.04724	.00517	82.68	8,000
	30	5	.03150	.06299	.00591	118.11	10,000	.01575	.03150	.00506	70.87	7,000
	40	6.7	.02362	.04724	.00591	94.49	8,000	.01181	.02362	.00447	49.21	5,500
3	50	8.3	.01969	.03937	.00591	70.87	6,000	.00984	.01969	.00394	31.50	4,000
Notes			※Recommended RPM based upon ideal conditions.									
			RPM may be adjusted to match the capabilities of your machine while maintaining constant feed rate per cutting tooth.									
			※1 These recommended cutting conditions indicate just reference. It should be adjusted according to milling shape and machine type.									
			※2 Depth of cut : ap=Axial Depth of cut / ae=Radial Depth of cut.									
			※3 Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine.									
			※4 Water-insoluble fluid is recommended.									

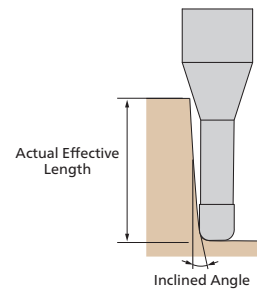
Long Neck Radius End Mill for Copper Electrode

Total 153 sizes

Long neck radius end mill specialized for machining copper alloy.
Sharpe cutting edge makes less burr and high quality surface.



- Long neck radius end mill specialized for machining copper electrode.
- 37.5° helix angle provides both sharpness shearing ability and finishing surface quality, combining the most suitable cutting edge design realizes the higher quality of finishing surface.
- High quality and stable milling performance with long tool life by optimized design and DLC COATING.
- Machining copper tungsten electrodes is also effective.



Work material

Copper	Copper Tungsten

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°
2.07-00110-02021	0.2	R0.02	0.5	0.4	0.18	12°	4	45	0.56	0.59	0.62	0.65	0.71
2.07-00110-02023			1	0.4	0.18	12°	4	45	1.09	1.13	1.19	1.24	1.38
2.07-00110-02025			1.5	0.4	0.18	12°	4	45	1.61	1.68	1.76	1.84	2.04
2.07-00110-02051		R0.05	0.5	0.4	0.18	12°	4	45	0.56	0.59	0.61	0.64	0.71
2.07-00110-02053			1	0.4	0.18	12°	4	45	1.08	1.13	1.18	1.24	1.37
2.07-00110-02055			1.5	0.4	0.18	12°	4	45	1.61	1.68	1.75	1.84	2.03
2.07-00110-03021	0.3	R0.02	1	0.6	0.28	12°	4	45	1.09	1.13	1.19	1.24	1.38
2.07-00110-03022			1.5	0.6	0.28	12°	4	45	1.61	1.68	1.76	1.84	2.04
2.07-00110-03023			2	0.6	0.28	12°	4	45	2.13	2.22	2.33	2.44	2.71
2.07-00110-03051		R0.05	1	0.6	0.28	12°	4	45	1.08	1.13	1.18	1.24	1.37
2.07-00110-03052			1.5	0.6	0.28	12°	4	45	1.61	1.68	1.75	1.84	2.03
2.07-00110-03053			2	0.6	0.28	12°	4	45	2.13	2.22	2.32	2.43	2.70
2.07-00110-04021	0.4	R0.02	1	0.8	0.37	12°	4	45	1.11	1.16	1.21	1.27	1.41
2.07-00110-04023			2	0.8	0.37	12°	4	45	2.15	2.25	2.35	2.47	2.74
2.07-00110-04025			3	0.8	0.37	12°	4	45	3.20	3.34	3.49	3.67	4.06
2.07-00110-04027			4	0.8	0.37	12°	4	45	4.24	4.43	4.63	4.86	5.39
2.07-00110-04051		R0.05	1	0.8	0.37	12°	4	45	1.11	1.16	1.21	1.27	1.40
2.07-00110-04053			2	0.8	0.37	12°	4	45	2.15	2.25	2.35	2.46	2.73
2.07-00110-04055			3	0.8	0.37	12°	4	45	3.19	3.34	3.49	3.66	4.05
2.07-00110-04057			4	0.8	0.37	12°	4	45	4.24	4.43	4.63	4.86	5.38
2.07-00110-04101		R0.1	1	0.8	0.37	12°	4	45	1.11	1.15	1.20	1.26	1.38
2.07-00110-04103			2	0.8	0.37	12°	4	45	2.15	2.24	2.34	2.45	2.71
2.07-00110-04105			3	0.8	0.37	12°	4	45	3.19	3.33	3.48	3.65	4.04
2.07-00110-04107			4	0.8	0.37	12°	4	45	4.24	4.42	4.62	4.85	5.37
2.07-00110-05022	0.5	R0.02	2	1	0.46	12°	4	45	2.18	2.27	2.38	2.50	2.77
2.07-00110-05023			3	1	0.46	12°	4	45	3.22	3.36	3.52	3.69	4.10
2.07-00110-05024			4	1	0.46	12°	4	45	4.26	4.45	4.66	4.89	5.42
2.07-00110-05025			5	1	0.46	12°	4	45	5.31	5.54	5.80	6.09	6.75
2.07-00110-05052		R0.05	2	1	0.46	12°	4	45	2.18	2.27	2.38	2.49	2.76
2.07-00110-05053			3	1	0.46	12°	4	45	3.22	3.36	3.52	3.69	4.09
2.07-00110-05054			4	1	0.46	12°	4	45	4.26	4.45	4.66	4.88	5.41
2.07-00110-05055			5	1	0.46	12°	4	45	5.31	5.54	5.80	6.08	6.74
2.07-00110-05102		R0.1	2	1	0.46	12°	4	45	2.17	2.27	2.37	2.48	2.74
2.07-00110-05103			3	1	0.46	12°	4	45	3.22	3.36	3.51	3.68	4.07
2.07-00110-05104			4	1	0.46	12°	4	45	4.26	4.45	4.65	4.87	5.40
2.07-00110-05105			5	1	0.46	12°	4	45	5.30	5.54	5.79	6.07	6.72

How to order

When you order, indicate DHR237R (D)×(R)×(L).

※(γ) is reference value.

Long Neck Radius End Mill for Copper Electrode

Code No.	Dia. (D)	Corner Radius (R)	Under Neck Length (ℓ ₁)	Length of Cut (ℓ)	Neck Dia. (d ₂)	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°
2.07-00110-06022	0.6	R0.02	2	1.2	0.56	12°	4	45	2.18	2.27	2.38	2.50	2.77
2.07-00110-06024			4	1.2	0.56	12°	4	45	4.26	4.45	4.66	4.89	5.42
2.07-00110-06026			6	1.2	0.56	12°	4	45	6.35	6.63	6.94	7.28	8.08
2.07-00110-06052		R0.05	2	1.2	0.56	12°	4	45	2.18	2.27	2.38	2.49	2.76
2.07-00110-06054			4	1.2	0.56	12°	4	45	4.26	4.45	4.66	4.88	5.41
2.07-00110-06056			6	1.2	0.56	12°	4	45	6.35	6.63	6.94	7.28	8.07
2.07-00110-06102		R0.1	2	1.2	0.56	12°	4	45	2.17	2.27	2.37	2.48	2.74
2.07-00110-06104			4	1.2	0.56	12°	4	45	4.26	4.45	4.65	4.87	5.40
2.07-00110-06106			6	1.2	0.56	12°	4	45	6.35	6.63	6.93	7.27	8.05
2.07-00110-08024	0.8	R0.02	4	1.6	0.76	12°	4	45	4.26	4.45	4.66	4.89	5.42
2.07-00110-08026			6	1.6	0.76	12°	4	45	6.35	6.63	6.94	7.28	8.08
2.07-00110-08028			8	1.6	0.76	12°	4	50	8.43	8.81	9.22	9.68	10.73
2.07-00110-08054		R0.05	4	1.6	0.76	12°	4	45	4.26	4.45	4.66	4.88	5.41
2.07-00110-08056			6	1.6	0.76	12°	4	45	6.35	6.63	6.94	7.28	8.07
2.07-00110-08058			8	1.6	0.76	12°	4	50	8.43	8.81	9.22	9.67	10.72
2.07-00110-08104		R0.1	4	1.6	0.76	12°	4	45	4.26	4.45	4.65	4.87	5.40
2.07-00110-08106			6	1.6	0.76	12°	4	45	6.35	6.63	6.93	7.27	8.05
2.07-00110-08108			8	1.6	0.76	12°	4	50	8.43	8.80	9.21	9.66	10.71
2.07-00110-10053	1	R0.05	3	2	0.95	12°	4	45	3.24	3.39	3.54	3.72	4.12
2.07-00110-10054			4	2	0.95	12°	4	45	4.29	4.48	4.68	4.91	5.44
2.07-00110-10055			5	2	0.95	12°	4	45	5.33	5.57	5.82	6.11	6.77
2.07-00110-10056			6	2	0.95	12°	4	45	6.37	6.66	6.97	7.31	8.10
2.07-00110-10058			8	2	0.95	12°	4	50	8.46	8.83	9.25	9.70	10.75
2.07-00110-10060			10	2	0.95	12°	4	50	10.54	11.01	11.53	12.09	13.41
2.07-00110-10103		R0.1	3	2	0.95	12°	4	45	3.24	3.38	3.54	3.71	4.10
2.07-00110-10104			4	2	0.95	12°	4	45	4.28	4.47	4.68	4.90	5.43
2.07-00110-10105			5	2	0.95	12°	4	45	5.33	5.56	5.82	6.10	6.76
2.07-00110-10106			6	2	0.95	12°	4	45	6.37	6.65	6.96	7.30	8.08
2.07-00110-10108			8	2	0.95	12°	4	50	8.46	8.83	9.24	9.69	10.74
2.07-00110-10110			10	2	0.95	12°	4	50	10.54	11.01	11.52	12.08	13.39
2.07-00110-10203		R0.2	3	2	0.95	12°	4	45	3.24	3.37	3.52	3.69	4.07
2.07-00110-10204			4	2	0.95	12°	4	45	4.28	4.46	4.66	4.88	5.40
2.07-00110-10205			5	2	0.95	12°	4	45	5.32	5.55	5.80	6.08	6.72
2.07-00110-10206			6	2	0.95	12°	4	45	6.37	6.64	6.94	7.28	8.05
2.07-00110-10208			8	2	0.95	12°	4	50	8.45	8.82	9.23	9.67	10.71
2.07-00110-10210			10	2	0.95	12°	4	50	10.54	11.00	11.51	12.06	13.36
2.07-00110-15105	1.5	R0.1	5	3	1.45	12°	4	45	5.33	5.56	5.82	6.10	6.76
2.07-00110-15110			10	3	1.45	12°	4	50	10.54	11.01	11.52	12.08	13.39
2.07-00110-15115			15	3	1.45	12°	4	50	15.76	16.46	17.22	18.07	20.03
2.07-00110-15205		R0.2	5	3	1.45	12°	4	45	5.32	5.55	5.80	6.08	6.72
2.07-00110-15210			10	3	1.45	12°	4	50	10.54	11.00	11.51	12.06	13.36
2.07-00110-15215			15	3	1.45	12°	4	50	15.75	16.45	17.21	18.05	20.00
2.07-00110-15305		R0.3	5	3	1.45	12°	4	45	5.32	5.54	5.79	6.06	6.69
2.07-00110-15310			10	3	1.45	12°	4	50	10.53	10.99	11.49	12.04	13.33
2.07-00110-15315			15	3	1.45	12°	4	50	15.75	16.44	17.20	18.03	19.96
2.07-00110-15505		R0.5	5	3	1.45	12°	4	45	5.31	5.53	5.76	6.02	6.63
2.07-00110-15510			10	3	1.45	12°	4	50	10.52	10.97	11.46	12.01	13.26
2.07-00110-15515			15	3	1.45	12°	4	50	15.74	16.42	17.17	17.99	19.90
2.07-00110-15520			20	3	1.45	12°	4	60	20.95	21.87	22.87	23.97	Free
2.07-00110-20105	2	R0.1	5	4	1.94	12°	4	45	5.35	5.59	5.84	6.13	6.79
2.07-00110-20108			8	4	1.94	12°	4	50	8.48	8.86	9.27	9.72	10.77
2.07-00110-20110			10	4	1.94	12°	4	50	10.57	11.03	11.55	12.11	13.42
2.07-00110-20115			15	4	1.94	12°	4	50	15.78	16.48	17.25	18.09	Free
2.07-00110-20120			20	4	1.94	12°	4	60	20.99	21.93	22.95	24.08	Free
2.07-00110-20205		R0.2	5	4	1.94	12°	4	45	5.35	5.58	5.83	6.11	6.75
2.07-00110-20208			8	4	1.94	12°	4	50	8.48	8.85	9.25	9.70	10.74
2.07-00110-20210			10	4	1.94	12°	4	50	10.56	11.03	11.53	12.09	13.39
2.07-00110-20215			15	4	1.94	12°	4	50	15.78	16.47	17.24	18.07	Free
2.07-00110-20220			20	4	1.94	12°	4	60	20.99	21.92	22.94	24.06	Free
2.07-00110-20305		R0.3	5	4	1.94	12°	4	45	5.34	5.57	5.82	6.09	6.72
2.07-00110-20308			8	4	1.94	12°	4	50	8.47	8.84	9.24	9.68	10.70
2.07-00110-20310			10	4	1.94	12°	4	50	10.56	11.02	11.52	12.07	13.36
2.07-00110-20315			15	4	1.94	12°	4	50	15.77	16.46	17.22	18.05	Free
2.07-00110-20320			20	4	1.94	12°	4	60	20.99	21.91	22.92	24.04	Free
2.07-00110-20505		R0.5	5	4	1.94	12°	4	45	5.33	5.55	5.79	6.05	6.66
2.07-00110-20508			8	4	1.94	12°	4	50	8.46	8.82	9.21	9.64	10.64
2.07-00110-20510			10	4	1.94	12°	4	50	10.55	11.00	11.49	12.03	13.30
2.07-00110-20515			15	4	1.94	12°	4	50	15.76	16.45	17.19	18.02	Free
2.07-00110-20520			20	4	1.94	12°	4	60	20.98	21.89	22.90	24.00	Free

Long Neck Radius End Mill for Copper Electrode

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°
2.07-00110-25208	2.5	R0.2	8	5	2.4	12°	4	50	8.57	8.95	9.36	9.81	10.86
2.07-00110-25214			14	5	2.4	12°	4	50	14.83	15.49	16.20	16.99	Free
2.07-00110-25220			20	5	2.4	12°	4	60	21.09	22.02	23.05	Free	Free
2.07-00110-25508		R0.5	8	5	2.4	12°	4	50	8.56	8.92	9.32	9.75	10.77
2.07-00110-25514			14	5	2.4	12°	4	50	14.82	15.46	16.16	16.93	Free
2.07-00110-25520			20	5	2.4	12°	4	60	21.08	22.00	23.00	Free	Free
2.07-00110-30112	3	R0.1	12	6	2.85	12°	6	50	12.87	13.44	14.07	14.76	16.36
2.07-00110-30118			18	6	2.85	12°	6	60	19.13	19.98	20.91	21.94	24.32
2.07-00110-30124			24	6	2.85	12°	6	70	25.39	26.52	27.76	29.12	Free
2.07-00110-30212		R0.2	12	6	2.85	12°	6	50	12.87	13.44	14.06	14.74	16.33
2.07-00110-30218			18	6	2.85	12°	6	60	19.13	19.97	20.90	21.92	24.29
2.07-00110-30224			24	6	2.85	12°	6	70	25.38	26.51	27.74	29.10	Free
2.07-00110-30312		R0.3	12	6	2.85	12°	6	50	12.86	13.43	14.04	14.72	16.29
2.07-00110-30318			18	6	2.85	12°	6	60	19.12	19.96	20.88	21.90	24.26
2.07-00110-30324			24	6	2.85	12°	6	70	25.38	26.50	27.73	29.08	Free
2.07-00110-30512		R0.5	12	6	2.85	12°	6	50	12.86	13.41	14.01	14.68	16.23
2.07-00110-30515			15	6	2.85	12°	6	60	15.98	16.68	17.44	18.27	20.21
2.07-00110-30518			18	6	2.85	12°	6	60	19.11	19.95	20.86	21.86	24.19
2.07-00110-30524			24	6	2.85	12°	6	70	25.37	26.48	27.70	29.04	Free
2.07-00110-30530			30	6	2.85	12°	6	70	31.63	33.02	34.54	36.22	Free
2.07-00110-40116		R0.1	16	8	3.8	12°	6	60	17.17	17.93	18.77	19.68	Free
2.07-00110-40124			24	8	3.8	12°	6	60	25.51	26.65	27.89	Free	Free
2.07-00110-40132			32	8	3.8	12°	6	70	33.85	35.36	37.01	Free	Free
2.07-00110-40216		R0.2	16	8	3.8	12°	6	60	17.16	17.92	18.75	19.66	Free
2.07-00110-40224			24	8	3.8	12°	6	60	25.50	26.64	27.88	Free	Free
2.07-00110-40232			32	8	3.8	12°	6	70	33.85	35.35	37.00	Free	Free
2.07-00110-40316		R0.3	16	8	3.8	12°	6	60	17.16	17.91	18.74	19.65	Free
2.07-00110-40324			24	8	3.8	12°	6	60	25.50	26.63	27.86	Free	Free
2.07-00110-40332			32	8	3.8	12°	6	70	33.84	35.34	36.99	Free	Free
2.07-00110-40516		R0.5	16	8	3.8	12°	6	60	17.15	17.89	18.71	19.61	Free
2.07-00110-40524			24	8	3.8	12°	6	60	25.49	26.61	27.83	Free	Free
2.07-00110-40532			32	8	3.8	12°	6	70	33.83	35.33	36.96	Free	Free
2.07-00110-41016		R1	16	8	3.8	12°	6	60	17.13	17.85	18.64	19.51	Free
2.07-00110-41024			24	8	3.8	12°	6	60	25.47	26.57	27.77	29.08	Free
2.07-00110-41032			32	8	3.8	12°	6	70	33.81	35.28	36.89	Free	Free
2.07-00110-50120	5	R0.1	20	10	4.8	12°	6	60	21.34	22.29	Free	Free	Free
2.07-00110-50140			40	10	4.8	12°	6	80	42.19	Free	Free	Free	Free
2.07-00110-60124	6	R0.1	24	12	5.8	—	6	60	Free	Free	Free	Free	Free
2.07-00110-60148			48	12	5.8	—	6	90	Free	Free	Free	Free	Free
2.07-00110-60224		R0.2	24	12	5.8	—	6	60	Free	Free	Free	Free	Free
2.07-00110-60248			48	12	5.8	—	6	90	Free	Free	Free	Free	Free
2.07-00110-60324		R0.3	24	12	5.8	—	6	60	Free	Free	Free	Free	Free
2.07-00110-60348			48	12	5.8	—	6	90	Free	Free	Free	Free	Free
2.07-00110-60524		R0.5	24	12	5.8	—	6	60	Free	Free	Free	Free	Free
2.07-00110-60530			30	12	5.8	—	6	70	Free	Free	Free	Free	Free
2.07-00110-60548		R1	48	12	5.8	—	6	90	Free	Free	Free	Free	Free
2.07-00110-61024			24	12	5.8	—	6	60	Free	Free	Free	Free	Free
2.07-00110-61048			48	12	5.8	—	6	90	Free	Free	Free	Free	Free

How to order

When you order, indicate DHR237R (D)×(R)×(ℓ1).

※(γ) is reference value.

Recommended Milling Conditions (Metric)

Work material				Copper				Copper tungsten (W70% - Cu30%)			
Dia.	Corner Radius	Under Neck Length	L/D	Depth of cut		Feed	Spindle Speed	Depth of cut		Feed	Spindle Speed
				a _p mm	a _e mm	mm/min	min ⁻¹	a _p mm	a _e mm	mm/min	min ⁻¹
0.2	0.02	0.5	2.5	0.01	0.1	400	40,000	0.009	0.09	360	36,000
		1	5	0.008	0.1	320	40,000	0.007	0.09	280	36,000
		1.5	7.5	0.005	0.1	180	30,000	0.005	0.09	160	27,000
	0.05	0.5	2.5	0.03	0.1	400	40,000	0.027	0.09	360	36,000
		1	5	0.02	0.1	320	40,000	0.018	0.09	280	36,000
		1.5	7.5	0.01	0.1	180	30,000	0.009	0.09	160	27,000
0.3	0.02	1	3.3	0.01	0.15	480	40,000	0.009	0.14	420	36,000
		1.5	5	0.008	0.15	360	40,000	0.007	0.14	320	36,000
		2	6.7	0.005	0.15	240	30,000	0.005	0.14	210	27,000
	0.05	1	3.3	0.03	0.15	480	40,000	0.027	0.14	420	36,000
		1.5	5	0.024	0.15	360	40,000	0.022	0.14	320	36,000
		2	6.7	0.018	0.15	240	30,000	0.016	0.14	210	27,000
0.4	0.02	1	2.5	0.01	0.2	640	40,000	0.009	0.18	580	36,000
		2	5	0.01	0.2	560	40,000	0.009	0.18	500	36,000
		3	7.5	0.008	0.2	420	30,000	0.007	0.18	380	27,000
		4	10	0.005	0.2	360	30,000	0.005	0.18	320	27,000
	0.05	1	2.5	0.03	0.2	640	40,000	0.027	0.18	580	36,000
		2	5	0.024	0.2	560	40,000	0.022	0.18	500	36,000
		3	7.5	0.018	0.2	420	30,000	0.016	0.18	380	27,000
		4	10	0.012	0.2	360	30,000	0.01	0.18	320	27,000
	0.1	1	2.5	0.06	0.2	640	40,000	0.054	0.18	580	36,000
		2	5	0.05	0.2	560	40,000	0.045	0.18	500	36,000
		3	7.5	0.036	0.2	420	30,000	0.032	0.18	380	27,000
		4	10	0.024	0.2	360	30,000	0.022	0.18	320	27,000
0.5	0.02	2	4	0.01	0.25	800	40,000	0.009	0.23	720	36,000
		3	6	0.01	0.25	640	35,000	0.009	0.23	580	32,000
		4	8	0.008	0.25	480	30,000	0.007	0.23	420	27,000
		5	10	0.005	0.25	400	25,000	0.005	0.23	360	23,000
	0.05	2	4	0.03	0.25	800	40,000	0.027	0.23	720	36,000
		3	6	0.024	0.25	640	35,000	0.022	0.23	580	32,000
		4	8	0.018	0.25	480	30,000	0.016	0.23	420	27,000
		5	10	0.012	0.25	400	25,000	0.01	0.23	360	23,000
	0.1	2	4	0.06	0.25	800	40,000	0.054	0.23	720	36,000
		3	6	0.05	0.25	640	35,000	0.045	0.23	580	32,000
		4	8	0.036	0.25	480	30,000	0.032	0.23	420	27,000
		5	10	0.024	0.25	400	25,000	0.022	0.23	360	23,000
0.6	0.02	2	3.3	0.01	0.3	1,000	30,000	0.009	0.27	900	27,000
		4	6.7	0.01	0.3	800	25,000	0.009	0.27	720	23,000
		6	10	0.008	0.3	600	20,000	0.007	0.27	540	18,000
	0.05	2	3.3	0.03	0.3	1,000	30,000	0.027	0.27	900	27,000
		4	6.7	0.02	0.3	800	25,000	0.018	0.27	720	23,000
		6	10	0.012	0.3	600	20,000	0.01	0.27	540	18,000
	0.1	2	3.3	0.06	0.3	1,000	30,000	0.054	0.27	900	27,000
		4	6.7	0.05	0.3	800	25,000	0.045	0.27	720	23,000
0.8	0.02	6	10	0.036	0.3	600	20,000	0.032	0.27	540	18,000
	0.05	4	5	0.01	0.4	1,600	25,000	0.009	0.36	1,400	23,000
		6	7.5	0.01	0.4	1,200	20,000	0.009	0.36	1,100	18,000
		8	10	0.01	0.4	800	16,000	0.009	0.36	720	14,000
	0.1	4	5	0.03	0.4	1,600	25,000	0.027	0.36	1,400	23,000
		6	7.5	0.024	0.4	1,200	20,000	0.022	0.36	1,100	18,000
		8	10	0.02	0.4	800	16,000	0.018	0.36	720	14,000
	0.1	4	5	0.06	0.4	1,600	25,000	0.054	0.36	1,400	23,000
		6	7.5	0.05	0.4	1,200	20,000	0.045	0.36	1,100	18,000
		8	10	0.04	0.4	800	16,000	0.036	0.36	720	14,000

Recommended Milling Conditions (Metric)

Work material				Copper				Copper tungsten (W70% - Cu30%)			
Dia.	Corner Radius (R)	Under neck length	L/D	Depth of cut		Feed	Spindle speed	Depth of cut		Feed	Spindle speed
				a _p mm	a _e mm	mm/min	min ⁻¹	a _p mm	a _e mm	mm/min	min ⁻¹
1	0.05	3	3	0.03	0.6	2,400	25,000	0.027	0.55	2,200	23,000
		4	4	0.03	0.6	2,200	25,000	0.027	0.55	2,000	23,000
		5	5	0.024	0.6	2,000	22,000	0.022	0.55	1,800	20,000
		6	6	0.024	0.6	1,800	20,000	0.022	0.55	1,600	18,000
		8	8	0.02	0.6	1,400	16,000	0.018	0.55	1,200	14,000
		10	10	0.02	0.6	1,000	12,000	0.018	0.55	900	11,000
	0.1	3	3	0.06	0.6	2,400	25,000	0.054	0.55	2,200	23,000
		4	4	0.055	0.6	2,200	25,000	0.05	0.55	2,000	23,000
		5	5	0.05	0.6	2,000	22,000	0.045	0.55	1,800	20,000
		6	6	0.045	0.6	1,800	20,000	0.04	0.55	1,600	18,000
		8	8	0.04	0.6	1,400	16,000	0.036	0.55	1,200	14,000
		10	10	0.03	0.6	1,000	12,000	0.027	0.55	900	11,000
	0.2	3	3	0.12	0.6	2,400	25,000	0.11	0.55	2,200	23,000
		4	4	0.11	0.6	2,200	25,000	0.1	0.55	2,000	23,000
		5	5	0.1	0.6	2,000	22,000	0.09	0.55	1,800	20,000
		6	6	0.09	0.6	1,800	20,000	0.08	0.55	1,600	18,000
		8	8	0.08	0.6	1,400	16,000	0.07	0.55	1,200	14,000
		10	10	0.06	0.6	1,000	12,000	0.054	0.55	900	11,000
1.5	0.1	5	3.3	0.06	0.9	2,400	20,000	0.054	0.8	2,200	18,000
		10	6.6	0.05	0.9	1,600	16,000	0.045	0.8	1,400	14,000
		15	10	0.04	0.9	1,000	12,000	0.036	0.8	900	11,000
	0.2	5	3.3	0.12	0.9	2,400	20,000	0.11	0.8	2,200	18,000
		10	6.6	0.1	0.9	1,600	16,000	0.09	0.8	1,400	14,000
		15	10	0.08	0.9	1,000	12,000	0.07	0.8	900	11,000
	0.3	5	3.3	0.18	0.9	2,400	20,000	0.16	0.8	2,200	18,000
		10	6.6	0.15	0.9	1,600	16,000	0.14	0.8	1,400	14,000
		15	10	0.12	0.9	1,000	12,000	0.11	0.8	900	11,000
	0.5	5	3.3	0.25	0.5	2,400	20,000	0.23	0.8	2,200	18,000
		10	6.6	0.2	0.5	1,600	16,000	0.18	0.8	1,400	14,000
		15	10	0.12	0.5	1,000	12,000	0.11	0.8	900	11,000
		20	13.3	0.06	0.5	600	8,000	0.054	0.8	540	7,000
2	0.1	5	2.5	0.06	1.2	3,000	16,000	0.054	1.1	2,700	14,000
		8	4	0.06	1.2	2,600	14,000	0.054	1.1	2,400	13,000
		10	5	0.06	1.2	2,000	12,000	0.054	1.1	1,800	11,000
		15	7.5	0.05	1.2	1,600	10,000	0.045	1.1	1,400	9,000
		20	10	0.04	1.2	1,200	8,000	0.036	1.1	1,100	7,000
	0.2	5	2.5	0.12	1.2	3,000	16,000	0.11	1.1	2,700	14,000
		8	4	0.12	1.2	2,600	14,000	0.11	1.1	2,400	13,000
		10	5	0.12	1.2	2,000	12,000	0.11	1.1	1,800	11,000
		15	7.5	0.1	1.2	1,600	10,000	0.09	1.1	1,400	9,000
		20	10	0.08	1.2	1,200	8,000	0.07	1.1	1,100	7,000
	0.3	5	2.5	0.18	1.2	3,000	16,000	0.16	1.1	2,700	14,000
		8	4	0.18	1.2	2,600	14,000	0.16	1.1	2,400	13,000
		10	5	0.18	1.2	2,000	12,000	0.16	1.1	1,800	11,000
		15	7.5	0.14	1.2	1,600	10,000	0.13	1.1	1,400	9,000
		20	10	0.1	1.2	1,200	8,000	0.09	1.1	1,100	7,000
	0.5	5	2.5	0.3	1.2	3,000	16,000	0.27	1.1	2,700	14,000
		8	4	0.3	1.2	2,600	14,000	0.27	1.1	2,400	13,000
		10	5	0.3	1.2	2,000	12,000	0.27	1.1	1,800	11,000
		15	7.5	0.2	1.2	1,600	10,000	0.18	1.1	1,400	9,000
		20	10	0.15	1.2	1,200	8,000	0.14	1.1	1,100	7,000
2.5	0.2	8	3.2	0.12	1.5	3,000	15,000	0.11	1.4	2,700	13,500
		14	5.6	0.1	1.5	2,200	12,000	0.09	1.4	2,000	11,000
		20	8	0.08	1.5	1,600	10,000	0.04	1.4	1,400	9,000
	0.5	8	3.2	0.3	1.5	3,000	15,000	0.027	1.4	2,700	13,500
		14	5.6	0.25	1.5	2,200	12,000	0.23	1.4	2,000	11,000
		20	8	0.2	1.5	1,600	10,000	0.18	1.4	1,400	9,000

Recommended Milling Conditions (Metric)

Work material				Copper				Copper tungsten (W70% - Cu30%)			
Dia.	Corner Radius (R)	Under neck length	L/D	Depth of cut		Feed	Spindle speed	Depth of cut		Feed	Spindle speed
				ap mm	ae mm	mm/min	min ⁻¹	ap mm	ae mm	mm/min	min ⁻¹
3	0.1	12	4	0.06	1.8	3,000	14,000	0.054	1.6	2,700	13,000
		18	6	0.05	1.8	2,400	12,000	0.045	1.6	2,200	11,000
		24	8	0.04	1.8	1,800	10,000	0.036	1.6	1,600	9,000
	0.2	12	4	0.12	1.8	3,000	14,000	0.11	1.6	2,700	13,000
		18	6	0.1	1.8	2,400	12,000	0.09	1.6	2,200	11,000
		24	8	0.08	1.8	1,800	10,000	0.07	1.6	1,600	9,000
	0.3	12	4	0.18	1.8	3,000	14,000	0.16	1.6	2,700	13,000
		18	6	0.15	1.8	2,400	12,000	0.14	1.6	2,200	11,000
		24	8	0.12	1.8	1,800	10,000	0.11	1.6	1,600	9,000
	0.5	12	4	0.3	1.8	3,000	14,000	0.27	1.6	2,700	13,000
		15	5	0.3	1.8	2,600	13,000	0.27	1.6	2,400	12,000
		18	6	0.25	1.8	2,400	12,000	0.23	1.6	2,200	11,000
		24	8	0.2	1.8	1,800	10,000	0.18	1.6	1,600	9,000
4	0.1	16	4	0.06	2.8	2,800	10,000	0.054	2.5	2,500	9,000
		24	6	0.05	2.8	2,200	8,000	0.045	2.5	1,900	7,000
		32	8	0.04	2.8	1,600	6,000	0.036	2.5	1,400	5,500
	0.2	16	4	0.14	2.8	2,800	10,000	0.13	2.5	2,500	9,000
		24	6	0.12	2.8	2,200	8,000	0.11	2.5	1,900	7,000
		32	8	0.1	2.8	1,600	6,000	0.09	2.5	1,400	5,500
	0.3	16	4	0.18	2.8	2,800	10,000	0.16	2.5	2,500	9,000
		24	6	0.15	2.8	2,200	8,000	0.14	2.5	1,900	7,000
		32	8	0.12	2.8	1,600	6,000	0.11	2.5	1,400	5,500
	0.5	16	4	0.3	2.4	2,800	10,000	0.27	2.2	2,500	9,000
		24	6	0.24	2.4	2,200	8,000	0.22	2.2	1,900	7,000
		32	8	0.18	2.4	1,600	6,000	0.16	2.2	1,400	5,500
	1	16	4	0.6	2	2,800	10,000	0.54	1.8	2,500	9,000
		24	6	0.48	2	2,200	8,000	0.43	1.8	1,900	7,000
		32	8	0.36	2	1,600	6,000	0.32	1.8	1,400	5,500
5	0.1	20	4	0.06	3.5	2,700	8,000	0.054	3.2	2,400	7,000
		40	8	0.04	3.5	1,600	5,000	0.036	3.2	1,400	4,500
6	0.1	24	4	0.06	4.2	2,600	6,000	0.054	3.8	2,300	5,500
		48	8	0.03	4.2	1,600	4,000	0.027	3.8	1,400	3,500
	0.2	24	4	0.12	4.2	2,600	6,000	0.11	3.8	2,300	5,500
		48	8	0.06	4.2	1,600	4,000	0.054	3.8	1,400	3,500
	0.3	24	4	0.18	4.2	2,600	6,000	0.16	3.8	2,300	5,500
		48	8	0.09	4.2	1,600	4,000	0.08	3.8	1,400	3,500
	0.5	24	4	0.3	3.6	2,600	6,000	0.27	3.2	2,300	5,500
		30	5	0.24	3.6	2,200	5,000	0.22	3.2	1,900	4,500
		48	8	0.16	3.6	1,600	4,000	0.14	3.2	1,400	3,500
1	24	4	0.6	3	2,600	6,000	0.54	2.7	2,300	5,500	
	48	8	0.3	3	1,600	4,000	0.27	2.7	1,400	3,500	
Notes				※Recommended RPM based upon ideal conditions. RPM may be adjusted to match the capabilities of your machine while maintaining constant feed rate per cutting tooth. ※1 Recommend to use the milling condition as just reference. Adjust milling conditions according to machining shape and machine status. ※2 Depth of cut : ap=Axial Depth of cut / ae=Radial Depth of cut. ※3 Recommend to apply helical or ramping for approaching into axial direction. ※4 For slotting, recommend reciprocating milling by adjusting feed & ap in below 60% of recommended milling condition. ※5 Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine. ※6 Water-insoluble fluid is recommended.							

Recommended Milling Conditions (Inch)

Work material				Copper					Copper tungsten (W70% - Cu30%)				
Dia.	Corner Radius	Under Neck Length	L/D	Depth of cut		Feed per tooth	Feed	Spindle Speed	Depth of cut		Feed per tooth	Feed	Spindle Speed
				ap inch	ae inch	IPT fz	IPM	RPM	ap inch	ae inch	IPT fz	IPM	RPM
0.2	0.02	0.5	2.5	.00039	.00394	.00020	15.75	40,000	.00035	.00354	.00020	14.17	36,000
		1	5	.00031	.00394	.00016	12.60	40,000	.00028	.00354	.00015	11.02	36,000
		1.5	7.5	.00020	.00394	.00012	7.09	30,000	.00020	.00354	.00012	6.30	27,000
	0.05	0.5	2.5	.00118	.00394	.00020	15.75	40,000	.00106	.00354	.00020	14.17	36,000
		1	5	.00079	.00394	.00016	12.60	40,000	.00071	.00354	.00015	11.02	36,000
		1.5	7.5	.00039	.00394	.00012	7.09	30,000	.00035	.00354	.00012	6.30	27,000
0.3	0.02	1	3.3	.00039	.00591	.00024	18.90	40,000	.00035	.00551	.00023	16.54	36,000
		1.5	5	.00031	.00591	.00018	14.17	40,000	.00028	.00551	.00017	12.60	36,000
		2	6.7	.00020	.00591	.00016	9.45	30,000	.00020	.00551	.00015	8.27	27,000
	0.05	1	3.3	.00118	.00591	.00024	18.90	40,000	.00106	.00551	.00023	16.54	36,000
		1.5	5	.00094	.00591	.00018	14.17	40,000	.00087	.00551	.00017	12.60	36,000
		2	6.7	.00071	.00591	.00016	9.45	30,000	.00063	.00551	.00015	8.27	27,000
0.4	0.02	1	2.5	.00039	.00787	.00031	25.20	40,000	.00035	.00709	.00032	22.84	36,000
		2	5	.00039	.00787	.00028	22.05	40,000	.00035	.00709	.00027	19.69	36,000
		3	7.5	.00031	.00787	.00028	16.54	30,000	.00028	.00709	.00028	14.96	27,000
		4	10	.00020	.00787	.00024	14.17	30,000	.00020	.00709	.00023	12.60	27,000
	0.05	1	2.5	.00118	.00787	.00031	25.20	40,000	.00106	.00709	.00032	22.84	36,000
		2	5	.00094	.00787	.00028	22.05	40,000	.00087	.00709	.00027	19.69	36,000
		3	7.5	.00071	.00787	.00028	16.54	30,000	.00063	.00709	.00028	14.96	27,000
		4	10	.00047	.00787	.00024	14.17	30,000	.00039	.00709	.00023	12.60	27,000
	0.1	1	2.5	.00236	.00787	.00031	25.20	40,000	.00213	.00709	.00032	22.84	36,000
		2	5	.00197	.00787	.00028	22.05	40,000	.00177	.00709	.00027	19.69	36,000
		3	7.5	.00142	.00787	.00028	16.54	30,000	.00126	.00709	.00028	14.96	27,000
		4	10	.00094	.00787	.00024	14.17	30,000	.00087	.00709	.00023	12.60	27,000
0.5	0.02	2	4	.00039	.00984	.00039	31.50	40,000	.00035	.00906	.00039	28.35	36,000
		3	6	.00039	.00984	.00036	25.20	35,000	.00035	.00906	.00036	22.84	32,000
		4	8	.00031	.00984	.00031	18.90	30,000	.00028	.00906	.00031	16.54	27,000
		5	10	.00020	.00984	.00031	15.75	25,000	.00020	.00906	.00031	14.17	23,000
	0.05	2	4	.00118	.00984	.00039	31.50	40,000	.00106	.00906	.00039	28.35	36,000
		3	6	.00094	.00984	.00036	25.20	35,000	.00087	.00906	.00036	22.84	32,000
		4	8	.00071	.00984	.00031	18.90	30,000	.00063	.00906	.00031	16.54	27,000
		5	10	.00047	.00984	.00031	15.75	25,000	.00039	.00906	.00031	14.17	23,000
	0.1	2	4	.00236	.00984	.00039	31.50	40,000	.00213	.00906	.00039	28.35	36,000
		3	6	.00197	.00984	.00036	25.20	35,000	.00177	.00906	.00036	22.84	32,000
		4	8	.00142	.00984	.00031	18.90	30,000	.00126	.00906	.00031	16.54	27,000
		5	10	.00094	.00984	.00031	15.75	25,000	.00087	.00906	.00031	14.17	23,000
0.6	0.02	2	3.3	.00039	.01181	.00066	39.37	30,000	.00035	.01063	.00066	35.43	27,000
		4	6.7	.00039	.01181	.00063	31.50	25,000	.00035	.01063	.00062	28.35	23,000
		6	10	.00031	.01181	.00059	23.62	20,000	.00028	.01063	.00059	21.26	18,000
	0.05	2	3.3	.00118	.01181	.00066	39.37	30,000	.00106	.01063	.00066	35.43	27,000
		4	6.7	.00079	.01181	.00063	31.50	25,000	.00071	.01063	.00062	28.35	23,000
		6	10	.00047	.01181	.00059	23.62	20,000	.00039	.01063	.00059	21.26	18,000
	0.1	2	3.3	.00236	.01181	.00066	39.37	30,000	.00213	.01063	.00066	35.43	27,000
		4	6.7	.00197	.01181	.00063	31.50	25,000	.00177	.01063	.00062	28.35	23,000
		6	10	.00142	.01181	.00059	23.62	20,000	.00126	.01063	.00059	21.26	18,000
0.8	0.02	4	5	.00039	.01575	.00126	62.99	25,000	.00035	.01417	.00120	55.12	23,000
		6	7.5	.00039	.01575	.00118	47.24	20,000	.00035	.01417	.00120	43.31	18,000
		8	10	.00039	.01575	.00098	31.50	16,000	.00035	.01417	.00101	28.35	14,000
	0.05	4	5	.00118	.01575	.00126	62.99	25,000	.00106	.01417	.00120	55.12	23,000
		6	7.5	.00094	.01575	.00118	47.24	20,000	.00087	.01417	.00120	43.31	18,000
		8	10	.00079	.01575	.00098	31.50	16,000	.00071	.01417	.00101	28.35	14,000
	0.1	4	5	.00236	.01575	.00126	62.99	25,000	.00213	.01417	.00120	55.12	23,000
		6	7.5	.00197	.01575	.00118	47.24	20,000	.00177	.01417	.00120	43.31	18,000
		8	10	.00157	.01575	.00098	31.50	16,000	.00142	.01417	.00101	28.35	14,000

Recommended Milling Conditions (Inch)

Work material				Copper					Copper tungsten (W70% - Cu30%)				
Dia.	Corner Radius (R)	Under neck length	L/D	Depth of cut		Feed per tooth	Feed	Spindle Speed	Depth of cut		Feed per tooth	Feed	Spindle Speed
				ap inch	ae inch	IPT fz	IPM	RPM	ap inch	ae inch	IPT fz	IPM	RPM
1	0.05	3	3	.00118	.02362	.00189	94.49	25,000	.00106	.02165	.00188	86.61	23,000
		4	4	.00118	.02362	.00173	86.61	25,000	.00106	.02165	.00171	78.74	23,000
		5	5	.00094	.02362	.00179	78.74	22,000	.00087	.02165	.00177	70.87	20,000
		6	6	.00094	.02362	.00177	70.87	20,000	.00087	.02165	.00175	62.99	18,000
		8	8	.00079	.02362	.00172	55.12	16,000	.00071	.02165	.00169	47.24	14,000
		10	10	.00079	.02362	.00164	39.37	12,000	.00071	.02165	.00161	35.43	11,000
	0.1	3	3	.00236	.02362	.00189	94.49	25,000	.00213	.02165	.00188	86.61	23,000
		4	4	.00217	.02362	.00173	86.61	25,000	.00197	.02165	.00171	78.74	23,000
		5	5	.00197	.02362	.00179	78.74	22,000	.00177	.02165	.00177	70.87	20,000
		6	6	.00177	.02362	.00177	70.87	20,000	.00157	.02165	.00175	62.99	18,000
		8	8	.00157	.02362	.00172	55.12	16,000	.00142	.02165	.00169	47.24	14,000
		10	10	.00118	.02362	.00164	39.37	12,000	.00106	.02165	.00161	35.43	11,000
	0.2	3	3	.00472	.02362	.00189	94.49	25,000	.00433	.02165	.00188	86.61	23,000
		4	4	.00433	.02362	.00173	86.61	25,000	.00394	.02165	.00171	78.74	23,000
		5	5	.00394	.02362	.00179	78.74	22,000	.00354	.02165	.00177	70.87	20,000
		6	6	.00354	.02362	.00177	70.87	20,000	.00315	.02165	.00175	62.99	18,000
		8	8	.00315	.02362	.00172	55.12	16,000	.00276	.02165	.00169	47.24	14,000
		10	10	.00236	.02362	.00164	39.37	12,000	.00213	.02165	.00161	35.43	11,000
1.5	0.1	5	3.3	.00236	.03543	.00236	94.49	20,000	.00213	.03150	.00241	86.61	18,000
		10	6.6	.00197	.03543	.00197	62.99	16,000	.00177	.03150	.00197	55.12	14,000
		15	10	.00157	.03543	.00164	39.37	12,000	.00142	.03150	.00161	35.43	11,000
	0.2	5	3.3	.00472	.03543	.00236	94.49	20,000	.00433	.03150	.00241	86.61	18,000
		10	6.6	.00394	.03543	.00197	62.99	16,000	.00354	.03150	.00197	55.12	14,000
		15	10	.00315	.03543	.00164	39.37	12,000	.00276	.03150	.00161	35.43	11,000
	0.3	5	3.3	.00709	.03543	.00236	94.49	20,000	.00630	.03150	.00241	86.61	18,000
		10	6.6	.00591	.03543	.00197	62.99	16,000	.00551	.03150	.00197	55.12	14,000
		15	10	.00472	.03543	.00164	39.37	12,000	.00433	.03150	.00161	35.43	11,000
	0.5	5	3.3	.00984	.01969	.00236	94.49	20,000	.00906	.03150	.00241	86.61	18,000
		10	6.6	.00787	.01969	.00197	62.99	16,000	.00709	.03150	.00197	55.12	14,000
		15	10	.00472	.01969	.00164	39.37	12,000	.00433	.03150	.00161	35.43	11,000
		20	13.3	.00236	.01969	.00148	23.62	8,000	.00213	.03150	.00152	21.26	7,000
2	0.1	5	2.5	.00236	.04724	.00369	118.11	16,000	.00213	.04331	.00380	106.30	14,000
		8	4	.00236	.04724	.00366	102.36	14,000	.00213	.04331	.00363	94.49	13,000
		10	5	.00236	.04724	.00328	78.74	12,000	.00213	.04331	.00322	70.87	11,000
		15	7.5	.00197	.04724	.00315	62.99	10,000	.00177	.04331	.00306	55.12	9,000
		20	10	.00157	.04724	.00295	47.24	8,000	.00142	.04331	.00309	43.31	7,000
	0.2	5	2.5	.00472	.04724	.00369	118.11	16,000	.00433	.04331	.00380	106.30	14,000
		8	4	.00472	.04724	.00366	102.36	14,000	.00433	.04331	.00363	94.49	13,000
		10	5	.00472	.04724	.00328	78.74	12,000	.00433	.04331	.00322	70.87	11,000
		15	7.5	.00394	.04724	.00315	62.99	10,000	.00354	.04331	.00306	55.12	9,000
		20	10	.00315	.04724	.00295	47.24	8,000	.00276	.04331	.00309	43.31	7,000
	0.3	5	2.5	.00709	.04724	.00369	118.11	16,000	.00630	.04331	.00380	106.30	14,000
		8	4	.00709	.04724	.00366	102.36	14,000	.00630	.04331	.00363	94.49	13,000
		10	5	.00709	.04724	.00328	78.74	12,000	.00630	.04331	.00322	70.87	11,000
		15	7.5	.00551	.04724	.00315	62.99	10,000	.00512	.04331	.00306	55.12	9,000
		20	10	.00394	.04724	.00295	47.24	8,000	.00354	.04331	.00309	43.31	7,000
	0.5	5	2.5	.01181	.04724	.00369	118.11	16,000	.01063	.04331	.00380	106.30	14,000
		8	4	.01181	.04724	.00366	102.36	14,000	.01063	.04331	.00363	94.49	13,000
		10	5	.01181	.04724	.00328	78.74	12,000	.01063	.04331	.00322	70.87	11,000
		15	7.5	.00787	.04724	.00315	62.99	10,000	.00709	.04331	.00306	55.12	9,000
		20	10	.00591	.04724	.00295	47.24	8,000	.00551	.04331	.00309	43.31	7,000
2.5	0.2	8	3.2	.00472	.05906	.00394	118.11	15,000	.00433	.05512	.00394	106.30	13,500
		14	5.6	.00394	.05906	.00361	86.61	12,000	.00354	.05512	.00358	78.74	11,000
		20	8	.00315	.05906	.00315	62.99	10,000	.00157	.05512	.00306	55.12	9,000
	0.5	8	3.2	.01181	.05906	.00394	118.11	15,000	.00106	.05512	.00394	106.30	13,500
		14	5.6	.00984	.05906	.00361	86.61	12,000	.00906	.05512	.00358	78.74	11,000
		20	8	.00787	.05906	.00315	62.99	10,000	.00709	.05512	.00306	55.12	9,000

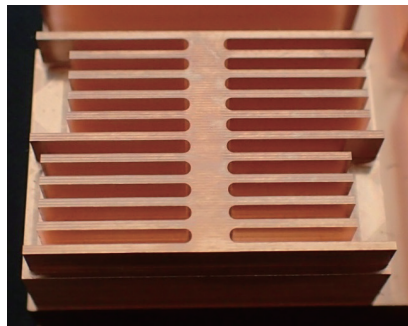
Recommended Milling Conditions (Inch)

Work material				Copper					Copper tungsten (W70% - Cu30%)				
Dia.	Corner Radius (R)	Under neck length	L/D	Depth of cut		Feed per tooth	Feed	Spindle Speed	Depth of cut		Feed per tooth	Feed	Spindle Speed
				ap inch	ae inch	IPT fz	IPM	RPM	ap inch	ae inch	IPT fz	IPM	RPM
3	0.1	12	4	.00236	.07087	.00422	118.11	14,000	.00213	.06299	.00409	106.30	13,000
		18	6	.00197	.07087	.00394	94.49	12,000	.00177	.06299	.00394	86.61	11,000
		24	8	.00157	.07087	.00354	70.87	10,000	.00142	.06299	.00350	62.99	9,000
	0.2	12	4	.00472	.07087	.00422	118.11	14,000	.00433	.06299	.00409	106.30	13,000
		18	6	.00394	.07087	.00394	94.49	12,000	.00354	.06299	.00394	86.61	11,000
		24	8	.00315	.07087	.00354	70.87	10,000	.00276	.06299	.00350	62.99	9,000
	0.3	12	4	.00709	.07087	.00422	118.11	14,000	.00630	.06299	.00409	106.30	13,000
		18	6	.00591	.07087	.00394	94.49	12,000	.00551	.06299	.00394	86.61	11,000
		24	8	.00472	.07087	.00354	70.87	10,000	.00433	.06299	.00350	62.99	9,000
	0.5	12	4	.01181	.07087	.00422	118.11	14,000	.01063	.06299	.00409	106.30	13,000
		15	5	.01181	.07087	.00394	102.36	13,000	.01063	.06299	.00394	94.49	12,000
		18	6	.00984	.07087	.00394	94.49	12,000	.00906	.06299	.00394	86.61	11,000
		24	8	.00787	.07087	.00354	70.87	10,000	.00709	.06299	.00350	62.99	9,000
4	0.1	16	4	.00236	.11024	.00551	110.24	10,000	.00213	.09843	.00547	98.43	9,000
		24	6	.00197	.11024	.00541	86.61	8,000	.00177	.09843	.00534	74.80	7,000
		32	8	.00157	.11024	.00525	62.99	6,000	.00142	.09843	.00501	55.12	5,500
	0.2	16	4	.00551	.11024	.00551	110.24	10,000	.00512	.09843	.00547	98.43	9,000
		24	6	.00472	.11024	.00541	86.61	8,000	.00433	.09843	.00534	74.80	7,000
		32	8	.00394	.11024	.00525	62.99	6,000	.00354	.09843	.00501	55.12	5,500
	0.3	16	4	.00709	.11024	.00551	110.24	10,000	.00630	.09843	.00547	98.43	9,000
		24	6	.00591	.11024	.00541	86.61	8,000	.00551	.09843	.00534	74.80	7,000
		32	8	.00472	.11024	.00525	62.99	6,000	.00433	.09843	.00501	55.12	5,500
	0.5	16	4	.01181	.09449	.00551	110.24	10,000	.01063	.08661	.00547	98.43	9,000
		24	6	.00945	.09449	.00541	86.61	8,000	.00866	.08661	.00534	74.80	7,000
		32	8	.00709	.09449	.00525	62.99	6,000	.00630	.08661	.00501	55.12	5,500
	1	16	4	.02362	.07874	.00551	110.24	10,000	.02126	.07087	.00547	98.43	9,000
		24	6	.01890	.07874	.00541	86.61	8,000	.01693	.07087	.00534	74.80	7,000
		32	8	.01417	.07874	.00525	62.99	6,000	.01260	.07087	.00501	55.12	5,500
5	0.1	20	4	.00236	.13780	.00664	106.30	8,000	.00213	.12598	.00675	94.49	7,000
		40	8	.00157	.13780	.00630	62.99	5,000	.00142	.12598	.00612	55.12	4,500
6	0.1	24	4	.00236	.16535	.00853	102.36	6,000	.00213	.14961	.00823	90.55	5,500
		48	8	.00118	.16535	.00787	62.99	4,000	.00106	.14961	.00787	55.12	3,500
	0.2	24	4	.00472	.16535	.00853	102.36	6,000	.00433	.14961	.00823	90.55	5,500
		48	8	.00236	.16535	.00787	62.99	4,000	.00213	.14961	.00787	55.12	3,500
	0.3	24	4	.00709	.16535	.00853	102.36	6,000	.00630	.14961	.00823	90.55	5,500
		48	8	.00354	.16535	.00787	62.99	4,000	.00315	.14961	.00787	55.12	3,500
	0.5	24	4	.01181	.14173	.00853	102.36	6,000	.01063	.12598	.00823	90.55	5,500
		30	5	.00945	.14173	.00866	86.61	5,000	.00866	.12598	.00831	74.80	4,500
		48	8	.00630	.14173	.00787	62.99	4,000	.00551	.12598	.00787	55.12	3,500
	1	24	4	.02362	.11811	.00853	102.36	6,000	.02126	.10630	.00823	90.55	5,500
		48	8	.01181	.11811	.00787	62.99	4,000	.01063	.10630	.00787	55.12	3,500
Notes				※ Recommended RPM based upon ideal conditions. RPM may be adjusted to match the capabilities of your machine while maintaining constant feed rate per cutting tooth. ※ 1 Recommend to use the milling condition as just reference. Adjust milling conditions according to machining shape and machine status. ※ 2 Depth of cut : ap=Axial Depth of cut / ae=Radial Depth of cut. ※ 3 Recommend to apply helical or ramping for approaching into axial direction. ※ 4 For slotting, recommend reciprocating milling by adjusting feed & ap in below 60% of recommended milling condition. ※ 5 Reduce both spindle speed and feed at same rate for chattering and also for insufficient spindle speed of a machine. ※ 6 Water-insoluble fluid is recommended.									

Machining case 1

Narrow Pitch Connector

Specialized cutting edge design realizes high accuracy milling for tough pitch copper.

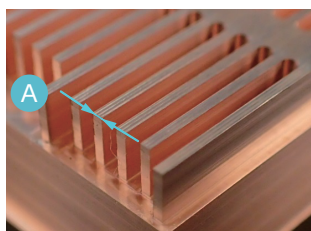


Material : Tough pitch copper (TPC)
 Work size : 25 × 18 mm
 Cutting depth : 3 mm
 Coolant : Water in-soluble fluid
 Total machining time : 1hr 10min/pc

DHR237



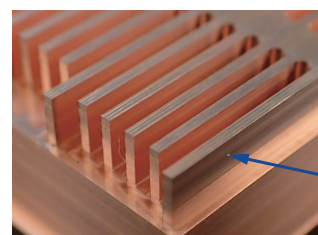
Accuracy



Unit [mm]

Measuring position	Target	1st	3rd	11th
A	0.600	0.600	0.601	0.602

Roughness



Unit [μm]

Measuring position	1st	3rd	11th
1	0.090	0.095	0.143

Process	Roughing	Finishing
Tool	DHR237 $\phi 0.8 \times 3$	
Spindle speed [min ⁻¹]	25,000	25,000
Feed [mm/min]	1,000	600
Depth of cut ap × ae [mm]	0.15 × 0.5	Plane: ae 0.1 Side: ap 1.0 (Stock: 0.005 × 6 sides)
Stock [mm]	0.03	-
Machining time	45min	Plane: 15 min Side: 10 min

Machining case 2

Copper tungsten cross rib electrode

DRB230 realizes long time machining and achieves stable high precision machining surface even on tough material of copper tungsten.

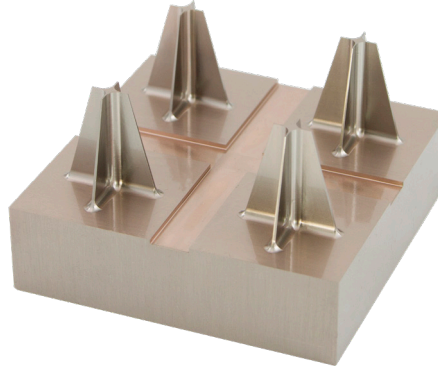
Material : Copper tungsten (W70%-Cu30%)

Work size : 22 × 22 mm / 1pc

Cutting depth : 16 mm

Coolant : Water-insoluble fluid

Total machining time : 12hr 52min/1pc



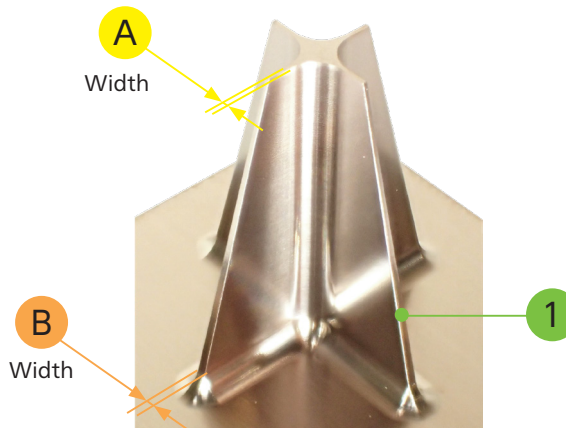
DRB230



Accuracy

Unit [mm]		
	Width A	Width B
Rib width Target	0.200	0.444
Actual 1st work	0.202	0.448
Actual 4th work	0.203	0.450

Measuring instrument : Nikon microscope MM-60



Roughness

Unit [μm]	
	1
1st work	Ra : 0.082 Rz : 0.783
4th work	Ra : 0.089 Rz : 0.854

Measuring instrument :
Mitaka Kohki point autofocus probe
3D measuring instrumentNH-3SP

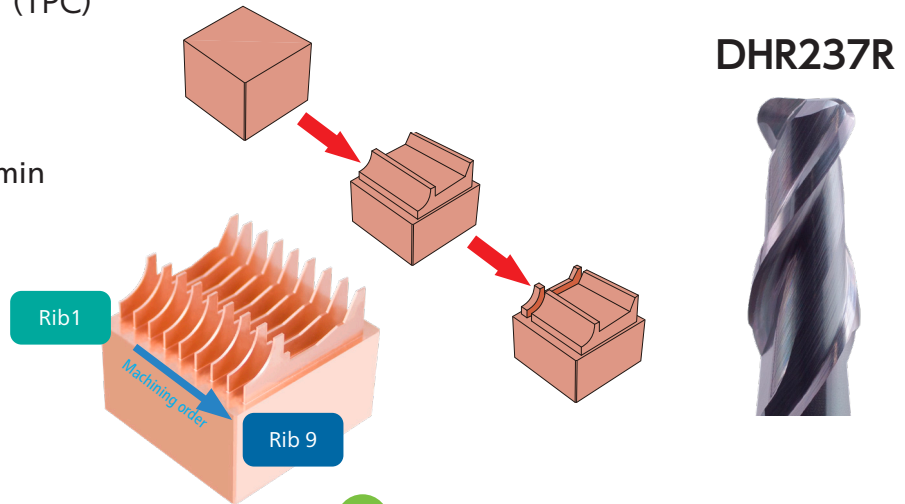
Process	Roughing		Finishing		
	Top•Bottom	Side	Top	Side	Bottom
Tool	DRB230 R1×16		DRB230 R1×16		
Spindle speed [min ⁻¹]	7,000		7,000		
Feed [mm/min]	800		500	100	500
Depth of cut ap × ae [mm]	0.15 × 0.25		0.05 × 0.03	0.015 × 1.3	0.05 × 0.03
Stock [mm]	0.05	1.3	-		
Machining time	4hr 37min		6 min	7 hr	1hr 9min

Machining case 3

Tough pitch copper rib shape electrode

Adopt cutting edge with high shearing ability to realize high precision machining even at ribs in thin plates.

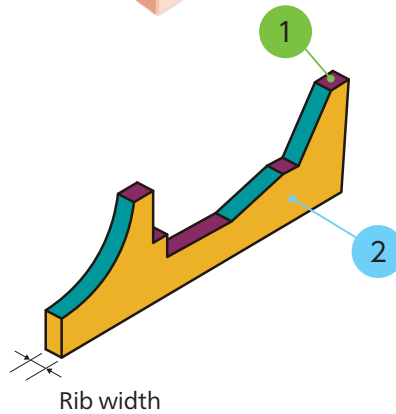
Material : Tough pitch copper (TPC)
 Work size : 35 × 35 mm
 Cutting depth : 10 mm
 Coolant : Water-soluble fluid
 Total machining time : 5hr 31min



Accuracy

	Unit [mm]	
	Rib 1	Rib 9
Rib width target	0.500	
Actual	0.500	0.501

Measuring instrument : Nikon microscope MM-60



Roughness

	Unit [μm]	
	1	2
Ra	0.100	0.126
Rz	0.824	0.797

Measuring instrument : Keyence VK-X250

Process	Roughing 1	Finishing		Roughing 2	Finishing 2
		 Flat	 Side		 Side
Tool	DHR237R ϕ 3×R0.2×12	DHR237R ϕ 2×R0.1×10			
Spindle speed [min ⁻¹]	14,000	12,000			
Feed [mm/min]	2,000	1,000			
Depth of cut ap x ae [mm]	0.12 x 1.8	0.03 x 0.04	0.04 x 0.03	ap 0.06	0.04 x 0.75
Stock [mm]	0.03	-			
Machining time	1hr 4min	1hr 7min		47 min	2hr 33min

Exclusive long-term partner for USA and Canada

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NS TOOL

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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.



2.MKTG.00762

Specifications may change without notice for improvement.

24'12

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