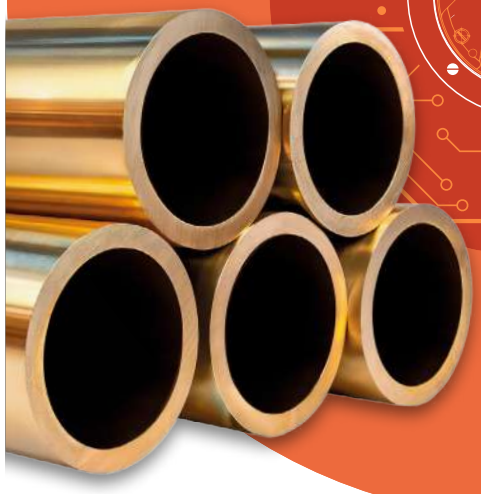
PRODUCT
CATALOG
Bars &
Hollows Bars

24

lebronze alloys



About Lebronze alloys

Lebronze alloys is a world leader in the **development** and **fully integrated production** of **high-performance copper and nickel alloys**.

Thanks to a multidisciplinary know-how, the Group provides **innovative solutions to all major industries** such as Aeronautics, Electronics, Space, Automotive, Energy, among others.

Our 6 production facilities and 730 employees manage a **unique range of metal processing technologies:** continuous and semi-continuous casting, extrusion, hot and cold rolling, drawing, open-die forging, hot stamping, closed-die forging, cold forming, machining, non-destructive testing, etc.

The Group's commitment is to find appropriate and **optimized solutions for every sector's requirements while optimizing the environmental impact of our products.**

High performance copper and nickel alloys

Fully integrated production process

Optimized environmental impact of our products

KEY FIGURES

- **6 production sites**
- **4 service centers**
- **730 employees**
- **200 + alloys produced**
- **239 M€ turnover**

History of the Group

2006

The DUMONT family, some private investors as well as some key managers, take over "Le Bronze Industriel", a company founded in France in 1934 specializing in copper alloys production.
This change of ownerships, with Michel DUMONT as active Chairman, marked a **new period of strategic growth for the company.**

2012-2016

Period of massive external growth for the company. Several major acquisitions are made such as Inoforges, Swissmetal Lüdenscheid and CLAL. These acquisitions consolidated our metallurgical expertise through a sharing of experience.

2016

Le Bronze Industriel officially becomes Lebronze alloys. It has been 10 years since the buyout and the Group has now tripled its sales.

2020

Opening of our first service center in Europe at Aldridge (UK). This service center joins an already well-established network of distributor partners around the globe and enables us to provide a greater responsiveness to our customers' needs.

2022

Marks the end of a 2-years industrial repositioning allowing the Group to focus on high added value materials.

2023-2024

The Group counts over 730 employees, 6 production sites and 4 service centers around the world and generates 239 M€ of sales.
Over the last two years, the Group has strengthened its distribution network by opening **two new service centers:** Lebronze alloys SE (Services Europe) in Breteuil, France, and Lebronze alloys NA in Bristol, USA.

Our worldwide footprint

- *Production plants*
- *Service centers*

LBA NA
USA
10 FTEs

LBA UK
England
13 FTEs

Lüdenscheid
Germany
120 FTEs

Rydzyna
Poland
42 FTEs

Dongguan
China
52 FTEs

LBA India
India
2 FTEs

LBA Asia
China
5 FTEs

Bornel
France
155 FTEs

Breteuil
France
85 FTEs

LBA SE
France
8 FTEs

Suippes
France
223 FTEs

Paris
Corporate headquarters

Product range at a glance

Lebronze alloys offers **more than 200 copper-based and nickel-based alloys** with unique properties which meet the most complex requirements. We supply these alloys in different forms:

Billets

Bars

Hollow bars

Strips

Sheets

Rods

Wires

Standard & complex profiles

Plates

Welding electrodes

Marine tubes & fitting

Machined blanks and parts

A fully integrated production process

One of the Group's major strengths relies in its **fully integrated production process,** from smelting to machining and recycling.

This particularity guarantees a traceability, optimization and strict control of the final properties of our materials so they can suit to the most stringent requirements.

Melting & Casting

- Continuous wire casting
- Continuous bar casting
- Semi-continuous casting

Hot forming

- Extrusion
- Hot rolling
- Free forging
- Hot stamping

Cold forming

- Cold rolling
- Drawing straightening
- Cold stamping
- Heat treatments

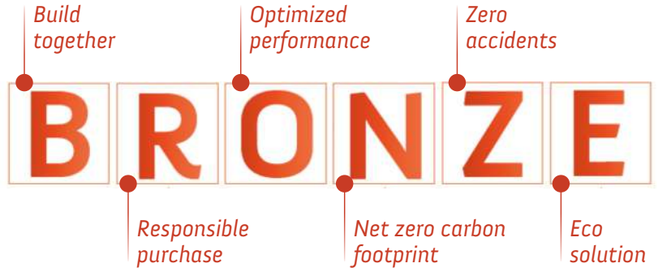
Finishing

- Machining
- Servicing
- Scrap recovery

Our sustainable development policy

To ensure the sustainability of our business, it is essential to strike the **right balance between economic performance, social impact and environmental impact.**

This balance within the Group is structured around our **6 "Bronze"** pillars. Each pillar is broken down into actions and indicators that enable us to be part of a dynamic of continuous progress and sustainability.



Build together: this pillar covers social initiatives that have a positive impact on gender, sex and age equality, as well as projects that improve the well-being of our teams at work.

Responsible purchase: purchases represent more than 50% of Group sales. It is therefore essential that we implement a responsible purchasing policy and tighten up our requirements of our suppliers.

Optimized performance: the Company's economic, industrial and environmental performance is a key factor in meeting the expectations of our relevant stakeholders.

Net zero carbon footprint: taking into account the major challenge of decarbonation, we have decided to make this a specific pillar and to build a path that meets the transformation of the Climate Act and the Paris Agreement.

Zero accidents: our processes require constant vigilance. We are taking actions to anticipate and reduce the risk of accidents as far as possible.

Eco solution: by working in collaboration with our customers and bringing innovations to the market, we are contributing to a more sustainable approach by improving the life cycle of products.

Quality

Lebronze alloys develops for all its activities a formally recognized quality management system which allows to:

- guarantee the traceability of our products, from raw material to the product delivered
- certify our products properties
- control our delivery times

Our state-of-the-art quality-check equipment include:

- **Metallurgical tests** such as traction, resilience, hardness, bending and others
- **Non destructive tests** such as Magnetic Particle Inspection (MPI), ultrasonic contact testing, liquid penetrant Inspection and others
- **Metrology, geometry and surface tests** such as surface metrology, global DEA, profile projectors and others

Our certifications

All our certificates can be consulted on our website

Aerospace certifications

afaq EN/AS/JISQ 9100 Aéronautique AFNOR CERTIFICATION

Certified site: Suippes

Nadcap Administered by PRI ACCREDITED

Heat treating

UKAS MANAGEMENT SYSTEMS 9963 — auva AS 9120 CERTIFIED

Certified service center: Lebronze alloys UK

General certifications

afaq ISO 9001 Qualité AFNOR CERTIFICATION

Certified sites: Bornel, Breteuil, Lüdenscheid, Suippes, Rydzyna.

afaq ISO 14001 Environnement AFNOR CERTIFICATION

Certified sites: Breteuil, Suippes, Rydzyna.

afaq ISO 45001 Santé Sécurité au Travail AFNOR CERTIFICATION

Certified sites: Bornel

afaq ISO 50001 Énergie AFNOR CERTIFICATION

Certified sites: Lüdenscheid, Breteuil and Suippes.

Hardiall® CuNiSn alloys
Copper Nickel Tin alloys
Superior strength and hardness

Hardiall® is a **proprietary range of spinodal alloys** composed of copper, nickel and tin. These alloys are designed for **high strength applications** and are characterized by **high yield and tensile strength** and **superior hardness.** Hardiall® is widely used in the Aerospace, Automotive, Industrial, Off-highway mining and Oil & Gas sectors. These amagnetic alloys present excellent wear resistance and high performance in harsh environments.

Hardiall® is a direct replacement to beryllium copper (CuBe2) and leaded beryllium copper (CuBe2Pb).

We provide Hardiall® as bars, hollow bars and plates, to be processed into relatively complex components.

PRODUCT PORTFOLIO

Alloy	ISO	UNS	Other designations	Aerospace specifications
Hardiall®	CuNi15Sn8	C72900	CW355H	AMS 4596 AMS 4597 AMS 4598
Hardiall® Eco	CuNi9Sn6	C72700	NA	NA

STANDARD CAPABILITY*

Round Bars	Other Bars**	Hollow bars	Plates
ALL DIMENSIONS	ALL DIMENSIONS	ALL DIMENSIONS	ALL DIMENSIONS

**Other shapes on request*
***Depending on alloy, square / flat / rectangular / hexagonal bars*

ESG Performance

We aim to offer our Customers products with the leading grade of environmental footprint.
To achieve this, we make major investments in innovative processes aiming to optimize energy and water consumption and increasing the use of recycled raw materials. More specifically, we have developed state-of-the-art recycling know-how based on specialized purchasers for sourcing end of life materials to be processed in our Group Upcycling Workshop. Another key aspect of our ESG strategy is to offer substitutes for alloys that are not REACH and RoHS compliant.

Our Hardiall® alloys are:
- REACH and RoHS compliant
- On average produced with 94 % of recycled materials

REACH compliant
RoHS compliant

Markets and applications

Aerospace

- Bearings and bushings for landing gears, flight controls and attachments

Automotive

- Bearings and bushings for braking and steering systems
- Valve guides

Industrial

- Bearings, bushings, wear contact pads for heavy metallurgical equipment
- Gear drives worm wheels

Off-Highway Mining

- Linkage bearings and bushings
- Tri-cone reamer drill bits thrust washers

Oil & Gas

- Bearings and bushings for drilling components

HARDIALL®

$CuNi_{15}Sn_8$

29	28	50
63.546	58.6934	118.71
Cu	Ni	Sn
copper	nickel	tin

Hardiall® is a spinodally hardened copper-nickel-tin ($CuNi_{15}Sn_8$) alloy designed for high strength applications. It is non-magnetic and resists mechanical wear, galling, stress relaxation, corrosion and erosion.

Hardiall® is a direct replacement to beryllium copper and leaded beryllium copper.

Bars and Hollow Bars | CuNiSn alloys | Hardiall®

MATERIAL DESIGNATION

ISO	UNS	Other designations	Aerospace specifications	Other standards
CuNi15Sn8	C72900	CW355H	AMS 4596, AMS 4597 AMS 4598	EN 12163, ASTM B929, NACE MR0175

CHEMICAL COMPOSITION (WEIGHT%)

Cu	Ni	Sn
Balance	15%	8%

PHYSICAL PROPERTIES

General properties		
Density at 20 °C (68 °F)	8.94 g/cm³	0.29 lb/in³
Thermal conductivity	38 W/m.°C	22 BTU/(h.ft.°F)
Coefficient of thermal expansion from 20 to 300 °C (68 °C to 572 °F)	16.4 x 10^{-6}/°C	9.11 µin/in °F
Young's modulus	130 GPa	18 855 ksi
Relative magnetic permeability	1.001	
Electrical properties		
Resistivity at 20 °C (68 °F)	23 µΩ.cm	138 Ω. circ mil/ft
Electrical conductivity	7.5 %IACS	

TYPICAL APPLICATIONS

Aerospace

Bushings and bearings in actuation systems for landing gears, primary and secondary flight controls, and attachments.

Automotive

Powertrain (valve guides, thrust washers, bearings, piston pins bushings). Bushings for braking and steering systems

Industrial

Bushings, bearings, wear contact pads in heavy metallurgical equipment. Gear drives worm wheels.

Off-highway mining

Linkage bushings and bearings, Tri-cone reamers drill bits thrust washers and bushings.

Oil and Gas

Bushings and bearings for drilling components, valves, wellhead controls, thrust washers, guide seals, and housings.

KEY FEATURES

High strength and hardness

Corrosion and erosion resistant

Non-magnetic and non-sparking

Excellent wear and galling resistance

No hydrogen embrittlement

High performance at both elevated and sub-zero temperatures -125 °C (-193 °F) up to 300 °C (572 °F)

COMPATIBLE DOWNSTREAM PROCESS

Extrusion, forging, or die stamping

Hot forming 750 to 900 °C

Cold forming

Arc, MIG and TIG welding

Machinability index: 200% of free-cutting steel

MECHANICAL PROPERTIES

Temper*	Minimal Yield Strength 0.2% MPa (ksi)	Minimal Tensile Strength MPa (ksi)	Minimal Elongation (%)	Minimal Hardness (HRC)	Size (mm)	Size (in.)
For other dimensions and shapes, mechanical properties on demand						
Bars - Wrought, solution heat treated and spinodal heat treated						
Hardiall® TX 90	620 / (90)	760 / (110)	15	23	15 ≤ Ø < 108 mm	0.60 ≤ Ø < 4.25 in.
	620 / (90)	760 / (110)	12	23	108 < Ø ≤ 170 mm	4.25 < Ø ≤ 6.7 in.
Hardiall® TX 105	724 / (105)	827 / (120)	10	27	15 ≤ Ø ≤ 127 mm	0.60 ≤ Ø ≤ 5 in.
	724 / (105)	827 / (120)	6	27	127 < Ø ≤ 170 mm	5 < Ø ≤ 6.7 in.
Hardiall® TX 110	760 / (110)	910 / (132)	10	30	15 ≤ Ø ≤ 108 mm	0.60 ≤ Ø ≤ 4.25 in.
	760 / (110)	876 / (127)	6	30	108 < Ø ≤ 170 mm	4.25 < Ø ≤ 6.7 in.
Bars - Wrought, solution heat treated, cold worked and spinodal heat treated						
Hardiall® TS 120U	755 / (110)	827 / (120)	15	24	19 ≤ Ø < 82 mm	3/4 ≤ Ø < 3.25 in.
Hardiall® TS 130	896 / (130)	965 / (140)	10	24	19 ≤ Ø < 82 mm	3/4 ≤ Ø < 3.25 in.
Hardiall® TS 160U	1069 / (155)	1137 / (165)	6	34	19 ≤ Ø < 40 mm	3/4 ≤ Ø < 1.57 in.
	1035 / (150)	1103 / (160)	3	34	40 ≤ Ø < 82 mm	1.57 ≤ Ø < 3.25 in.
Hollow bars - Wrought, solution heat treated and spinodal heat treated (length limited to 1000 mm / 39.37 in.) Thickness: 10 to 20 % of OD						
Hardiall® TX 110	760 / (110)	903 / (131)	8	30	50 ≤ OD < 217.4 mm	2 ≤ OD < 8.55 in.

**Figures following the tempers letters represent minimum yield or tensile strength*

OTHER AVAILABLE FORMS

Plates, billets, strips, sheets, rods, wires, standard & complex profiles

Disclaimer : Data for information only, non-contractual / Dimensions outside these ranges on request

HARDIALL® ECO

$CuNi_9Sn_6$

Cu copper | Ni nickel | Sn tin

Hardiall® Eco is a variant of the Hardiall® alloy with less nickel and tin but still a good balance for high strength applications. It is non-magnetic and resists mechanical wear, galling, stress relaxation, corrosion and erosion.

Hardiall® eco is a direct replacement to beryllium copper and leaded beryllium copper.

Bars and Hollow Bars | CuNiSn alloys | Hardiall®Eco

MATERIAL DESIGNATION

ISO	UNS	Other designations	Aerospace specifications	Other standards
CuNi9Sn6	C72700	NA	NA	NA

CHEMICAL COMPOSITION (WEIGHT%)

Cu	Ni	Sn
Balance	9%	6%

PHYSICAL PROPERTIES

General properties		
Density at 20 °C (68 °F)	8.9 g/cm³	0.32 lb/in³
Thermal conductivity	53.6 W/m.°C	32.6 BTU/(h.ft.°F)
Coefficient of thermal expansion from 20 to 300 °C (68 °C to 572 °F)	17.25 x 10^{-6}/°C	9.58 µin/in °F
Young's modulus	120 GPa	17 400 ksi
Relative magnetic permeability	< 1.01	
Electrical properties		
Resistivity at 20 °C (68 °F)	14.4 µΩ.cm	86.6 Ω. circ mil/ft
Electrical conductivity	12 %IACS	

TYPICAL APPLICATIONS

Construction and mining

Heavy vehicles excavators, continuous miners haul truck, shovel draglines, pivot bushings, bearings, thrust washers

Automotive

Racing Cars Powertrain (valve guides, thrust washers, bearings, piston pins)

Braking and Steering Systems (Brake caliper bushings, Steering bushings)

COMPATIBLE DOWNSTREAM PROCESS

Extrusion, forging, or die stamping

Hot forming

Cold forming

KEY FEATURES

High strength and hardness

Corrosion and erosion resistant

Non-magnetic

Excellent lubricity

Excellent wear and galling resistance

Non-sparking

No hydrogen embrittlement

High performance at both elevated and sub-zero temperatures -125 °C (-193 °F) up to 300 °C (572 °F)

MECHANICAL PROPERTIES

Size	Temper*	Yield Strength 0.2% MPa (ksi)	Tensile Strength MPa (ksi)	Elongation (%)	Hardness (HRC)
For other dimensions and shapes, mechanical properties on demand					
Bars					
Ø ≤ 108 mm (Ø ≤ 4.25 in.)	TX 105	≥ 724 (≥ 105)	827 (≥ 120)	≥ 6	≥ 27
108 < Ø ≤ 170 mm (4.25 < Ø ≤ 6.7 in.)	TX 100	≥ 689 (≥ 100)	≥ 790 (≥ 115)	≥ 5	≥ 25
Hollow bars Thickness 10 to 20% of OD					
50 ≤ OD ≤ 170 mm (2 ≤ OD ≤ 6.7 in.)	TX 105	≥ 724 (≥ 105)	≥ 827 (≥ 120)	≥ 6	≥ 27
170 < OD ≤ 203 mm (6.7 < OD ≤ 8 in.)	TX 100	≥ 689 (≥ 100)	≥ 790 (≥ 115)	≥ 5	≥ 27

**Figures following the tempers letters represent minimum yield or tensile strength.*
TX: wrought, solution heat treated and spinodal heat treated

OTHER AVAILABLE FORMS

Plates, billets, strips, sheets, rods, wires, standard & complex profiles, machined blanks and parts

Disclaimer : Data for information only, non-contractual / Dimensions outside these ranges on request

lebronze alloys

Métallurgie d'exception

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