ALLOY SPECIFICATION

CuSn12-C (CC483K) EN 1982

CuSn12 Bronze Bearings: A High-Strength Alloy for Demanding Applications

Bronze alloys are widely recognized for their exceptional mechanical properties, wear resistance, and versatility in demanding applications. Among these, **CuSn12 bronze** (also known as CC483K or C90700) stands out as a high-performance material, particularly for bearing applications. In this blog post, we'll explore the specifications, mechanical properties, international standards, and unique characteristics of CuSn12 bronze bearings, highlighting why this alloy is a trusted choice for engineers and manufacturers.

1. - Requirements

What is CuSn12 Bronze?

CuSn12 is a high-tin bronze alloy composed primarily of copper (Cu) and tin (Sn), with small amounts of other elements to enhance its properties.

Chemical Composition (%)												
	Cu	Ni	P	Pb	Sn	Al	Fe	Mn	S	Sb	Si	Zn
Min.	85,0	-	-	-	11,0	-	-	-	-	-	-	-
Max.	88,5	2,0	0,60	0,7	13,0	0,01	0,2	0,2	0,05	0,15	0,01	0,5

For continuous castings and centrifugal castings, the minimum tin content shall be 10,5 % and the maximum copper content shall be 89,0 %.

For continuous and centrifugal castings, the minimum tin content must be **10.5%**, and the maximum copper content must not exceed **89.0%**. The addition of tin (Sn) significantly enhances the alloy's strength and wear resistance, making it ideal for high-load applications.

Mechanical Properties of CuSn12 Bronze

CuSn12 bronze exhibits impressive mechanical properties, which vary slightly depending on the casting process used

Mechanical properties (Minimun values)				
Casting process and designation	Tensile strength R_m (MPa)	0,2% proof strength $R_{p0,2}$ (MPa)	Elongation 5D A (%)	HBW (10-1000)
Continuous(GC)	300	150	6	90
Centrifugal (GZ)	280	150	5	90

The mechanical property requirements given apply to sizes up to and including 300 mm external diameter. For larger continuous castings, the mechanical property requirements should be agreed between the supplier and the purchaser.

2. - Closest International standards International Standards for CuSn12 Bronze

CuSn12 bronze is recognized and standardized across various global markets. Here's a quick overview of its closest international equivalents:

Standard		Alloy	Status
Europe	BS 1400 DIN 1705 NFA-53707	PB2 CuSn12 UE12, CuSn12P	Withdrawn
USA	ASTM B505 ASTM B271	C90700 (SAE65)	Active
Australia	AS 1565	C90710	Active
Japan	JIS H5121 JIS H5120	CAC503C CAC503	Active
ISO	1338	CuSn12	Withdrawn

3. - Optional Heat Treatments

To further enhance the performance of CuSn12 bronze components, manufacturers can apply optional heat treatments at the client's request. These include:

• **Stress Relieving**: Reduces internal stresses caused by machining or casting, improving dimensional stability and fatigue resistance.
• **Phase Transformation**: Alters the microstructure of the alloy to optimize its mechanical properties for specific applications.

These treatments allow for customization based on the operational demands of the bearing, ensuring optimal performance in even the most challenging environments.

4. - Technical Characteristics of CuSn12 Bronze Bearings

CuSn12 bronze is renowned for its exceptional technical characteristics, which include:

• **High Strength and Hardness**: Ideal for applications involving high static and dynamic loads.
• **Wear and Fatigue Resistance**: Excellent resistance to wear, making it suitable for high-stress environments.
• **Self-Lubricating Properties**: The addition of lead (Pb) improves self-lubrication, reducing friction and wear in bearing applications.
• **Corrosion Resistance**: Highly resistant to corrosion, making it suitable for use in harsh environments.
• **High-Temperature Performance**: Suitable for working conditions up to **200°C (392°F)**, ensuring reliability in high-temperature environments.
• **Challenging Machinability**: Due to its high tin content, CuSn12 bronze is more challenging to machine, but the addition of lead (Pb) helps improve machinability.

5. - Applications of CuSn12 Bronze Bearings

Thanks to its unique properties, CuSn12 bronze is widely used in various industries, including:

- **Heavy Machinery**: Gears, bushings, and thrust washers.
- **Marine Engineering**: Propeller shafts, rudder bearings, and pump components.
- **Industrial Equipment**: High-load bearings and sliding surfaces.
- **Automotive**: Suspension components and engine parts.

6. - Conclusion

CuSn12 bronze (CC483K) is a high-strength alloy that delivers exceptional performance in demanding applications. Its excellent wear resistance, fatigue resistance, and self-lubricating properties make it a preferred choice for engineers and manufacturers worldwide. Whether you're designing heavy machinery, marine equipment, or industrial components, CuSn12 bronze offers the reliability and durability you need.

If you're considering CuSn12 bronze for your next project, consult with your supplier about optional heat treatments to maximize its potential. With the right approach, CuSn12 bronze bearings can deliver unmatched performance and longevity.

Have you used CuSn12 bronze in your projects? Share your experiences and insights in the comments below!