



**HARDIALL®  
KEY FEATURES & BENEFITS**

- High strength & hardness
- Low friction
- Excellent lubricity
- Corrosion & erosion resistant
- Excellent wear resistance
- Excellent machinability
- Excellent galling resistance
- Pitting & spalling resistance
- No hydrogen embrittlement
- Non-magnetic
- High performance at both elevated and sub-zero temperatures -193°F up to 572°F
- Dimensional stability



Hardiall® is a wrought, spinodally hardened copper alloy CuNi15Sn8 (C72900) designed for high strength applications where toughness is required. It is non-magnetic and resists mechanical wear, galling, stress relaxation, corrosion and erosion.

It is easily machined into complex components and is environmentally friendly being both lead and beryllium free.

Hardiall® is used within the oil & gas industry thanks to its outstanding physical and mechanical properties in many varied components. Lebronze alloys has developed a full range of Hardiall® products to match the stringent demands of the oil & gas industry.

**Lebronze alloys' manufacturing process for Hardiall® is fully integrated:** *internal processes include casting, hot and cold working stage, heat treatment and non-destructive testing. Being fully integrated ensures reactivity and complete traceability.*

**Hardiall® Properties and Benefits**

HARDIALL® PHYSICAL PROPERTIES		
Electrical Conductivity at 20°C (68°F)	7.5	% IACS
Thermal Conductivity at 20°C to 200°C (68°F to 392°F)	38 (22)	W/m/°C (Btu/ft/hr/°F)
Coefficient of Thermal Expansion at 20°C to 200°C (68°F to 392°F)	16.4 x10 <sup>-6</sup> (9.1 x 10 <sup>-6</sup> )	Per °C (Per °F)
Density	8.95 (0.323)	g/cm <sup>3</sup> (lb/in <sup>3</sup> )

**Hardiall® Key Applications in Oil & Gas**

**Couplings for onshore production systems**

Hardiall® is used in bushings and bearings for drilling components. For such applications, Hardiall® demonstrates outstanding wear, corrosion, temperature and pressure resistance, thus providing a longer service life and a better total cost of ownership (TCO) compared to beryllium copper, as well as some nickel or cobalt based alloys. Hardiall® can be used in both offshore and onshore systems and in vertical or directional drilling products.

**Couplings for onshore production systems**

Hardiall® is also used in onshore oil pumps for sucker rod and valve rod guide bushing couplings. In such applications, where stainless steel is generally used, Hardiall® demonstrates excellent resistance to metal-to-metal wear, providing a reduction of failures.

For these applications Lebronze alloys' integrated supply chain can propose ready-to-use products.

## Hardiall® Products Portfolio

Hardiall® is available in various tempers and grades offering different mechanical properties. The following table indicates Hardiall® products available for the oil & gas industry.

MECHANICAL PROPERTIES OF HARDIALL® ALLOYS*						
LBA Designation	Minimal Yield Strength 0.2% Offset (MPa)	Minimal UTS (MPa)	Minimal Elongation 4D (%)	Typical Hardness (HRC)	Available Forms	Available Sizes

### Wrought and spinodally hardened Hardiall® rods

Hardiall TX 90	620	760	15			
Hardiall TX 105	724	758	4			Contact us for more properties, customised products, size information and stock availabilities
	652	683	4			
Hardiall TX 110	760	910	10			
	760	875	6			

### Solution annealed, cold finished and spinodally hardened Hardiall® rods

Hardiall TS 95	655	730	18			Contact us for more properties, customised products, size information and stock availabilities
	655	725	18			
Hardiall TS 120U	755	825	15			
	755	825	15			
Hardiall TS 130	895	965	10			
Hardiall TS 160U	1035	1105	3			
	1020	1100	3			

### Wrought and spinodally hardened Hardiall® hollow bars/tubes (length limited to 1000mm) Wall thickness: 10 to 20% of Ø

Hardiall TX 105	724	758	4			Contact us for more properties, customised products, size information and stock availabilities
	652	683	4			
Hardiall TX 110	760	895	10			
	760	895	6			
	760	895	5			

\* Measurements made in laboratory conditions. Non contractual. TS 120U & TS 160U refer to UTS, other tempers refer to YS. All products can be ultrasonically tested at LBA upon customer request.

## Your trusted supply partner for premium quality metals and specialist plastics

### Righton Blackburns Service Centres

Operating a reliable and efficient delivery service from our 11 Service Centres nationwide, we offer in-house processing facilities. In addition to next day delivery from locally-held stock, we also provide non-standard or customer specific material.

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