

***SOFIA MED***

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More than Copper



EXTRUDED COPPER PRODUCTS





# EXTRUDED AND DRAWN COPPER PRODUCTS

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## More than Copper

**Sofia Med** is a producer of a wide range of rolled and extruded copper and copper alloy products such as sheets, strips, plates, circles, disks, bare and plated copper bus bars, rods, profiles, components, fabricated parts and wire that are used in a wide variety of building and industrial applications.

**Sofia Med** is part of the ElvalHalcor Hellenic Copper and Aluminium industry S.A., a leading global manufacturer of aluminium and copper rolled and extrusion products.

**Sofia Med** is situated in Sofia, Bulgaria, on a 250 000 m<sup>2</sup> area and has three production units: Foundry, Rolling and Extrusion.

With more than 85 years of manufacturing experience and significant investments, **Sofia Med** has evolved into a competitive modern European company with customers globally.

**Sofia Med** operates under strict quality, environmental, as well as health and safety management systems, in compliance with ISO 9001:2015, IATF 16949:2016, ISO 14001, ISO 45001, ISO50001:2018, as well as follows the guidelines of ISO 26000:2010.

The wide product range of **Sofia Med** meets the requirements of the Unified European standards (EN), as well as BS, DIN, ASTM, JIS standards, or any other specific customer request.

# GENERAL APPLICATIONS

The extruded copper products find wide application in electrical engineering equipment, e-mobility, decoration, mechanical engineering equipment and rain gutters.



## GENERAL SPECIFICATIONS

Extruded and subsequently drawn rod sections or flats are manufactured from controlled raw materials, applying state-of-the-art production methods, which guarantee top quality products.

Their chemical, physical and mechanical properties, tolerances and/or limitations comply to variety of standards, as for example EN 13601, JIS H 3250/JIS H 3140, ASTM B 187. Their production is monitored throughout all stages with the application of management system certified by Lloyds Register as complying with the requirements of standards ISO 9001:2015.

# GENERAL PROPERTIES

## PHYSICAL PROPERTIES OF PURE COPPER

Density (g/cc)	8,96
Thermal Conductivity (W/cm °K)	4,01
Specific Heat (J/g °K)	0,38
Coefficient of linear thermal expansion / K <sup>-1</sup>	16,5E <sup>-6</sup>
Atomic Mass Average	63,546
Melting Point	1357,75 °K 1084,6 °C 1984,3 °F

## MECHANICAL PROPERTIES ACCORDING TO EN 13601

Alloy	Temper	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation (%)	Hardness (HB)	Conductivity (MS/m)
	D (Hard as drawn)	-	-	-	-	56 min
	H035	-	-	-	35 - 65	58 min
	R200	200 min	10 max	25 min	-	58 min
	H065	-	-	-	65 - 90	57 min
Cu-ETP	R230	230 min	160 min	-	-	57 min
	R250	250 min	200 min	8 min	-	57 min
	H085	-	-	-	85 - 110	57 min
	R300	300 min	260 min	5 min	-	57 min
	H100	-	-	-	100 min	57 min



# GENERAL PROPERTIES

## ACCORDING TO ASTM B 187

Alloy	Temper	Rod & Bar (mm)	Rm, Mpa	Elongation (%)	Hardness (HV)	Conductivity (MS/m)
Cu-ETP	O60	All sizes	195 - 255	25 min	57 max	58 min
		For rod: (Round/ Square/ Hexagonal): Up to 10 incl.	310 - 410	15 min	-	56 min
	H04	Over 10 to 25 incl.	275 - 380	12 min	89 min	56 min
		Over 25 to 50 incl.	240 - 345	15 min	83 min	56 min
		Over 50 to 75 incl.	230 - 330	15 min	71 min	57 min
		Over 75	205 - 330	15 min	-	-
	H02	For flat bar: Up to 10 incl. thickness and up to 110 incl. in width	260 - 346	10 min	89 min	56 min
All other sizes		230 - 345	15 min	71 min	57 min	

## ACCORDING TO JIS H 3250

Alloy	Temper	Rod & Bar Strength (mm)	Tensile Strength (MPa)	Elongation (%)	Conductivity (%IACS)
Cu-ETP	O	6 or over up to and incl. 110	195 min	30 min	100 min
	½ H	6 or over up to and incl. 25	245 min	15 min	98 min
		over 25 up to and incl. 50	225 min	20 min	
		over 50 up to and incl. 75	215 min	25 min	
H	25 or over up to and incl. 50	245 min	-	97 min	

## ACCORDING TO JIS H 3140

Alloy	Temper	Rod & Bar Strength (mm)	Tensile Strength (MPa)	Elongation (%)	Conductivity (%IACS)
Cu-ETP	O	2.0 or over up to and incl. 30	195 min	35 min	100 min
	¼ H	2.0 or over up to and incl. 30	215 - 275	25 min	98 min
	½ H	2.0 or over up to and incl. 20	245 - 315	15 min	98 min
	H	2.0 or over up to and incl. 10	275 min	-	97 min

# COPPER FLATS

## IN STRAIGHT LENGTHS

Bus bars, with sharp, round or full radius edges, in standard straight lengths from 3000 to 5000 mm and tempers from R230 to R300, including all intermediate tempers.

<b>Thickness (mm)**</b> <b>Width (mm)</b> <b>Packing</b>	from 1,5 to 60 mm from 10 to 250 mm On pallets and or wooden cases of about 500 kg or 1000 kg
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*Available in imperial sizes and other lengths upon agreement.  
\*\* Maximum thickness could be 60 mm with restrictions with respect to width.*

## IN COILS

Bus bars, with sharp, round or full radius edges; from R200 to R300, including all intermediate tempers.

Temper	Thickness (mm)	Width (mm)	Packing
Soft/Half hard/Hard R200 - R300 incl. all intermediate tempers	1,5 - 8 COD: max. 1400 mm CID: 400, 500, 600 mm	15 - 105	In coils on wooden pallets



# COPPER BARS/RODS

## EXTRUDED

	Dimensions (mm)	Length (mm)
Round	61 ÷ 160	1500 - 5000*
Square	30 ÷ 115	1500 - 5000*
Hexagone	5 ÷ 55	1500 - 5000*
Packing	On pallets and wooden cases of about 500 kg.	

*\*not available for all dimensions*

## DRAWN IN STRAIGHT LENGTHS

	Dimensions (mm)	Length (mm)
Round	3 ÷ 80	3000 - 5000
Hexagone	5 ÷ 55	3000 - 5000
Packing	On pallets and wooden cases of about 500 kg.	

*Available in imperial sizes and other lengths upon agreement.*

# COPPER WIRES

## APPLICATIONS

Copper wire is used for the production of wires used in telecommunications and electric power transmission, as well as for magnet wires.

### SPECIFICATIONS

The Cu-ETP wire is produced in compliance to specification EN 13601.

## PHYSICAL PROPERTIES

Cu-ETP

Density	8,94 g/cm <sup>3</sup>
Melting point	1.083 °C
40 - 100 & Linear expansion coefficient	0,0165 mm/°C m.
Thermal conductivity	3,9 W/cm °K
Electrical resistivity	17,241 mΩ mm <sup>2</sup> /m or lower
Conductivity	58,0 Siemens (m/Ωmm <sup>2</sup> ) ≥ 101% IACS

### Mechanical Properties

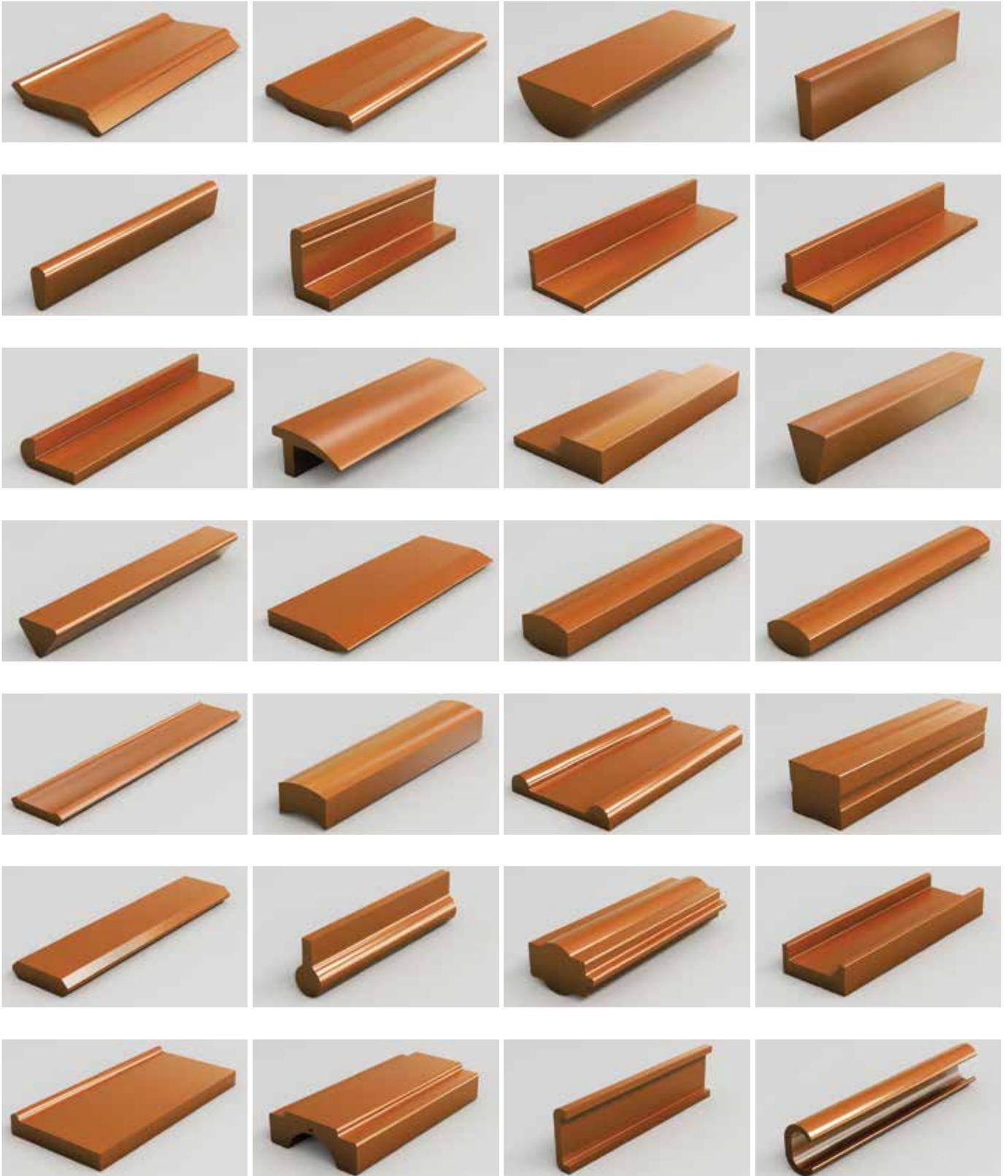
<b>Modulus of elasticity</b>	120 GPa
<b>Tensile strength</b>	> 240 N/mm <sup>2</sup>
<b>Elongation</b>	min 35%

### Dimensions

<b>Diameter (mm)</b>	3,0 +/- 12,5 mm
<b>Packing</b>	Free coiled coils

# COPPER PROFILES

Copper profiles are tailor-made and are produced as per specifications and requirements, provided by the customers.



# TIN AND SILVER PLATED COPPER BUS BARS

Tin-plated, electrolytic silver plated and silver flash plated copper bus bars are extensively used in the production of electrical panels, switchboards, switchgears, power transformers and bus ducts.

**Sofia Med** produces high quality plated copper bus bars via tin and silver electrolytic processes as per International Standards such as EN, JIS, BS and ASTM, or as per other customer requirements.

## TIN ELECTROLYTIC PROCESS

In-house tin-plating to produce bright tin deposit with:

Excellent solderability characteristics  
Constant deposit properties  
Uniform, bright appearance

**Coating material:** tin anode with 99,9% purity and above

**Coating thickness:** 3-30 microns and as per customer requirement

**Quality test certificate:** adhesion test, Sn thickness test

## SILVER ELECTROLYTIC PROCESS

In-house silver electrolytic process designed to produce bright silver deposits, white and levelled.

**Coating material:** silver anode with 99,9% purity and above

**Coating thickness:** 0,5-30 microns and as per customer requirement

**Quality test certificate:** adhesion test, Ag thickness test

## SILVER FLASH PROCESS

In-house silver flash process with the following deposit properties:

Smooth, fine grained  
Low porosity  
Consistent solderability

**Silver deposit purity:** 99,8 - 99,9%

**Coating thickness:** from 0,00001" and as per customer requirement

**Quality test certificate:** adhesion test, Ag thickness test

*Anti-tarnish treatment is available upon request.*

# COPPER COMPONENTS

<b>Components</b>	Thickness: 2 - 15 mm Width: 10 - 160 mm
<b>CNC Bending</b>	Width of bus bars: 10 - 160 mm Thickness of bus bars: 3 - 15 mm Max. bending radius: 15 mm
<b>CNC Punching</b>	Width of bus bars: 10 - 160 mm Thickness of bus bars: 3 - 15 mm
<b>CNC milling machine</b>	Working area: 600 x 1200 mm 24 tool holder
<b>Tin and silver surface plating of bus bars and components</b>	upon request

**Sofia Med** offers components from copper bus bars and profiles according to customer drawings.

The realization of the customers' requirements is ensured by technical know-how and an adapted machine park. With sophisticated logistics we ensure the consistent quality of the products.

The components can also be coated in silver or tin upon request.

## COMPONENTS ALLOYS:

Cu-ETP - SM1100

Cu-PHC - SM1030

Cu-DHP - SM1220

Cu-OF - SM1010



BARE COPPER

PLATED COPPER



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