SWISSMETAL

Precision in Copper

Product Range

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Content

A Complete Product Spectrum

The Swissmetal product spectrum comprises hot extruded and drawn products of copper and copper alloys in a wide variety of shapes and sizes.

Our plants produce wires and rods (round, square and sections), hollow rods, hollow sections and strips. Our offering comprises over 100 common copper alloys as well as 15,000 tools in various forms, in the following sizes:

- Wires with diameters from 1.0 mm to 8.0 mm
- Rods with diameters from 1.0 mm to 200 mm
- Flat rods from 10 x 3 mm to 150 x 50 mm
- Hollow rods with outer diameters from 15 mm to 100 mm
- Solid sections within a circumscribing circle from 1.5 mm to 200 mm and a linear density of up to 30 kg per meter
- Hollow sections within a circumscribing circle from 10 mm to 140 mm
- Tapered sections for commutator bars with a linear density from 0.2 to 9 kg/m
- Strips with thicknesses from 0.2 to 0.5 mm and ranging from 10 mm to 140 mm in width

Smaller diameters or thinner strips are available on request. Size ranges may vary depending on the alloy.

The table on the following page shows the product forms and dimensions for the different alloys:

Strips

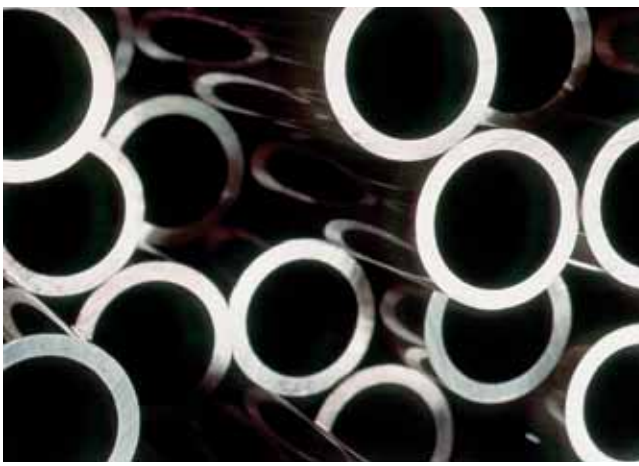
Wires

Rods

	Strips	Wires	Rods	Sections	Hollow rods (tubes)
Pure copper			•	•	•
Copper for turned parts		•	•		
Low-alloyed copper	•	•	•	•	•
Brass for turned parts	•	•	•	•	•
Brass for cold forming (without lead)		•		•	
Brass for hot forming			•	•	•
Special brass	•	•	•	•	•
Bronze for turned parts		•	•	•	
Bronze for cold forming		•			
Two-phase nickel silver for turned parts		•	•	•	
Single-phase nickel silver for turned parts		•	•	•	
Single-phase nickel silver for cold forming		•	•	•	
Special high-strength alloys		•	•		•
Aluminium copper			•	(•)	•

(•) available on request

Sections



Hollow rods

Electronics – In Contact with High Tech

A significant portion of the semi-finished products supplied by Swissmetal are processed to produce contacts for electronics and electrical applications – contact pins, terminals and other components for connectors. These components are used in various high-tech sectors such as IT, the aircraft industry, telecommunications and the automotive industry.

The manufacturers and users of connectors require that the materials have specific physical, mechanical and chemical properties. In this context, copper and copper alloys offer an ideal combination of desirable properties.

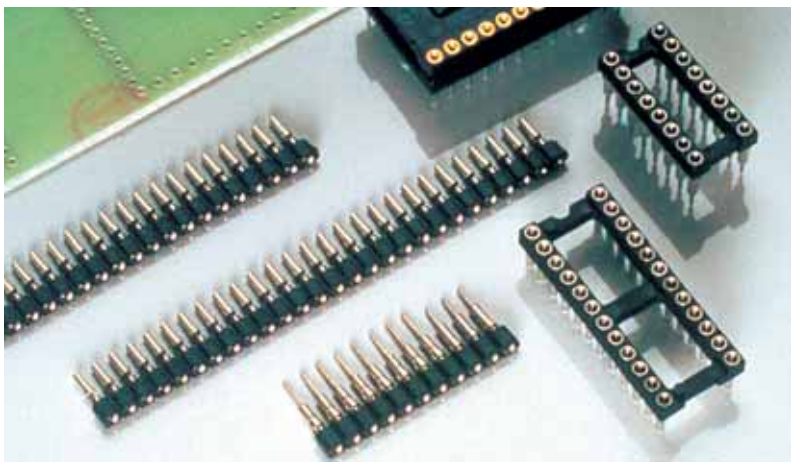
Electrical conductivity is the key criterion for ensuring an effective flow of electricity between connected parts; this is especially the case in high voltage current. Mechanical and chemical properties are also highly important. For example, movable connectors must be capable of sustaining a large number of connect ion and disconnection cycles, requiring high static and dynamic strength. Since friction forces must remain constant, freedom from corrosion is essential, along with adherence to all the other specifications. Corrosion can also adversely effect the contact resistance between the various parts of the connector.

Once all of these essential criteria for fault-free operation have been met, our semi-finished products must also exhibit their well-known machining and forming properties. Our semi-finished products are easy to form, and, with the addition of lead, can be easily machined by free cutting operations. Swissmetal alloys are eminently suitable for electroplating with a whole range of elements such as gold, silver, nickel and tin.

Our copper alloys, which are used in the manufacture of connectors, can be divided into various categories on the basis of their mechanical, physical or forming properties.

The low-alloyed coppers facilitate electrical conductivity or a combination of high electrical conductivity and high mechanical strength. The leaded brasses are optimally suited to machining. A reduction in lead content together with an increase in copper content ensures good cold formability while maintaining good machinability. The tin and aluminium bronzes are characterized by very good corrosion resistance, and, in the case of tin bronzes, by optimum suitability for electroplating. Alloys B05 and PS2 were developed as cost-effective and environmentally compatible alternatives for the fabrication of contacts requiring high spring force.

Low-alloy Swissmetal copper wire



Connectors for the IT sector, Precidip-Durtal (CH)

Type of alloy EN/ISO designation*	Alloy number EN	ASTM	Swissmetal designation Boillat plant	Dornach plant	Typical strength (N/mm²)	Conductivity (% IACS)
Special low-alloy copper grades in rods and wires						
CuPb1P		C18700	C99		200–400	> 85
CuTeP	CW118C	C14500	C42		200–400	> 90
CuNi1Pb1P		C19160	C97		550–700	> 50
CuNi1PbP		C19140	C98		550–770	> 50
Leaded brass in rods, wire or sections						
CuZn39Pb3	CW614N	C38500	58F	Ms58Pb	380–600	28
CuZn36Pb3	CW603N	C36000	61A	Ms62Pb	380–600	28
CuZn35Pb2	CW601N	C34500	62A	Ms63Pb	320–550	26
CuZn9Pb2		C31400	90A	Ms89Pb	270–410	42
Tailored for elasticity and corrosion resistance						
CuSn5Pb1	CW458K	C53400	BP5		500–800	20
CuSn4Pb4Zn4	CW456K	C54400	BZ4		500–800	19
The most recent products approaching the mechanical properties of Beryllium copper and offering better machinability						
CuSn13Pb0.5		C53800	B05	B05	800–1000	9
CuZn16Si2Pb1		C69750	PS2	PS2	800–1000	9.5

* ISO designations are given for alloys not covered by EN standards.

Swissmetal rods

Connectors for electronics, Lemo (CH)

Consumer Goods

The Swissmetal Group emerged from traditional regional industries. With its international reputation for reliability and quality, Swissmetal has long enjoyed the recognition and appreciation of its many customers in an area ranging from the High Savoy through the entire Jura Mountain region to the Black Forest. Devotion to detail, enthusiasm and a spirit of openness are reflected in long and close customer relations.

Precision, reliability and high performance are the hallmarks of the millions of components produced day after day from Swissmetal materials for use in the manufacture of watches, writing instruments and spectacles.

Our precision rods, wires (in drums or coils), highly complex sections, strips and stamped watch movement blanks are highly regarded by the makers of prestigious brandname products.

Writing instruments

For manufacturers of writing instruments, our production range includes

- Brass rods for the longitudinally bored barrels of ballpoint pens or the production of retraction mechanisms;
- Wire and rods of brass and nickel silver for the production of ball-points;
- Brass blanks and nickel-silver for the tips of writing instruments.

Dependable, consistent product quality has long convinced manufacturers of the benefits of brass ballpoints. The timely development of the Swissmetal Group's nickel silver alloys containing manganese has accelerated the recent trend towards silver coloured ball-points made of highly corrosion-resistant alloys. Nickel silver alloy ball-points are also more comfortable to write with.

Swissmetal product forms hold a key position in this market sector. The wires are supplied in coils and in drums of up to 400kg, thus increasing our customers' productivity.

Nickel silver wire

Nickel silver blanks

Type of alloy EN/ISO designation*	Alloy number EN	ASTM	Swissmetal designation Boillat plant	Dornach plant	Machinability index
Leaded brass					
CuZn39Pb3	CW614N		58F	Ms59Pb	100%
Leaded nickel silver					
CuNi7Zn39Mn2Pb3	CW400J		NM2	Ns7Mn2Pb	95%
CuNi7Zn38Mn3Pb3			NM3		90%
CuNi12Zn37Mn6Pb2		C79860	NM6	Ns12MnPb	90%
CuNi12Zn36Mn5Pb2			NNS		90%
CuNi15Zn23Pb2			N15		85%

* ISO designations are given for alloys not covered by EN standards.

Ball-point pen tips, brass and nickel silver

Watches

Swissmetal products have played a major role in the history of the watchmaking industry:

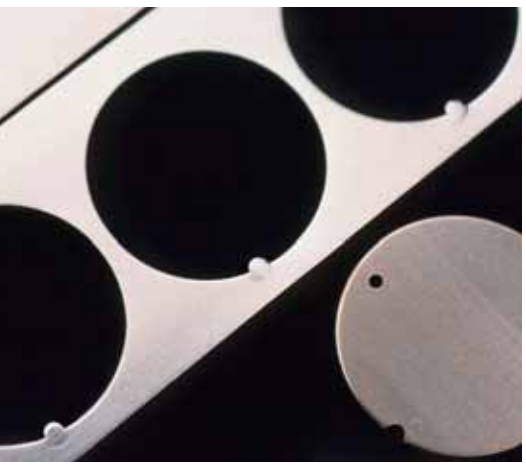
- Our alloys and special products continue to be characterized by high precision.
- They are ideal for the production of Swiss quality gear wheels, winding buttons, pivots, balance wheels, spring barrels and watch cases.
- The finished products are obtained by machining or by stamping.

Our leaded brass strips are ideal for blanking and for precision forming of watch main plates and bridges.

Spectacles

More than 50 years ago, the cornerstone was laid for close cooperation between the Swiss metal plants, the Cadore region of Italy and the French Jura in the production of sections for spectacles hinges.

The hinge between the bows and frame of glasses – regardless of whether fashion dictates that they be made of metal or plastic – is still manufactured from nickel silver. With “Borodur”™, Swissmetal can also supply nickelfree alloys.



Swissmetal strips of hot-extruded and cold-rolled brass

Stamped parts for watch movements

Type of alloy EN/ISO designation*	Alloy number EN	Alloy number ASTM	Swissmetal designation Boillat plant	Swissmetal designation Dornach plant	Machinability index	Special features
«Borodur»™						
CuZn16Si2Pb1		C69750	PS2	PS2	90%	This alloy meets the requirements of rapidly expanding markets such as mobile telecommunications and the fabrication of watch components.
Leaded brass						
CuZn39Pb3	CW614N	C38500	58A	Ms58Pb	100%	Standard machining grade; available from stock.
CuZn39Pb3	CW614N	C38500	58F	Ms59Pb	100%	Standard machining grade; available from stock.
CuZn39Pb3	CW614N	C38500	59B		100%	Grade for balance wheels/spring barrels.
CuZn38Pb2	CW608N	C35300	60A	Ms60Pb	80%	Rolled special grade for watch main plates.
Leaded and unleaded nickel silver						
CuNi10Zn42Pb2	CW402J		N09	Ns10Pb	90%	Traditional machining grade.
CuNi7Zn39Mn2Pb3	CW400J		NM2	Ns7MnPb	95%	Special grade for automatic machine tools.
CuNi12Zn37Mn6Pb2		C79860	NM6	Ns12MnPb	90%	Sections for spectacle hinges.
CuNi18Zn19Pb1	CW408J	C76300	N29		50%	Rods or wires for screws and frames.
CuNi18Zn20	CW409J	C75900	M18		20%	Rods or wires for screws and frames.

* ISO designations are given for alloys not covered by EN standards.
See page 25 for other copper alloys for machining.

Swissmetal sections of nickel silver

Spectacle hinges from Chevassus (F)

Power Generation and Distribution

Medium and high voltage

The most important requirement for products for electrical engineering is generally the lowest possible electrical resistance, which is synonymous with high electrical conductivity. Copper is ideal for meeting this condition. The addition of a small quantity of silver raises the softening temperature of the copper, also enabling its use in higher-temperature applications. The characteristic features of “Nibrofor” (Cu-Ni-Si alloys) are high mechanical strength and creep strength under cyclic loading, combined with good wear resistance, corrosion resistance and high electrical conductivity.

Applications

Solid and hollow sections of various copper qualities are used in generators, power lines and earth leads. Slot wedges made of “Nibrofor” are extremely strong and are used in manufacturing generator rotors.

Copper sections of various shapes are used for busbars, in high-voltage installations, for high voltage breakers, in switchgear and in transformers.

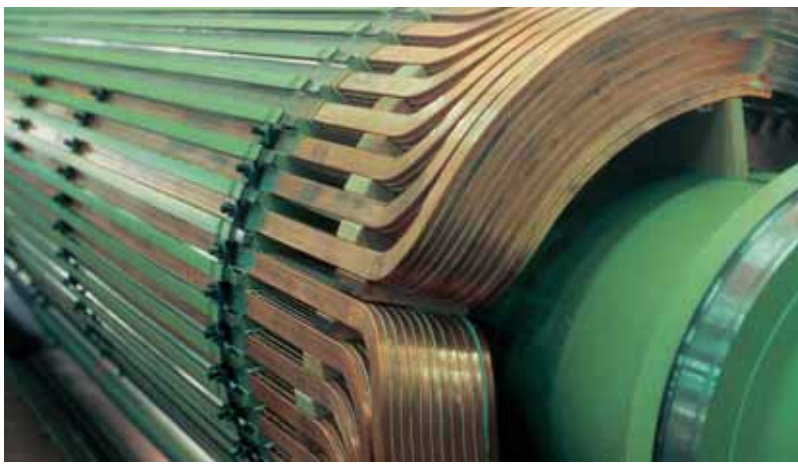
Billets in CuAg 0,1 P

Hollow sections from Swissmetal

Type of alloy EN/ISO designation*	Alloy number EN	ASTM	Swissmetal designation	Remarks
Cu-PHC	CW020A	C30300	Cu-PHC	Oxygen-free (deoxidised) copper, resists embrittlement in reducing atmosphere.
Cu-HCP	CW021A		Cu-HCP	See Cu-PHC.
Cu-ETP	CW004A	C11000	Cu-ETP	Grade of copper used most frequently in the electrical industry.
CuAg0,10P	CW016A		CuAg0,1 P	Copper grade containing silver, oxygen-free (deoxidised) with delayed softening at elevated temperatures.
CuNi2Si	CW111C		CuNi2Si/K	Precipitation hardenable copper alloys with high mechanical strength and hardness, with good corrosion resistance and high electrical conductivity.

* ISO designations are given for alloys not covered by EN standards.

Hollow profiles for power generator



AC generator, Alstom (CH)

Electrical Equipment and Installations

Copper alloys are ubiquitous in electrical equipment. Electrical conductivity is a key criterion for selecting the appropriate material, as are corrosion resistance and suitability for forming by such processes as bending, machining and brazing.

Perfect mastery of the materials as well as the expertise of our specialists enable us to offer our products in the widest range of forms in order to meet the discerning requirements of the market.

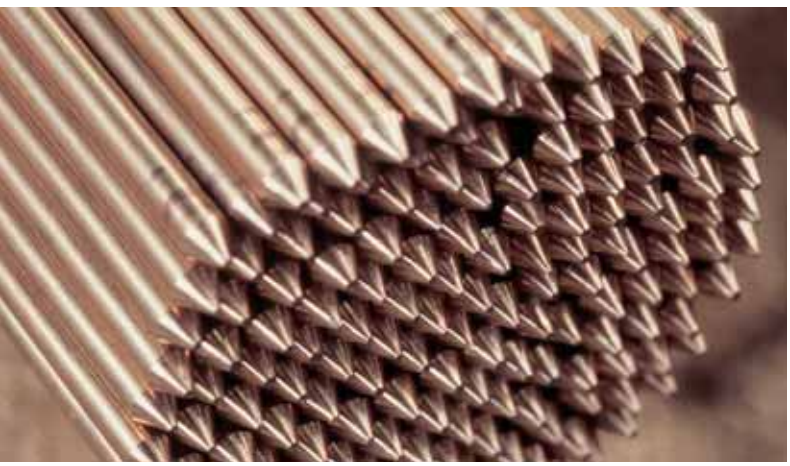
Continuous production is possible thanks to the ability to furnish our sections on drums.

These products are found in most electrical applications, from power distribution through to daily household use.

Copper sections enable interesting technical solutions for switchgear cabinets or contacts. The supply of hollow copper sections furnished on drums increases productivity and significantly reduces the number of necessary brazing operations. The intrinsic quality of our semi-finished products from a broad spectrum of copper alloys enables them to be used even under extreme conditions or in corrosive environments such as in marine applications, in tunnels or in mining operations.

Type of alloy EN/ISO designation*	Alloy number EN	ASTM	Swissmetal designation Boillat plant	Dornach plant	Remarks
CuZn39Pb3	CW614N	C38500	58A	Ms58Pb	Copper alloy most widely used in Europe for workpieces processed on automatic machine tools. Ideal machinability.
CuZn38Pb2	CW608N	C35300	60A	Ms60Pb	Machinable alloy well-suited to stamping.
CuZn38Pb2	CW608N	C37700	60M	Ms60Pb1.5	Same properties as CuZn38Pb2, with lower lead content.
CuZn36Pb3	CW603N	C36000	61A	Ms62Pb	This alloy is used in the USA for workpieces processed on automatic machine tools.
CuAl10Ni5Fe4	CW307G			AlBz10Ni5	Multiple-phase material with high mechanical strength and hardness also at higher temperatures and under cyclic loads, good corrosion and wear resistance.

* ISO designations are given for alloys not covered by EN standards.



Swissmetal rods

Mechanical components for vehicles, Helios (CH)

Safely on the Way

Safety has become a key element of modern life. Many means of transportation traditionally feature a high degree of complexity and innovation, enabled by the use of special materials. Swissmetal has long been a partner to transportation industry leaders. On the product side, the special properties of copper and its alloys and their combinations are ideally adapted to the corresponding requirements.

The key factors for the transportation industry are the high conductivity of copper, the outstanding corrosion resistance of copper alloys, the high mechanical strength with good ductility (long-term properties, even under temperature fluctuations) as well as cold and hot formability for specific applications.

Applications

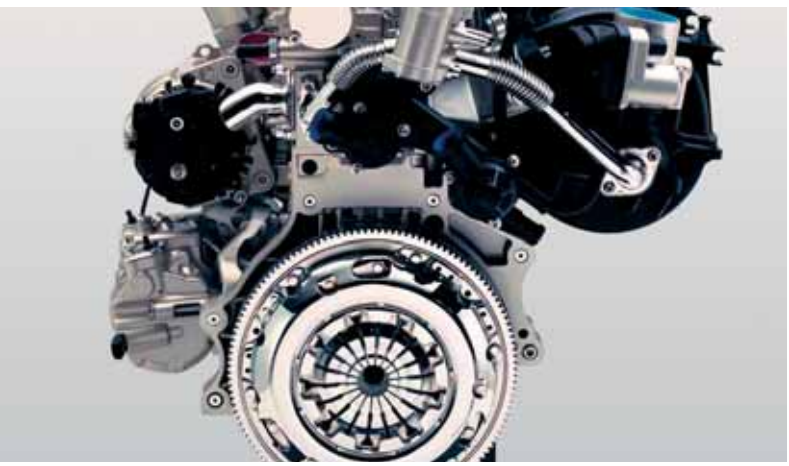
In the automotive industry, a special brass with a high copper content is used in the manufacture of bushings; these have to dissipate heat and must possess excellent wear resistance at high temperatures. Other special brasses with tailored combinations of wear resistance, hardness and ductility are used for valve guides, bearings, synchronizing disks, shaft seals and similar applications. The selection is rounded out by copper sections for starter commutators and for other auxiliary motors.

Swissmetal wire

Swissmetal precision rods and sections

Type of alloy EN/ISO designation*	Alloy number EN	ASTM	Swissmetal designation Boillat plant	Dornach plant	Remarks
CuZn35Pb1	CW600N	C34000	62N	Ms63Pb-1	Copper-zinc duplex alloy with finely distributed lead particles. Well suited to cold forming and machining.
CuZn35Pb2	CW601N	C34500	62A	Ms63Pb-2	Copper-zinc duplex alloy with finely distributed lead particles. Relatively well-suited to cold forming. Well suited to extrusion and cold forging.
CuZn39Pb3	CW614N	C38500	58A	Ms58Pb	Copper alloy most widely used in Europe. Excellent machinability. For workpieces processed on automated machine tools.
CuZn31Si1	CW708R			SoMs68/B	Copper-zinc alloy with silicon additive. Well suited to sliding applications, even under high loads.
CuZn37Mn3Al2PbSi	CW713R			SoMsIII	Multiple-phase material with a combination of high mechanical strength, good toughness and outstanding sliding properties.
CuNi12Zn37Mn6Pb2		C79860	NM6	Ns12MnPb	Copper-nickel-zinc alloy with manganese additive. Good machinability and tarnish resistance.

* ISO designations are given for alloys not covered by EN standards.



Engine VW (D)

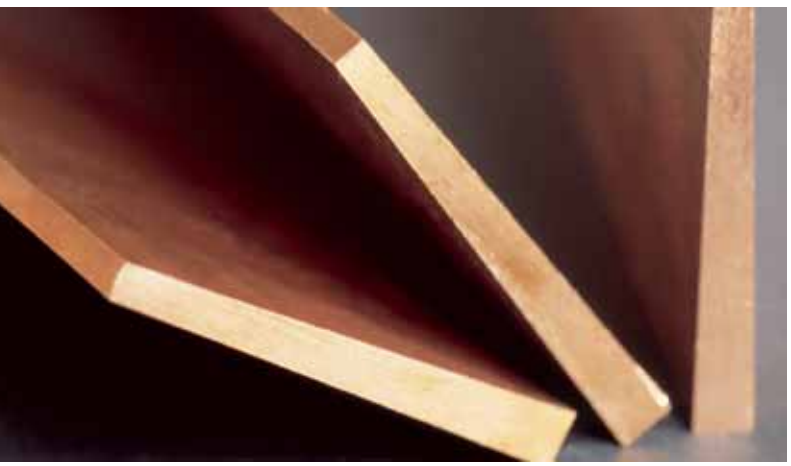
Type of alloy EN/ISO designation*	Alloy number EN	ASTM	Swissmetal designation Boillat plant	Dornach plant	Remarks
Cu-ETP	CW004A	C11000		Cu-ETP	One of the copper grades used in electric motor technology.
CuAg0,03P				CuAg0,03P	Copper grade with elevated softening temperature for high-temperature applications.
CuCr1Zr	CW106C			CCZ	Precipitation hardenable alloy. Excellent mechanical properties, high conductivity.
CuNi2Si	CW111C			CuNi2Si	Precipitation hardenable copper alloy. High mechanical strength, good corrosion resistance and satisfactory conductivity.
CuAl10Ni5Fe4	CW307G			CuAl10Ni5Fe4	Multiple-phase material. High mechanical strength and hardness, also at high temperatures and under cyclic loads. Resistant to scaling and corrosion.

* ISO designations are given for alloys not covered by EN standards.

For the rail industry, the primary products are high-precision commutator bars of silver-alloyed copper for traction motors. These are accompanied by sections in a wide range of shapes in copper and copper alloys for terminals, connectors and contacts.

Special products for railway construction and anchoring are made from Cu-Ni-Si alloys (“Nibrofor”) and from copper-aluminium alloys. For trunk and phase separators, the supporting components of catenary insulators and for terminals, a key role is played by the combination of high mechanical strength, outstanding corrosion resistance under all environmental effects (salt, soot, exhaust gases etc.) and contact corrosion resistance (e.g. due to iron dust). Together with good cold and hot formability, these properties enable wide freedom of design.

In addition to the electronic contacts listed above, bushing and components for landing gear of high-strength and corrosion-resistant alloys are used in the aircraft industry.



Swissmetal commutator bar sections

Commutators, Nelco Commutators (F)

Attractive Solutions for Construction

Although the construction of a house is a technical matter, it also has a deep-reaching emotional side. Both factors dictate the use of strong, durable materials. Copper and copper alloys fulfil these basic criteria admirably and offer a means of providing high-quality, attractive solutions.

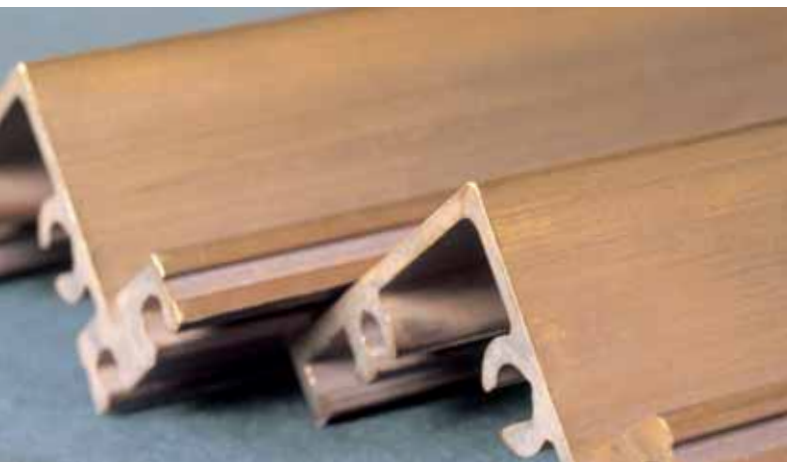
Architectural bronze and copper are frequently used for building exteriors (windows, facades), to which they lend a certain air of nobility with their natural patina. Brass sections are a firmly established feature of interior fittings thanks to the wide variety of possible shapes. Using brass in fittings ensures a long life and anticipates design developments. Swissmetal products play a major role in both locks and keys: brass offers great flexibility in geometry and is also highly resistant to moisture.

Applications

Sections of Dorna-A architectural bronze (CuZn40Mn2Fe1) enable perfect solutions for windows, facades, doors, vestibules and conservatories. Combinations with other metals or with wood are also possible. This material also provides its own protection against weathering through the formation of a natural patina.

Swissmetal's expertise also extends to sections for handrails, hinges and display cases. The wide selection of available copper alloys with their specific properties allows for some surprisingly inexpensive and technically efficient solutions, especially where sections are concerned.

Interior finishing experts value Swissmetal sections because all needs – sills, decorative trim, edging – can be completely satisfied using the wide range of available shapes.



Swissmetal sections

Detail of a window at the school house, Paspels (CH)

Swissmetal leaded brass is used in a large number of applications. This material exhibits an optimum combination of hot formability and machinability (including machining with diamond cutting tools) and can easily be polished. Typical end products are fixtures, valve parts, threaded connections, handles and fittings.

Keys are stamped from leaded brass strips, then machined, and usually surface finished. Solid sections are used for lock cylinder rotors and stators, as well as hollow sections and rods – again, the preferred material is leaded brass.

Wires of brass, special brass, bronze and nickel silver are also used in the cylinders of safety locks

Swissmetal section for hand rail

Hand rail

Type of alloy EN/ISO designation*	Alloy number EN	ASTM	Swissmetal designation Boillat plant	Dornach plant	Remarks
Facades					
CuZn40Mn2Fe1	CW723R			DORNA A	Copper-zinc alloy with iron and manganese additive. Brown, bronzelike colour. Resists weathering. Especially well suited to architectural and craft work. Trade name: Dorna-A™.
CuAl10Ni5Fe4	CW307G			AlBz10Ni.5	Multiple-phase material. High mechanical strength and hardness even at high temperatures and under cyclic loads. Resists scaling and corrosion.
Interior design					
CuZn43Pb2Al	CW624N	C38000		Ms56Pb	Used primarily for extruded sections. A slight aluminium additive results in a light yellow coloration and improves tarnish resistance.
CuZn40Pb1Al	CW616N			Ms58/Pb	Copper-zinc alloy. Optimal for hot stamping, good machinability. Optimal for hot stamped and forged parts.
CuZn40				Ms60V DORECO	Lead-free copper-zinc alloy. Exceptional for hot forming. Good machinability. Can be used in drinking water supply systems.
CuZn39Pb3	CW614N	C38500	58A	Ms58Pb	Copper alloy most widely used in Europe. Excellent machinability. For workpieces processed on automatic lathes.
CuZn38Pb2	CW608N	C35300	60A	Ms60Pb	Most important copper-zinc alloy for key manufacturing.
CuNi12Zn37Mn6Pb2		C79860	NM6	Ns12MnPb	Copper-nickel-zinc alloy with manganese additive. Good machinability and tarnish resistance.

* ISO designations are given for alloys not covered by EN standards.

Swissmetal sections for door locks

Door lock

Manufacture of Machines and Appliances

Swissmetal products for machine and appliance manufacture feature a wide variety of alloys of different shapes and mechanical strengths to match the wide range of customer specifications. Copper alloys – especially leaded brass, special brass, nickel silver, aluminium bronze and also low-alloyed copper – enable the realization of innovative solutions. Even complex production processes can be simplified by using sections that have been developed jointly with the customer. Customers can achieve high added value by working together with Swissmetal at an early stage to identify the best solutions in terms of materials and cost-effectiveness.

Applications

There is virtually no limit to the types of machines and appliances in which copper alloys can be used to advantage thanks to their specific properties or combinations of properties and/or tailored section shapes. The most important properties, some of which can be combined, are listed below.

For further processing:

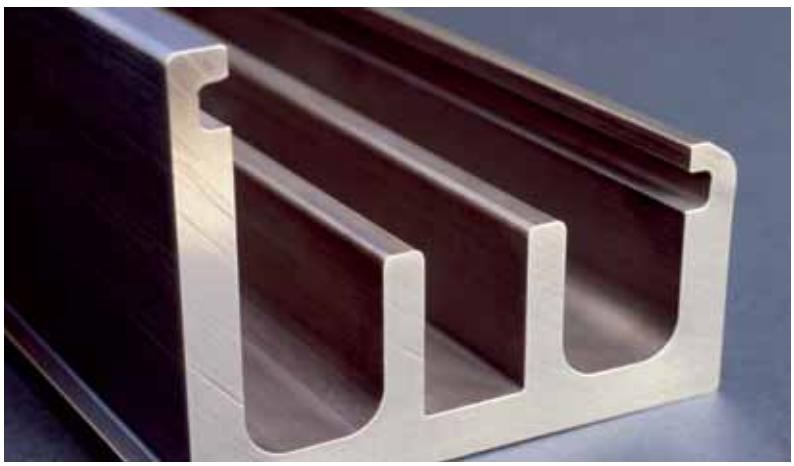
- Outstanding machinability
- Excellent hot formability

For applications:

- Special sliding and/or friction properties
- High mechanical strength at elevated temperatures
- Corrosion resistance
- Resistance to scaling, even at elevated temperatures
- Non-sparking
- Non-magnetic

Under new regulations originating in the USA, lead may only be present in water in minuscule quantities. A special lead-free brass grade named Doreco with outstanding hot forming and machining properties replaces the traditional leaded brasses in coffee machines and other appliances using drinking water. It can be used in all applications where certification is required that the liquid (coffee, tea, water) has not absorbed any lead.

Swissmetal sections for textile machines



Profile for paper machinery branch

Type of alloy EN/ISO designation*	Alloy number EN	ASTM	Swissmetal designation Boillat plant	Dornach plant	Remarks
CuZn39Pb3	CW614N	C38500	58A	MS58Pb	Copper alloy most widely used in Europe. Outstanding machinability. For parts manufactured on automatic lathes.
CuZn37Mn3Al2PbSi	CW713R		58S	SoMs58Al2	Copper-zinc alloy with added aluminium, lead and silicon. High mechanical strength and toughness. Meets stringent demands for sliding stress resistance. Resistant to weathering.
CuZn37Pb1Sn1	CW714R	C48200		SoMs60Pb	Copper-zinc alloy with added tin and lead. Good hot-forming characteristics and machinability. Withstands effects of marine and other slightly corrosive environments.
CuZn40				DORECO	Lead-free brass grade for use in drinking-water supply systems and for coffee and tea machines.
CuNi2Si	CW111C			CuNi2Si	Precipitation hardenable copper alloy. High mechanical strength, corrosion resistance, satisfactory electrical conductivity.
CuAl10Ni5Fe4	CW307G	C63000		AlBz10Ni5	Multiphase material. High strength and hardness even at high temperatures and under cyclic loading. Resistant to scaling and corrosion.
CuZn36Pb2As	CW602N	C35330		ENZIDOR	Brass for machining with elevated galvanic corrosion resistance and corrosion resistance under stress.

* ISO designations are given for alloys not covered by EN standards.

Nibrofor profile for plastic film welders

Turning parts

A large proportion of the production of the two Swissmetal plants consists of machinable alloys, a fact that can be explained by the historical evolution of machining technology. In a development paralleling that in the watchmaking industry, the first rudimentary metal cutting machines were operated by homeworkers in a region stretching from the High Savoy across the entire Jura chain to the Black Forest.

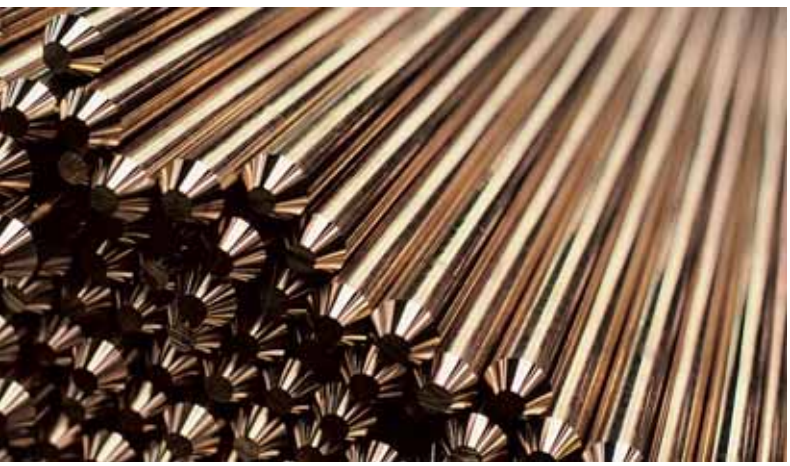
The advent of industrialization increased the demand for shaped metal parts, in response to which our plants began producing brass rods at the beginning of the 20th century. Expansion of this branch of business coincided with the development of the first automatic lathes in Moutier, and later also in Germany and France. This development and the high standards demanded (especially by the watchmaking industry) spurred on the factories – now part of Swissmetal – to continually improve the quality of their products. Hence our worldwide reputation for top quality and reliability.

Many developments have been initiated in Switzerland over the past decades, and most are now regarded as setting world standards. The Swissmetal plants have succeeded to this day in maintaining their lead in quality and performance. Our aim is to continuously upgrade our production processes so that we can offer our customers products for machining that meet the most stringent standards.

By perfecting alloy variants with good machinability and excellent mechanical properties for cold forming, and by developing to market maturity high-strength machining alloys made from environmentally compatible metals, the Swissmetal plants have provided solid proof of their innovative strength and performance

Type of alloy EN/ISO designation*	Alloy number EN	ASTM	Swissmetal designation Boillat plant	Dornach plant	Machinability index	Remarks
High-conductivity copper alloys for electrical applications						
CuPb1P		C18700	C99	CuPb1P	70%	Electrical conductivity 85% IACS.
CuTeP	CW118C	C14500	C42		70%	Electrical conductivity 90% IACS.
Leaded brass						
CuZn35Pb2	CW601N	C34500	62A	Ms63Pb2	75%	Machinable and cold formable.
CuZn36Pb3	CW603N	C36000	61A	Ms62Pb	100%	USA standard grade.
CuZn38Pb2	CW608N	C37700	60A	Ms60Pb	85%	Permits some cold forming.
CuZn39Pb3	CW614N	C38500	58A	Ms58Pb	100%	European standard grade.
CuZn39Pb3	CW614N	C38500	58F	Ms59Pb	100%	
Special brasses for special properties						
CuZn16Si2Pb1		C69750	PS2	PS2	90%	Machinability and spring properties.
CuZn37Mn3Al2PbSi	CW713R		58S	SoMs58Al2	75%	Machinability and spring properties.
CuZn40Mn1Pb1	CW720R		58C	DORNA Z	75%	Elevated corrosion resistance.
Nickel silver						
CuNi7Zn39Mn2Pb3	CW400J		NM2	Ns7Mn2Pb	95%	Long-proven machining grade.
CuNi12Zn37Mn6Pb2		C79860	NM6	Ns12MnPb	90%	Improved cold formability.
CuNi10Zn42Pb2	CW402J		N09	Ns10Pb	90%	Alloy with ivory hue.
CuNi15Zn23Pb2			N15		85%	High ductility.
High-strength bronzes						
CuSn4Pb4Zn4	CW456K	C54400	BZ4		90%	High-strength machinable bronze.
CuSn5Pb1	CW458K	C53400	BP5		60%	Mechanical strength and corrosion resistance.
CuSn13Pb0.5		C53800	B05	B05	80%	Spring contacts and extreme mechanical strength.

* ISO designations are given for alloys not covered by EN standards.



Pointed Swissmetal rods

Turned parts

A Long Tradition of Cooperative Partnership

Where high-grade products are concerned, success hinges on information. With us, it's a two-way process rooted in a spirit of partnership. We will be delighted to put our experience at your disposal and advise you on all aspects of machining and metallurgical matters. It goes without saying that all research and development information is treated in the strictest confidence.

Customer benefits

Swissmetal gives top priority to maximizing customer benefits. Thanks to its extensive technological know-how in metallurgy and alloy processing, Swissmetal plays a key role in helping its clients boost their productivity. Whether they are manufacturers of finished products or parts, or component suppliers, clients benefit from our know-how.

Expert advice

Customers who themselves define the form of their product (e.g. profiles) or the alloy to be used attach great importance to collaboration even during the product development phase. Depending on the type of processing selected, our experts advise clients on the optimum use of the semi-finished product.

Reliable delivery

Swissmetal is always ready to assist you with reliable, customized solutions – from client-specific consulting to packaging and dispatch.

Partnership

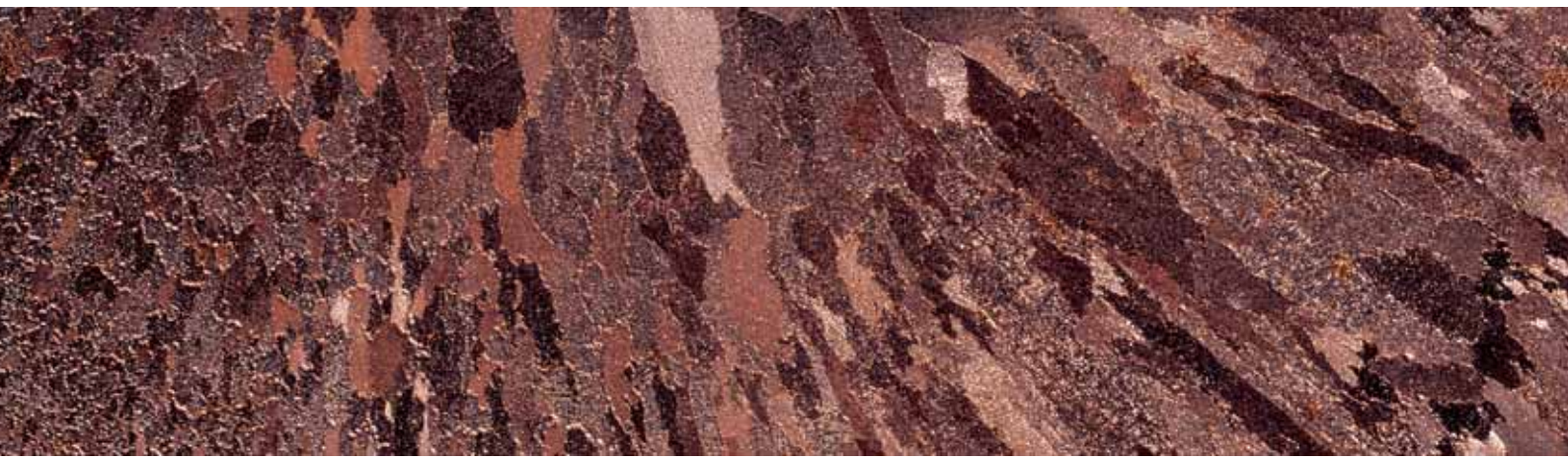
Swissmetal always endeavours to live up to its reputation as a provider of high-quality semi-finished products and as a technology leader. Building up a close, longterm partnership with our clients is a key element in these endeavours.

Make Swissmetal your partner and benefit from the comprehensive experience and know-how of our specialists. We are just a phone call away.

An Investment in Quality

The Swissmetal plants have been certified to SN EN ISO 9001: 2000 and to SN EN ISO 14001: 2004. At the client's request, the test results ascertained are made available in the form of a declaration of conformity with EN 1655 or as a test certificate in accordance with EN 10204.

ISO 9001
ISO 14001
BUREAU VERITAS
Certification



Brief portrait

Swissmetal manufactures and sells high-quality speciality products made from copper and copper alloys in markets around the world. Its products are mainly used in the electronics, telecommunications, aviation, petroleum, automotive, stationery and watch industries and also for architectural purposes. Based in Dornach, Switzerland, Swissmetal is listed on the SWX Swiss Exchange as Swissmetal Holding Ltd.

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