

# Copper in Top Shape

Aurubis SHAPES offers specialized products for optimal coverage of all customer needs. The dimensions and material specifications of our continuous-cast products are individually tailored according to processing and usage requirements.

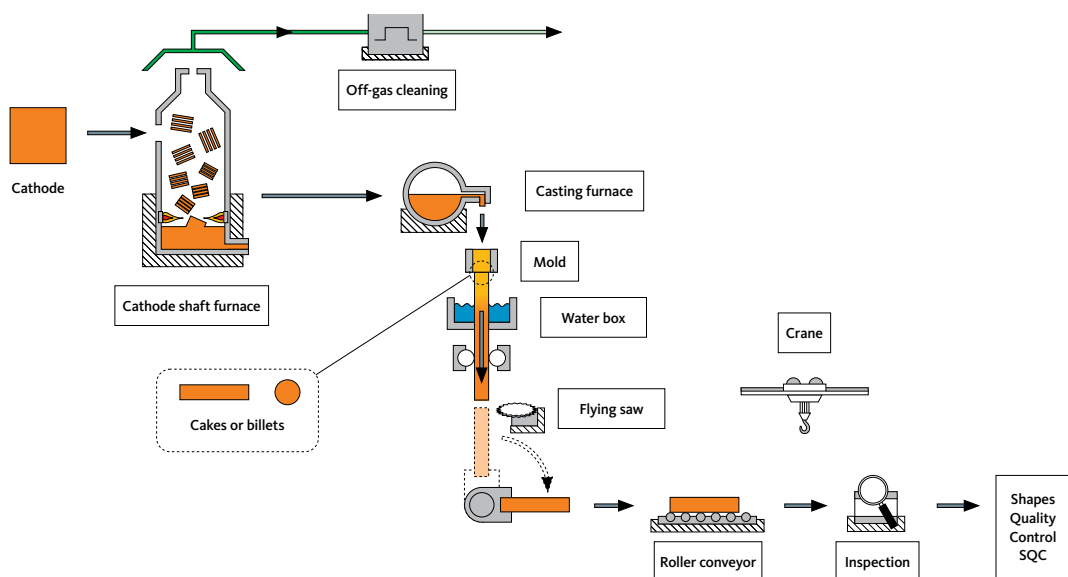
## Production process for Aurubis SHAPES

A variety of copper input materials are first melted down in a stringently monitored process. Depending on the requirements, alloying elements are added to adjust the desired chemical composition and the copper is then cast continuously as an endless bar. Once it has reached the desired length, the shape is cut off by a flying saw and moves on to quality control. Aurubis SHAPES are the dependable basis for the manufacture of high-quality strip, sheet, and foil for all applications.

You will also find the perfect starting product for high-performance industrial pipes, complex profiles, forged products, or anode molds.

## Supply security and flexibility

Aurubis SHAPES benefit from the advantages of an integrated copper group with its own cathode production. A secure supply of high-quality Grade A cathodes guarantees that we can fulfill our customer's strictest requirements. This includes our ability to react flexibly to customers' requests for specific dimensions and material compositions.



Oxygen-bearing copper															
Aurubis name	Standard				Chemical analysis							Physical properties			
	DIN EN 1976 Code	Number	UNS No.	US Standard ASTM	Copper in % min.	Oxygen in % min.	Oxygen in % max.	Silver in % min.	Silver in % max.	Phosphorus in % min.	Phosphorus in % max.	Conductivity in MS/m	Conductivity in % IACS	Recrystallization temperature in °C	Hydrogen-resistant
NO58	Cu-ETP	CR004A	C11000	B5	99.90 (Cu+Ag)	-	0.04	-	-	-	-	≥ 58.0	≥ 100	approx. 180	no
NORG	Cu-ETP1	CR003A	C11000	B5	99.99 (incl. O)	-	0.04	-	0.003	-	-	≥ 58.6	≥ 101	approx. 180	no
NORV	Cu-ETP1	CR003A	C11000	B5	99.99 (incl. O)	-	0.04	-	0.003	-	-	≥ 58.6	≥ 101	approx. 170	no
NOSV	Cu-ETP1	CR003A	C11000	B5	99.99 (incl. O)	-	0.04	-	0.003	-	-	≥ 58.6	≥ 101	(RRR* ≥ 400)	no
NG10 (NO58+Ag)	CuAg0.10	CR013A	C11600	B152	99.97 (Cu+Ag+O)	-	0.04	0.08	0.12	-	-	≥ 58.0	≥ 100	approx. 320	no
Oxygen-free copper															
OF01	Cu-OFE	CR009A	C10100	B170	99.99	-	≤ 0.0003	-	0.003	-	0.0003	≥ 58.6	≥ 101	approx. 200	yes
OF02	Cu-OF	CR008A	C10200	B170	99.95 (Cu+Ag)	-	0.001	-	-	-	-	≥ 58.0	≥ 100	approx. 210	yes
OS10 (OF02+Ag)	CuAg0.10 (OF)	CR019A	C10700	B152	99.99 (Cu+Ag+O)	-	0.001	0.08	0.12	-	-	≥ 58.0	≥ 100	-	yes
Phosphorus deoxidized copper															
BEEL	Cu-PHCE	CR022A	C10300**	B379	99.99	-	-	-	0.003	0.001	0.006	≥ 58.0	≥ 100	approx. 230	yes
BEAL	Cu-HCP	CR021A	C10300**	B379	99.95 (Cu+Ag)	-	-	-	-	0.002	0.007	57.0 – 57.9	98.3 – 99.8	approx. 260	yes
BES7	Cu-HCP	CR021A	C10300**	B379	99.95 (Cu+Ag)	-	-	-	-	0.002	0.007	≥ 57.0	≥ 98.3	approx. 260	yes
BE58	Cu-PHC	CR020A	C10300**	B379	99.95 (Cu+Ag)	-	-	-	-	0.001	0.006	≥ 58.0	≥ 100	approx. 230	yes
BG10 (BE57+Ag)	CuAg0.10P	CR016A	C10700**	B152	99.97 (Cu+Ag+P)	-	-	0.08	0.12	0.001	0.007	≥ 57.0	≥ 98.3	approx. 320	yes
Phosphorus-bearing copper															
DLP	Cu-DLP	CR023A	C12000**	B379	99.90 (Cu+Ag)	-	-	-	-	0.005	0.013	(54.0 – 57.0)***	(93.1 – 98.3)***	approx. 280	yes
DHP	Cu-DHP	CR024A	C12200	B379	99.90 (Cu+Ag)	-	-	-	-	0.015	0.040	(44.4 – 52.7)***	(76.6 – 90.9)***	approx. 290	yes

\* RRR: residual resistivity ratio, ratio of electrical resistivity at 300 K to electrical resistivity at 4 K  
 \*\* deviates from standard  
 \*\*\* reference value

## Quality

To ensure that our copper materials are produced at a consistently high level and fulfill demanding quality standards, all of the relevant parameters of our casting process are strictly monitored with the help of computers, documented, and used to assess product quality in detail. The Shapes Quality Control department is responsible for analyzing the quality of our shapes using our integrated Quality Management System, which is aligned with DIN ISO 9001ff.

Using sample sections, our products are tested to determine their chemical, physical, and technological properties according to fixed guidelines. Our copper products are only released for dispatch once we are satisfied that they fulfill all specifications entirely.

## Technical service

- » Laboratory with facilities for extensive analysis
- » Metallographic testing methods and scanning electron microscopy/EDX analysis
- » Support from our experienced engineers
- » Joint projects with our customers to optimize the overall production chain
- » Joint training programs with our customers' employees

## High-performance alloys (HPAs)

Aurubis name	Standards				Chemical analysis		
	Symbol	Standard	Number	UNS No.	Alloying element	in % min.	in % max.
LCR1	CuCr1	-	-	C18200*	Cr	0.5	1.2
LCZ1	CuCr1Zr	EN 12420	CR106C	C18150*	Cr Zr	0.5 0.03	1.2 0.3
LZR1	CuZr	DIN 17666	2,1580	C15100*	Zr	0.1	0.3
LFE1	CuFe0.1P*	ASTMB465	-	C19210*	Fe P	0.08 0.025	0.12 0.04
LS15	CuSn0.15	EN 1758	CR117C	C14410	Sn	0.1	0.15

\* deviates from standard

Additional materials upon request.



### Billets

Format	Diameter		Weight/length *	
	inches	mm	lb/inch	kg/m
B150	6	150	8.8	157
B175	6 ¾	175	12.0	214
B196	7 ½	196	15.1	269
B199	7 ¾	199	15.5	277
B203	8	203	16.2	288
B217	8 ½	217	18.5	330
B229	9	229	20.6	367
B234	9 ½	234	21.5	383
B248	9 ¾	248	24.1	430
B254	10	254	25.3	451
B273	10 ¾	273	29.2	522
B280	11	280	30.8	549
B298	11 ¾	298	34.8	621
B305	12	305	36.5	651
B312	12 ¾	312	38.2	681
B325	12 ¾	325	41.7	744
B332	13	332	43.2	771
B347	13 ¾	347	47.2	843
B356	14	356	49.7	887
B368	14 ½	368	53.1	948
B410	16 ½	410	66.0	1,176
B500	19 ¾	500	98.1	1,749

\* Reference value at a density of 8.91 g/cm<sup>3</sup>

Lengths: 19.29 – 350.39 in (490 – 8,900 mm)  
 Length tolerance: ± 0.39 in (± 10 mm)  
 Diameter tolerances: ≤ 5.91 in (≤ 150 mm) ± 0.04 in (± 1 mm)  
 5.91 – 11.02 in (150 – 280 mm) ± 0.08 in (± 2 mm)  
 > 11.02 in (> 280 mm) ± 0.12 in (± 3 mm)



### Cakes

Format	Width		Thickness		Weight/length *	
	inches	mm	inches	mm	lb/inch	kg/m
C416	15.94	405	6.30	160	32.4	577
C602	25.00	635	8.27	210	66.6	1,188
C698	27.17	690	7.09	180	62.0	1,107
C635	27.17	690	13.19	335	115.5	2,060
C732	28.35	720	12.60	320	115.1	2,053
C775	29.53	750	6.89	175	65.6	1,169
C726	29.53	750	10.24	260	97.4	1,737
C826	32.87	835	10.24	260	108.5	1,934
C978	37.52	953	7.01	178	84.7	1,511
C929	37.52	953	11.42	290	138.1	2,462
C020	40.55	1,030	8.07	205	105.5	1,881
C026	40.55	1,030	10.24	260	133.8	2,386
C129	48.43	1,230	11.42	290	178.2	3,178
C232	50.39	1,280	12.60	320	204.6	3,650

\* Reference value at a density of 8.91 g/cm<sup>3</sup>

Lengths: 23.6 – 350.39 in (600 – 8,900 mm)  
 Length tolerance: ± 0.79 in (± 20 mm)  
 Width and thickness tolerances: ≤ 7.87 in (≤ 200 mm) ± 0.24 in (± 6 mm)  
 > 7.87 in (> 200 mm) ± 3%

Additional dimensions can be delivered upon request.

## Metals for Progress



### Contact for Aurubis SHAPES

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