



# Rolled Products

 **Aurubis**



# Facts & Figures

## Aurubis Rolled Products

- » **> 200,000 t strips, sheets and plates** are produced worldwide annually by Aurubis.
- » **> 98 % of global strip demand** is covered by Aurubis' alloy portfolio.
- » **3 rolling mills** in Europe and the US.
- » **3 tin-plating lines** in Europe and the US.

# Aurubis Group

## Metals for progress

Aurubis is creating the foundation for the technologies of the future – with metals. Being smart and connected is impossible without metals. Whether for renewable energies, electric vehicles, digitalization, or urbanization, the demand for metals will continue to rise.

For more than 150 years, Aurubis has produced copper and other metals that are crucial for modernization and the ongoing development of our lives over the coming decades. We see ourselves as a true multimetal provider.

Aurubis has around 6,900 employees, production sites in Europe and the USA, and an extensive distribution network around the world.

# 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, electronics and electrical industries 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 and brass alloys to phosphor-bronze 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 three rolling mills in Europe and the US, a network of sales offices as well as distribution partners around the world, Aurubis provides its customers worldwide with excellent local services – in emerging markets as well.

Aurubis manufactures its flat rolled products in Buffalo (US), Pori (Finland) and Stolberg (Germany) with a large portfolio of alloys and production capabilities.

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

# Offering the broadest range

In keeping with special customer requirements, Aurubis has one of the world's largest product portfolios of strip, sheet, plate and circles.



## Cable strip

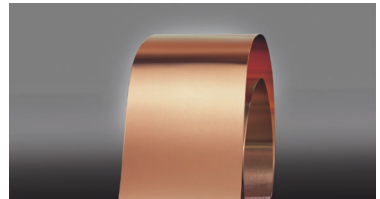
Strip for radio frequency, submarine cable and cable wrap for power cable have been part of the production program for decades.



## Connector strip

Responding to high demand from the automotive, electrical and electronics industries, 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.

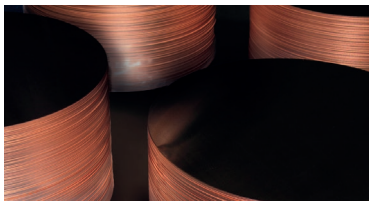
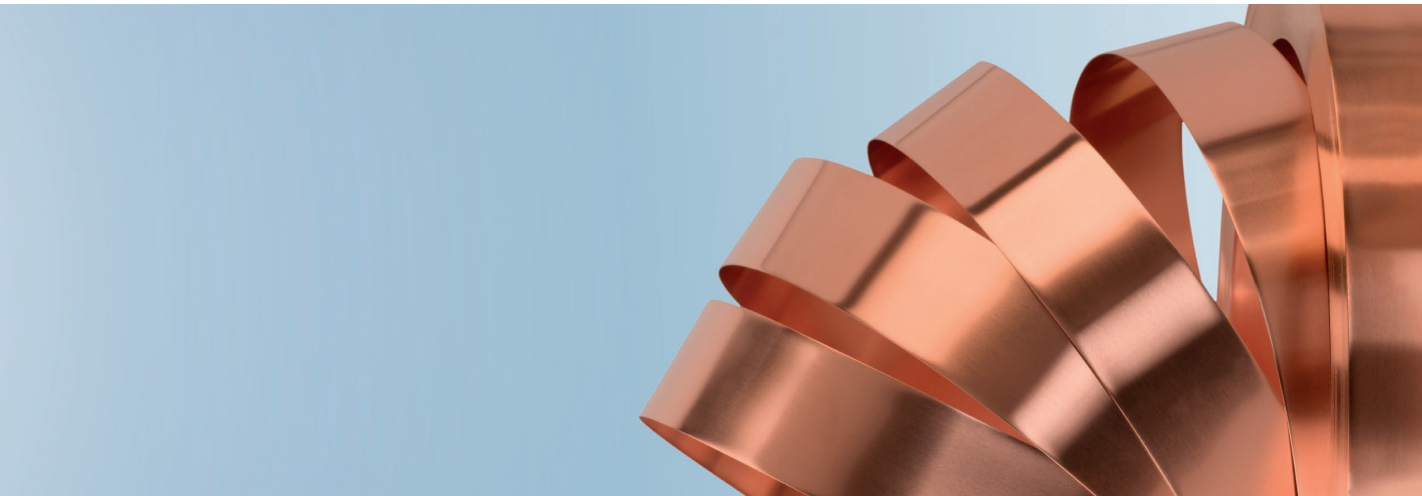


## Industrial strip

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 conform with the customer's individual production processes and the requirements of their equipment.

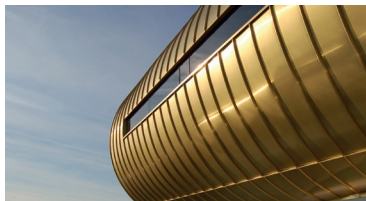
\* as coil, spooled and ContiCoil®.



### 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 construction industry.

These include copper and copper alloy 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-patination and brown pre-oxidation.

**Please ask for any special leaflets you may require.**

# 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
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
Cu-XLP / Cu-PHC (SE-Cu 58)	C10300	CW020A		C103	Cu-XLP	PNA 209
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
Cu-DLP	C12000	CW023A	C1201	C120	Cu-DLP	PNA 220
Cu-DHP (SF-Cu)	C12200	CW024A	C1221	C122	Cu-DHP	PNA 219
CuTe0.02Sn0.02	C14530			C1453		
CuSn0.15	C14415	CW117C		C14415	CuSn0.15	PNA 216
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
CuZn5	C21000	CW500L	C2100	C210		PNA 221
CuZn10	C22000	CW501L	C2200	C220		PNA 222
CuZn12.5	C22600			C226		
CuZn15	C23000	CW502L	C2300	C230	Nordic Brass™	PNA 223
CuZn20	C24000	CW503L	C2400	C240		PNA 224
CuZn28		CW504L				PNA 225
CuZn30	C26000	CW505L	C2600	C260		PNA 226
CuZn30As	C26130	CW707R				
CuZn33	C26800	CW506L	C2680	C268		PNA 227
CuZn36	C27000	CW507L		C270		PNA 248
CuZn37	C27200	CW508L	C2720	C272/C274		PNA 243
CuZn40	C28000	CW509L	C3712	C280		PNA 260
CuZn42 BlueBrass®						PNA 378

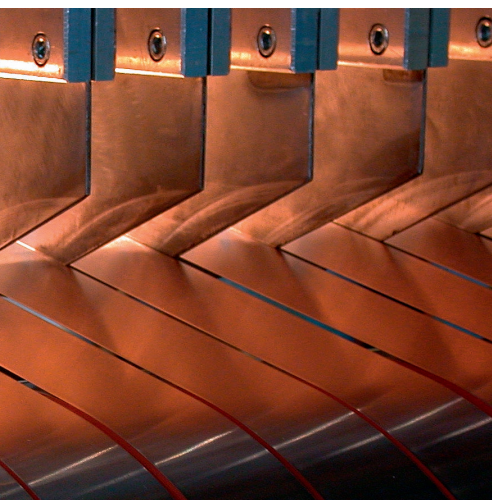
Alloyed brass						
ISO	UNS	EN	JIS	Buffalo	Pori	Stolberg
CuZn11.5Sn1	C42200			C422		
CuZn9.5Sn2	C42500		C4250	C425		
CuZn14Fe0.8Sn0.8	C66430			OCPX		
Phosphor-bronze alloys						
ISO	UNS	EN	JIS	Buffalo	Pori	Stolberg
CuSn2Fe0.1P0.03	C50715			KLF-5*		PNA 328
CuSn2Zn2.2Fe0.1P0.03	C50725			KLF-5Z*		
CuSn1						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 bronze						
ISO	UNS	EN	JIS	Buffalo	Pori	Stolberg
CuAl5Zn5Sn1					Nordic Royal™	PNA 319
CuNi10Fe1Mn	C70600	CW352H				PNA 334
High performance alloys						
ISO	UNS	EN	JIS	Buffalo	Pori	Stolberg
CuCrZr	C18150					PNA 372
CuZr0.1	C15100			C151		PNA 296
CuMg0.1	C15500			C155		PNA 297
CuNi1.5Si	C19010			C19010		PNA 290
CuNi1.5Sn	C19005			C19005		PNA 326
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 cooperates with a network of slitting and distribution centers in Europe and Asia.

Aurubis has the largest continuous casting production capacities worldwide. State-of-the-art casting techniques such as slab casting (continuous or discontinuous, each followed by hot rolling) and continuous strip casting followed by cold rolling are used to produce high-quality rolled products.

These different techniques guarantee high flexibility, the fulfillment of special requirements or efficient

mono production for large batch sizes, depending on requirements.

In addition, Aurubis uses the most efficient technology and offers innovative assistance in research and development as well as technical cooperation for customers.

Unique range of dimensions				
	Thickness in mm	Width in mm	Thickness in inches	Width in inches
Industrial strip	0.100 – 7.000	5 – 1219	0.0039 – 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	0.180 – 0.500	5 – 635	0.0071 – 0.0197	0.197 – 25.000
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 electronics industries

High purity, excellent surfaces and customized production

The main consumers of copper are in the electrical and electronics industries 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, such as for copper ceramic substrates (DCB, AMB).

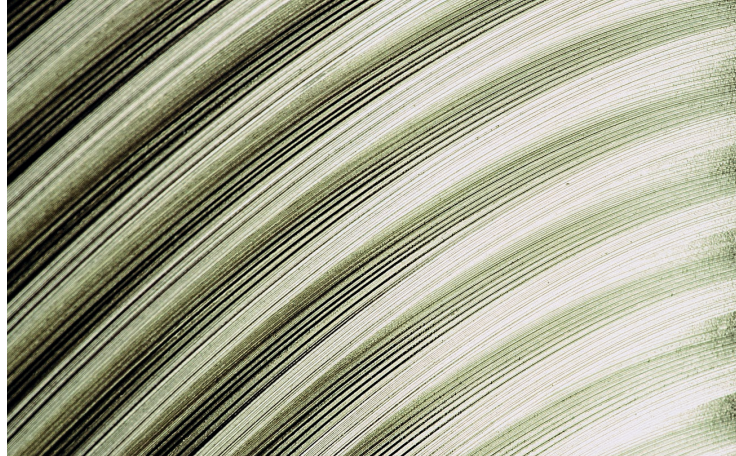
In addition to an individually chosen alloy and customized production, the excellent surface quality of Aurubis copper strips provides the basis for a wide range of applications – even with greater material thicknesses.



## Quality assurance

Aurubis monitors and documents product quality using a quality management system. All rolling mills are certified in accordance with IATF 16949 and/or EN ISO 9001:2015.

# Tin-plated solutions



## Properties and applications

In order to meet the high demands the automotive, electrical and electronics industries place on connectors and stamped grids – such as low insertion forces, good corrosion resistance and good solderability – the strip used often requires surface treatments. Three main processes are used for coating: hot-dip tinning, electroplating and electroplating with a subsequent reflow treatment.

In electroplating, strips of copper and copper alloys can be coated with various 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	0.8 – 1.5 µm	Low insertion force
	1.0 – 3.0 µm	Low insertion force, corrosion protection
	2.0 – 4.0 µm 3.0 – 6.0 µm	Good corrosion protection
	4.0 – 8.0 µm 5.0 – 10.0 µm	Good solderability
	10.0 – 16.0 µm	Special applications

In-house production

Aurubis operates two hot-dip tinning and one 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.

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 – closing the loop

## 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 an international sales network: operating globally – acting locally

## Sustainability – Tomorrow Metals by Aurubis:

### Our biggest impact on having less impact

- › Tomorrow Metals is our Aurubis promise to stay best in class in all sustainability challenges of today and the future through our metals.
- › We are committed to constantly delivering more value with a lower environmental footprint. Therefore, our understanding of sustainability covers the key areas of business, the environment, and people.
- › Our mission: We responsibly transform raw materials into metals for an innovative and sustainable world.



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





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## Metals for progress

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