

## Alloys and standards

Alloy	Standards Nearest international standards	Nominal composition %	Physical properties							Remarks	Mechanical properties							
			Density	Electrical conductivity %IACS	Electrical resistivity at 20°C μΩcm	Thermal conductivity 20° to 200°C W/mK	Coefficient of expansion 20° to 200° c x 10 <sup>-6</sup> K <sup>-1</sup>	Relative magnetic permeability	Young's modulus KN/mm <sup>2</sup>		Tensile strength		Yield strength 0.2% offset or 0.5% E.U.L. <sup>(1)</sup>	Elongation 5.65 %S	Hardness		Impact strength KCU <sup>(1)</sup> or IZOD <sup>(2)</sup>	
											Mpa ≥ ; * = Mpa ≤	Ksi ≥ ; * = Mpa ≤			Mpa ≥	Ksi ≥		% ≥
<b>CB4</b> CuCO2Be	BS 2874 CC 112 DIN 17666 wn 2.1285 DIN 17672- DIN 44759 ISO 1187- NFA 82100 ASTM B441- B534- B 870- C 17500 MIL 46087- RWMA class 3 SAE CA 184	Cu: remainder Co: 2,2 Be: 0,5	8,9	≥ 43	≤ 4	200	17,5	1,01	130	section < 1000 mm <sup>2</sup> - < 1,550 in. <sup>2</sup> TR or TER condition	700	101	650	94	10	240		
									section ≥ 1000 mm <sup>2</sup> - ≥ 1,550 in. <sup>2</sup> TR condition	700	101	550	80	10	220			
<b>NS5</b> CuNi2Si	DIN 17666 wn 2.0855 DIN 17672 w 2.0855 DIN 44759 el A3.2 NFL 14-701 ISO 1187 EN 12163, EN 12167, EN 12420, EN 12165 CW111C DTD 498- RWMA class 3	Cu: remainder Fe: 2,3 Si: 0,6	8,8	38	4,5	180	16	1,01	130	section ≤ 1000 mm <sup>2</sup> - ≤ 1,55 in. TER temper	650	94	590	86	10	≥ 195		
									1000 < section ≤ 2800 mm <sup>2</sup> - 1,55 in. <sup>2</sup> < section ≤ 4,3 in. <sup>2</sup> TR temper	650	94	500	72	10	≥ 195			
									2800 < section ≤ 60 000 mm <sup>2</sup> - 4,3 in. <sup>2</sup> < section ≤ 93 in. <sup>2</sup> TR temper	590	86	440	64	8	≥ 190			
									section > 60 000 mm <sup>2</sup> - section > 93 in. <sup>2</sup> TR temper	490	71	340	49	8	≥ 160			

## There is no substitute for experience

Thanks to a multidisciplinary know-how in copper alloys, le Bronze Industriel is at the heart of wide industrial technologies, such as aerospace, shipbuilding, oil & gas, automotive, power, transport and metallurgy.

Located for 40 years in the heart of Champagne region, a brand new factory of 20 000 m<sup>2</sup> was inaugurated in 2004. The same year, a major investment was carried out with the introduction of a new extrusion press rated at 5400 tons, this was installed to satisfy an ever increasing demand in the international markets that we serve.

75% of our copper alloys production is exported towards 45 countries.

We offer a complete range of semi-finished products (round bars, hollow bars, flat bars, polygons, plates).

With a task force of 300 people, including 60 for machining, Le Bronze is also supporting its customers in the conception and fabrication of any kind of parts.



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2011 - Conception - réalisation : Bol d'Air / www.bol-d-air.net - Crédits photos : Jean-Marie Proneau (Axing)



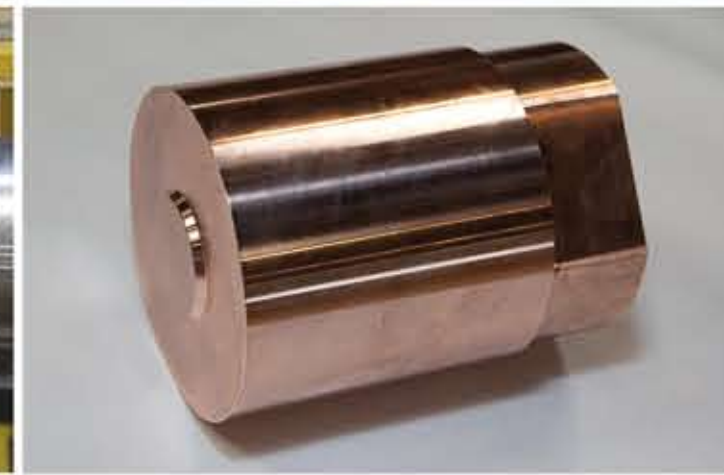
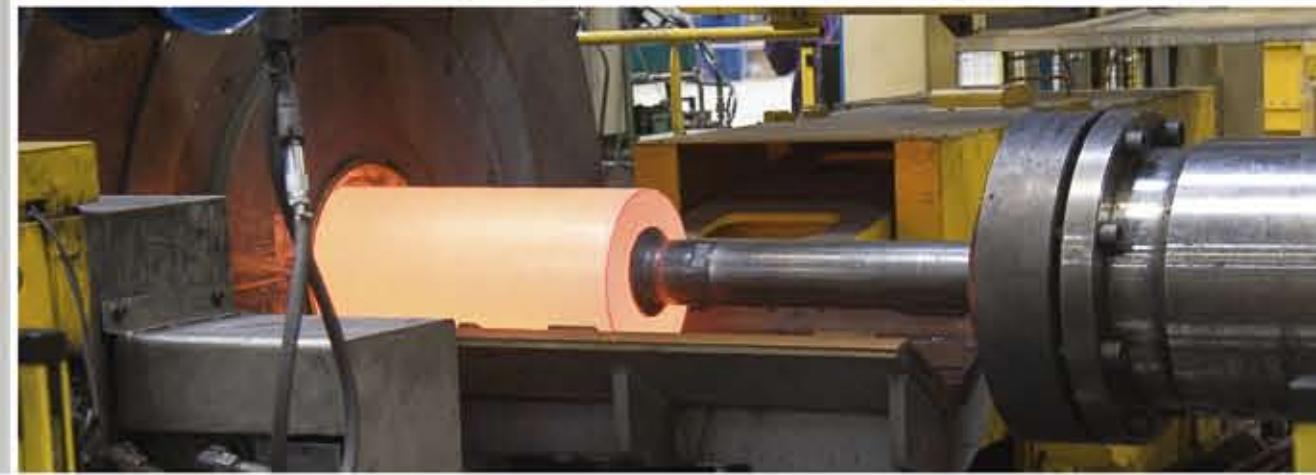
le bronze industriel

Pistons



## Applications

Aluminium or magnesium pressure die casting foundries



## Pistons production

Regarding pistons for aluminium pressure die casting, we produce both Nickel and Beryllium copper alloys.

Material is either extruded or forged by ourselves in order to achieve the best possible mechanical properties for the alloy. Heat treatment and machining are carried out in house in our dedicated production cell.

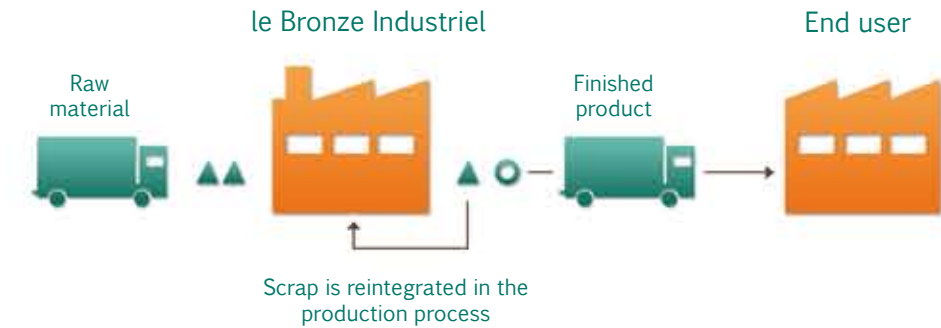
We manufacture pistons according to customer drawings ranging from 30mm (1.18") diameter to 300 mm (11.8") diameter, larger diameters can be accommodated if necessary.

Additionally for those not wanting to take delivery of fully finished pistons we also offer to manufacture and supply pre-machined blanks or hollow bars.

## From casting to machining

One of Le Bronze Industriel major strengths relies in its fully integrated production process, from casting thru to machining. This uniqueness guarantees complete traceability and thus a perfect control of quality.

Le Bronze Industriel offers you a faster and easier ordering process (logistic, lead time, administrative and costs):



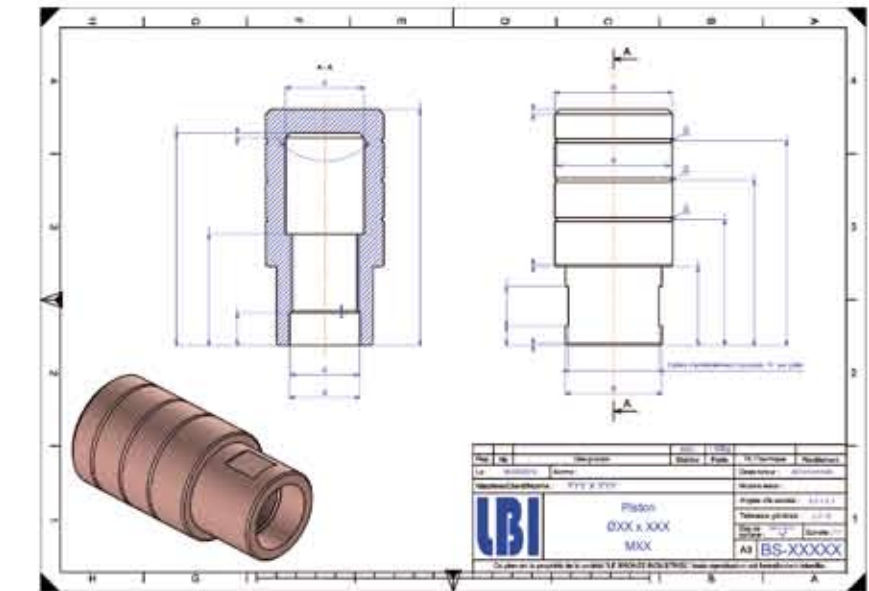
## Customer's benefit

✓ A much longer life span of extruded pistons compared to non extruded pistons



- ✓ Competitive prices thanks to a completely integrated manufacturing process
- ✓ Possibility to stock pistons for our customers and to deliver upon request
- ✓ Recycling your used pistons thus reducing your costs and both our carbon footprints

✓ We support our customers thanks to our specialized engineering department and qualified TOP SOLID technicians



## Our approvals



Our quality control system complies with the criteria established by:  
ISO 9001 : 2008 (AFAQ)

## Our references

Many companies in France, Germany, Italy, Belgium and United Kingdom are using Le Bronze Industriel components.

We deliver pistons to car builders as well as Tier 1 suppliers and our pistons are also used with success in Marine, Civil Work or Electrical industries.