

CONCAST

METAL PRODUCTS CO.

Proven Integrity. Delivering Value.

Aircraft | Aerospace and Concast



14315 State Route 113
Wakeman, OH 44889
800.626.7071 phone
724.538.3956 fax
sales@concast.com

www.concast.com

Standard-Stocked Alloys

AMS 4640-C63000 | AMS 4590-C63020 | AMS 4634-C64200
AMS 4596-C72900 | AMS 4597-C72900 | AMS 4598-C72900
AMS 4880-C95510

Other Available Alloys

AMS 4631-C64200 | AMS 4633-C64200 | AMS 4881-C95520

■ Concast Metal Products Co. is certified to ISO 9001 and AS9100

Concast Metal Products Company

We are a manufacturer of specialty continuous-cast copper alloys. Concast has achieved a strong and stable market position through a sharp focus on evolving technologies, quality control, and a high level of customer service.

RICH HISTORY

We trace our roots back to 1891, when we began production of brass and bronze ingot in Pittsburgh, Pennsylvania. In 1960, Concast began producing continuous-cast products. Thirty years later we incorporated the production of copper alloys into our business. Then in 1995, we acquired our Birmingham, Ohio, facility and expanded our product line to include aluminum bronze and manganese bronze.

Today, Concast is a single-source supplier whose primary focus is the production of copper alloys in bars, rods, tubes and rectangles as well as custom alloys.

OUR FACILITIES

More than 1,000 standard sizes are maintained in our distribution center in Birmingham, Ohio. This facility is a modern, environmentally sound 65,000-sq. ft. distribution warehouse located near the Ohio turnpike and is open six days a week.

While Birmingham is the site for our horizontal continuous casting production operation, our Mars, Pa. plant houses our vertical continuous casting operation. Mars is also the location for our administrative offices.

Our inventory of over 1,000 standard sizes is the largest inventory of standard-stocked, continuous-cast alloys in North America. Concast is well equipped to serve a large variety of industries, including aircraft and aerospace.



Quality

Concast is a team of professionals focused on manufacturing the highest quality materials at a fair value that meet and exceed customers' expectations, providing a 99.7% quality acceptance rating. Our goal is to ensure superior products by promoting and demanding adherence to strict requirements.

ISO 9001/AS9100

As an ISO 9001 certified manufacturer, we have been recognized as the premier producer of continuous-cast copper alloys. Concast is also certified to AS9100 standards and requirements for the aerospace industry. We continually adapt to changing markets and industry demand for greater diversity, higher quality, and more eco-friendly products. Additionally, we invest in state-of-the-art casting equipment and advanced product engineering, as well as comprehensive before-and-after sales service.

Serving the Aircraft and Aerospace Industry

The aircraft and aerospace industry requires alloys to provide corrosion, wear, and impact resistance as well as high-strength characteristics.

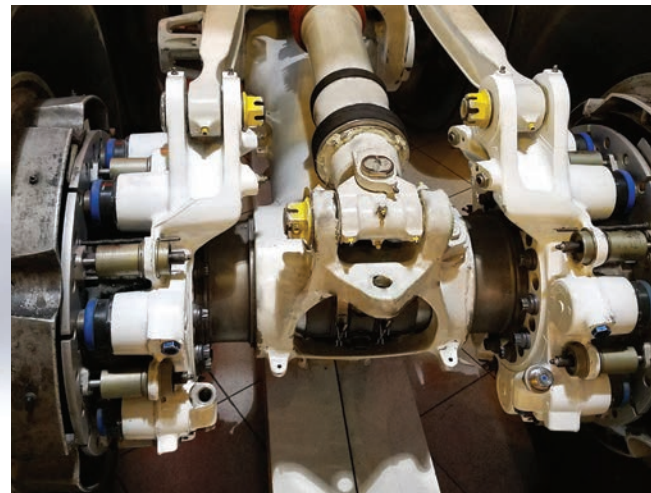
*At **Concast Metal Products Co.**, our unparalleled experience, service, and quality are at the foundation of our success in meeting the demand for alloys utilized in various aerospace and aircraft-related applications. These include bushings and bearings utilized in landing gear and other industry-specific components.*

ALLOY OFFERINGS

Nickel aluminum bronze is available in both cast and wrought product forms and is the primary group of alloys serving the aircraft and aerospace industry. Concast is the exclusive North American distributor of Hardiall® C72900 produced by Lebronze Alloys. All C72900 alloys are standard-stocked products.

Adhering to strict SAE Aerospace Material Specifications, Concast provides the following aerospace-related alloys:

AMS 4640-C63000*	AMS 4633-C64200	AMS 4597-C72900*	AMS 4881-C95520
AMS 4590-C63020*	AMS 4634-C64200*	AMS 4598-C72900*	
AMS 4631-C64200	AMS 4596-C72900*	AMS 4880-C95510*	*standard-stocked alloy



AMS 4640-C63000

✓ STANDARD-STOCKED PRODUCT

Wrought

Uba
lebronze alloys

Product Description:	Nickel-Aluminum Bronze
Tempers:	HR50 Drawn and Stress Relieved (0.38" to 3.00" O.D.) TQ50 Quenched and Temper Annealed (over 3.00" O.D.)
Solids:	0.38" to 10.00" (9.65 mm to 254.00 mm) O.D.
Tubes:	3.00" to 10.00" (76.20 mm to 254.00 mm) O.D.*
Standard Lengths:	144" *Consult Mill for Other Sizes.

Typical Uses

Aerospace landing gear bushings and bearings, control surface and actuator bushings and bearings, wing flap bearings, wheel bearings, brakes, door hardware, hydraulic actuators, valves, steering joints, helicopter controls, compression fit airframe fasteners, electronic system connectors

Chemical Composition

Al%	Ni%	Fe%	Mn%	Zn%	Sn%	Si%	Cu% + Ag%
9.00- 11.00	4.00- 5.50	2.00- 4.00	1.50	0.30	0.20	0.25	Rem.

Chemical Composition according to AMS 4640

Note: Copper + Silver + Sum of Named Elements, 99.5% min. Single values represent maximums.

Machinability

AMS	Machinability Rating	Density (lb/in ³ at 68 °F)	Density (gm/cu ³ at 20 °C)
AMS 4640-C63000	30	0.274	7.60

Mechanical Properties

AMS 4640-C63000 continued

Mechanical properties according to AMS 4640

Composition similar to UNS C63000

HR50 Drawn and Stress Relieved Temper (3/8" to 3" O.D.), TQ50 Quenched and Temper Annealed (over 3" O.D.)

SIZE RANGE: UP TO 1" ROUNDS INCLUSIVE

Tensile Strength, min		Yield Strength, at .5% Extension Under Load, min		Elongation in 4D	Brinell Hardness (3000 kg load)	Remarks
ksi	MPa	ksi	MPa	%	min to max BHN	
110	760	68	469	10	201 to 248	

SIZE RANGE: OVER 1" TO 2" ROUNDS INCLUSIVE

Tensile Strength, min		Yield Strength, at .5% Extension Under Load, min		Elongation in 4D	Brinell Hardness (3000 kg load)	Remarks
ksi	MPa	ksi	MPa	%	min to max BHN	
110	760	60	414	10	201 to 248	

SIZE RANGE: OVER 2" TO 3" ROUNDS INCLUSIVE

Tensile Strength, min		Yield Strength, at .5% Extension Under Load, min		Elongation in 4D	Brinell Hardness (3000 kg load)	Remarks
ksi	MPa	ksi	MPa	%	min to max BHN	
105	725	55	379	10	187 to 241	

SIZE RANGE: OVER 3" TO 5" ROUNDS INCLUSIVE

Tensile Strength, min		Yield Strength, at .5% Extension Under Load, min		Elongation in 4D	Brinell Hardness (3000 kg load)	Remarks
ksi	MPa	ksi	MPa	%	min to max BHN	
100	690	50	345	10	187 to 241	

Physical Properties

AMS 4640-C63000 continued

	US Customary	Metric
Melting Point – Liquidus	1930 °F	1054 °C
Melting Point – Solidus	1895 °F	1035 °C
Density	0.274 lb/in ³ at 68 °F	7.58 gm/cm ³ at 20 °C
Specific Gravity	7.58	7.58
Electrical Conductivity	7% IACS at 68 °F	0.041 MegaSiemens/cm at 20 °C
Thermal Conductivity	22.6 Btu/sq ft/ft hr/°F at 68 °F	39.1 W/m at 20 °C
Coefficient of Thermal Expansion 68-572	9.0 · 10 ⁻⁶ per °F (68-572 °F)	15.5 · 10 ⁻⁶ per °C (20-300 °C)
Specific Heat Capacity	0.09 Btu/lb/°F at 68 °F	377.1 J/kg at 293 °C
Modulus of Elasticity in Tension	17500 ksi	120650 MPa
Modulus of Rigidity	6400 ksi	44130 MPa

Physical Properties provided by CDA

Fabrication Properties

Joining Technique	Suitability
Soldering	Not Recommended
Brazing	Fair
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Good
Coated Metal Arc Welding	Good
Spot Weld	Good
Seam Weld	Good
Butt Weld	Good
Capacity for Being Cold Worked	Poor
Capacity for Being Hot Formed	Good
Forgeability Rating	75

Fabrication Properties provided by CDA

AMS 4590-C63020

✓ **STANDARD-STOCKED PRODUCT**

Wrought

Uba
lebronze alloys

Product Description:	Nickel-Aluminum Bronze
Tempers:	TQ50 Quenched and Temper Annealed
Solids:	0.75" to 4.00" (19.05 mm to 101.60 mm) O.D.*
Tubes:	2.00" to 4.00" (50.80 mm to 101.60 mm) O.D.*
Standard Lengths:	24"
	*Consult Mill for Other Sizes Tolerances as per AMS2221 do not apply

Typical Uses

Aerospace

landing gear bushings and bearings, control surface and actuator bushings and bearings, wing flap bearings, wheel bearings, brakes, door hardware, hydraulic actuators, valves, steering joints, helicopter controls, compression fit airframe fasteners, electronic system connectors

Chemical Composition

Al%	Ni, including Co%	Fe%	Mn%	Zn%	Sn%	Co%	Si%	Cr%	Pb%	Cu%
10.00- 11.00	4.20- 6.00	4.00- 5.50	1.50	0.30	0.25	0.20	0.15	0.05	0.03	Rem.

Chemical Composition according to AMS 4590

Note: Sum of Named Elements, 99.5% min. Single values represent maximums.

Machinability

AMS	Machinability Rating	Density (lb/in ³ at 68 °F)	Density (gm/cu ³ at 20 °C)
AMS 4590-C63020		0.274	7.60



Mechanical Properties

AMS 4590-C63020 continued

Mechanical properties according to AMS 4590
Composition similar to UNS C63020
TQ50 Quenched and Temper Annealed

SIZE RANGE: UP TO 1" DIAMETER INCLUSIVE (BETWEEN PARALLEL SIDES OF BARS, RODS; NOM. WALL THICKNESS OF TUBES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 2 Inches (50.8 mm) or 4D	Rockwell "C" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min HRC	
135	931	100	689	6	26	

SIZE RANGE: OVER 1" TO 2" DIAMETER INCLUSIVE (BETWEEN PARALLEL SIDES OF BARS, RODS; NOM. WALL THICKNESS OF TUBES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 2 Inches (50.8 mm) or 4D	Rockwell "C" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min HRC	
130	896	95	655	6	26	

SIZE RANGE: OVER 2" TO 4" DIAMETER INCLUSIVE (BETWEEN PARALLEL SIDES OF BARS, RODS; NOM. WALL THICKNESS OF TUBES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 2 Inches (50.8 mm) or 4D	Rockwell "C" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min HRC	
130	896	90	621	6	26	

Physical Properties

	US Customary	Metric
Melting Point – Liquidus	1940 to 1967 °F	1060 to 1075 °C
Density	0.274 lb/in ³ at 68 °F	7.60 gm/cm ³ at 20 °C
Specific Gravity	7.60	7.60
Electrical Resistivity	132.33 ohms-cmil/ft at 68 °F	22.0 microhm-cm at 20 °C
Thermal Conductivity	31.2 Btu/sq ft/ft hr/°F at 68 °F	54.0 W/m at 20 °C
Coefficient of Thermal Expansion 68-572	9.4 · 10 ⁻⁶ per °F (68-572 °F)	17.0 · 10 ⁻⁶ per °C (20-300 °C)

AMS 4631-C64200

Wrought

Product Description:	Silicon Aluminum Bronze
Tempers:	Stress Relieved
Solids:	0.19" to 6.00" (4.82 mm to 152.40 mm) O.D.
Hex:	0.50" to 2.00" (12.70 mm to 50.80 mm) O.D.
Rectangles:	Consult Mill
Standard Lengths:	144"

Typical Uses

Aerospace

landing gear bushings and bearings, control surface and actuator bushings and bearings, wing flap bearings, wheel bearings, brakes, door hardware, hydraulic actuators, valves, steering joints, helicopter controls, compression fit airframe fasteners, electronic system connectors

Chemical Composition

Cu%	Al%	Si%	Other Elements, each%	Other Elements, total%
89.00 min	6.50- 8.50	1.60- 2.25	0.05	0.50

Chemical Composition according to AMS 4631

Single values, unless otherwise noted, represent maximums.

Machinability

AMS	Machinability Rating	Density (lb/in ³ at 68 °F)	Density (gm/cu ³ at 20 °C)
AMS 4631-C64200	60	0.278	7.69



Mechanical Properties

AMS 4631-C64200 continued

Mechanical properties according to AMS 4631
Composition similar to UNS C64200
Stress Relieved

SIZE RANGE: UP TO ½" INCLUSIVE (NOMINAL DIAMETER OR DISTANCE BETWEEN PARALLEL SIDES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HRB	
90	621	45	310	15	80-100	

SIZE RANGE: OVER ½" TO 1" INCLUSIVE (NOMINAL DIAMETER OR DISTANCE BETWEEN PARALLEL SIDES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HRB	
88	607	44	303	15	80-100	

SIZE RANGE: OVER 1" TO 2" INCLUSIVE (NOMINAL DIAMETER OR DISTANCE BETWEEN PARALLEL SIDES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HRB	
85	586	42	290	20	80-100	

SIZE RANGE: OVER 2" TO 3" INCLUSIVE (NOMINAL DIAMETER OR DISTANCE BETWEEN PARALLEL SIDES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HRB	
75	517	35	241	30	70-95	

AMS 4631-C64200 continued

Physical Properties

	US Customary	Metric
Melting Point – Liquidus	1840 °F	1004 °C
Melting Point – Solidus	1800 °F	982 °C
Density	0.278 lb/in ³ at 68 °F	7.69 gm/cm ³ at 20 °C
Specific Gravity	7.69	7.69
Electrical Conductivity	8% IACS at 68 °F	0.047 MegaSiemens/cm at 20 °C
Thermal Conductivity	26 Btu/sq ft/ft hr/°F at 68 °F	45 W/m at 20 °C
Coefficient of Thermal Expansion 68-572	10 · 10 ⁻⁶ per °F (68-572 °F)	17.3 · 10 ⁻⁶ per °C (20-300 °C)
Specific Heat Capacity	0.09 Btu/lb/°F at 68 °F	377.1 J/kg at 293 °C
Modulus of Elasticity in Tension	16000 ksi	110310 MPa
Modulus of Rigidity	6000 ksi	41370 MPa

Physical Properties provided by CDA

Fabrication Properties

Joining Technique	Suitability
Soldering	Not Recommended
Brazing	Fair
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Fair
Coated Metal Arc Welding	Fair
Spot Weld	Fair
Seam Weld	Fair
Butt Weld	Fair
Capacity for Being Cold Worked	Poor
Capacity for Being Hot Formed	Excellent
Forgeability Rating	80

Fabrication Properties provided by CDA

AMS 4633-C64200

Wrought



Product Description:	Aluminum Silicon Bronze
Temper:	HR50 Drawn and Stress Relieved
Solids:	0.19" to 6.00" (4.82 mm to 152.40 mm) O.D.
Hex:	0.50" to 2.00" (12.70 mm to 50.80 mm) O.D.
Rectangles:	Consult Mill
Standard Lengths:	144"

Typical Uses

Aerospace

landing gear bushings and bearings, control surface and actuator bushings and bearings, wing flap bearings, wheel bearings, brakes, door hardware, hydraulic actuators, valves, steering joints, helicopter controls, compression fit airframe fasteners, electronic system connectors

Chemical Composition

Al%	Si%	Zn%	Fe%	Ni, including Co%	Sn%	As%	Mn%	Pb%	Cu%
6.30-7.60	1.50-2.20	0.50	0.30	0.25	0.20	0.15	0.10	0.05	Rem.

Chemical Composition according to AMS 4633

Note: Sum of Named Elements, 99.5% min. Single values represent maximums.

Machinability

AMS	Machinability Rating	Density (lb/in ³ at 68 °F)	Density (gm/cu ³ at 20 °C)
AMS 4633-C64200	60	0.278	7.69



Mechanical Properties

AMS 4633-C64200 continued

Mechanical properties according to AMS 4633
Composition similar to UNS C64200
HR50 Drawn and Stress Relieved

SIZE RANGE: UP TO ½" INCLUSIVE (NOMINAL DIAMETER OR DISTANCE BETWEEN PARALLEL SIDES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HRB	
90	621	45	310	9	80-100	

SIZE RANGE: OVER ½" TO 1" INCLUSIVE (NOMINAL DIAMETER OR DISTANCE BETWEEN PARALLEL SIDES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HRB	
85	586	45	310	12	80-100	

SIZE RANGE: OVER 1" TO 2" INCLUSIVE (NOMINAL DIAMETER OR DISTANCE BETWEEN PARALLEL SIDES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HRB	
80	552	42	290	12	80-100	

SIZE RANGE: OVER 2" TO 3" INCLUSIVE (NOMINAL DIAMETER OR DISTANCE BETWEEN PARALLEL SIDES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HRB	
75	517	35	241	15	70-95	

Physical Properties

	US Customary	Metric
Melting Point – Liquidus	1840 °F	1004 °C
Melting Point – Solidus	1800 °F	982 °C
Density	0.278 lb/in ³ at 68 °F	7.69 gm/cm ³ at 20 °C
Specific Gravity	7.69	7.69
Electrical Conductivity	8% IACS at 68 °F	0.047 MegaSiemens/cm at 20 °C
Thermal Conductivity	26 Btu/sq ft/ft hr/°F at 68 °F	45 W/m at 20 °C
Coefficient of Thermal Expansion 68-572	10 · 10 ⁻⁶ per °F (68-572 °F)	17.3 · 10 ⁻⁶ per °C (20-300 °C)
Specific Heat Capacity	0.09 Btu/lb/°F at 68 °F	377.1 J/kg at 293 °C
Modulus of Elasticity in Tension	16000 ksi	110310 MPa
Modulus of Rigidity	6000 ksi	41370 MPa

Physical Properties provided by CDA

Fabrication Properties

Joining Technique	Suitability
Soldering	Not Recommended
Brazing	Fair
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Fair
Coated Metal Arc Welding	Fair
Spot Weld	Fair
Seam Weld	Fair
Butt Weld	Fair
Capacity for Being Cold Worked	Poor
Capacity for Being Hot Formed	Excellent
Forgeability Rating	80

Fabrication Properties provided by CDA

AMS 4634-C64200

✓ STANDARD-STOCKED PRODUCT

Wrought


lebronze alloys

Product Description:	Aluminum Silicon Bronze
Temper:	Stress Relieved
Solids:	0.375" to 6.00" (9.53 mm to 152.40 mm) O.D.
Hex:	0.50" to 2.00" (12.70 mm to 50.80 mm) O.D.
Rectangles:	Consult Mill
Standard Lengths:	144"

Typical Uses

Aerospace

landing gear bushings and bearings, control surface and actuator bushings and bearings, wing flap bearings, wheel bearings, brakes, door hardware, hydraulic actuators, valves, steering joints, helicopter controls, compression fit airframe fasteners, electronic system connectors

Chemical Composition

Al%	Si%	Fe%	Ni, including Co%	Mn%	Sn%	Zn%	Pb%	Cu, including Ag%
6.30- 7.60	1.50- 2.20	0.30	0.25	0.10	0.20	0.50	0.05	Rem.

Chemical Composition according to AMS 4634

Note: Sum of Named Elements, 99.5% min. Single values represent maximums.

Machinability

AMS	Machinability Rating	Density (lb/in ³ at 68 °F)	Density (gm/cu ³ at 20 °C)
AMS 4634-C64200	60	0.278	7.69



Mechanical Properties

AMS 4634-C64200 continued

Mechanical properties according to AMS 4634
Composition similar to UNS C64200
Stress Relieved

SIZE RANGE: UP TO ½" INCLUSIVE (NOMINAL DIAMETER OR DISTANCE BETWEEN PARALLEL SIDES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HRB	
90	621	45	310	9	80-100	

SIZE RANGE: OVER ½" TO 1" INCLUSIVE (NOMINAL DIAMETER OR DISTANCE BETWEEN PARALLEL SIDES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HRB	
85	586	45	310	12	80-100	

SIZE RANGE: OVER 1" TO 2" INCLUSIVE (NOMINAL DIAMETER OR DISTANCE BETWEEN PARALLEL SIDES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HRB	
80	552	42	290	12	80-100	

SIZE RANGE: OVER 2" TO 3" INCLUSIVE (NOMINAL DIAMETER OR DISTANCE BETWEEN PARALLEL SIDES)

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "B" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max HRB	
75	517	35	241	15	70-95	

AMS 4634-C64200 continued

Physical Properties

	US Customary	Metric
Melting Point – Liquidus	1840 °F	1004 °C
Melting Point – Solidus	1800 °F	982 °C
Density	0.278 lb/in ³ at 68 °F	7.69 gm/cm ³ at 20 °C
Specific Gravity	7.69	7.69
Electrical Conductivity	8% IACS at 68 °F	0.047 MegaSiemens/cm at 20 °C
Thermal Conductivity	26 Btu/sq ft/ft hr/°F at 68 °F	45 W/m at 20 °C
Coefficient of Thermal Expansion 68-572	10 · 10 ⁻⁶ per °F (68-572 °F)	17.3 · 10 ⁻⁶ per °C (20-300 °C)
Specific Heat Capacity	0.09 Btu/lb/°F at 68 °F	377.1 J/kg at 293 °C
Modulus of Elasticity in Tension	16000 ksi	110310 MPa
Modulus of Rigidity	6000 ksi	41370 MPa

Physical Properties provided by CDA

Fabrication Properties

Joining Technique	Suitability
Soldering	Not Recommended
Brazing	Fair
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Fair
Coated Metal Arc Welding	Fair
Spot Weld	Fair
Seam Weld	Fair
Butt Weld	Fair
Capacity for Being Cold Worked	Poor
Capacity for Being Hot Formed	Excellent
Forgeability Rating	80

Fabrication Properties provided by CDA

AMS 4596-C72900 (Hardiall®)

Wrought



Product Description:	Copper Nickel-Tin Bronze
Tempers:	TX 00 Solution Annealed and Spinodal Hardened
Solids:	0.75" to 6.75" (19.05 mm to 171.45 mm) O.D.*
	*Consult Mill for Other Shapes/Sizes

Typical Uses

Aerospace	landing gear bushings and bearings, control surface and actuator bushings and bearings, wing flap bearings, wheel bearings, brakes, door hardware, hydraulic actuators, valves, steering joints, helicopter controls, compression fit airframe fasteners, electronic system connectors
Electrical	connectors, contacts, controls, miniaturized sockets, relay elements, switches
Industrial	springs, wire
Marine	marine components

Chemical Composition

Ni + Co%	Sn%	Fe%	Zn%	Mn%	Cb%	Mg%	Pb%	Cu%
14.50-15.50	7.50-8.50	0.50	0.50	0.30	0.10	0.15	0.02	Rem.

Chemical Composition according to AMS 4596

Note: Copper + Sum of Named Elements, 99.5% min. Single values represent maximums.

Machinability

AMS	Machinability Rating	Density (lb/in ³)	Density (g/cm ³)
AMS 4596-C72900		0.323	8.95

Mechanical Properties

AMS 4596-C72900 continued

Mechanical properties according to AMS 4596

Composition similar to UNS C72900

TX 00 Solution Annealed and Spinodal Hardened

SIZE RANGE: UP TO 4.249" (108 MM) INCLUSIVE (NOMINAL THICKNESS BETWEEN PARALLEL SIDES) BARS, RODS

Ultimate Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "C" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min HRC	
132	910	107	738	9.5	30	

SIZE RANGE: 4.250" TO 8.500" (108 TO 216 MM) INCLUSIVE (NOMINAL THICKNESS BETWEEN PARALLEL SIDES) BARS, RODS

Ultimate Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "C" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min HRC	
127	876	108	745	3	30	

Physical Properties

	US Customary	Metric
Melting Point – Liquidus	2039 °F	1115 °C
Melting Point – Solidus	1742 °F	950 °C
Density	0.323 lb/in ³ at 68 °F	8.94 gm/cm ³ at 20 °C
Specific Gravity	8.94	8.94
Electrical Conductivity	7.8% IACS at 68 °F	0.045 MegaSiemens/cm at 20 °C
Thermal Conductivity	17 Btu/sq ft/ft hr/°F at 68 °F	29.4 W/m at 20 °C
Coefficient of Thermal Expansion 68-572	9.1 · 10 ⁻⁶ per °F (68-572 °F)	15.8 · 10 ⁻⁶ per °C (20-300 °C)
Specific Heat Capacity	0.09 Btu/lb/°F at 68 °F	377.1 J/kg at 293 °C
Modulus of Elasticity in Tension	18500 ksi	127554 MPa
Modulus of Rigidity	7500 ksi	51711 MPa

Physical Properties provided by CDA

Fabrication Properties

Joining Technique	Suitability
Soldering	Excellent
Brazing	Excellent
Oxyacetylene Welding	Good
Gas Shielded Arc Welding	Excellent
Coated Metal Arc Welding	Excellent
Spot Weld	Excellent
Seam Weld	Excellent
Butt Weld	Excellent
Capacity for Being Cold Worked	Excellent
Capacity for Being Hot Formed	Good

Fabrication Properties provided by CDA

AMS 4597-C72900 (Hardiall®)

✓ **STANDARD-STOCKED PRODUCT**

Wrought

Uba
lebronze alloys

Product Description:	Copper Nickel-Tin Bronze
Temper:	TX TS Solution Annealed, Cold Finished and Spinodal Hardened
Solids:	.75" to 2.00" (19.05 mm to 50.80 mm) O.D.* *Consult Mill for Other Shapes/Sizes

Typical Uses

Aerospace landing gear bushings and bearings, control surface and actuator bushings and bearings, wing flap bearings, wheel bearings, brakes, door hardware, hydraulic actuators, valves, steering joints, helicopter controls, compression fit airframe fasteners, electronic system connectors

Chemical Composition

Ni + Co%	Sn%	Fe%	Zn%	Mn%	Cb%	Mg%	Pb%	Cu%
14.50- 15.50	7.50- 8.50	0.50	0.50	0.30	0.10	0.15	0.02	Rem.

Chemical Composition according to AMS 4597

Note: Copper + Sum of Named Elements, 99.5% min. Single values represent maximums.

Machinability

AMS	Machinability Rating	Density (lb/in ³)	Density (g/cm ³)
AMS 4597-C72900		0.323	8.95

Mechanical Properties

AMS 4597-C72900 continued

Mechanical properties according to AMS 4597

Composition similar to UNS C72900

TX TS Solution Annealed, Cold Finished and Spinodal Hardened

SIZE RANGE: UP TO 1.60" (40 MM) EXCLUSIVE NOMINAL THICKNESS BETWEEN PARALLEL SIDES (BARS, RODS); NOMINAL WALL THICKNESS (TUBING)

Ultimate Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "C" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min HRC	
165	1137	155	1069	6	34	

SIZE RANGE: 1.60" TO 3.25" (40 TO 83 MM) INCLUSIVE NOMINAL THICKNESS BETWEEN PARALLEL SIDES (BARS, RODS); NOMINAL WALL THICKNESS (TUBING)

Ultimate Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "C" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min HRC	
156	1075	148	1020	3	34	

Physical Properties

	US Customary	Metric
Melting Point – Liquidus	2039 °F	1115 °C
Melting Point – Solidus	1742 °F	950 °C
Density	0.323 lb/in ³ at 68 °F	8.94 gm/cm ³ at 20 °C
Specific Gravity	8.94	8.94
Electrical Conductivity	7.8% IACS at 68 °F	0.045 MegaSiemens/cm at 20 °C
Thermal Conductivity	17 Btu/sq ft/ft hr/°F at 68 °F	29.4 W/m at 20 °C
Coefficient of Thermal Expansion 68-572	9.1 · 10 ⁻⁶ per °F (68-572 °F)	15.8 · 10 ⁻⁶ per °C (20-300 °C)
Specific Heat Capacity	0.09 Btu/lb/°F at 68 °F	377.1 J/kg at 293 °C
Modulus of Elasticity in Tension	18500 ksi	127554 MPa
Modulus of Rigidity	7500 ksi	51711 MPa

Physical Properties provided by CDA

Fabrication Properties

Joining Technique	Suitability
Soldering	Excellent
Brazing	Excellent
Oxyacetylene Welding	Good
Gas Shielded Arc Welding	Excellent
Coated Metal Arc Welding	Excellent
Spot Weld	Excellent
Seam Weld	Excellent
Butt Weld	Excellent
Capacity for Being Cold Worked	Excellent
Capacity for Being Hot Formed	Good

Fabrication Properties provided by CDA

✓ STANDARD-STOCKED PRODUCT

AMS 4598-C72900 (Hardiall®)

Wrought

Uba
lebronze alloys

Product Description:	Copper Nickel-Tin Bronze
Tempers:	TX 00 Solution Annealed and Spinodal Hardened
Tubes:	4.50" to 8.56" (114.30 mm to 217.42 mm) O.D.*
	*Consult Mill for Other Shapes/Sizes

Typical Uses

Aerospace	landing gear bushings and bearings, control surface and actuator bushings and bearings, wing flap bearings, wheel bearings, brakes, door hardware, hydraulic actuators, valves, steering joints, helicopter controls, compression fit airframe fasteners, electronic system connectors
Electrical	connectors, contacts, controls, miniaturized sockets, relay elements, switches
Industrial	springs, wire
Marine	marine components

Chemical Composition

Ni + Co%	Sn%	Fe%	Zn%	Mn%	Cb%	Mg%	Pb%	Cu%
14.50- 15.50	7.50- 8.50	0.50	0.50	0.30	0.10	0.15	0.02	Rem.

Chemical Composition according to AMS 4598

Note: Copper + Sum of Named Elements, 99.5% min. Single values represent maximums.

Machinability

AMS	Machinability Rating	Density (lb/in ³)	Density (g/cm ³)
AMS 4598-C72900		0.323	8.95



Mechanical Properties

AMS 4598-C72900 continued

Mechanical properties according to AMS 4598

Composition similar to UNS C72900

TX 00 Solution Annealed and Spinodal Hardened

SIZE RANGE: 1.10" (28 MM) TO 7.25" (184 MM) INCLUSIVE NOMINAL OUTSIDE DIAMETER (TUBE); FORWARD EXTRUDED

Ultimate Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "C" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min HRC	
131	903	104	717	8	30	

SIZE RANGE: 7.25" (184 MM) TO 13.6" (330 MM) INCLUSIVE NOMINAL OUTSIDE DIAMETER (TUBE); BACK EXTRUDED

Ultimate Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Rockwell "C" Hardness	Remarks
ksi	MPa	ksi	MPa	%	min HRC	
130	896	108	745	5	30	

Physical Properties

	US Customary	Metric
Melting Point – Liquidus	2039 °F	1115 °C
Melting Point – Solidus	1742 °F	950 °C
Density	0.323 lb/in ³ at 68 °F	8.94 gm/cm ³ at 20 °C
Specific Gravity	8.94	8.94
Electrical Conductivity	7.8% IACS at 68 °F	0.045 MegaSiemens/cm at 20 °C
Thermal Conductivity	17 Btu/sq ft/ft hr/°F at 68 °F	29.4 W/m at 20 °C
Coefficient of Thermal Expansion 68-572	9.1 · 10 ⁻⁶ per °F (68-572 °F)	15.8 · 10 ⁻⁶ per °C (20-300 °C)
Specific Heat Capacity	0.09 Btu/lb/°F at 68 °F	377.1 J/kg at 293 °C
Modulus of Elasticity in Tension	18500 ksi	127554 MPa
Modulus of Rigidity	7500 ksi	51711 MPa

Physical Properties provided by CDA

Fabrication Properties

Joining Technique	Suitability
Soldering	Excellent
Brazing	Excellent
Oxyacetylene Welding	Good
Gas Shielded Arc Welding	Excellent
Coated Metal Arc Welding	Excellent
Spot Weld	Excellent
Seam Weld	Excellent
Butt Weld	Excellent
Capacity for Being Cold Worked	Excellent
Capacity for Being Hot Formed	Good

Fabrication Properties provided by CDA

AMS 4880-C95510

✓ **STANDARD-STOCKED PRODUCT**

Continuous Cast | Product of Concast U.S.

Product Description:	Nickel Aluminum Bronze
Temper:	TQ50 Quench Hardened and Temper Annealed
Solids:	0.50" to 9.00" (12.70 mm to 228.60 mm) O.D.*
Tubes:	1.13" to 9.50" (28.70 mm to 241.30 mm) O.D.*
Rectangles:	Up to 15" (381 mm)
Standard Lengths:	24"***
	*Consult Mill for Other Sizes **Consult Mill for Other Lengths

Typical Uses

Aerospace

landing gear bushings and bearings, control surface and actuator bushings and bearings, wing flap bearings, wheel bearings, brakes, door hardware, hydraulic actuators, valves, steering joints, helicopter controls, compression fit airframe fasteners, electronic system connectors

Chemical Composition

Cu%	Al%	Ni, including Co%	Fe%	Mn%	Zn%	Sn%
78.00 min	9.70- 10.90	4.50- 5.50	2.00- 3.50	1.50	0.30	0.20

Chemical Composition according to AMS 4880

Note: Sum of Named Elements, 99.8% min. Single values, unless otherwise noted, represent maximums.

Machinability

AMS	Machinability Rating	Density (lb/cu in at 68 °F)
AMS 4880-C95510	50	0.272



Mechanical Properties

AMS 4880-C95510 continued

Mechanical properties according to AMS 4880
 Composition similar to UNS C95510
 TQ50 Quench Hardened and Temper Annealed

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Brinell Hardness	Remarks
ksi	MPa	ksi	MPa	%	min to max BHN	
105.0	724	62.5	431	9	192 to 248	castings <4.0 (102 mm), nominal cross-section, heat treated
95.0	655	56.0	386	9	192 to 248	castings 4.0 (102 mm)+, nominal cross-section, heat treated

Mechanical Properties according to AMS 4880

AMS 4881-C95520

Continuous Cast | Product of Concast U.S.

Product Description:	Nickel Aluminum Bronze
Temper:	TQ50 Quench Hardened and Temper Annealed
Solids:	0.50" to 4.00" (12.70 mm to 101.60 mm) O.D.*
Tubes:	1.13" to 9.50" (28.70 mm to 241.30 mm) O.D.*
Rectangles:	Up to 15" (381 mm)
Standard Lengths:	24"
	*Consult Mill for Other Sizes

Typical Uses

Aerospace

landing gear bushings and bearings, control surface and actuator bushings and bearings, wing flap bearings, wheel bearings, brakes, door hardware, hydraulic actuators, valves, steering joints, helicopter controls, compression fit airframe fasteners, electronic system connectors

Chemical Composition

Cu%	Al%	Ni%	Fe%	Mn%	Zn%	Sn%	Co%	Si%	Cr%	Pb%
74.50	10.50- min 11.50	4.20- 6.00	4.00- 5.50	1.50	0.30	0.25	0.20	0.15	0.05	0.03

Chemical Composition according to AMS 4881

Note: Sum of Named Elements, 99.8% min. Single values, unless otherwise noted, represent maximums.

Machinability

AMS	Machinability Rating	Density (lb/cu in at 68 °F)
AMS 4881-C95520	45	0.272



Mechanical Properties

AMS 4881-C95520 continued

Mechanical properties according to AMS 4881
 Composition similar to UNS C95520
 TQ50 Quench Hardened and Temper Annealed

Tensile Strength, min		Yield Strength, at .2% Offset, min		Elongation, in 4D, min	Brinell Hardness	Remarks
ksi	MPa	ksi	MPa	%	minimum BHN	
125	860	90	621	2	262 (3000 kg)	castings <2.0 (50.8 mm) nominal section thickness, heat treated

Mechanical Properties according to AMS 4881

Aerospace-Related Alloys Overview

General Information

AMS	Material Description	Temper	Applications
AMS 4640-C63000*	Aluminum Bronze	HR50 Drawn and Stress Relieved (3/8" to 3" O.D.) TQ50 Temper Annealed (over 3" O.D.)	landing gear bushings and bearings, control surface and actuator bushings and bearings, wing flap bearings, wheel bearings, brakes, door hardware, hydraulic actuators, valves, steering joints, helicopter controls, compression fit airframe fasteners, electronic system connectors
AMS 4590-C63020*	Nickel Aluminum Bronze	TQ50 Quenched and Tempered	
AMS 4631-C64200	Aluminum Bronze	Stress Relieved	
AMS 4633-C64200	Silicon Aluminum Bronze	HR50 Drawn and Stress Relieved	
AMS 4634-C64200*	Silicon Aluminum Bronze	Stress Relieved	
AMS 4596-C72900**	Copper Nickel-Tin Bronze	TX00 Solution Annealed and Spinodal Hardened	
AMS 4597-C72900**	Copper Nickel-Tin Bronze	TX TS Solution Annealed, Cold Finished and Spinodal Hardened	
AMS 4598-C72900**	Copper Nickel-Tin Bronze	TX00 Solution Annealed and Spinodal Hardened	
AMS 4880-C95510*	Nickel Aluminum Bronze	TQ50 Quench Hardened and Temper Annealed	
AMS 4881-C95520	Nickel Aluminum Bronze	Quench Hardened and Temper Annealed	

*standard-stocked alloy. [†]Concast is the exclusive North American distributor of Hardiall® C72900 produced by Lebronze Alloys.

Chemical Composition

AMS	Cu%	Pb%	Sn%	Zn%	Fe%	Ni%	Al%	Co%	Cr%	Mn%	Si%	Mg%	As%	Cb%
AMS 4640-C63000*	remainder ¹		0.20	0.30	2.00-4.00	4.00-5.50	9.00-11.00			1.50	0.25			
AMS 4590-C63020*	remainder	0.03	0.25	0.30	4.00-5.50	4.20-6.00 ²	10.00-11.00	0.20	0.05	1.50	0.15			
AMS 4631-C64200 [†]	89.00 min						6.50-8.50				1.60-2.25			
AMS 4633-C64200	remainder	0.05	0.20	0.50	0.30	0.25 ²	6.30-7.60			0.10	1.50-2.20		0.15	
AMS 4634-C64200*	remainder ¹	0.05	0.20	0.50	0.30	0.25 ²	6.30-7.60			0.10	1.50-2.20			
AMS 4596-C72900*	remainder	0.02	7.50-8.50	0.50	0.50	14.50-15.50 ²				0.30		0.15		0.10
AMS 4597-C72900*	remainder	0.02	7.50-8.50	0.50	0.50	14.50-15.50 ²				0.30		0.15		0.10
AMS 4598-C72900*	remainder	0.02	7.50-8.50	0.50	0.50	14.50-15.50 ²				0.30		0.15		0.10
AMS 4880-C95510*	78.00 min		0.20	0.30	2.00-3.50	4.50-5.50 ²	9.70-10.90			1.50				
AMS 4881-C95520	74.50 min	0.03	0.25	0.30	4.00-5.50	4.20-6.00	10.50-11.50	0.20	0.05	1.50	0.15			

¹Cu value includes Ag. ²Ni value includes Co. [†]Other elements, each, 0.05%; Other elements, total, 0.50%

*standard-stocked alloy. Note: Single values, unless otherwise noted, represent maximums.

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14315 State Route 113 | Wakeman, OH 44889 | 800.626.7071 phone | 724.538.3956 fax | sales@concast.com

www.concast.com

