

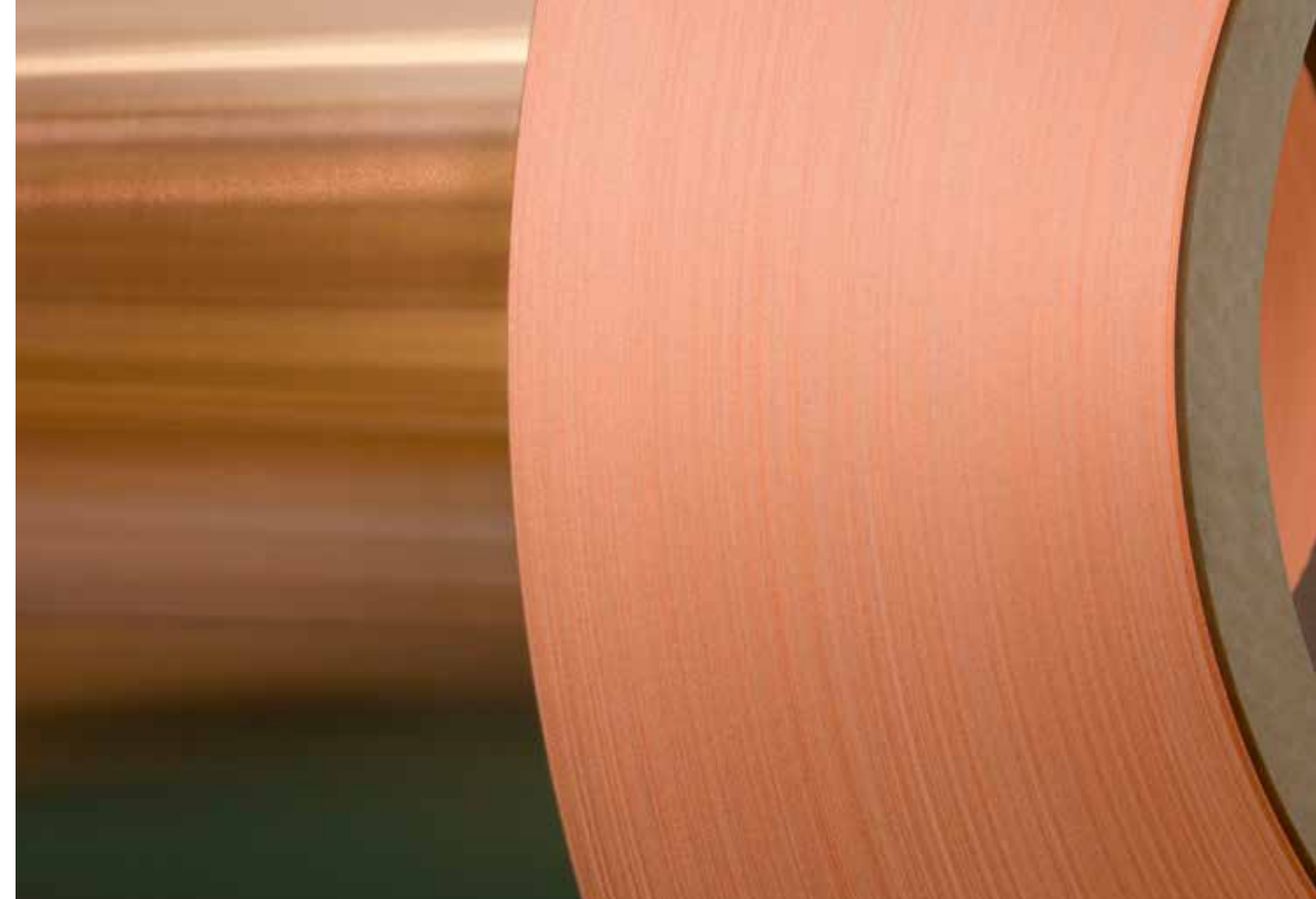


Rolled Products

Facts & Figures

Aurubis Rolled Products

- > **200,000** metric tons of foil, strip, sheet and plate are produced worldwide annually by Aurubis.
- > **98 %** of **global strip demand** is covered by Aurubis' alloy portfolio.
- 50** metric tons is the size of the **biggest copper and brass coil in the world** produced by Aurubis.
- 4** **rolling mills** in Europe and the US.
- 4** **tin-plating lines** in Europe and the US.



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






























The Products


























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Min. 0.025 mm to max. 200 mm
extensive thickness range –
from foil to plate.

Rolled Products Fabrication

Sites		
AE	Dubai	
BE	Brussels	
	Olen	    
BG	Pirdop	    
CN	Hong Kong	
	Shanghai	
CZ	Prague	
DE	Emmerich	
	Fehrbellin	   
	Hamburg Group headquarters	    
	Lünen	    
	Stolberg	   
	Strass	 
FI	Pori	 
FR	Lyon	

IT	Avellino	
	Mortara	 
JP	Tokyo	
KR	Seoul	
NL	Zutphen	  
RU	St. Petersburg	
SG	Singapore	
SI	Dolný Kubín	 
ES	Barcelona	
SE	Finspång	
	Västerås	
CH	Yverdon-les-Bains	
TH	Bangkok	
TR	Istanbul	
UK	Birmingham	 
US	Buffalo	  
	Chicago	
VN	Ho Chi Minh City	

Raw materials

Concentrates and recycling materials are the raw materials from which copper is produced.



Concentrates



Recycling materials

Slitting Centers

Service centers located near our customers slit strip to the desired dimensions.



Products

The copper is processed into products. Some products are already the result of copper production.



Iron silicate



Sulfuric acid



Other metals



Precious metals



Cathodes



Continuous cast shapes



Wire rod



Specialty rod/shaped wire



Strip/foil



Bars & Profiles

Sales and distribution

An international sales and distribution network markets our products.



Aurubis Group

Our copper for your life

The company's history is characterized by its dynamics and flexibility, from our founding as a stock corporation in 1866 to today.

Nowadays, the Aurubis Group is ideally positioned; with about 6,300 employees at production sites in Europe and the US and sales offices all over the world, Aurubis is one of the leading integrated copper groups.

Aurubis stands for innovative processes, cutting-edge technology, exemplary environmental protection, customer value and profitability.

Uniquely, Aurubis combines copper production with processing copper into tailor-made products. As a fully integrated global copper company, Aurubis is a leader in smelting, fabricating, refining and recycling copper.

Aurubis shares are part of the Prime Standard Segment of the Deutsche Börse and are listed in the MDAX and the Global Challenges Index (GCX).

Aurubis Rolled Products

Synergies & strengths



Reliability

Aurubis is one of the leading strip producers worldwide, covering the products that are in demand today – from basic alloys to High Performance Alloys (HPAs) and specialty alloys.

Global market leaders in the automotive, electrical and electrical industry trust Aurubis' production capabilities, financial stability, competence and long-term commitment to the copper industry.

Aurubis' alloy portfolio contains over 70 top quality copper and copper alloys: from high purity oxygen-free copper to brass alloys, copper-tin alloys, special CuproBraz® alloys and High Performance Alloys.

Aurubis understands its customers' markets, needs and requirements.

Our focus is on markets where the specific, conductivity-related properties of copper add value for our customers. Customers benefit from our quality, productivity, process efficiency and innovation.

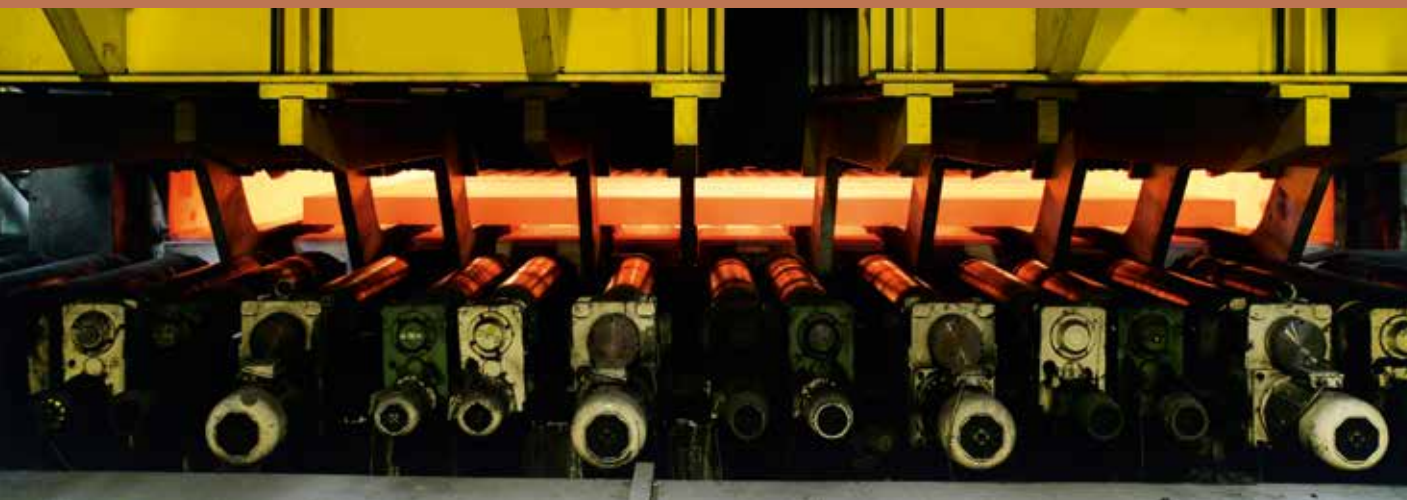
Aurubis values long-term relationships and strives to build those relationships with its business partners.

Operating globally – acting locally

As a global player with four rolling mills in Europe and the US, a network of slitting centers and sales offices as well as distribution partners around the world, Aurubis provides its customers worldwide with excellent local services, also in emerging markets.

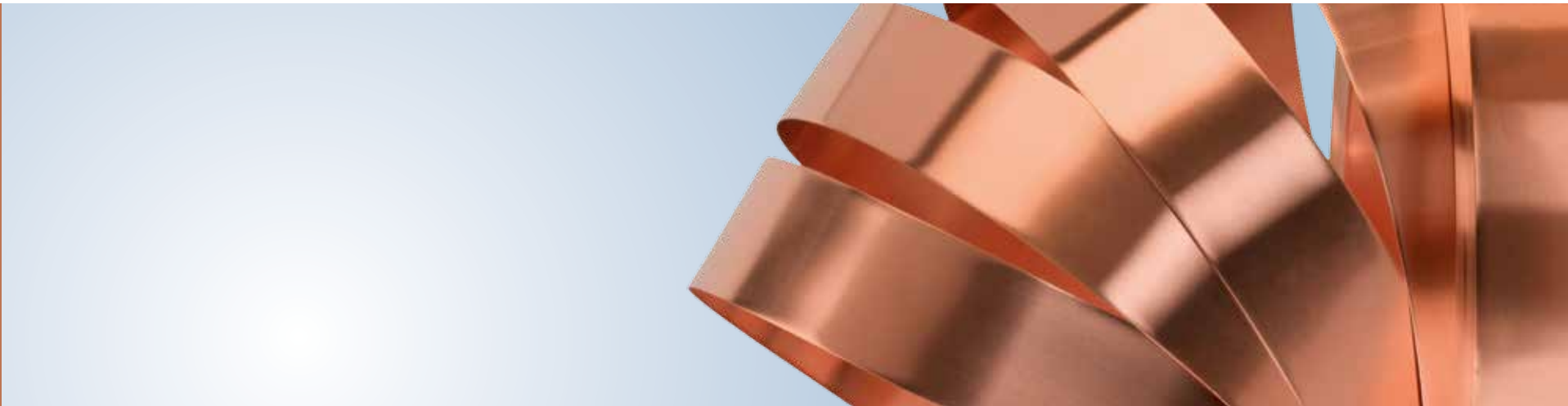
Aurubis fabricates its flat rolled products in Buffalo (US), Pori (Finland), Stolberg (Germany) and Zutphen (Netherlands) with a big portfolio of materials and production capabilities.

All of these factors make Aurubis a global and local partner.



Offering the broadest range

Aurubis is the fabricator with the world's largest product portfolio of foil, strip, sheet, plate and circles produced according to special customer requirements.



Cable strip
Strip for radio frequency and submarine cable and cable wrap for power cable have been part of the production program for decades. Aurubis' core expertise is in continuous casting and rolling to thin gauges with tight tolerances and homogeneous properties. New applications – such as deep-water dynamic sea cables for floating oil and gas platforms – have been developed to serve customer needs.

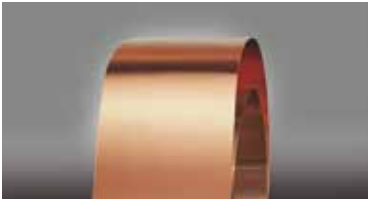


Connector strip
Responding to the high demands in the automotive, electrical and electronics industry, Aurubis offers connector and stamped grid products with standard and High Performance Alloys (HPAs). The extensive portfolio is produced with bare or tin-coated surfaces* to the highest standards in the industry.

* as coil, spooled and as ContiCoil®.



Strip for engine cooling
Aurubis is the worldwide market leader in copper and brass strip for engine cooling applications utilizing soft solders and CuproBraz® technology. The CuproBraz® technology was specifically developed for manufacturing heavy-duty mobile and industrial heat exchangers. New brass and copper alloys offer high durability, high thermal performance and corrosion resistance – maintaining their mechanical properties at elevated operating temperatures of more than 290°C (554°F).



Industrial strip
Aurubis provides a full range of copper and copper alloy strip for almost any industrial application in standard dimensions or custom made to special requirements. Coil weights and inner and outer diameters are tailor-made to follow the customer's individual production processes and the requirements of their equipment.



Sheet, plate and circle
Aurubis' sheet and plate have an unrivaled range of dimensions that are unique in the marketplace and manufactured for various applications and critical parts of many diverse products. The variety of Aurubis' products is matched by the number of applications in which they are found – from MRI scanners to printed circuit boards (PCBs), printing plates for engraving and even sputtering targets.



Architectural Solutions
Aurubis offers a wide range of copper-based architectural products and services for the building and construction industry. These include copper sheet and strip with different surface qualities, prefabricated systems for facades, roofs and rainwater systems and integrated roof systems. The Nordic Products™ surfaces by Aurubis include variable intensities of green or blue pre-patina-tion and brown pre-oxidation.

Please ask for our special leaflets as required.

Alloys

More than 98 % of global strip demand is covered by our alloy portfolio.

Pure copper alloys and low-alloyed copper*							
ISO	UNS	EN	JIS	Buffalo	Pori	Stolberg	Zutphen
Cu-OFE (OF-Cu)	C10100	CW009A	C1011	C101	Cu-OFE	PNA 203	
Cu-OF	C10200	CW008A	C1020	C102	Cu-OF		
Cu-HCP (SE-Cu 57)	C10300	CW021A		C103	Cu-HCP	PNA 210	SM0013
Cu-XLP / Cu-PHC (SE-Cu 58)	C10300	CW020A		C103	Cu-XLP	PNA 209	SM0011
CuAg0.03(OF) (CuAg0.03P)	C11300					PNA 202	
CuAg0.04 (OF)	C10400	CW017A			CuAg0.04 (OF)		
CuAg0.045 (OF)					CuAg0.05 (OF)		
CuAg0.10P	C10700	CW016A			CuAg0.10P	PNA 217	
CuAg0.10	C10700	CW013A			CuAg0.10		
CuAg0.10 (OF)	C10700	CW019A			CuAg0.10 (OF)		
Cu-ETP (E-Cu)	C11000	CW004A	C1100	C110	Cu-ETP	PNA 211	SM0008
Cu-DLP	C12000	CW023A	C1201	C120	Cu-DLP	PNA 220	
Cu-DHP (SF-Cu)	C12200	CW024A	C1221	C122	Cu-DHP	PNA 219	
Cu-DHP	C12210	CW024A	C1220		Cu-DHP		SM0028
CuTe0.02Sn0.02	C14530			C1453			SM0300
CuSn0.04					CuSn0.04		SM0700
CuSn0.09					CuSn0.09		SM0701
CuSn0.15	C14415	CW117C		C14415	CuSn0.15	PNA 216	SM0702
CuSn0.2	C14410			C1441		PNA 215	
CuFe0.1P	C19210			KFC*		PNA 214	
CuZn0.5		CW119C		CuZn0.5		PNA 218	
Brass							
ISO	UNS	EN	JIS	Buffalo	Pori	Stolberg	Zutphen
CuZn5	C21000	CW500L	C2100	C210		PNA 221	
CuZn10	C22000	CW501L	C2200	C220		PNA 222	SM1090
CuZn12.5	C22600			C226			
CuZn15	C23000	CW502L	C2300	C230	Nordic Brass™	PNA 223	SM1085
CuZn20	C24000	CW503L	C2400	C240		PNA 224	
CuZn28		CW504L				PNA 225	
CuZn30	C26000	CW505L	C2600	C260		PNA 226	SM1070
CuZn30As	C26130	CW707R					SM2870
CuZn33	C26800	CW506L	C2680	C268		PNA 227	SM1067
CuZn35	C26800		C2680				SM1065
CuZn35P							SM2965
CuZn36	C27000	CW507L		C270		PNA 248	SM1064
CuZn37	C27200	CW508L	C2720	C272/C274		PNA 243	SM1063
CuZn40	C28000	CW509L	C3712	C280		PNA 260	
CuZn42 BlueBrass®						PNA 277	

Alloyed brass							
ISO	UNS	EN	JIS	Buffalo	Pori	Stolberg	Zutphen
CuZn11.5Sn1	C42200			C422			
CuZn9.5Sn2	C42500		C4250	C425			
CuZn14Fe0.8Sn0.8	C66430			OCPX			
Copper-tin alloys							
ISO	UNS	EN	JIS	Buffalo	Pori	Stolberg	Zutphen
CuSn2Fe0.1P0.03	C50715			KLF-5*			
CuSn2Zn2.2Fe0.1P0.03	C50725			KLF-5Z*			
CuSn1						PNA 298	
CuSn2						PNA 288	
CuSn4	C51100	CW450K	C5111	C511	Nordic Bronze™	PNA 284	
CuSn5	C51000	CW451K	C5102	C510		PNA 285	
CuSn6	C51900	CW452K	C5191	C519		PNA 282	
CuSn8	C52100	CW453K		C521		PNA 283	
CuSn10	C52400			C524		PNA 292	
CuSn12						PNA 295	
Special CuproBraz® alloys							
ISO	UNS	EN	JIS	Buffalo	Pori	Stolberg	Zutphen
CuCr0.2							SM0502
CuZn15Fe0.8	C66420						SM2385
Cu64ZnNi3	C74400						SM2464
Special bronze							
ISO	UNS	EN	JIS	Buffalo	Pori	Stolberg	Zutphen
CuAl5Zn5Sn1					Nordic Royal™	PNA 319	
CuNi10Fe1Mn	C70600	CW352H				PNA 334	
High performance alloys							
ISO	UNS	EN	JIS	Buffalo	Pori	Stolberg	Zutphen
CuZr0.1	C15100			C151		PNA 296	
CuMg0.1	C15500			C155		PNA 297	
CuMg0.6	C18665			C18665		PNA 395	
CuNi1.5Si	C19010			C19010		PNA 290	
CuFe2P	C19400	CW107C	C1940	C194		PNA 212	
CuFe2PMg	C19400			C194		PNA 206	
CuFe0.7MgP	C19700			C197		PNA 205	
CuSn1.2Ni0.8P0.07	C19040			CAC5*			
CuNi0.5Sn0.5	C19022			UNILLOY			
CuNi1.8Si0.4Zn1.1SnMg	C64760			CAC60*			
CuNi3SiMg	C70250			C7025		PNA 370	
CuNi2Si0.4	C70260	CW111C		C7026			

Aurubis also supplies slightly modified alloys with special properties, e.g. in accordance with Oeko-Tex Standard 100 and US Federal Regulations.

* available in US.

Technology with outstanding possibilities



Slitting Centers

Aurubis has established a network of slitting and distribution centers in Europe (Italy, Netherlands, Slovakia, United Kingdom) and Asia and cooperates with partners worldwide. Furthermore, the slitting centers also function as service centers.

Aurubis has the largest continuous casting production capacities worldwide. Several state-of-the-art casting technologies such as cake casting (with consecutive hot rolling) and vertical and horizontal strip casting (both with consecutive cold rolling) are used to produce consistent and high quality rolled products.

These different technologies provide high flexibility, custom products and efficient mono-manufacturing of large lot sizes. Aurubis produces the largest copper coils in the world with the tightest tolerances. In addition, Aurubis uses the most efficient technology and offers innovative assistance in Research & Development as well as technical

cooperation for customers. The technical center for developing and manufacturing thermal management solutions offers accelerated corrosion tests and wind tunnel tests for radiators and charge air coolers (CACs), for instance. Aurubis has the variety of material, production capabilities and knowledge to meet customer requirements.

Unique range of dimensions				
	Thickness in mm	Width in mm	Thickness in inches	Width in inches
Industrial strip	0.075 – 7.000	5 – 1219	0.0030 – 0.2756	0.197 – 48.000
Engine cooling strip	0.025 – 0.500	5 – 320	0.0010 – 0.0197	0.197 – 12.598
Cable strip & foil	0.025 – 0.500	5 – 635	0.0010 – 0.0197	0.197 – 25.000
Industrial foil	0.025 – 0.100	10 – 600	0.0010 – 0.0040	0.394 – 23.622
Sheets < 2 mm / 0.0787 inch	0.300 – 2.000	350 – 1219	0.0118 – 0.0787	13.780 – 48.000
Sheets > 2 mm / 0.0787 inch	2.000 – 6.000	540 – 1100	0.0787 – 0.2366	21.598 – 43.307
Plates	6.000 – 200	100 – 1100	0.2362 – 7.8740	3.937 – 43.307
Circles	0.300 – 3.000	65 – 1050	0.0118 – 0.1181	2.559 – 41.338

Ratio of width to thickness on request.

Electrical and electronical industries

High purity, excellent surfaces and microalloyed compositions

The main consumers of copper are in the electrical and electronical industry due to the excellent electrical and thermal conductivity of copper. Copper is an ideal material for heavy gauge printed circuit boards (PCBs), switches, connectors, transformers, heat sinks and base plates, bus bars, commutators and many other demanding applications like for copper ceramic substrates (DCB, AMB).

The combination of chemical composition and excellent surface quality of higher thicknesses or dimensions covers different applications. The properties of pure copper can still be improved by micro-alloyed amounts of silver that enable use under high, demanding temperatures.



Quality Assurance

Aurubis monitors and documents product quality using a Quality Management System. All rolling mills are certified in accordance with ISO/TS 16949 and/or DIN EN ISO 9001:2008.

Tin-plated solutions

with outstanding possibilities



Aurubis operates two hot-dip tinning and two electroplating lines in Europe and the US and supplies customers with tinned products.

We offer additional types of coatings, such as TN, TQ, silver and copper-nickel, via service partners.

Properties and applications

In order to meet the high demands of the automotive, electrical and electronical industries on connectors and stamped grids – such as low insertion forces, good corrosion resistance and good solderability – the strip used is required to have surface treatments. Three main processes are used for

coating: hot-dip tinning, electroplating and electroplating with a subsequent reflow treatment. Accordingly, copper and copper alloy strip can be coated with a variety of metals. Pure tin coatings are particularly important due to their economic efficiency.

Hot-Dip Tinning			
Strip thickness in mm		Tin layer thickness incl. tolerances (standard tin-plating 99.9 %)	Main properties
0.10 - 1.50	Air level mechanical wipe	0.8 – 1.5 µm	Low insertion force
		1.0 – 3.0 µm	Low insertion force, corrosion protection
		2.0 – 4.0 µm	Good corrosion protection
		3.0 – 6.0 µm	
		4.0 – 8.0 µm	Good solderability
		5.0 – 10.0 µm	
		10.0 – 16.0 µm	Special applications

Electroplating		
Strip thickness in mm		Main properties
0.20 – 0.80	Tin matte / bright / brushed	Good electrical contact, low insertion force and / or corrosion protection
	Tin reflowed	Mitigates whiskers
	Nickel	Special applications and diffusion barrier (underlayer)
	TN (available in US)	Very low insertion force
	TQ (available in US)	Long-term solderability
0.10 – 4.0	Tin matte / bright / brushed	Good electrical contact, low insertion force and / or corrosion protection
0.10 – 2.0	Tin reflowed	Mitigates tin whiskers
	Advanced reflow tin	Long-term solderability
	Super thin advanced reflow tin (STAR)	Very low insertion force
	Nickel	Special applications and diffusion barrier (underlayer)
	Silver	High corrosion protection, higher temperature resistance

■ In-house production
Copper underlayer and selective plating on request.

Outstanding Service

Commercial Services

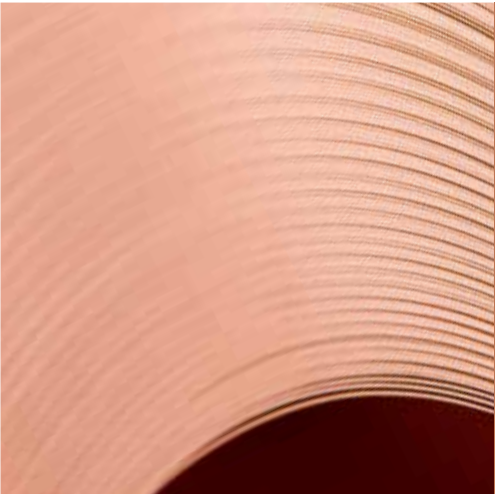
- » Copper market expertise and many years of experience
- » Strong and financially healthy long-term copper supply
- » Provision of the latest copper market information
- » Hedging advice and support

Technical Services

- » Support from our network of experienced technicians and engineers in selecting and processing semi-finished products
- » Laboratory with facilities for extensive, state-of-the-art physical and chemical analyses including scanning electron microscopy
- » Recycling concepts for our customers to increase economic efficiency

Logistics

- » Maximum reliability of supply and flexibility, thanks to the integrated chain from concentrate to strip
- » Joint projects with our customers to optimize the production chain
- » Worldwide availability thanks to the international sales network: Operating globally – acting locally



Before, during and of course also after purchase, Aurubis offers its customers comprehensive commercial, technical and logistical services, geared entirely to the needs of our customers.

Contacts Rolled Products

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