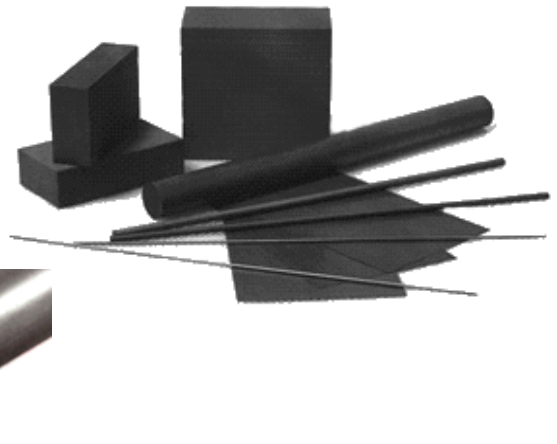



ELECTRODE PRODUCTION MATERIAL



Electrode production material


E-Cu ELECTROLYTIC COPPER

ISO: Cu-ETP, STN/ČSN: 423001, EN: CW004A, DIN: 2.0065/E-Cu58 2.0060/E-Cu57

 ROUND BARS (diameter mm)	3	4	5	6	8	10	12	15
	16	20	25	30	36	40	50	60
	70	80	90	100	110	130		


Length: We cut the bars to your required length.

Information about delivery of other diameters are available on request.

 DRAWN BARS FLAT, SQUARE (width mm x height mm)	10x10	20x10	30x10	40x10	50x10
	60x10	80x10	100x10	120x10	15x15
	20x20	30x20	40x20	50x20	25x25
	30x30	40x40			

Length: We cut the bars to your required length.

Information about delivery of other dimensions are available on request.

 ROLLED SHEETS (PLATES) (thickness mm)	15	20	25	30	40	50
	60	70	80	90	100	

Length and width:

The standard stock plate sizes are 500mm wide x 1200mm long and are available in all the thicknesses shown above. We supply the plates cut exactly to your required length and width*.

* Note: Orders using the full width of 500mm are supplied at discounted prices as there is no wastage.

Information about delivery of other dimensions are available on request.

Available also other materials such as CuCr1Zr, CuCo2Be, CuCoNiBe, CuBe2, Cu-DHP, Cu-OF, ...

Electrode production material

GRAPHITE

Advantages of using Graphite:

- ⇒ **Thermal independence** For long and very thin electrodes there is no warping due to heat during EDM die-sinking.
- ⇒ **Light weight** For very big electrodes, the graphite electrode is significantly less weight than the same size copper electrode.
- ⇒ **High efficiency** Greater efficiency can be achieved in EDM die-sinking when using graphite electrodes instead of copper. The large range of graphite compositions available ensures that we can supply the ideal electrode material for all your requirements. From heavy roughing to extra fine finishing, a suitable graphite electrode is available from us.

TOYO TANSO and IBIDEN (Japan), and SGL Carbon (Germany)

Characteristics

Item No.	Density (g/cm ³)	Hardness (Shore)	Specific electrical resistance (μΩcm)	Flexural strength (MPa)	Thermal Expansion (x 10 ⁻⁶ / K)	Medium grain size (μm)	Maximum dimensions (mm)
ISEM-2	1,78	55	1100	41	4,6	10	305 x 620 x 1000
ISEM-8	1,78	63	1340	52	5,6	8	305 x 620 x 1000
ISO-63	1,78	76	1500	65	5,6	5	230 x 540 x 1000
TTK-55	1,79	72	1420	63	5,8	5	230 x 540 x 1000
TTK-4	1,78	72	1400	73	5	4	210 x 510 x 950
ED-3	1,80	65	1400	58,8	4,9	10	300 x 500 x 1000
EX-60	1,8	62	1300	80	5	10	305 x 610 x 1200
EX-70	1,85	70	1500	68,6	6	6	235 x 440 x 1000
EX-75	1,80	68	1600	79	4,7	5	310 x 620 x 1220
R 8340	1,72	80 HR _{10/100}	1200	45	2,9	15	400 x 500 x 1300
R 8500	1,77	70 HR _{5/100}	1400	50	3,9	10	400 x 500 x 1300
R 8510	1,83	95 HR _{5/100}	1300	60	4	10	400 x 500 x 1300
R 8710	1,88	110 HR _{5/100}	1300	85	4,7	3	190 x 390 x 610

Graphite materials are according to their specific properties suitable for heavy roughing, for roughing, for medium machining and finishing, for fine finishing, or for extra fine finishing.

The suitability of using electrodes made from graphite raw material in the EDM machining process is shown in the table on the following page.

Electrode production material

Using

Item No.	Heavy roughing	Roughing	Medium machining and finishing	Fine finishing	Extra fine finishing
ISEM-2	x	xx	xx	x	
ISEM-8		x	xx	xx	x
ISO-63		x	xx	xx	x
TTK-55		x	x	xx	xx
TTK-4			x	xx	xx
ED-3	xx	xx	x		
EX-60		x	xx	xx	x
EX-70		x	x	xx	xx
EX-75		x	x	xx	xx
R 8340	xx	xx	x		
R 8500	x	xx	xx	x	
R 8510	x	xx	xx	x	
R 8710			x	xx	xx

x – suitable xx - ideal

Dimensions: We supply the graphite cut to your requirements.

We are pleased to recommend a suitable type of graphite electrode to meet your requirements.

Note: For machining graphite electrodes, it is necessary to use a fully enclosed machine with a strong suction for dust extraction and suitable machining tools.

Notice:

Copper, copper-tungsten, graphite and other electrodes for EDM are suitable for gluing. Also is possible gluing electrodes to clamping pallets. More information how to glue electrodes you can find in the end of chapter.

Electrode production material

Tungsten rods - the cheapest and the most used diameters and lengths

Diameter \varnothing	1.0	1.6	2.0	2.4	3.2	4.0	4.8	6.4
Length	175mm	175mm	175mm	175mm	175mm	175mm	175mm	175mm

Copper-tungsten - round bars

Φ /Length	50mm	100mm	150mm	200mm
1.0	○	○	○	○
2.0	○	○	○	○
3.0	○	○	○	○
4.0	○	○	○	○
5.0	○	○	○	○
6.0	○	○	○	○
7.0	○	○	○	○
8.0	○	○	○	○
9.0	○	○	○	○
10.0	○	○	○	○
11.0	○	○	○	○
12.0	○	○	○	○
13.0	○	○	○	○
14.0	○	○	○	○
15.0	○	○	○	○
16.0	○	○	○	○
17.0	○	○	○	○
18.0	○	○	○	○
19.0	○	○	○	○
20.0	○	○	○	○
25.0	○	○	○	○
30.0	○	○	○	○
35.0	○	○		
40.0	○	○		
45.0	○	○		
50.0	○	○		
55.0	○			
60.0	○			
65.0	○			
70.0	○			
75.0	○			
80.0	○			
85.0	○			
90.0	○			
95.0	○			
100.0	○			

Silver-tungsten - round bars

Φ /Length	50mm	100mm	150mm	200mm
1.0	○	○	○	○
2.0	○	○	○	○
3.0	○	○	○	○
4.0	○	○	○	○
5.0	○	○	○	○
6.0	○	○	○	○
7.0	○	○	○	○
8.0	○	○	○	○
9.0	○	○	○	○
10.0	○	○	○	○
11.0	○	○	○	○
12.0	○	○	○	○
13.0	○	○	○	○
14.0	○	○	○	○
15.0	○	○	○	○
16.0	○	○	○	○
17.0	○	○	○	○
18.0	○	○	○	○
19.0	○	○	○	○
20.0	○	○	○	○
25.0	○	○	○	○
30.0	○	○	○	○
35.0	○	○		
40.0	○	○		
45.0	○	○		
50.0	○	○		
55.0	○			
60.0	○			
65.0	○			
70.0	○			
75.0	○			
80.0	○			
85.0	○			
90.0	○			
95.0	○			
100.0	○			

Information about delivery of other dimensions are available on request.

Electrode production material

Copper-tungsten - square bars

Dimensions mm	50x50	50x100	50x150	100x100	100x200
5	○	○	○	○	○
10	○	○	○	○	○
15	○	○	○	○	○
20	○	○	○	○	○
25	○	○	○	○	○
30	○	○	○	○	○
35	○	○	○	○	○
40	○	○	○	○	○

Silver-tungsten - square bars

Dimensions mm	50x50	50x100	50x150	100x100	100x200
5	○	○	○	○	○
10	○	○	○	○	○
15	○	○	○	○	○
20	○	○	○	○	○
25	○	○	○	○	○
30	○	○	○	○	○
35	○	○	○	○	○
40	○	○	○	○	○



Information about delivery of other dimensions are available on request.

Electrode production material

Copper tungsten - rods			
Dimension	Length	Composition	Specification
Ø 0,5 – 60 mm	175mm	75% tungsten - 25% copper	grinded
Ø 3,0 – 60mm	300mm		
Ø 50mm	30mm		
Ø 60mm	30mm		
Ø 70mm	30mm		
Ø 80mm	30mm		
Ø 90mm	30mm		
Ø 40mm	40mm		
Ø 50mm	50mm		
Ø 60mm	60mm		
Ø 70mm	60mm		
Ø 80mm	60mm		
Ø 90mm	60mm		
Ø 60mm	50mm		
Ø 100mm	30mm		
Ø 100mm	60mm		
Ø 150mm	30mm		
Special dimensions and other compositions (80%:20%, 90%:10%, ...) on request.			

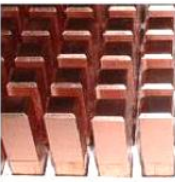
Copper tungsten - square			
Dimension	Length	Composition	Specification
4x4 mm	300mm	75% tungsten - 25% copper	grinded
5x5 mm			
6x6 mm			
8x8 mm			
10x10 mm			
12x12 mm			
15x15 mm			
20x20 mm			
25x25 mm			
30x30 mm			
35x35 mm			
40x40 mm			
50x50 mm			
Special dimensions and other compositions (80%:20%, 90%:10%, ...) on request.			


Electrode production material

	Description	Item No.	Hexagon Size	Offset total	Clamping diameter	Hexagon Length	Total Length
	Hexagon copper rods with round shank	Cu6ER3-01	3 mm	- 0,1 mm	Ø6 mm	50mm	80mm
		Cu6ER4-01	4 mm	- 0,1 mm	Ø6 mm		
		Cu6ER5-01	5 mm	- 0,2 mm	Ø6 mm		
		Cu6ER5-02	5 mm	- 0,2 mm	Ø6 mm		
		Cu6ER6-01	6 mm	- 0,1 mm	Ø6 mm	100mm	130mm
		Cu6ER6-02	6 mm	- 0,2 mm	Ø6 mm		
		Cu6ER8-01	8 mm	- 0,1 mm	Ø6 mm		
		Cu6ER8-02	8 mm	- 0,2 mm	Ø6 mm		
		Cu6ER10-01	10 mm	- 0,1 mm	Ø6 mm		
		Cu6ER10-02	10 mm	- 0,2 mm	Ø6 mm		
		Cu6ER12-01	12 mm	- 0,1 mm	Ø6 mm		
		Cu6ER12-02	12 mm	- 0,2 mm	Ø6 mm		


Offset total -0,1mm for hexagon copper rods 5mm and bigger is suitable for EDM die sinkers without all axis CNC (without planetary function).

Offset total -0,2mm for hexagon copper rods 5mm and bigger is suitable for CNC EDM die sinkers and EDM RBT1 EDM device for removing broken taps and tools.

	Description	Dimension	Length	Specific.
	Square copper and graphite electrode raw material	15x15 mm	80 mm	40 pcs
		25x25 mm	90 mm	24 pcs

	Description	Dimension	Length	Specific.
	Square copper and graphite electrode raw material Step type (shank 15x15mm)	25x25x30 mm	60 mm	12 pcs
		25x25x50 mm	80 mm	
		30x30x30 mm	60 mm	
		30x30x50 mm	80 mm	
		35x35x30 mm	60 mm	
		35x35x50 mm	80 mm	
		40x40x30 mm	60 mm	
		40x40x50 mm	80 mm	

Electrode production material

	Description	Dimension	Length	Specific.
	Square copper and graphite electrode raw material Step type (shank 25x25mm)	30x30x25 mm	67 mm	12 pcs
		30x30x43 mm	85 mm	
		35x35x25 mm	67 mm	
		35x35x43 mm	85 mm	
		40x40x25 mm	67 mm	
		40x40x43 mm	85 mm	
		50x50x43 mm	67 mm	

Information about delivery of other dimensions are available on request.

Single component adhesive



- is recommended for joining small adjacent surfaces
- suitable for electrode production materials, such as graphite, copper, copper-tungsten...
- suitable for quick joining electrode production materials together with clamping pallets – palletisation for EDM

If necessary, we also provide the multi-component adhesives, suitable for larger surfaces to be glued.

Adhesive application:

The adhesive should be applied to the contact surface of the electrode, however max. on 40% of the surface of the electrode. Best on the circumference of the electrode contact surface. After application of adhesive must be bonded parts pressed together. The adhesive has quenched into microspores of bonded parts, microfilm has formed, but still remains conductive contact for the electric current flowing. Therefore, it must remain at least 60% of the bonding surface without adhesive.