

Bearing Bronze Copper Alloy Material, Plain & Self-Lubricating Bushings



Tin Bronzes Material for Plain and Self-Lubricating Bushings

Symbol	Describe
CuSn5Zn5Pb5 Bearing Bronze Copper Alloy Material	Copper CuSn5Zn5Pb5, a base alloy of CuSn, is renowned for its exceptional properties, including toughness, wear resistance, corrosion resistance, and elasticity. These alloys require adequate lubrication to function effectively under high specific loads. The tin copper alloy is also referred to as red bronze or leaded gunmetal.
CuSn6 Bearing Bronze Copper Alloy Material	CuSn6 offers an outstanding blend of strength, cold workability, and hardness. It is characterized by its wear resistance, excellent corrosion resistance, and favorable welding characteristics. Owing to its high strength and elasticity, coupled with superior machining properties, it is employed in the fabrication of a wide array of springs and flexible metal tubing.
CuSn7Pb6Zn4 Bearing Bronze Copper Alloy Material	CuSn7Pb6Zn4, also referred to as red bronze or leaded gunmetal, is a type of tin-lead bronze. These alloys are characterized by their excellent machinability and maintain favorable thermal conductivity and lubricity because of the lead content. They exhibit a desirable balance between resistance and elongation. Additionally, these materials are semi-hard, offering resistance to wear, corrosion, and sea water. They are commonly used in a variety of applications.
CuSn8 Bearing Bronze Copper Alloy Material	Bronze alloys, including those that are phosphorous-enhanced such as CuSn8, exemplified by the specific designation C52100, commonly referred to as C521, are primarily composed of copper. Within their composition, they contain a range of 0.50 to 11.00 percent tin and a range of 0.01 to 0.35 percent phosphorus. The addition of tin to these alloys serves to enhance their resistance to corrosion as well as to augment the overall strength of the alloy. On the other hand, phosphorus is incorporated to improve the wear resistance and rigidity of the alloy. These particular bronze alloys are distinguished by their remarkable toughness and strength, coupled with a low coefficient of friction, which contributes to their smooth operation and durability. Additionally, they possess a fine grain structure, which further enhances their mechanical properties and makes them suitable for a variety of engineering applications where these characteristics are highly valued.
CuSn10 Bearing Bronze Copper Alloy Material	The CuSn10 alloy, based on copper and tin, is distinguished by its exceptional hardness, toughness, wear resistance, corrosion resistance, and elasticity. It requires adequate lubrication to function effectively under high specific loads. Given that welding is performed over a very short span and at elevated temperatures, it is crucial to prevent tension during both the welding and cooling phases.
CuSn12 Bearing Bronze Copper Alloy Material	Materials that possess excellent resistance to wear and tear, are resistant to corrosion, and can withstand the harsh conditions of saltwater environments are highly sought after in various industries. Among these materials, the CuSn12Ni2-C and CuSn11Pb2 alloys stand out due to their superior stability and enhanced wear resistance. These alloys have been specifically engineered to offer improved anti-friction properties, making them ideal for applications where durability and smooth operation are crucial. The CuSn12 alloy, also known by its designation C90800, is particularly noteworthy as it adheres to the Federal Law regarding the reduction of lead in drinking water. This compliance ensures that the alloy is safe for use in applications where it may come into contact with potable water, thereby safeguarding public health while maintaining high performance standards.
CuSn14 Bearing Bronze Copper Alloy Material	The CuSn14 alloy is renowned for its exceptional hardness and toughness, coupled with superior sliding properties and outstanding corrosion resistance. It endures significant forces, impacts, wear, abrasion, fatigue, and high temperatures, while also exhibiting resistance to high hydraulic pressures and possessing excellent anti-friction qualities. Additionally, it demonstrates relatively good resistance to cavitation and corrosion from seawater.

ALUMINUM BRONZES Plain & Self-Lubricating Bushings

Symbol	Describe
CuAl10Fe2 Bearing Bronze Copper Alloy Material	Aluminum bronzes, exemplified by CuAl10Fe2, offer exceptional hardness and corrosion resistance compared to other bronze alloys. They are particularly utilized in scenarios where corrosion resistance is paramount, such as in marine water environments. In the alloy CuAl10Fe2, also known as C95500, aluminum, iron, and nickel synergistically function as reinforcement agents, enhancing the overall properties of these materials.
CuAl10Ni5Fe5 Bearing Bronze Copper Alloy Material	Bronze nickel aluminum bronzes, including CuAl10Ni5Fe5, offer exceptional hardness and corrosion resistance compared to other bronze alloys. These materials are particularly valued in applications that demand high levels of corrosion resistance, such as in marine water environments. Among copper alloys, CuAl10Ni5Fe5 aluminum bronze stands out as the one with the highest strength.

LEAD BRONZES: Plain and Self-Lubricating Bushings

Symbol	Describe
CuSn10Pb10 Bearing Bronze Copper Alloy Material	Tin bronzes with a high lead content are characterized by their free-cutting properties and maintain excellent thermal conductivity and superior lubricity, attributes that are attributed to the lead content. Tin-lead bronzes, exemplified by CuSn10Pb10, are particularly well-suited for bearing applications where the lubrication threshold might be compromised.
CuSn7Pb15 Bearing Bronze Copper Alloy Material	The CuSn7Pb15 alloy contains lead in a range of 7 to 30 percent. High-lead tin bronzes are characterized by their excellent machinability and maintain favorable thermal conductivity and lubricity, attributes conferred by the lead content. These properties make them particularly suitable for bearing applications where the lubrication threshold might be compromised.
CuSn5Pb20 Bearing Bronze Copper Alloy Material	Alloys with a high lead content possess a malleable nature that enables them to envelop foreign matter, thereby safeguarding the wear surface of a coupling component, such as a shaft. These alloys exhibit outstanding performance in harsh environments where the presence of foreign matter, including dirt and other debris, is common.

Features	Applications
<p>Copper CuSn5Zn5Pb5 is a base alloy noted for its exceptional properties, including toughness, wear resistance, corrosion resistance, and elasticity. It requires good lubrication to function effectively under high specific loads. This tin copper alloy is also known as red bronze or leaded gunmetal.</p> <p>The closest international standards are BS 1400 LG2, ASTM B505 C83600, and CuSn5Zn5Pb (Rg5).</p> <p>It boasts excellent machinability and provides superior corrosion resistance. We maintain a stock of hollow bars, solid bars, and rectangular plates, and can supply other forms based on customer requests.</p>	<p>This product is intended for use in bushings and components subjected to moderate loads and speeds.</p> <p>Common applications include lubricated parts experiencing high loads, impacts, and couplings, as well as precision serrated components. It is suitable for use in crowns, gears, bearings, shirts, nuts, screws, worms, balance weights, friction rings, connecting rod bushings, presses, cranes, and more.</p>

Chemical composition												
%	Cu	Neither	P	Pb	Sn	Zn	Al	Fe	S	Sb	Others	Si
Min.	84	-	-	4	4	4	-	-	-	-	-	-
Max.	86	1	0,05	6	6	6	0,005	0,3	0,08	0,25	-	0,005

Chemical Composition in Accordance with ASTM B505

International Equivalences							
VIPLUS	ISO / EN	W Nr / DIN	UNS / CDA	SAE	BS	DIN / ISO	ASTM
TIN BRONZES	CuSn5Zn5Pb5	CC491K	C83600	40	LG2	1705-RG5	B-145-4A

Mechanical properties				
Tensile strength (MPa)	Elastic limit (MPa)	Elongation (%)	Brinell hardness (HB)	Observations
248	131	15	60	-

General Physical Properties	
Melting Point (Liquid)	1010 ° C
Melting Point (Solid)	854 ° C
Density	8.83 gm / cm at 20 ° C
Specific weight	8,83
Electric conductivity	0.087 MegaSiemens / cm at 20 ° C
Thermal conductivity	72 W / m at 20 ° C
Thermal expansion coefficient	7.3 · 10 ⁻⁶ per ° C (20 ° -200 ° C)
Specific heat capacity	377.1 J / kg at 293 ° C
Tension Elasticity Module	93100 Mpa
Magnetic Permeability *	1

Physical properties provided by CDA

Manufacturing Properties	
Welding	Excellent
Braised	Good
Oxyacetylene Welding	Not recommended
Gas arc welding	Not recommended
Coated Metal Arc Welding	Half
Machinability Classification	84

Manufacturing properties provided by CDA

Features	Applications
<p>CuSn6 alloy offers an exceptional blend of strength, cold workability, and hardness. It is characterized by its wear resistance, excellent corrosion resistance, and favorable welding characteristics.</p> <p>Thanks to its superior strength and elasticity, coupled with commendable machining properties, CuSn6 is utilized in the production of a wide array of springs and flexible metal tubing.</p> <p>We provide exceptionally tight tolerances concerning chemical composition, dimensional precision, and mechanical properties.</p> <p>Special attributes, including ultra-fine particle size or relief from thermal mechanical stress, enhance mechanical properties and offer increased strength and enhanced malleability.</p>	<p>Electrical: Miniaturized connectors, contact springs, relay springs, electric flex contact blades, terminals, switch components, fuse clips, electronic connectors, resistance cables, electromechanical spring components, electric flex contact sheets, wire brushes, switch components, electronic and precision instrument parts.</p> <p>Closures: Lock washers, cotter pins, fasteners.</p> <p>Industrial: Bourdon tube, bellows, textile machinery, perforated sheets, springs, sleeve bushings, clutch discs, beater bars, chemicals.</p> <p>General: Stamped parts, connectors, contact springs, spring elements, ultra-high force spring elements, membranes, switch elements, fixed contacts.</p>

Chemical composition												
%	Cu	Neither	P	Pb	Sn	Zn	Al	Fe	S	Sb	Others	Si
Min.	-	-	0,03	-	5	-	-	-	-	-	-	-
Max.	99,5	-	0,35	0,05	7	0,3	-	-	-	-	-	-

Chemical Composition in Accordance with ASTM B505

International Equivalences							
VIPLUS	ISO / EN	W Nr / DIN	UNS / CDA	SAE	BS	DIN / ISO	ASTM
TIN BRONZES	CuSn6	CC452K	C51900	-	PB103	1705-RG5	B-145-4A

Mechanical properties				
Tensile strength (MPa)	Elastic limit (MPa)	Elongation (%)	Brinell hardness (HB)	Observations
607	586	13	62	-

General Physical Properties	
Melting Point (Liquid)	1010 ° C
Melting Point (Solid)	930 ° C
Density	8.84 gm / cm at 20 ° C
Specific weight	8,84
Electric conductivity	0.09 MegaSiemens / cm at 20 ° C
Thermal conductivity	75 W / m at 20 ° C
Thermal expansion coefficient	1810 -6 per ° C (20 ° -200 ° C)
Specific heat capacity	377 J / kg at 293 ° C
Tension Elasticity Module	93100 Mpa
Magnetic Permeability *	1

Physical properties provided by CDA

Manufacturing Properties	
Welding	Excellent
Braised	Excellent
Oxyacetylene Welding	Half
Gas arc welding	Good
Coated Metal Arc Welding	Bad
Machinability Classification	20

Manufacturing properties provided by CDA

Features	Applications
<p>CuSn7Pb6Zn4, also known as red bronze or leaded gunmetal, is a type of tin lead bronze.</p> <p>In tin bronze alloys with a high lead content, the lead concentration ranges from 7.00% to 15.00%. These alloys are characterized by their excellent machinability and maintain favorable thermal conductivity and lubricity due to the presence of lead. The C93200 alloy, commonly referred to as C932 or SAE 660, is regarded as a versatile workhorse within its family and is extensively utilized in numerous bearing applications.</p> <p>The closest international standards are ASTM B505 for C93200 and DIN 1705 for RG7.</p> <p>This alloy exhibits a favorable balance between resistance and elongation properties. It is a semi-hard material with resistance to wear, corrosion, and sea water, making it</p>	<p>CuSn7Pb6Zn alloys are renowned for their exceptional anti-friction properties, superior pressure resistance, and resistance to corrosion, vibration, and shock. These alloys are particularly recommended in situations where lubrication is inadequate.</p> <p>Typical applications include: Bushings and Bearings subjected to high loads, Presses and mechanical shovels, Connecting Rod Bushings, Pumps, Motors, as well as in the Automotive and Railway Industries.</p>

Chemical composition												
%	Cu	Neither	P	Pb	Sn	Zn	Al	Fe	S	Sb	Others	Si
Min.	81	-	-	6	6,3	1	-	-	-	-	-	-
Max.	85	1	0,15	8	7,5	4	0,005	0,2	0,08	0,35	-	0,005

Chemical Composition in Accordance with ASTM B505

International Equivalences							
VIPLUS	ISO / EN	W Nr / DIN	UNS / CDA	SAE	BS	DIN / ISO	ASTM
TIN BRONZES	CuSn7Pb6Zn4	CC493K	C93200	660	LG4	1705-RG7	B-584-932

Mechanical properties				
Tensile strength (MPa)	Elastic limit (MPa)	Elongation (%)	Brinell hardness (HB)	Observations
241	138	10	65	-

Mechanical properties in accordance with ASTM B505

General Physical Properties	
Melting Point (Liquid)	977 ° C
Melting Point (Solid)	854 ° C
Density	8.91 gm / cm at 20 ° C
Specific weight	8,91
Electric conductivity	0.07 MegaSiemens / cm at 20 ° C
Thermal conductivity	58.2 W / m at 20 ° C
Thermal expansion coefficient	7.3 · 10 ⁻⁶ per ° C (20 ° -200 ° C)
Specific heat capacity	377.1 J / kg at 293 ° C
Tension Elasticity Module	100,000 Mpa
Magnetic Permeability *	1

Physical properties provided by CDA

Manufacturing Properties	
Welding	Excellent
Braised	Good
Oxyacetylene Welding	Not recommendable
Gas arc welding	Not recommendable
Coated Metal Arc Welding	Not recommendable
Machinability Classification	70

Manufacturing properties provided by CDA

Features	Applications
<p>Bronze alloys, including phosphorous-containing CuSn8, such as C52100, commonly referred to as C521, are composed of copper with a tin content ranging from 0.50 to 11.00% and a phosphorus content of 0.01 to 0.35%.</p> <p>The addition of tin enhances the alloy's corrosion resistance and strength, while phosphorus contributes to increased wear resistance and rigidity. These alloys are particularly distinguished by their durability, robustness, low coefficient of friction, and fine grain structure.</p> <p>CuSn8 is particularly suited for applications requiring high elasticity, strength, and wear resistance. Special characteristics, such as an extra-fine particle size or thermal-mechanical stress relief, further enhance the mechanical properties, offering superior strength and malleability.</p>	<p>Architecture: bridge support plates.</p> <p>Building: Thermostat</p> <p>Consumer: Bellows. Energy conductor for electrosurgical pencil.</p> <p>Electric: Miniaturized connectors, contact springs, Relais springs, electronic connectors, electrical connectors, cold head parts, electrical flex contact sheets, wire brushes, switch parts, fuse clips.</p> <p>Fasteners: cotter pins, fasteners, heavy duty, lock washers.</p> <p>Industrial: cold head parts, thrust bearings, reinforcement wire, pneumatic hammers, paper industry, pipe, drilling equipment, clutch discs, welding wire, diaphragms, mixer bar, bellows, springs, helical extension, helical torsion, clips, gears, pinions, textile machinery, perforated blades, chemical hardware, heavy duty, sleeve bushings.</p>

Chemical composition												
%	Cu	Neither	P	Pb	Sn	Zn	Al	Fe	S	Sb	Others	Si
Min.	-	-	0,03	-	7	-	-	-	-	-	-	-
Max.	99,5	-	0,35	0,05	9	0,2	-	0,1	-	-	-	-

Chemical composition according to ASTM B505

International Equivalences							
VIPLUS	ISO / EN	W Nr / DIN	UNS / CDA	SAE	BS	DIN / ISO	ASTM
TIN BRONZES	CuSn8	CW453K	C52100	J461	PB104	-	B139M

Mechanical properties				
Tensile strength (MPa)	Elastic limit (MPa)	Elongation (%)	Brinell hardness (HB)	Observations
415- 585	-	12-20	93	-

Mechanical properties as per ASTM B505

General Physical Properties	
Melting Point (Liquid)	1027 ° C
Melting Point (Solid)	882 ° C
Density	8.8 gm / cm at 20 ° C
Specific weight	8,8
Electric conductivity	0.076 MegaSiemens / cm at 20 ° C
Thermal conductivity	62.3 W / m at 20 ° C
Thermal expansion coefficient	7.4 · 10 ⁻⁶ per ° C (20 ° -200 ° C)
Specific heat capacity	377 J / kg at 293 ° C
Tension Elasticity Module	110310 Mpa
Magnetic Permeability *	41370 MPa

Physical properties provided by CDA

Manufacturing Properties	
Welding	Excellent
Braised	Excellent
Oxyacetylene Welding	Half
Gas arc welding	Good
Coated Metal Arc Welding	Half
Machinability Classification	20

Manufacturing properties provided by CDA

Features	Applications
<p>The CuSn10 alloy, based on copper and tin, is distinguished by its superior hardness, toughness, wear resistance, corrosion resistance, and elasticity. It requires adequate lubrication to function effectively under high specific loads.</p> <p>Given that welding is performed over a very short range and at elevated temperatures, it is crucial to prevent tension during the welding and cooling phases.</p> <p>Tin bronze castings, including the CuSn10 alloy, are utilized in the construction of components for mobile bridges, bridge turntables, and other structures. These components are designed for fixed and expansion bearings that experience slow or intermittent movement under heavy loads.</p>	<p>Lubricated components subjected to high loads, impacts, and couplings. Serrations on parts that are highly stressed. Crowns, Gears, Bearings, Shirts, Nuts, Screws, Worms, Swinging, Friction Rings, and Nuts, Connecting Rod Bushings, Presses, Cranes, and more.</p> <p>CuSn10 C90700 Tin bronze alloys are commonly used in gears, high-strength bushings, and bearing applications where high strength, low speeds, and heavy loads are required. These alloys also find application in other high-strength scenarios, such as pump impellers, piston rings, steam fittings, and valve bodies.</p>

Chemical composition												
%	Cu	Neither	P	Pb	Sn	Zn	Al	Fe	S	Sb	Others	Si
Min.	88	-	-	-	10	-	-	-	-	-	-	-
Max.	90	0,5	0,3	0,5	12	0,5	0,005	0,15	0,05	0,2	-	0,005

Chemical composition according to ASTM B505

International Equivalences							
VIPLUS	ISO / EN	W Nr / DIN	UNS / CDA	SAE	BS	DIN / ISO	ASTM
TIN BRONZES	CuSn10	CC480K	C90700	65	PB1	1705-GSnBz10	B-427

Mechanical properties				
Tensile strength (MPa)	Elastic limit (MPa)	Elongation (%)	Brinell hardness (HB)	Observations
276	172	10	80	-

Mechanical properties as per ASTM B505

General Physical Properties	
Melting Point (Liquid)	999 ° C
Melting Point (Solid)	831 ° C
Density	8.77 gm / cm at 20 ° C
Specific weight	8,77
Electric conductivity	0.056 MegaSiemens / cm at 20 ° C
Thermal conductivity	70.6 W / m at 20 ° C
Thermal expansion coefficient	18.410 -6 per ° C (20 ° -200 ° C)
Specific heat capacity	377.1 J / kg at 293 ° C
Tension Elasticity Module	103400 Mpa
Magnetic Permeability *	1

Physical properties provided by CDA

Manufacturing Properties	
Welding	Excellent
Braised	Good
Oxyacetylene Welding	Half
Gas arc welding	Half
Coated Metal Arc Welding	Half
Machinability Classification	20

Manufacturing properties provided by CDA

Features	Applications
<p>The CuSn12 alloy, which is also known by its specific designation C90800.</p> <p>CuSn12Ni2-C - GS and CuSn11Pb2 - GS are two advanced materials that have been engineered based on the foundation of the CuSn12 alloy. These materials are renowned for their exceptional wear resistance, making them highly durable and long-lasting. Additionally, they exhibit robust resistance to corrosion and the corrosive effects of salt water, which makes them suitable for marine and other harsh environments. The distinguishing feature of these materials is their enhanced stability and superior wear resistance, coupled with improved anti-friction properties. This combination of characteristics makes them ideal for applications where reliability and longevity are crucial, such as in bearings, gears, and other mechanical components that require smooth operation and minimal maintenance.</p>	<p>Speed reducers and worm gears.</p> <p>CuSn12 C90800 tin bronze alloys, exemplified by C90800, are typically utilized in heavy-duty gear, bushing, and bearing applications that require high strength at low speeds and under heavy loads. These alloys also find application in high-strength scenarios such as pump impellers, piston rings, steam fittings, and valve bodies. Additionally, C908 tin bronze castings are employed in the components of movable bridges, bridge turntables, and other structures that support fixed and expansion bearings subjected to slow or intermittent movement under heavy loads.</p>

Chemical composition												
%	Cu	Neither	P	Pb	Sn	Zn	Al	Fe	S	Sb	Others	Si
Min.	85	-	-	-	11	-	-	-	-	-	-	-
Max.	89	0,5	0,3	0,25	13	0,25	0,005	0,15	0,05	0,2	-	0,005

Chemical Composition in Accordance with ASTM B505

International Equivalences							
VIPLUS	ISO / EN	W Nr / DIN	UNS / CDA	SAE	BS	DIN / ISO	ASTM
TIN BRONZES	CuSn12	CC483K	C90800	-	PB2	-	B-427

Mechanical properties				
Tensile strength (MPa)	Elastic limit (MPa)	Elongation (%)	Brinell hardness (HB)	Observations
310	152	14	95	-

General Physical Properties	
Melting Point (Liquid)	999 ° C
Melting Point (Solid)	831 ° C
Density	8.6 gm / cm at 20 ° C
Specific weight	8,6
Electric conductivity	6.2 MegaSiemens / cm at 20 ° C
Thermal conductivity	54 W / m at 20 ° C
Thermal expansion coefficient	18.510 -6 per ° C (20 ° -200 ° C)
Specific heat capacity	377.1 J / kg at 293 ° C
Tension Elasticity Module	90000 Mpa
Magnetic Permeability *	1

Physical properties provided by CDA

Manufacturing Properties	
Welding	Good
Braised	Good
Oxyacetylene Welding	Half
Gas arc welding	Half
Coated Metal Arc Welding	Half
Machinability Classification	30

Manufacturing properties provided by CDA

Features	Applications
<p>The CuSn14 alloy is renowned for its exceptional hardness and toughness, coupled with superior sliding properties and outstanding corrosion resistance. It endures significant forces, impacts, wear, abrasion, fatigue, and high temperatures, while also exhibiting resistance to high hydraulic pressures and possessing excellent anti-friction qualities. Additionally, it demonstrates relatively good resistance to cavitation and corrosion from seawater.</p> <p>The UNS C90900 copper alloy is amenable to various welding techniques, including brazing, soft soldering, oxyacetylene welding, gas-shielded arc welding, metal-arc welding with coated electrodes, and carbon arc welding. This alloy can undergo stress relief at an approximate temperature of 260° C (500° F), requiring a duration of 1 hour per inch of thickness. Notably, it does not respond to heat treatment.</p>	<p>The CuSn14 alloy Hydraulic components and valve parts designed for high-pressure applications, axial piston pumps, refrigeration equipment, as well as straight or helical gears for industrial gearboxes and elevators, are subjected to immense forces and speeds. Gears, pinions, worm screws, nuts, and other toothed elements must endure these extreme conditions. To ensure optimal performance, it is recommended that these parts operate while submerged in oil.</p>

Chemical composition												
%	Cu	Neither	P	Pb	Sn	Zn	Al	Fe	S	Sb	Others	Si
Min.	86	-	-	-	12	-	-	-	-	-	-	-
Max.	89	0,5	0,05	0,25	14	0,25	0,005	0,15	0,05	0,2	-	0,005

Chemical Composition in Accordance with ASTM B505

International Equivalences							
VIPLUS	ISO / EN	W Nr / DIN	UNS / CDA	SAE	BS	DIN / ISO	ASTM
TIN BRONZES	CuSn14	-	C90900	-	-	-	-

Mechanical properties				
Tensile strength (MPa)	Elastic limit (MPa)	Elongation (%)	Brinell hardness (HB)	Observations
275	137	15	90	-

General Physical Properties	
Melting Point (Liquid)	978 ° C
Melting Point (Solid)	818 ° C
Density	8.74 gm / cm at 20 ° C
Specific weight	8,74
Electric conductivity	-
Thermal conductivity	46 W / m at 20 ° C
Thermal expansion coefficient	18.510 -6 per ° C (20 ° -200 ° C)
Specific heat capacity	377.1 J / kg at 293 ° C
Tension Elasticity Module	110000 Mpa
Magnetic Permeability *	1

Physical properties provided by CDA

Manufacturing Properties	
Welding	Excellent
Braised	Good
Oxyacetylene Welding	Half
Gas arc welding	Half
Coated Metal Arc Welding	Half
Machinability Classification	20

Manufacturing properties provided by CDA

Features	Applications
<p>Aluminum bronzes, exemplified by CuAl10Fe2, offer exceptional hardness and corrosion resistance compared to other bronze alloys. They are particularly valued in applications where corrosion resistance is paramount, such as in marine water environments.</p> <p>In the CuAl10Fe2 alloy, also known as C95500, aluminum, iron, and nickel act synergistically as reinforcement agents. All aluminum bronzes can be subjected to heat treatment, which significantly enhances their tensile strength.</p> <p>The UNS C95200 copper alloy is designed to release tension at 316 ° C (600 ° F). The stress relief process typically requires about 1 hour per inch of thickness. Notably, this alloy does not undergo any beneficial change with heat treatment.</p>	<p>Acid-resistant pumps, gears, valve seats, guides, plungers, pump rods, and bushings.</p> <p>INDUSTRIAL: Large gear components, pickling tanks, soft alkali applications, hot milling guides, heavy-duty clamps, hydrant parts, welding jaws, pickling equipment, worm gears, worms, pump bars, valve bodies, wear plates, thrust pads, bearing linings, pump parts, valves, valve seats, acid-resistant pumps, bearings, bushings, gears, plungers.</p> <p>RISK: Gun mounts, gun guides.</p> <p>MARINE: Marine hardware, covers for marine hardware, propellers, marine engines.</p> <p>FASTENERS: Nuts.</p> <p>ELECTRICAL: Electrical hardware.</p>

Chemical composition												
%	Cu	Neither	P	Pb	Sn	Zn	Al	Fe	S	Sb	Others	Si
Min.	86	-	-	-	-	-	8,5	2,5	-	-	-	-
Max.	-	-	-	-	-	-	9,5	4	-	-	-	3,5

Chemical Composition in Accordance with ASTM B505

International Equivalences							
VIPLUS	ISO / EN	W Nr / DIN	UNS / CDA	SAE	BS	DIN / ISO	ASTM
ALUMINIUM BRONZES	CuAl10Fe2	CC331G	C95200	-	-	-	B763

Mechanical properties				
Tensile strength (MPa)	Elastic limit (MPa)	Elongation (%)	Brinell hardness (HB)	Observations
469	179	20	125	-

Mechanical Properties in Accordance with ASTM B427

General Physical Properties	
Melting Point (Liquid)	1045 ° C
Melting Point (Solid)	1042 ° C
Density	7.64 gm / cm at 20 ° C
Specific weight	7,64
Electric conductivity	0.064 MegaSiemens / cm at 20? C
Thermal conductivity	50.4 W / m at 20 ° C
Thermal expansion coefficient	15.510 -6 per ° C (20 ° -200 ° C)
Specific heat capacity	377 J / kg at 293 ° C
Tension Elasticity Module	103400 Mpa
Magnetic Permeability *	1,1

Physical properties provided by CDA

Manufacturing Properties	
Welding	Good
Braised	Good
Oxyacetylene Welding	Not recommended
Gas arc welding	Excellent
Coated Metal Arc Welding	Good
Machinability Classification	20

Manufacturing properties provided by CDA

Features	Applications
<p>Bronze nickel aluminum bronzes, such as CuAl10Ni5Fe5, offer superior hardness and corrosion resistance compared to other bronze alloys. They are particularly utilized in applications where corrosion resistance is paramount, especially in marine water environments.</p> <p>CuAl10Ni5Fe5 aluminum bronze stands out as the copper alloy with the highest strength. C95500 aluminum bronze alloys are available in standard forms including bars, tubes, and plates. The addition of aluminum, iron, and nickel in C955 serves as a reinforcement within these alloys. Moreover, all aluminum bronzes can undergo heat treatment, which significantly enhances their tensile strength.</p>	<p>CuAl10Ni5Fe5 for MANUFACTURING: Window fittings. CONSUMERS: Musical instruments, piano keys. ELECTRICAL: Electrical hardware. FASTENERS: Nut box filling. INDUSTRIAL: Machine parts, glass molds, welding jaws, wear plates, aircraft components, pickling equipment, valve guides/seats, piston guides, pump fluid ends, glands, worms, screw gears, hot milling guides, sewage treatment applications, valve components, bearings, gears, bushings, landing gear parts, gun recoil mechanisms. MARINE: Shipbuilding, covers for marine hardware, marine applications, marine hardware.</p>

Chemical composition												
%	Cu	Neither	P	Pb	Sn	Zn	Al	Fe	S	Sb	Others	Si
Min.	78	3	-	-	-	-	10	3	-	-	-	-
Max.	-	5,5	-	-	-	-	11,5	5	-	-	-	3,5

Chemical Composition in Accordance with ASTM B505

International Equivalences							
VIPLUS	ISO / EN	W Nr / DIN	UNS / CDA	SAE	BS	DIN / ISO	ASTM
ALUMINIUM BRONZES	CuAl10Ni5Fe5	CC333G	C95500	-	AB2	-	B505M

Mechanical properties				
Tensile strength (MPa)	Elastic limit (MPa)	Elongation (%)	Brinell hardness (HB)	Observations
655	290	10	208	-

Mechanical Properties in Accordance with ASTM B427

General Physical Properties	
Melting Point (Liquid)	1045 ° C
Melting Point (Solid)	1038 ° C
Density	7,53 gm / cm at 20 ° C
Specific weight	7,53
Electric conductivity	0.049 MegaSiemens / cm at 20? C
Thermal conductivity	41.9 W / m at 20 ° C
Thermal expansion coefficient	15.510 -6 per ° C (20 ° -200 ° C)
Specific heat capacity	419 J / kg at 293 ° C
Tension Elasticity Module	110000 Mpa
Magnetic Permeability *	1,32

Physical properties provided by CDA

Manufacturing Properties	
Welding	Good
Braised	Half
Oxyacetylene Welding	Not recommended
Gas arc welding	Good
Coated Metal Arc Welding	Good
Machinability Classification	50

Manufacturing properties provided by CDA

Features	Applications
<p>The lead content in the CuSn10Pb10 alloy ranges from 7 to 30 percent. High-lead tin bronzes are characterized by their free-cutting properties and maintain advantageous thermal conductivity and effective lubrication, attributes that are attributed to the presence of lead.</p> <p>Tin-lead bronzes, including the CuSn10Pb10 variety, are particularly well-suited for bearing applications where lubrication may be compromised. These alloys demonstrate outstanding performance in harsh conditions that might introduce contaminants such as dirt and other foreign substances.</p> <p>Alloys enriched with lead have the ability to envelop foreign particles due to their malleable character, thereby shielding the wear surface of components like shafts from abrasion.</p>	<p>FASTENERS: Motor washers, nuts.</p> <p>INDUSTRIAL: Crankshaft shafts, bearings, bearing plates, machine components, bushings, applications requiring acid resistance to sulfite fluids, steel factory maintenance parts, steel slide guides, high-speed, heavy-duty bearings, pumps, die-cast parts, impellers, corrosion-resistant castings, high-speed and high-pressure bushings.</p> <p>MARINO: Large bearings for ships.</p>

Chemical composition												
%	Cu	Neither	P	Pb	Sn	Zn	Al	Fe	S	Sb	Others	Si
Min.	78	-	-	8	9	-	-	-	-	-	-	-
Max.	82	0,5	0,1	11	11	0,8	0,005	0,7	0,08	0,5	-	0,005

Chemical Composition in Accordance with ASTM B505

International Equivalences							
VIPLUS	ISO / EN	W Nr / DIN	UNS / CDA	SAE	BS	DIN / ISO	ASTM
LEAD BRONZES	CuSn10Pb10	CC495K	C93700	64	LB2	-	B144 (3A)

Mechanical properties				
Tensile strength (MPa)	Elastic limit (MPa)	Elongation (%)	Brinell hardness (HB)	Observations
241	138	6	65 - 80	-

Mechanical Properties in Accordance with ASTM B505

General Physical Properties	
Melting Point (Liquid)	929 ° C
Melting Point (Solid)	762 ° C
Density	8.86 gm / cm at 20 ° C
Specific weight	8,86
Electric conductivity	0.059 MegaSiemens / cm at 20? C
Thermal conductivity	46.9 W / m at 20 ° C
Thermal expansion coefficient	17.810 -6 per ° C (20 ° -200 ° C)
Specific heat capacity	377.1 J / kg at 293 ° C
Tension Elasticity Module	75800 Mpa
Magnetic Permeability *	1

Physical properties provided by CDA

Manufacturing Properties	
Welding	Good
Braised	Good
Oxyacetylene Welding	Not recommended
Gas arc welding	Not recommended
Coated Metal Arc Welding	Not recommended
Machinability Classification	80

Manufacturing properties provided by CDA

Features	Applications
<p>The lead content in the CuSn7Pb15 alloy is between 7 and 30 percent. Tin bronzes with high lead content are free cut and retain favorable thermal conductivity and good lubrication due to lead content.</p> <p>Tin lead bronzes such as CuSn7Pb15 are ideal for bearing applications where there could be a loss of the lubrication limit. These alloys have excellent performance in unforgiving environments where there may be foreign matter, such as dirt and other foreign materials.</p> <p>Alloys with a high lead content can wrap foreign matter due to its malleable nature and, in doing so, protect the wear surface of a coupling part, such as a shaft.</p>	<p>INDUSTRIAL: bearings, rail motor housings, pumps, industrial centrifuges, machine parts, low friction, moderate pressure bushings, railway applications, acid resistance applications, bearings for bearings covered for passenger cars, general service bearings for moderate pressures, rod wear material Bushings, wedge wear material, shoe wear material, pump impellers for acid mine water, pump bodies for acid mine water, bearings for freight wagons, bearings for coated bearings for locomotives</p> <p>MARINO: large bearings for ships.</p>

Chemical composition												
%	Cu	Neither	P	Pb	Sn	Zn	Al	Fe	S	Sb	Others	Si
Min.	75	-	-	13	6,3	-	-	-	-	-	-	-
Max.	79	1	0,05	16	7,5	0,8	0,005	0,15	0,08	0,8	-	0,005

Chemical Composition in Accordance with ASTM B505

International Equivalences							
VIPLUS	ISO / EN	W Nr / DIN	UNS / CDA	SAE	BS	DIN / ISO	ASTM
LEAD BRONZES	CuSn7Pb15	CC496K	C93800	67	LB1	-	-

Mechanical properties				
Tensile strength (MPa)	Elastic limit (MPa)	Elongation (%)	Brinell hardness (HB)	Observations
172	110	5	-	-

Mechanical Properties in Accordance with ASTM B505

General Physical Properties	
Melting Point (Liquid)	943 ° C
Melting Point (Solid)	854 ° C
Density	9.25 gm / cm at 20 ° C
Specific weight	9,25
Electric conductivity	0.066 MegaSiemens / cm at 20? C
Thermal conductivity	52.3 W / m at 20 ° C
Thermal expansion coefficient	17.810 -6 per ° C (20 ° -200 ° C)
Specific heat capacity	377.1 J / kg at 293 ° C
Tension Elasticity Module	72400 Mpa
Magnetic Permeability *	1

Physical properties provided by CDA

Manufacturing Properties	
Welding	Good
Braised	Means, medium
Oxyacetylene Welding	Not recommended
Gas arc welding	Not recommended
Coated Metal Arc Welding	Not recommended
Machinability Classification	80

Manufacturing properties provided by CDA

Features	Applications
<p>The lead content in the CuSn5Pb20 alloy is between 7 and 30 percent. Tin bronzes with high lead content are free cut and retain favorable thermal conductivity and good lubrication due to lead content.</p> <p>Tin lead bronzes such as CuSn5Pb20 are ideal for bearing applications where there could be a loss of the lubrication limit. These alloys have excellent performance in unforgiving environments where there may be foreign matter, such as dirt and other foreign materials.</p> <p>Alloys with a high lead content can wrap foreign matter due to its malleable nature and, in doing so, protect the wear surface of a coupling part, such as a shaft.</p>	<p>INDUSTRIAL: thrust block due to its properties: Corrosion resistance, Corrosion resistance in many environments, Low friction coefficient, Wear resistance, Excellent machinability.</p> <p>TYPICAL USES: Bearings, bushings, centrifuge bushings, gears, hydraulic parts, impellers, linings, piston rings, pump and valve components, sleeves, steam fittings.</p>

Chemical composition												
%	Cu	Neither	P	Pb	Sn	Zn	Al	Fe	S	Sb	Others	Si
Min.	72	-	-	18	4,5	-	-	-	-	-	-	-
Max.	79	1	0,5	22	6,5	1	0,005	0,25	0,08	0,8	-	0,005

Chemical Composition in Accordance with ASTM B505

International Equivalences							
VIPLUS	ISO / EN	W Nr / DIN	UNS / CDA	SAE	BS	DIN / ISO	ASTM
LEAD BRONZES	CuSn5Pb20	CC497K	C94100	94	LB5	-	-

Mechanical properties				
Tensile strength (MPa)	Elastic limit (MPa)	Elongation (%)	Brinell hardness (HB)	Observations
172	117	7	50	-

Mechanical Properties in Accordance with ASTM B505

General Physical Properties	
Melting Point (Liquid)	950 ° C
Melting Point (Solid)	855 ° C
Density	9.2 gm / cm at 20 ° C
Specific weight	9,2
Electric conductivity	-
Thermal conductivity	-
Thermal expansion coefficient	-
Specific heat capacity	-
Tension Elasticity Module	-
Magnetic Permeability *	-

Physical properties provided by CDA

Manufacturing Properties	
Welding	Good
Braised	Means, medium
Oxyacetylene Welding	Not recommended
Gas arc welding	Not recommended
Coated Metal Arc Welding	Not recommended
Machinability Classification	-

Manufacturing properties provided by CDA