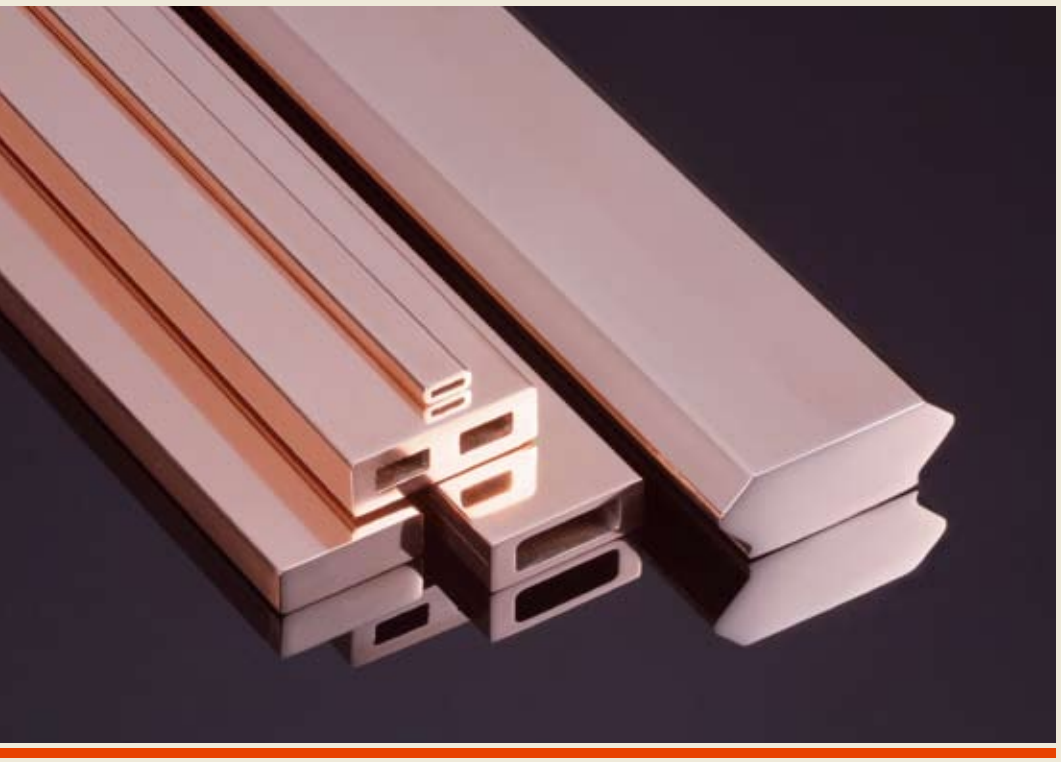
Wieland

Copper sections and components



Copper sections and components for a wide range of applications

Company portrait

The Wieland Group, with headquarters in Ulm, Germany, is one of the world's leading manufacturers of semi-finished and special products in copper and copper alloys. These include strip, sheet, tube, rod, wire and sections as well as slide bearings, finned tubes, heat exchangers and ready-to-mount components.

Wieland's history dates back to the early 19th century. Founder Philipp Jakob Wieland took over his uncle's Ulm art and bell foundry in 1820 and by 1828 he was producing brass sheet and wire.

Today, the Wieland Group comprises manufacturing companies, slitting centres and trading subsidiaries in many European countries as well as in the USA, in South Africa, Singapore and the People's Republic of China. Wieland manufactures approx. 500,000 tons of copper alloys every year, from the continuous cast product to the ready-to-mount component. Production starts at Europe's largest foundry for copper alloys, at our plant in Vöhringen, Germany. **Through systematic investment in our facilities we are continuously striving to improve our capabilities.**

Copper

Copper is one of the oldest natural materials known to man, yet today it remains amongst the most important and widely used non-ferrous metals in the world. Wieland semi-finished products form an indispensable link between the raw material copper and the wide variety of products made by our customers.

Copper is suitable for a tremendous range of applications due to its unique combination of various properties such as

- high electrical and thermal conductivity
- outstanding corrosion resistance
- good forming and processing properties
- excellent suitability for surface coating

Copper sections from the Wieland Group are, therefore, used across a multitude of industries.

Sections and components

Sections are semi-finished products from which functional parts are manufactured – in the majority of cases at very low processing costs. **With sections it is possible to reduce production costs, and consequently, total costs.**

Due to their excellent electrical and thermal conductivity, copper sections are mainly used in the electrical industry and in cooling systems.

The Wieland Group manufactures solid and hollow copper sections in a wide range of sizes both at the production plants in Ulm and Vöhringen (Germany) and at the subsidiary buntmetall amstetten Ges.m.b.H in Amstetten (Austria).

Moreover, we supply ready-to-mount components manufactured in Ulm (Germany). We offer all common methods of machining as well as surface coating. **For every application the Wieland Group offers a suitable solution.** A team of experts can provide assistance from the concept to the realisation of your idea. For further information please contact us.

Wieland-Werke AG, Vöhringen plant, Germany

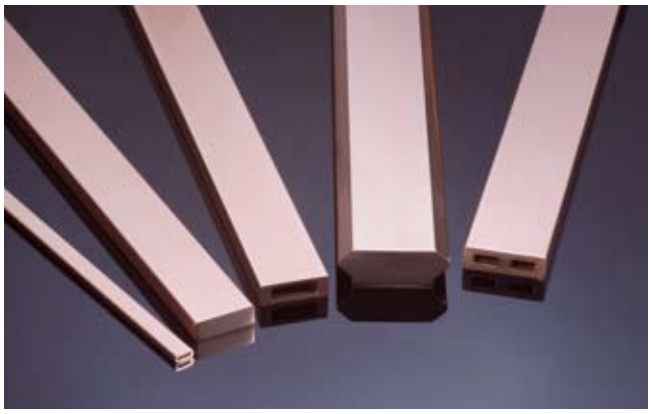
buntmetall amstetten Ges.m.b.H, Amstetten plant, Austria

Copper sections

Advantages of copper sections

Technical solutions achieved through the use of copper sections are becoming increasingly important for cost-efficient production. **Ideally, it is sufficient to simply cut the section to length to produce the desired finished part.** Copper sections offer **additional advantages** such as

- electrical optimisation of conductor cross-sections
- thermal optimisation (cooling)
- reduction of processing costs
- ease of mounting and installation
- saving of material



Materials and semi-finished products available

Material						Semi-finished products		Thermal conductivity in W/(mK)	Electrical conductivity (reference value) in % IACS	Other characteristics	Application examples
Copper grade	Wieland	EN designation		UNS	JIS	Hollow section	Solid section				
		Symbol	Number	Number	Number						
Oxygen-containing copper grades	K16	Cu-ETP1	CW003A	C11000	C1020	•	•	≥ 385	≥ 98	Oxygen-containing copper grade with high purity, high electrical conductivity	Busbars, general applications in the electrical industry if there are no requirements regarding hydrogen embrittlement
	K32	Cu-ETP	CW004A	C11000	C1100	•	•	≥ 385	≥ 98	Oxygen-containing copper grade, high electrical conductivity	Busbars, gripper arms, general applications in the electrical industry if there are no requirements regarding hydrogen embrittlement
Oxygen-free copper grades	K10	Cu-OFE	CW009A	C10100	C1011	•	•	≥ 394	≥ 101	P ≤ 3 ppm, resistant to hydrogen embrittlement, no volatile particles enter the vacuum	High-vacuum technology, magnetrons and electronic tubes
	K30	Cu-OF	CW008A	C10200	–	•	•	≥ 394	≥ 100	High electrical conductivity, resistance to hydrogen embrittlement	Switch gear, instruments in reducing gas environments, general applications in the electrical industry
Deoxidised copper grades	K12	Cu-HCP	CW021A	C10300	–	•	•	≥ 385	≥ 98	Deoxidised copper grade,high electrical conductivity, resistance to hydrogen embrittlement, good weldability and solderability	Square-wave generators, switching elements, induction coils
	K20 K21	Cu-DHP	CW024A	C12200	C1220	•	•	≥ 330	≥ 77	Deoxidised copper grade, low electrical conductivity, resistance to hydrogen embrittlement, good weldability and solderability	Cooling panels
Copper grade containing silver	KA1	CuAg0.1P	CW016A	C11600	–	•	•	≥ 380	≥ 94	Oxygen-free copper grade containing silver, resistance to hydrogen embrittlement, increased resistance to softening with high conductivity	Moulds, rotor bars

Other copper grades, high-copper alloys and dispersion-hardened copper alloys on request

Solid copper sections

Applications

Solid sections are used in various shapes and sizes, mainly in the electrical industry, e.g. for:

- busbars
- terminals
- switches
- superconductors
- generators
- motors

Shapes available

The production of a section depends on its geometry and dimensions.

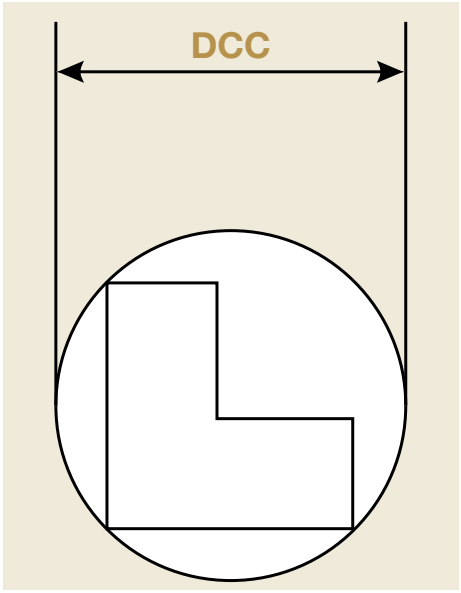
Basic information on shapes available as well as process-related limits of copper sections are provided in EN 13605. On request, we also fulfil requirements exceeding the specifications of this standard.

We are willing and able to assist you from the concept, prototypes and samples up to the moment of release for series production as well as throughout series production.

Solid copper sections

Production capabilities

We offer a wide range of production possibilities and shapes **which is unique in the industry.** Our equipment allows us to produce copper sections with weights of 0.02 kg/m to 30 kg/m and to realise sections whose diameter of circumscribed circle ranges between 2.5 mm and 200 mm. Copper sections outside these limits are possible on request. Advances in production processes and tool design make it possible to realise ever more complex shapes. Our competence in the production of sections is unsurpassed as a result of our own tool design and construction. **The Wieland Group offers a unique range of copper sections.**



Diameter of circumscribed circle

Production technologies

For the production of copper sections the Wieland Group has all production technologies at its disposal, from the roll forming of a continuous cast and rolled wire, via the CONFORM process through to the extruding technology. The processes mentioned can be completed with a drawing process setting certain tempers and tolerances.

The extruding technology used at the plants in Vöhringen, Germany, and Amstetten, Austria, enables us to achieve a substantial structural transformation and to get close to the final cross-section in a cost-effective manner.

Using the CONFORM process at our plant in Amstetten, Austria, profiles with small to medium-sized cross-sections can be manufactured from a copper wire. The process is characterised by the possibility of a nearly endless continuous production.

At our plant in Vöhringen, Germany, very small sections with weights of 2.0 g/m to 250 g/m are manufactured from cast wire using a shape roll.

Sections are usually supplied in straight lengths of up to 8 m. Small and medium-sized sections are also available in the form of wire for which additional information regarding the direction of coiling and the position of the cross-section in the coil is necessary.

Hollow copper sections

Applications

Due to their excellent electrical and thermal conductivity hollow copper sections are also suitable for cooled electrical conductors. Since hollow sections are often used at high temperatures, silver-containing copper is used in addition to pure copper. Silver-containing copper has a better softening resistance. Typical applications are:

- induction heating and melting plants
- generators
- busbars
- transformers
- electromagnets

Shapes available

Hollow sections are available as symmetric and asymmetric sections as well as double-chamber sections.
Asymmetric hollow sections and double-chamber sections are the specialty of our plant in Amstetten, Austria. Extensive know-how is necessary for the production of these shapes. We manufacture the sections in close cooperation with our customers according to drawings and specifications. We would be pleased to examine and determine whether the hollow section you require can be manufactured.

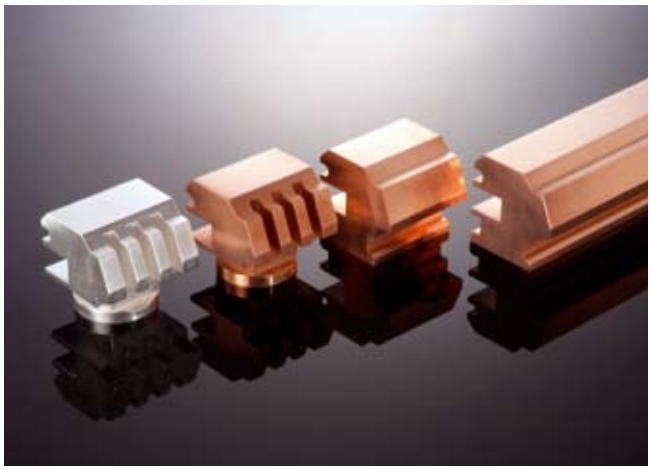
Production capabilities

Hollow sections are manufactured by extruding and drawing. Asymmetric hollow sections and double-chamber sections are extruded using so-called bridge tools.

Components from copper sections

Applications

Based on our know-how as manufacturer of semi-finished products we take charge of the entire production process, if required, **from casting via the production of semi-finished products and the production of near-net-shape parts through to the manufacture of ready-to-mount assemblies.**



Ready-to-mount components are used for a large number of applications such as:

- electric motors
- switches
- busbars

Your benefits

- unsurpassed competence of one of the world's leading producers of copper alloys
- complete one-stop solutions – from design to series production
- less coordination required in your process chain
- constant monitoring of the whole process
- extensive documentation of production – from casting to finishing
- clear heat traceability
- reliable metal supply
- efficient scrap recycling in our foundry

Production capabilities

Wieland offers the following in-house processing steps:

- machining: cutting, drilling, turning, milling etc.
- stamping
- bending
- coating
- different joining processes

We will assist you from the idea to the realisation of your component. Please contact us and benefit from our know-how.

Wieland-Werke AG **www.wieland.com** **Extruded and Drawn Products Division**

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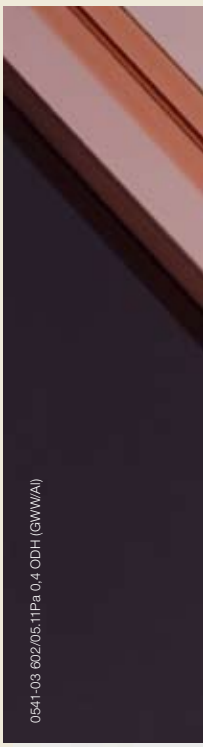

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