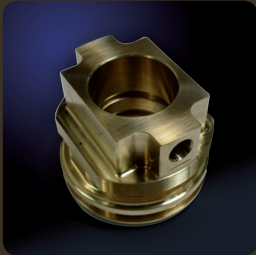




lebronze alloys



Copper alloy machined parts
for Aerospace Industry



Leading the Aerospace industry for 50 years

For more than 50 years, Le Bronze Industriel has been the international reference for special copper alloys dedicated to the Aerospace industry.

When it comes to civil or defense applications, to OEM's or MRO's, our group Lebronze alloys is providing major actors with a full range of high mechanical alloys complying with all international standards.

We can adapt to your needs by offering semi-finished products (rods, hollows), blank parts and fully machined components, leading to significant cost reduction.

In 45 countries, the group has become a leading solution developer to all major aircrafts, helicopters and space launchers, and now holds the largest number of approvals for copper alloys in the Aerospace industry.

From casting to machining

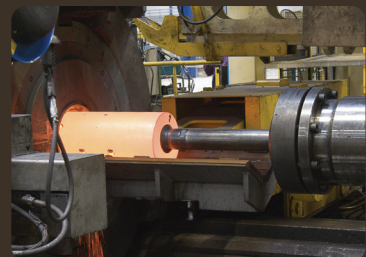
Thanks to a fully integrated process, from raw material melting to machining including surface treatments, Lebronze alloys offers products adapted to your needs (proof machined blanks and fully machined components).

This advantage guarantees complete traceability and leads to significant cost reduction.

The group recently invested in a number of brand new CNC lathes in order to comply with the highest aeronautical requirements.

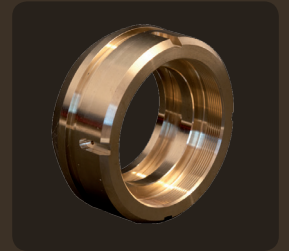
Multiple technical solutions to manufacture your components

- Continuous or semi-continuous casting
- Centrifugal casting
- Extrusion
- Forging
- Machining



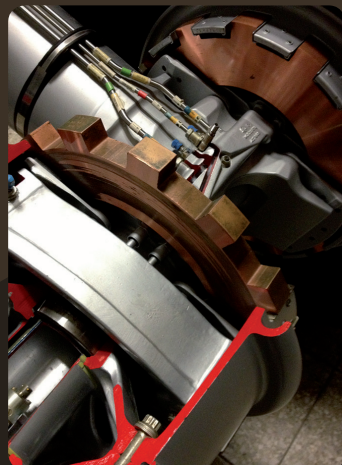
A global range of products

- Discs up to 600 mm dia
- Rings (from 10 mm to 600 mm OD) and blank bushings
- Bearing cages
- Proof machined bushings close to finished dimensions
- Fully machined parts including NDT's and surface treatments according to NADCAP requirements
- Round bars from 10 to 400 mm OD
- Hollow bars from 50 mm OD
- Flats, squares and hexagons



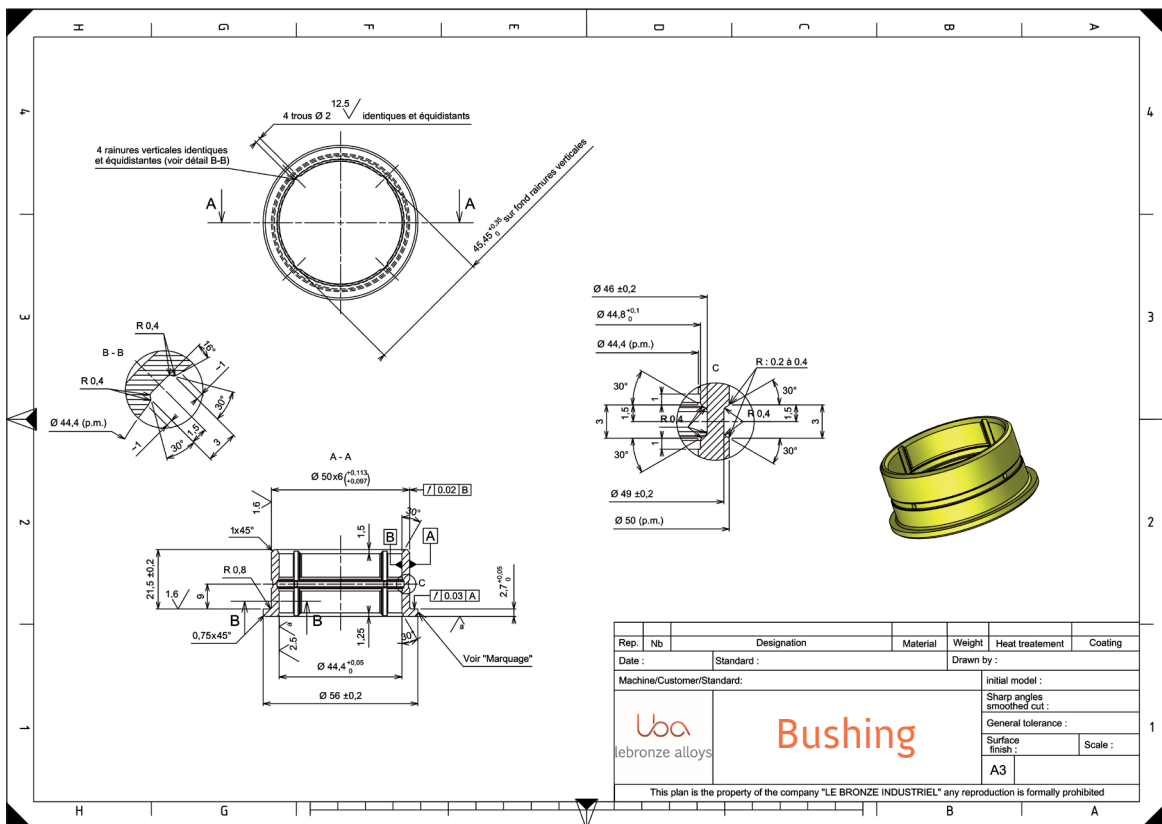
Applications

- Landing gears
- Wheels and brakes
- Hydraulic and actuation systems
- Bearings
- Parts for doors and hatches
- Wing flaps
- Cargo loading systems



Customer benefits

- Substantial cost reduction thanks to the recycling of turnings in our own foundry (60% to 90% weight saving)
- Fixed prices over long-term periods
- Reduction of the number of suppliers
- Reduction of product references (solids and hollows substituted with machined parts)
- Reduction of stocks
- Reduction of global lead times
- Technical support provided through direct contact with metallurgists
- Complete integration of fabrication process which then ensures a perfect control over the quality of the finished product
- Positive impact on environment
- We support our customers thanks to our specialized engineering department and qualified TOP SOLID technicians



Our approvals and references

Approvals

ISO9001:2008 / EN9100:2009. Airbus, Aircelle, Agusta Westland, BAE Systems, Bombardier, Embraer, Messier-Dowty PRIDE, MHI, SKF, UK, Spirit Aerosystems.

References

AAR, Airbus, Alenia Aerospace, ATR, AVIC, Bombardier, British Aerospace, Dassault Aviation, Embraer, Eurocopter, HAL, Héroux Devtek, IAI, Liebherr, Luftansa Technik, Messier-Bugatti-Dowty, MHI, NMB Minebea, MOOG, Premium Aerotec, Revima, SABCA, SKF, SNR-NTN, Snecma, Thalès, Turbomeca, UTC, Zodiac.

Alloy	Standards	Nominal composition %	Physical properties							Size and condition	Mechanical properties							
			Density	Electrical conductivity % IACS	Electrical resistivity at 20°C, μΩ·cm	Thermal conductivity 20° to 200°C, W/mk	Coefficient of expansion 20° to 200°C, x 10 ⁻⁶ K ⁻¹	Relative magnetic permeability	Young's modulus kN/mm ²		Tensile strength		Yield strength 0.2% offset ^{a)} 0.5% E.U.L. ^{b)}		Elongation 5,65 %S	Hardness		
											Mpa ≥ ; * = Mpa ≤	ksi ≥ ; * = Mpa ≤	Mpa ≥	ksi ≥		% ≥	HB	HRB
CBE2 CuBe2	ASTM B196: C 17200 AMS 4533 : C17200 AMS 4535 : C17200 RWMA class 4 QQC 530 DIN 17666, DIN 17672 wn 2.1247 NFL 14709 EN 12163 CW 101C	Cu: remainder Be: 1,9 Co: 0,3	8,3	28	6	110	17	1,01	130	discs 200 ≤ Ø ≤ 400 mm 7,9 in. ≤ Ø ≤ 15,7 in.	1050	152	850	123	2	≥320		
										plate 25 ≤ thickness ≤ 250 1 in. ≤ thickness ≤ 10 in.	1140	165	965	140	2	≥340		
										rods 19,05 ≤ Ø ≤ 50,8 mm 0,75 in. ≤ Ø < 2 in. TER condition	1240	180	1061	154	3	≥360		37-45
										rods 50,8 ≤ Ø ≤ 76,2 mm 2 in. ≤ Ø ≤ 3 in. TER condition	1210	175	1040	151	4	≥360		37-45
										rods 19,05 ≤ Ø ≤ 150 mm 0,75 in. ≤ Ø ≤ 5,9 in. TR condition	1150	167	965	140	4	≥340		36-42
										rods 19,05 ≤ Ø ≤ 150 mm 0,75 in. ≤ Ø ≤ 5,9 in. T condition	570	83			35	≤150	≤85	
NS5 CuNi2Si	DIN 17666 wn 2.0855 DIN 17672 w 2.0855 DIN 44759 dA3.2 NFL 14.701 ISO 1187 EN 12163, EN 12167, EN 12420, EN 12165 CW111C DTD 498	Cu: remainder Ni: 2,3 Si: 0,6	8,8	38	4,5	180	16	1,01	130	Rings TR condition	1050	152	850	123	2	≥320		
										section ≤ 1000 mm ² - ≤ 1,55 in. TER temper	650	94	590	86	10	≥195		
										1000 < section ≤ 2800 mm ² - 1,55 in. ² < section ≤ 4,3 in. ² TR temper	650	94	500	72	10	≥195		
										2800 < section ≤ 60 000 mm ² - 4,3 in. ² < section ≤ 93 in. ² TR temper	590	86	440	64	8	≥190		
										section > 60 000 mm ² - section > 93 in. ² TR temper	490	71	340	49	8	≥160		
K5 CuNi14Al	NFL14702	Cu: remainder Ni: 14 Al: 3	8,6	9	19	30	17	≤1,01	145	section ≤ 2000 mm ² - ≤ 3,10 in ²	780	113	590	86	10	≥215		
										2000 mm ² < section ≤ 11000 mm ² - 3,10 in ² < section ≤ 17 in ²	740	107	540	78	7	≥205		
										section > 11000 mm ² - section > 17 in ²	720	104	500	72	7	≥200		
K7 CuNi14Al	LN 9468 WL 2,1504-1	Cu: remainder Ni: 14,5 Al: 2,5 Fe: 1	8,6	9	19	30	17	≤1,01	145	section ≤ 180 mm ² - ≤ 0,3 in ²	830	120	690	100	10	≥240		
										180 mm ² < section ≤ 2000 mm ² - 0,3 in ² < section ≤ 3,1 in ²	780	113	640	93	10	≥230		
										2000 mm ² < section ≤ 13000 mm ² - 3,10 in ² < section ≤ 20 in ²	780	113	590	86	10	≥225		
										as manufactured temper M	690	100	320	46	13	≥180		
NC4 CuAl10Ni5Fe4	ASTM B124- B150- B171: C63000 SAE J 463 CA 630 AMS 4640: C63000 DIN 17665, wn 2.0966 DIN 17672, wn 2.0966 NFL 14705 ISO 428 et 1338 NFA 51 116 EN 12420, EN 12163, EN 12165, EN 12167 CW307G	Cu: remainder Al: 10 Ni: 5 Fe: 4 Mn: 0,5	7,6	8	22	40	16	1,5	125	rods 12,7 ≤ Ø ≤ 25,4 mm - 0,5 in. ≤ Ø ≤ 1 in. HR50 temper	760	110	469(1)	68(1)	10	201 to 248		
										rods 25,4 < Ø ≤ 50,8 mm - 1 in. < Ø ≤ 2 in. HR50 temper	760	110	413(1)	60(1)	10	201 to 248		
										rods 50,8 < Ø ≤ 76,2 mm - 2 in. < Ø ≤ 3 in. HR50 temper	723	105	379(1)	55(1)	10	187 to 241		
										Rods 76,2 < Ø ≤ 254 mm - 3 in. < Ø ≤ 10 in. HR50, TQ50 temper	689	100	345(1)	50(1)	10	187 to 241		
										tubes Ø ≥ 50 mm - 2 in., Thickness ≥ 10 mm - ≥ 0,4 in. HR50, TQ50 temper	689	95	345(1)	50(1)	10	190		
										nominal thickness ≤ 1 in.	896	130	655	95	3	≥28		
AMS 4881	AMS 4881 ASTM B271 C95520	Cu: remainder Al: 11 Ni: 5 Fe: 5	7,5	8	22	40	16	1,5	125	nominal thickness > 1 in. separatly cast specimen	896	130	655	95	3	≥28		
										nominal thickness > 1 in. specimen from any area of casting	860	125	621	90	2	≥28		
										nominal thickness ≤ 1 in.	724	105	431	62,5	9			
AMS 4880	AMS 4880 C95510	Cu: remainder Al: 10 Ni: 5 Fe: 3	7,6	8	22	40	16	1,3	125	nominal thickness > 1 in. separatly cast specimen	724	105	431	62,5	9			
										nominal thickness > 1 in. specimen from any area of casting	655	95	345	50	8			
										nominal thickness ≤ 1 in.	724	105	431	62,5	9			
CA104 CuAl10Ni5Fe4	BS B23, BS 2874 DTD 197	Cu: remainder Al: 10 Ni: 5 Fe: 4,5 Mn: 0,5	7,6	8	22	40	16	1,5	125	rods 16 ≤ Ø ≤ 18 mm	700	102	400	58	15	190		
										rods 18 < Ø ≤ 80 mm	700	94	370	54	12	190		
										rods Ø > 80 mm	650	94	320	46	15	190		
										tubes 50 ≤ Ø ≤ 80, Thickness ≥ 10 mm	700	94	370	54	12	190		
										tubes, rings, discs Ø > 80 mm, thickness ≥ 10 mm	650	94	320	46	12	190		
NCS CuAl11Ni5Fe5	NFA 51-116 NFL 14-706 DIN 17665 WN 20978 DIN 17672 WN 20978 EN 12167, EN 12163, EN 12420 CW308G	Cu: remainder Al: 11 Ni: 5 Fe: 5	7,5	8	22	40	16	1,5	125	19 ≤ Ø ≤ 25,4 - 0,75 in. ≤ Ø ≤ 1 in.	931	135	689	100	6	255		
										25,4 < Ø ≤ 50,8 - 1 in. < Ø ≤ 2 in.	896	130	655	95	6	255		
AMS4590	AMS 4590 ASTM B150 : C63020	Cu: remainder Al: 11 Ni: 5 Fe: 5	7,5	8	22	40	16	1,5	125	50,8 < Ø ≤ 101,6 - 2 in. < Ø ≤ 4 in.	896	130	621	90	6	255		
										19 ≤ Ø ≤ 25,4 - 0,75 in. ≤ Ø ≤ 1 in.	931	135	689	100	6	255		
										25,4 < Ø ≤ 50,8 - 1 in. < Ø ≤ 2 in.	896	130	655	95	6	255		
VNC CuAl10Mn7Fe2		Cu: remainder Al: 9 Mn: 7 Fe: 2,5	7,5				16	120		690	320		13	≥170				
S145Z CuSi3Fe2Zn3	AMS4616	Cu: remainder Si: 3 Zn: 3 Fe: 1,5	8,6	8	21,5	30	17,5		110	cold worked temper H	540	78	340	49	12	≥150		
										as manufactured temper M	390	57	140	20	30	≥90		
ZA4 CuZn23Al4MnFeNi	NFL14708	Cu: remainder Zn: 23 Al: 5 Mn: 2,5 Fe: 2	7,8	9	18	40	17	1,2	105		590	86	270	39	15	≥170		
ZA9 CuZn19Al6MnFe	NFL 14707	Cu: remainder Zn: 18 Al: 7 Mn: 5,5 Fe: 3,5	7,6	6	28	35	17	1,2	110	section ≤ 2000 mm ² - section ≤ 3,1 in. ²	830	120	590	86	10	≥225		
										section > 2000 mm ² - section > 3,1 in. ²	780	113	540	78	7	≥225		
											780	113	540	78	7	≥225		
LBU CuZn39Pb2	NFL14710 NFA 51-105 EN 12164 CW612N ISO 426 DIN 17660 WN 20402	Cu: remainder Zn: 39 Pb: 2 Sn: 0,5	8,4	11	15	17			100		380	120		20	≥90			
										section ≤ 2000 mm ² - section ≤ 3,1 in. ² 1/2 hard tempe	400	250		20	≥115			
										section > 2000 mm ² - section > 3,1 in. ² 1/2 hard temper	380	170		15	≥105			
BE10 CuSn8,5P	DIN17662 WN 21030 EN 12163 CW453K NFL14703 ISO427 DTD 265 A QOB 750 D BS 2874 PB 104 SAE J 461 CA 521	Cu: remainder Sn: 8 P: 0,2	8,8	11	15	67	18		115	section ≤ 25000 mm ² - section ≤ 38,75 in. ²	400	58	175	25	60	≥80		
										1/2 hard temper	440	64	220	32	30	≥110		
										hard temper	490	71	320	46	10	≥135		

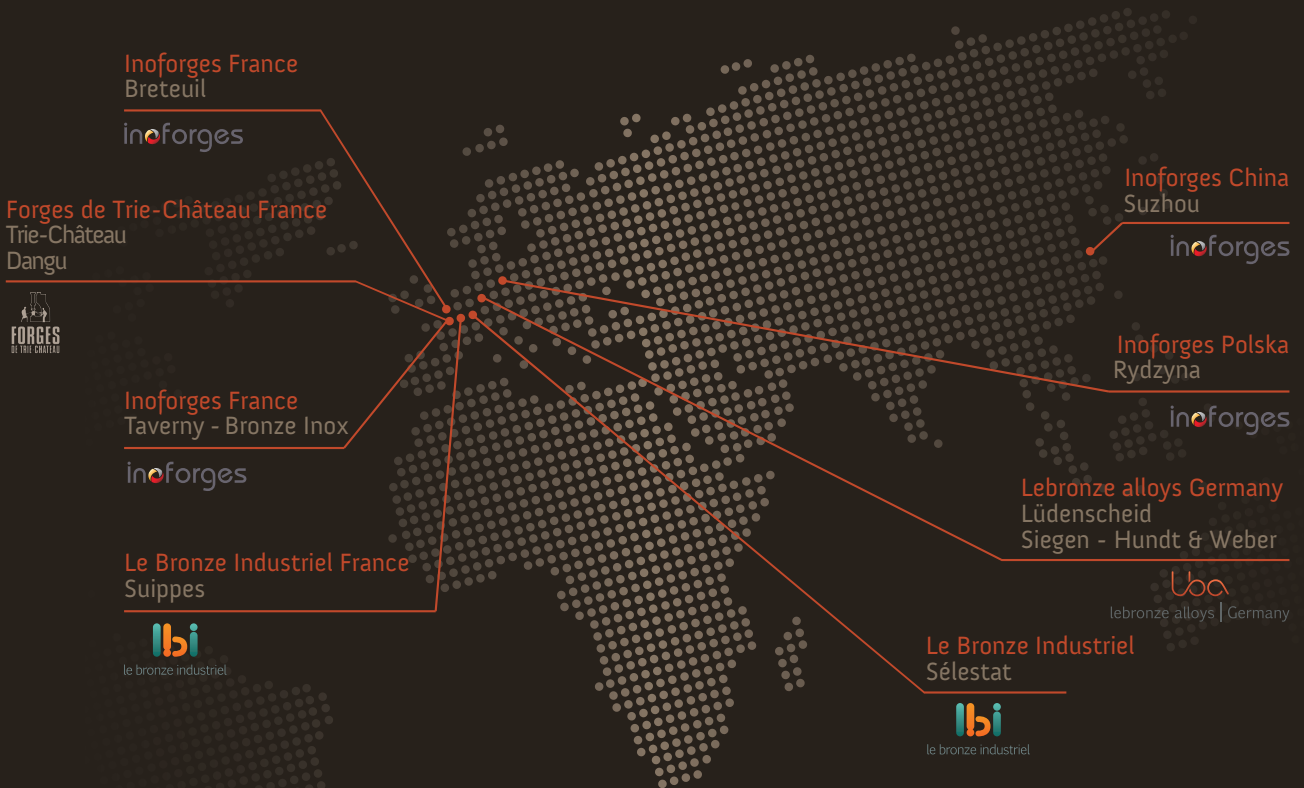


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Lebronze alloys group was born from the integration of different companies specializing mainly in copper alloys but also aluminium alloys and speciality steels.

Thanks to a multidisciplinary know-how, the group is today at the heart of heavy industries such as Aerospace, Oil & Gas, Power, Railway but also in sectors manufacturing smaller equipment and products.

Our 10 complementary facilities all offer industrial technologies (foundry, extrusion, forging, hot stamping, wire drawing, machining, centrifugal casting). The group's commitment is to find appropriate and optimized solutions for every sector's requirements.



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