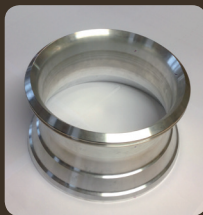


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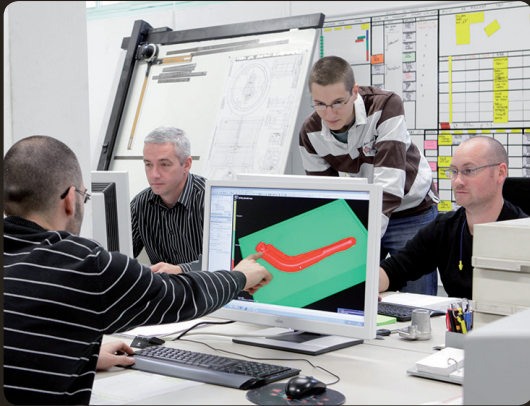


Experts in processing  
aluminium

# Experts in processing aluminium

Thanks to its recognized know-how of more than 50 years, Lebronze alloys is today a major player in the aluminium industry.

The combination of the Group's various production facilities, allows us to offer a full range of aluminium alloys that are processed by either: open die-forging, hot-stamping, ring rolling, machining and all required heat treatments.



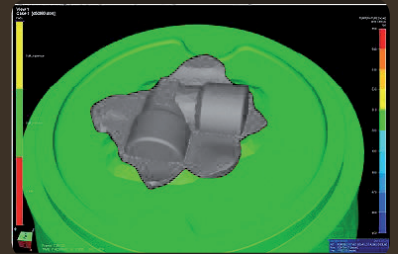
## From product development to the delivery of final ready to assemble parts.

Our engineering office and workshops are available to support you in your research and development programmes where a high level of technical expertise is needed. We are able to perform a wide variety of mechanical tests and metallurgical analysis (preparation, micrography).

The mastering of CAD advanced tools and digital simulation

software such as Forge® allows us to perform reliability analysis whilst supporting you, not only in finding solutions but also in the detailed conception of new products.

By supporting you in the early stages; including the analysis of your specifications, we have the possibility, if necessary, to propose alternatives to existing solutions that meet both your costs and quality objectives.



## Many applications

- Aerospace (aircraft structural blocks, hot-rolled rings for engine parts),
- Defense and Armament (forged blanks with a high wrought ratio level),
- Road transport / Railway / Automotive (structural parts, braking system components, sound attenuators, suspension wishbones, ...),
- Gas & Fluids (gas regulation, breathing equipment,..),
- Power and Electricity (contactors, switches),
- Building (safety parts, mechanical components).

## Our production capacities



Lebronze alloys Group has additional capacities allowing to design and realize all kinds of parts in aluminium in a particularly large dimensional ranging from a few centimetres to several meters.

The Group capacities are in particular :

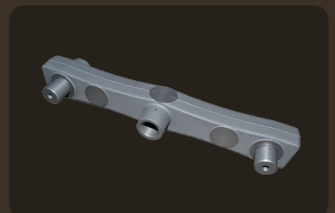
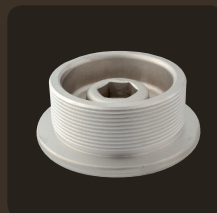
- 1 open-die forging press with a 2750 tons capacity, enable to produce parts with a particularly high wrought ratio level (rates over 6),
- More than 30 presses dedicated to hot-stamping and closed-die forging of volume parts,
- 1 ring rolling mill to manufacture rings up to 2500 mm external diameter,
- More than 150 machining centres allowing to supply ready-to-use parts,
- Varied and numerous heat treatment furnaces,
- Control and measurement equipment.

We can also develop components by forging two different types of materials simultaneously, which enables a combined benefit of both alloys properties, always taking in consideration their compatibility, for example aluminium and brass or aluminium and steel. Our forged parts are ideal for their weight, resistance and precision.

## For each application, a suitable alloy

We work with all the alloys in the series, each one is according to your specific needs. Each series enables us to reach specific characteristics and properties for each application.

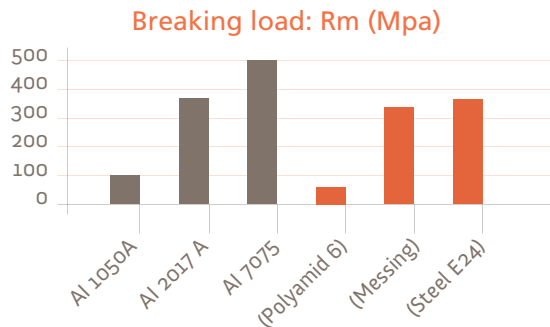
- Series 1000 : mechanical parts with sulphuric anodizing (electrical, chemical and food components..),
- Series 2000 : various components for industries such as Aerospace, Defense and Armament (easy machining),
- Series 5000 : Shipbuilding applications and building components such as bodies, chassis...
- Series 6000 : electrical applications, Automotive, Shipbuilding, Defense and Armament, (corrosion resistance, easy forging),
- Series 7000 : Sports, Defense, Armament and Aerospace (good hardness, easy machining)



# Forged aluminium – The performance.

## ▶ Mechanical strength

Some aluminium alloy characteristics approach or surpass the strength of commonly used steels.



## ▶ Light weight

Aluminium weighs about 35% as compared to steel by volume.

## ▶ Toughness

Aluminium has good toughness properties measured by K1C testing.

## ▶ Corrosion resistance

Aluminium offers a good stress corrosion resistance and exfoliation corrosion (preventing the propagation of cracks), an essential requirement for the aerospace industry. Its natural oxide coating blocks certain kinds of aggression and the risk of galvanic corrosion can be minimized by protective measures such as anodization

## ▶ Electrical conductivity

Aluminium's excellent electrical conductivity makes it the lightest conductor. It is thus used in many electrical applications, even for high voltage lines.

## ▶ Thermal conductivity

Aluminium has a very good thermal conductivity. It is an excellent material for heat exchangers, radiators etc..

## ▶ Cold resistance

Aluminium has higher strength and ductility at subzero temperatures and is often used for cryogenic applications.

## ▶ Recyclability

Recycling aluminium is easy, economic (substantial scrap value) and provides environmental benefits. Aluminium has a well-established market for recycling.

## ▶ Savings

Material savings on implementation and time savings on production, the forged part being very close geometrically to finished parts, additional work/machining is limited.

## ▶ Joining

Aluminium can be joined easily by all common methods in order to produce functional sub-assemblies : welding, crimping, folding...

## ▶ Appearance

Visual appearance and high-performance as requested by designers and consumers.

# Alloys

Mechanical test values of 2014, 2219, 2618, 6061, 7050, 7075/7175 are according to aerospace standard AMS 22771.

Alloy class	Designation (NF EN 573)	Heat treatment (NF EN 515)	Thickness standard (mm)	Yield strength R <sub>P0,2</sub> (MPa)	Ultimate tensile strength R <sub>m</sub> (MPa)	Elongation A <sub>5</sub> (%)	Toughness K <sub>1C</sub> (MPa·√m)	Anodizing	Hardness (HB)	Conductivity (MS/m)	Corrosion resistance	
Serie 1000	EN AW 1050	H...		80	100 -145	6		Sulf.	35	34,5	Good	
Serie 2000	EN AW 2014	T6 T652	<50	386	450	8	19	(delicate)	125		Good	
	EN AW 2017	T4 T451		221	379	12		Sulf.	110	19,7		
	EN AW 2024	T4		324	469	10	26	(delicate)				
	EN AW 2124	T851		441	483	8	26					
	EN AW 2219	T852 T81	<100	344	427	6	36					
		T6	<100	275	400	6			100			
EN AW 2618	T61	<50	324	400	6			115				
Serie 5000	EN AW 5754	H24		80	180	14		Sulf. / Chr.			Very good	
	EN AW 5083	H111		110	275	12						
	EN AW 5086	H112		207	290	12			80	18		
Serie 6000	EN AW 6060	T6	<20	160	215	12		Sulf. / Chr.			Excellent	
	EN AW 6061	T6	<100	241	262	10	29		80			
	EN AW 6082	T6	20-150	270	310	8		Sulf. / Elec.	90	26,3		
Serie 7000	EN AW 7010	T74	100 -125	420	486	7	27	Sulf.		> 23,2	Very good stress corrosion resistance	
	EN AW 7020	T6		280	350	10		Sulf.				
	EN AW 7050	T7452	50-75	427	496	9	28	Sulf.	135	> 23,2		
	EN AW 7075	T6 T73	50 -75	420	503	7		Chr. dure	135			
		T6	50-75	420	503	9		Sulf.	135			
	EN AW 7475	T6	50-75	420	503	9		Sulf.	135			
T 73 T7352		<75	386	455	7		Sulf.	> 23,2				
	T 74	<75	434	503	9		Sulf.		> 23,2			

The figures given in the table are standard values.



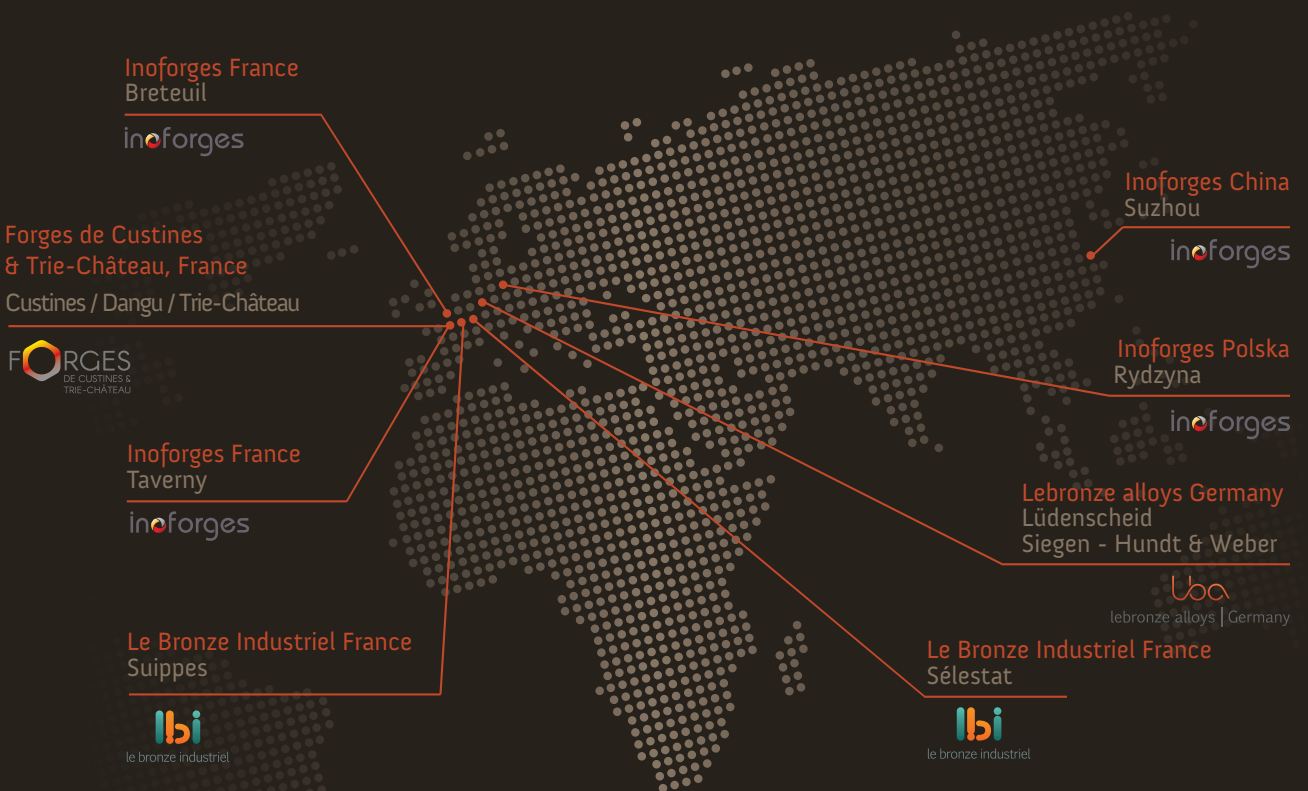
# lebronze alloys

Lebronze alloys Group was born from the integration of different companies specializing in copper alloys, aluminium alloys, special steels and superalloys.

Thanks to a multidisciplinary know-how, the Group provides innovative solutions to all major industries such as Aerospace, Oil & Gas, Power, Railway but also in sectors manufacturing smaller equipment and products.

Our 12 production facilities and 1,150 employees manage a unique range of metal processing technologies: continuous and semi-continuous casting, sand casting, die precision chill casting (manual, semi automated and automated), centrifugal casting, extrusion, ring rolling, 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.



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