COPPER INFORMATION

COPPER BERYLLIUM (C17200)
PAGE 3

NAVAL BRASS (C46400)
PAGE 6

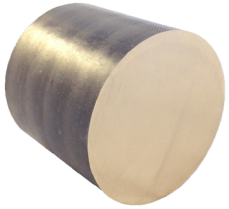
NICKEL ALUMINUM BRONZE (C63000)
PAGE 9

NICKEL ALUMINUM BRONZE (C63020)
PAGE 12

COPPER NICKEL-TIN BRONZE (C72900)
PAGE 14

MANGANESE BRONZE (C86300)
PAGE 17

LEAD-FREE BRONZE (C89835)
PAGE 20



TIN BRONZE (C90300)
PAGE 22

TIN BRONZE (C90500)
PAGE 25

TIN BRONZE (C90700)
PAGE 28

LEADED TIN BRONZE (C93200)
PAGE 31

HIGH LEADED TIN BRONZE (C93700)
PAGE 34

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COPPER INFORMATION

ALUMINUM BRONZE (C95400)

PAGE 37

NICKEL ALUMINUM BRONZE (C95500)

PAGE 40

NICKEL ALUMINUM BRONZE (C95510)

PAGE 43

NICKEL ALUMINUM BRONZE (C95520)

PAGE 46

ALUMINUM BRONZE (C95900)

PAGE 49

POWDERED METAL BRONZE (SAE841)

PAGE 50

15-5 STAINLESS STEEL (AMS 5659)

PAGE 51

17-4 STAINLESS STEEL (AMS 5643)

PAGE 53

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COPPER BERYLLIUM (C17200)

TYPICAL USES

C17200 Beryllium Copper is an excellent material for a number of applications. C172 has excellent bearing properties with extremly high compressive strengths. C17200 also has siginificant non corrosive properties when exposed to harsh conditions. This alloy also has great galling resisitance. C17200 has a relative magnetic permability very close to 1.00, making it transparent to the effect of magnetic fields. This alloy is non sparking.

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COPPER BERYLLIUM (C17200)

TYPICAL USES

Product Category	Product	Reason
Electrical	Connectors	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, High Strength, Solderability, Resistance to Stress Relaxation
	Electronic Equipment Components	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, High Strength, Resistance to Stress Relaxation
	Fuse Clips	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, High Strength
	Relay Parts	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, High Strength
	Switch Parts	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, High Strength, Resistance to Stress Relaxation
Fasteners	Fasteners	Corrosion Resistance, High Strength, Resistance to Stress Relaxation
	Lock Washers	Corrosion Resistance, High Strength, Resistance to Stress Relaxation
	Retaining Rings	Corrosion Resistance, High Strength, Resistance to Stress Relaxation
	Roll Pins	Corrosion Resistance, High Strength
Industrial	Bellows	Formability, Ductility, High Strength, Resistance to Stress Relaxation
	Bourdon Tubing	Formability, Ductility, High Strength, Resistance to Stress Relaxation
	Diaphragms	Formability, Ductility, High Strength, Resistance to Stress Relaxation
	Electrodes for Welding	Electrical Conductivity, Thermal Conductivity, High Strength
	Forgings	Corrosion Resistance, Formability, High Strength
	Machined Components	Corrosion Resistance, High Strength, Resistance to Stress Relaxation
	Plastic Mold Components	Thermal Conductivity, Wear Resistance, High Strength
	Pump Parts	Thermal Conductivity, Wear Resistance, High Strength
	Rolling Mill Parts	Corrosion Resistance, Wear Resistance, High Strength, Retains Strength at High Temperaturesc, Resistance to Stress Relaxation
	Spline Shafts	Corrosion Resistance, High Strength
	Springs	Corrosion Resistance, High Strength, Resistance to Stress Relaxation
	Steel Mold Components	Thermal Conductivity, High Strength
	Valves	Corrosion Resistance, Wear Resistance, High Strength
	Welding Equipment	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, Creep Resistant, Wear Resistance, Very High Strength, Resistance to Thermal Softening
Other	Continuous Casting, Permanent Brass	Thermal Conductivity, Corrosion Resistance, High Strength
	Non-Sparking Tools	Energy Damping, Impact Resistant, Non-Magnetic, High Strength, Non-Sparking

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COPPER BERYLLIUM (C17200)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.2% Offset (ksi)	Elongation (%)	Rockwell B scale	Rockwell C scale	Rockwell 30T scale	Fatigue Strength** (ksi)	Section Size (in)
Flat Products	TH02	182 Typ	160 Typ	4 Typ		39 Typ		42 Typ	0.188
	TH01	172 Typ	150 Typ	5 Typ		37 Typ		40 Typ	0.188
	TH04	190 Typ	170 Typ	3 Typ		40 Typ		43 Typ	0.188
	TM00	105 Typ	80 Typ	20 Typ		20 Typ			0.188
	TM02	128 Typ	105 Typ	15 Typ		27 Typ			0.188
	TM01	115 Typ	90 Typ	18 Typ		23 Typ			0.188
	TM04	142 Typ	122 Typ	12 Typ		32 Typ			0.188
	TM06	168 Typ	148 Typ	6 Typ		36 Typ			0.188
	TF00	165 Typ	145 Typ	7 Typ		35 Typ		36 Typ	0.188
	TB00	70 Typ	32 Typ	45 Typ	60 Typ		58 Typ		0.188
	TD02	92 Typ	82 Typ	15 Typ	92 Typ		77 Typ		0.188
	TD01	80 Typ	70 Typ	25 Typ	80 Typ		70 Typ		0.188
	TD04	110 Typ	104 Typ	5 Typ	99 Typ		81 Typ		0.188
Rod	TH04	178 Typ				36 Typ			<1
		183 Typ				37 Typ			1
		188 Typ				38 Typ			0.375
	TD04	105 Typ			95 Typ				1
		112 Typ			95 Typ				0.375
		100 Typ			95 Typ				<1
Shapes	TB00								
	TD04								

* Measured at room temperature, 68°F (20°C).
** Fatigue Strength: 100 x 106 cycles, unless indicated as [N] x 106.

CHEMICAL PROPERTIES

Elements					
	Cu(1,2)	Al	Be	Co(3)	Si
Min (%)			1.6	0.2	
Max (%)	Rem	0.2	1.85		0.2

(1) Cu + Sum of Named Elements 99.5% min.
(2) Cu value includes Ag.
(3) Ni value includes Co.

FABRICATION PROPERTIES

Technique	Suitability
Soldering	Good
Brazing	Good
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Good
Coated Metal Arc Welding	Good
Spot Weld	Good
Seam Weld	Fair
Butt Weld	Fair
Capacity for Being Cold Worked	Excellent
Capacity for Being Hot Formed	Good
Machinability Rating	20

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Naval Brass (C46400)

TYPICAL USES

C46400 Naval Brass is made up of 60% copper, 40% zinc with 1% tin alloy. The addition of tin allows for superb corrosion resistance in fresh water and seawater, as well as other mildly aggressive environments. This brass also offers strength combined with an excellent hot formability.

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Naval Brass (C46400)

TYPICAL USES

Product Category	Product	Reason
Builders Hardware	Lock Pins	Corrosion Resistance, Wear Resistance, Strength
Electrical	Precision Shipboard Equipment	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, Formability, Moderate Strength
Fasteners	Bolts	Appearance, Corrosion Resistance, Formability, Wear Resistance
	Nuts	Appearance, Corrosion Resistance, Moderate Strength
	Rivets	Corrosion Resistance, Formability, Moderate Strength
Industrial	Aircraft Turn buckle Barrels	Corrosion Resistance, Formability, Galling Resistance, Wear Resistance,Fatigue Resistance, Moderate Strength
	Balls	Thermal Conductivity, Corrosion Resistance, Formability, Galling Resistance,Wear Resistance, Fatigue Resistance, Moderate Strength
	Bearings	Rubber Adhesion, Corrosion Resistance, Wear Characteristics, Wear Resistance, Machinability, Moderate Strength
	Bushings	Corrosion Resistance, Galling Resistance, Wear Resistance, Moderate Strength
	Condenser Plates	Corrosion Resistance, Formability, Moderate Strength
	Dies, Golf Ball Production	Corrosion Resistance, Wear Resistance, Strength
	Heat Exchanger Tube	Thermal Conductivity, Corrosion Resistance, Moderate Strength
	Hub Cones	Corrosion Resistance, Formability, Wear Resistance, Moderate Strength
	Pressure Vessels	Corrosion Resistance, Stress Corrosion Cracking Resistance
	Structural Uses	Corrosion Resistance, Formability, Moderate Strength
	Valve Stems	Corrosion Resistance, Formability, Galling Resistance, Wear Resistance, Fatigue Resistance, Moderate Strength
	Welding Rod	Electrical Conductivity, Thermal Conductivity, Oxidation Resistance, Resistance to Thermal Softening
Marine	Decorative Fittings	Appearance, Corrosion Resistance, Formability, Moderate Strength
	Marine Hardware	Corrosion Resistance, Formability, Plateable
	Propeller Shafts	Corrosion Resistance, Formability, Galling Resistance, Wear Resistance, Fatigue Resistance, Moderate Strength
	Shafting	Corrosion Resistance, Formability, Wear Resistance, Fatigue Resistance, Moderate Strength
	Turn buckles	Corrosion Resistance, Formability, Wear Resistance, Moderate Strength
Ordnance	Missile Components	Corrosion Resistance, Strength
Other	Baffle Plates and Flanges	Corrosion Resistance
Plumbing	Fittings	Corrosion Resistance, Formability, Moderate Strength

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Naval Brass (C46400)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.5% Ext (ksi)	Elongation (%)	Rockwell B scale	Rockwell 30T scale	Shear Strength (ksi)	Torsion Modulus (ksi)	Izod (ft-lbs)	Reduction of Area (%)	Ultimate Tensile Strength in Shear (ksi)	Section Size (in)	Cold Work (%)
Flat Products	H01	70 Typ	58 Typ	17 Typ	75 Typ	68 Typ	43 Typ					0.04	
	M20	55 Typ	25 Typ	50 Typ	55 Typ	55 Typ	40 Typ					1	
	O50	60 Typ	28 Typ	45 Typ	58 Typ	56 Typ	41 Typ					0.25	
	O50	62 Typ	30 Typ	40 Typ	60 Typ	57 Typ	41 Typ					0.04	
	O60	58 Typ	25 Typ	49 Typ	56 Typ	55 Typ	40 Typ					0.25	
Flat Products & Rod	O60	58 Typ	25 Typ	49 Typ							40 Typ	0.24	
	O60	56 Typ	25 Typ	47 Typ						60 Typ	40 Typ	2	
	O60	57 Typ	25 Typ	47 Typ						60 Typ	40 Typ	1	
	O60	58 Typ	27 Typ	45 Typ						60 Typ	40 Typ	0.24	
Flat Products, Rod & Bar	H01	69 Typ	46 Typ	27 Typ						50 Typ	43 Typ	1	8
	H01	67 Typ	40 Typ	35 Typ						50 Typ	43 Typ	2	8
	H015	70 Typ	48 Typ	25 Typ						50 Typ	43 Typ	0.24	10
	H01	70 Typ	58 Typ	17 Typ							43 Typ	0.04	
	O50	62 Typ	30 Typ	40 Typ							41 Typ	0.04	
	O50	63 Typ	30 Typ	40 Typ						55 Typ	42 Typ	0.24	
	O50	60 Typ	28 Typ	45 Typ							41 Typ	0.24	
	O50	62 Typ	28 Typ	43 Typ						55 Typ	42 Typ	2	
	O50	63 Typ	30 Typ	40 Typ						55 Typ	42 Typ	1	
Rod	H02	75 Typ	53 Typ	20 Typ	82 Typ		44 Typ					1	20
	H02	80 Typ	57 Typ	20 Typ	85 Typ		45 Typ					0.25	20
	H01	70 Typ	48 Typ	25 Typ	80 Typ		43 Typ					0.25	10
	H01	69 Typ	46 Typ	27 Typ	78 Typ		43 Typ					1	8
	H01	67 Typ	40 Typ	35 Typ	75 Typ		43 Typ	5.7 Typ	32 Typ			2	8
	O50	63 Typ	30 Typ	40 Typ	60 Typ		42 Typ					1	
	O50	62 Typ	28 Typ	43 Typ	60 Typ		42 Typ					2	
	O50	63 Typ	30 Typ	40 Typ	60 Typ		42 Typ					0.25	
	O60	58 Typ	27 Typ	45 Typ	56 Typ		40 Typ					0.25	
	O60	56 Typ	25 Typ	47 Typ	55 Typ		40 Typ					2	
	O60	57 Typ	25 Typ	47 Typ	55 Typ		40 Typ					1	
Rod & Bar	H02	75 Typ	53 Typ	20 Typ						45 Typ	44 Typ	1	20
	H02	80 Typ	57 Typ	20 Typ						45 Typ	45 Typ	0.24	20

CHEMICAL PROPERTIES

	Element				
	Cu(1)	Pb	Sn	Zn	Fe
Min (%)	59.0		0.50		
Max (%)	62.0	0.20	1.0	Rem	0.10

(1) Cu + Sum of Named Elements 99.6% min.

FABRICATION PROPERTIES

Machining Technique	Suitability
Soldering	Excellent
Brazing	Excellent
Oxyacetylene Welding	Good
Gas Shielded Arc Welding	Fair
Coated Metal Arc Welding	Not Recommended
Spot Weld	Good
Seam Weld	Fair
Butt Weld	Good
Capacity for Being Cold Worked	Fair
Capacity for Being Hot Formed	Excellent
Forgeability Rating	90
Machinability Rating	30

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NICKEL ALUMINUM BRONZE (C63000)

TYPICAL USES

C63000 Nickel Aluminum Bronze is an extruded aluminum bronze that contains nickel, and is alloyed for exceptional strength and toughness. It's used where higher mechanical properties are required. It's used in equipment for the energy markets, in aircraft, marine and a host of other industrial applications. It finds use as valve stems, high strength bushings, valve guides and seats, gears, cams, ship propellers, as well as propeller nuts and shafts.

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NICKEL ALUMINUM BRONZE (C63000)

TYPICAL USES

Product Category	Product	Reason
Industrial	Aircraft Parts	Corrosion Resistance, Wear Resistance, Impact Resistant, High Strength
	Balls	Corrosion Resistance (Chemicals) (Non Oxidizing Acids) (Salt Water) (Numerous Environments), Galling Resistance, Wear Resistance, High Strength
	Bearings	Corrosion Resistance, Resistant to Abrasive Wear, Toughness, Heavy Load Strength
	Bushings	Corrosion Resistance, Resistant to Abrasive Wear, Toughness, Heavy Load Strength
	Cams	Corrosion Resistance (Chemicals) (Non Oxidizing Acids) (Salt Water) (Numerous Environments), Galling Resistance, Wear Resistance, High Strength
	Condenser Tube for Power Stations and Desalting Unit	Corrosion Resistance (Chemicals) (Non Oxidizing Acids) (Fresh Water) (Salt Water) (Numerous Environments), Wear Resistance, High Strength
	Corrosion Resistant Articles	Corrosion Resistance (Chemicals) (Non Oxidizing Acids) (Fresh Water) (Salt Water) (Numerous Environments), High Strength
	Gears	Corrosion Resistance (Chemicals) (Non Oxidizing Acids) (Salt Water) (Numerous Environments), Galling Resistance, Wear Resistance, High Strength
	Heat Exchanger Tube	Thermal Conductivity, Corrosion Resistance, Weldability, Thermal Conductivity
	Hydraulic Bushings for Earth Moving Equipment	Corrosion Resistance, Resistant to Abrasive Wear, Impact Resistant, High Strength
	Plunger Tips	Corrosion Resistance (Chemicals) (Non Oxidizing Acids) (Fresh Water) (Salt Water) (Numerous Environments), Wear Resistance, High Strength
	Pump Parts	Corrosion Resistance (Chemicals) (Non Oxidizing Acids) (Fresh Water) (Numerous Environments), Wear Resistance, High Strength
	Pump Shafts	Corrosion Resistance (Chemicals) (Non Oxidizing Acids) (Fresh Water) (Salt Water) (Numerous Environments), Wear Resistance, High Strength
	Shafting	Corrosion Resistance (Chemicals) (Non Oxidizing Acids) (Fresh Water) (Salt Water) (Numerous Environments), Wear Resistance, High Strength
	Structural Members	Corrosion Resistance (Chemicals) (Non Oxidizing Acids) (Fresh Water) (Salt Water) (Numerous Environments), High Strength
	Tanks	Electrical Conductivity, Corrosion Resistance to Chemicals, High Strength, Weldability
	Valve Balls	Cavitation Corrosion Resistance, Erosion Corrosion Resistance, Pitting Corrosion Resistance, Resistance to Corrosion by a broad variety of Corrosive Media, Retains Surface Finish, Wear Resistance
	Valve Guides	Corrosion Resistance (Chemicals) (Non Oxidizing Acids) (Fresh Water) (Salt Water) (Numerous Environments), Wear Resistance, High Strength
	Valve Seats	Corrosion Resistance (Chemicals) (Non Oxidizing Acids) (Fresh Water) (Salt Water) (Numerous Environments), Wear Resistance, High Strength
	Welded Piping Systems	Corrosion Resistance, High Strength, Weldability
Marine	Bolts	Corrosion Resistance (Chemicals) Fresh Water) (Salt Water) (Numerous Environments), Impact Resistance, High Strength
	Nuts	Corrosion Resistance (Chemicals) Fresh Water) (Salt Water) (Numerous Environments), High Strength
	Propellers	Corrosion Resistance, Wear Resistance, High Strength
	Pump Parts	Corrosion Resistance, Wear Resistance, High Strength
	Ship Propellers	Cavitation Corrosion Resistance, Corrosion Resistance to Salt Water, High Strength, Weldability
Plumbing	Fittings	Corrosion Resistance, High Strength

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NICKEL ALUMINUM BRONZE (C63000)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.5% Ext (ksi)	Elongation (%)	Rockwell B scale	Shear Strength (ksi)	Torsion Modulus (ksi)	Izod (ft-lbs)	Compressive Strength .1 in. set/in. (ksi)	Fatigue Strength** (ksi)	Section Size (in)	Cold Work (%)
Bar	M30	90 Typ	50 Typ	15 Typ	96 Typ						3	
	HR50	100 Typ	60 Typ	15 Typ	96 Typ						2	10
	HR50	110 Typ	62 Typ	15 Typ	97 Typ		6.4 Typ	12 Typ	150 Typ	37 Typ	1	10
Rod	M30	100 Typ	60 Typ	15 Typ	96 Typ	62 Typ				36 Typ	4	
	HR50	118 Typ	75 Typ	15 Typ	98 Typ	70 Typ				37 Typ	1	10
	HR50	115 Typ	65 Typ	18 Typ	96 Typ	69 Typ				38 Typ	2	10
	HR50	112 Typ	62 Typ	20 Typ	96 Typ	65 Typ				37 Typ	3	10

* Measured at room temperature, 68°F (20°C).
** Fatigue Strength: 100 x 106 cycles, unless indicated as [N] x 106.

CHEMICAL PROPERTIES

Element								
	Cu(1,2)	Sn	Zn	Fe	Ni(3)	Al	Mn	Si
Min (%)				2	4	9		
Max (%)	Rem	0.2	0.3	4	5.5	11	1.5	0.25

(1) Cu + Sum of Named Elements 99.5% min.(2) Cu value includes Ag.(3) Ni value includes Co.

FABRICATION PROPERTIES

Machining 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
Machinability Rating	30

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NICKEL ALUMINUM BRONZE (C63020)

TYPICAL USES

C63020 AMS 4590 Nickel Aluminum Bronze is an extra high strength nickel aluminum bronze alloy. This alloy is heat treated and martensitic. C63020 is the strongest in the Nickel Aluminum Bronze family and sometimes can be a substitute for Beryllium Copper. Originally developed for aircraft components in retractable landing assemblies, this alloy is ideal for applications involving very heavy loads, extreme abrasive wear, corrosion service, friction, deformation, and high temperatures.

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NICKEL ALUMINUM BRONZE (C63020)

TYPICAL USES

Product Category	Product	Reason
Industrial	Bearings	Corrosion Resistance, Resistant to Abrasive Wear, Resistant to Adhesive Wear Toughness, Heavy Load Strength
	Bushings	Corrosion Resistance, Heavy Load Strength, Resistance to Abrasive Wear, Resistance to Adheasive Wear
	Forming Dies for Roll Bearings	Heavy Duty, High Mechanical Loading, High Strength
	Hydraulic Bushings for Earth Moving Equipment	Corrosion Resistance, Resistant to Abrasive Wear, Impact Resistant, High Strength
	Valve Balls	Cavitation Corrosion Resistance, Erosion Corrosion Resistance, Pitting Corrosion Resistance, Resistance to Corrosion by a broad variety of Corrosive Media, Retains Surface Finish, Wear Resistance
	Valve Parts - Cryogenic	Corrosion Resistance, High Strength

CHEMICAL PROPERTIES

Elements										
	Cu(1,2)	Pb	Sn	Zn	Fe	Ni(3)	Al	Co	Cr	Mn
Min (%)	74.5				4.0	4.2	10.0			
Max (%)		0.03	0.25	0.30	5.5	6.0	11.0	0.20	0.05	1.5
(1) Cu + Sum of Named Elements 99.5% min.(2) Cu value includes Ag.(3) Ni value includes Co.										

FABRICATION PROPERTIES

Machining 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
Machinability Rating	30

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COPPER NICKEL-TIN BRONZE (C72900)

TYPICAL USES

Hardiall is used in aircrafts in various components thanks to its outstanding physical and mechanical properties, matching the stringent needs of the aircraft and aerospace industries. Because of these same characteristics, C729 is in high demand for the oil and gas industry, and others as well.

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COPPER NICKEL-TIN BRONZE (C72900)

TYPICAL USES

Product Category	Product	Reason
Electrical	Connectors	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, Resistant to Oxidation, Formability, High Modulus of Elasticity, Very High Strength, Resistance to Stress Relaxation
	Contacts	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, Resistant to Oxidation, Formability, High Modulus of Elasticity, Very High Strength, Resistance to Stress Relaxation
	Controls	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, High Strength
	Miniaturized Sockets	Corrosion Resistance, Formability, High Modulus of Elasticity, Very High Strength
	Relay Elements	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, Resistant to Oxidation, Formability, High Modulus of Elasticity, Very High Strength, Resistance to Stress Relaxation
	Switches	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, High Strength
Industrial	Springs	Corrosion Resistance, Resistant to Oxidation, Formability, High Modulus of Elasticity, Very High Strength, Resistance to Stress Relaxation
	Wire	Corrosion Resistance, Resistant to Oxidation, Formability, High Modulus of Elasticity, Very High Strength

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COPPER NICKEL-TIN BRONZE (C72900)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.2% Offset (ksi)	YS-0.5% Ext (ksi)	YS-0.05% Offset	Elongation (%)
Strip	TS02	145 Min for Standard			125 Min for Standard	3 Typ
	TS01	130 Min for Standard			105 Min for Standard	4 Typ
	TS03	155 Min for Standard			135 Min for Standard	2 Typ
	TS04	165 Min for Standard			145 Min for Standard	2 Typ
	TM02	105 Min for Standard	90 Min for Standard		80 Min for Standard	15 Typ
	TM00	95 Min for Standard	75 Min for Standard		70 Min for Standard	22 Typ
	TM04	115 Min for Standard	105 Min for Standard		95 Min for Standard	10 Typ
	TM08	150 Min for Standard	140 Min for Standard		125 Min for Standard	2 Typ
	TM06	130 Min for Standard	120 Min for Standard		105 Min for Standard	6 Typ
	TB00	64 Min for Standard			24 Min for Standard	32 Typ
	TD02	85 Min for Standard				8 Typ
	TD01	75 Min for Standard			50 Min for Standard	18 Typ
	TD03	95 Min for Standard			80 Min for Standard	3 Typ
	TD04	100 Min for Standard			85 Min for Standard	
	TX00	120 Min for Standard			95 Min for Standard	6 Typ

* Measured at room temperature, 68°F (20°C).

CHEMICAL PROPERTIES

Elements									
Cu(1,2)	Pb(3)	Sn	Zn	Fe	Ni(4)	Mg	Mn	Nb	
Min (%)			7.5			14.5			
Max (%)	Rem	0.02	8.5	0.5	0.5	15.5	0.15	0.3	0.1

(1) Cu + Sum of Named Elements 99.7% min.
(2) Cu value includes Ag.
(3) 0.005% Pb max. for hot rolling.
(4) Ni value includes Co.

FABRICATION PROPERTIES

Machining 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

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MANGANESE BRONZE (C86300)

TYPICAL USES

Mangenese Bronze can operate at low speeds under heavy loads, but require high shaft hardness and nonabrasive operating conditions. This alloy has excellent mechanical qualities and good corrosion resistance. This alloy is compromised of copper, manganese, aluminum and iron. This combination raises the tensile strength.

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MANGANESE BRONZE (C86300)

TYPICAL USES

Product Category	Product	Reason
Builders Hardware	Brackets	Corrosion Resistance, Wear Resistance, High Strength
Electrical	Electrical Components	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, High Strength
	Switches	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, High Strength
Fasteners	Screw Down Nuts	Corrosion Resistance, High Strength
Industrial	Bridge Pins	Corrosion Resistance, Wear Resistance, High Strength
	Bushings	Corrosion Resistance, Wear Resistance, High Strength
	Cams	Corrosion Resistance, Wear Resistance, High Strength
	Forming Dies for Wood Pulp Industry	Corrosion Resistance, Wear Resistance, High Strength
	Frames	Corrosion Resistance, High Strength
	Gears	Corrosion Resistance, Wear Resistance, High Strength
	Gib	Corrosion Resistance, Wear Resistance, High Strength
	High Strength Machine Parts	Thermal Conductivity, Corrosion Resistance, Wear Resistance, High Strength
	Hooks	Corrosion Resistance, High Strength
	Hydraulic Cylinder Parts	Corrosion Resistance, Wear Resistance, High Strength
	Large Valve Stems	Corrosion Resistance, Wear Resistance, High Strength
	Propellers	Corrosion Resistance, Wear Resistance, High Strength
	Slow Speed, Heavy Load Bearings	Corrosion Resistance, Wear Resistance, High Strength
	Struts	Corrosion Resistance, High Strength
	Wear Rings for Forming Dies for Wood Pulp Industry	Corrosion Resistance, Wear Resistance, High Strength
Marine	Boat Parts	Corrosion Resistance, Wear Resistance, High Strength
	Clamps	Corrosion Resistance, Wear Resistance, High Strength
	Covers for Marine Hardware	Appearance, Corrosion Resistance, Wear Resistance, High Strength
	Marine Hardware	Appearance, Corrosion Resistance, High Strength
	Rudders	Corrosion Resistance, Wear Resistance, High Strength

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MANGANESE BRONZE (C86300)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.2% Offset	YS-0.5% Ext (ksi)	Elongation (%)	Brinell Hardness, 3000 kg load	Izod (ft-lbs)	Charpy V-Notch Impact Strength (ft-lbs)	Compression Deformation Limit (ksi)	Compressive Strength .001 in. set/in. (ksi)	Compressive Strength .1 in. set/in. (ksi)	Creep Strength (0.1% per 10,000 hours) (ksi)	Fatigue (ksi)
As Centrifugal Cast	M02	110 Min for Standard	83 Typ	65 Typ	12 Min for Standard								
As Continuous Cast	M07	110 Min for Standard		62 Min for Standard	14 Min for Standard								
As Sand Cast	M01	110 Min for Standard 119 Typ		60 Min for Standard 62 Typ	12 Min for Standard 18 Typ	223 Min for Standard 225 Typ	15 Typ	12 Typ	55 Min for Standard	60 Typ	97 Typ	19 Typ	25 Typ

* Measured at room temperature, 68°F (20°C).
** Fatigue Strength: 100 x 106 cycles, unless indicated as [N] x 106.

CHEMICAL PROPERTIES

	Element							
	Cu(1,2)	Pb	Sn	Zn	Fe	Ni(3)	Al	Mn
Min (%)	60			22	2		5	2.5
Max (%)	66	0.2	0.2	28	4	1	7.5	5

(1) Cu + Sum of Named Elements 99.5% min.
(2) Cu value includes Ag.
(3) Ni value includes Co.

FABRICATION PROPERTIES

Machining Technique	Suitability
Soldering	Poor
Brazing	Poor
Oxyacetylene Welding	Poor
Gas Shielded Arc Welding	Poor
Coated Metal Arc Welding	Good
Machinability Rating	8

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LEAD-FREE BRONZE (C86835)

TYPICAL USES

C89835 is a “Lead Free” alternative for C93200 Bearing Bronze. When an application requires the properties of C932 Bearing Bronze but needs to be “lead free”, C89835 Bismuth Tin Bronze can be used. C89835 Bismuth Tin Bronze utilizes Bismuth as a Lead replacement.Bismuth and Lead both have relativily low solubility in copper alloys. As such, during casting, these elements solidify into low melt point pools throught the alloy matrix, filling porosity voids and providing advantages for chip breakage during machining.

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LEAD-FREE BRONZE (C86835)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.5% Ext (ksi)	Elongation (%)	Brinell Hardness, 500 kg load	Izod (ft-lbs)
As Sand Cast	M01	35 Typ	18 Typ	20 Typ	65 Typ	8 Typ
* Measured at room temperature, 68°F (20°C).						

CHEMICAL PROPERTIES

Element												
	Cu(1,2)	Pb	Sn	Zn	Fe	P	Ni(3)	Al	Bi	S	Sb	Si
Min (%)	85		6	2					1.7			
Max (%)	89	0.09	7.5	4	0.2	0.1	1	0.005	2.7	0.08	0.35	0.005

(1) Cu + Sum of Named Elements 99.0% min.
(2) 0.01 - 2.0% as any single or combination of Ce La or other rare earth(x) elements as agreed upon. (x)ASM International definition: one of the group of chemically similar metals with atomic numbers 57 through 71 commonly refered to as lanthanides
(3) Ni value includes Co.

FABRICATION PROPERTIES

Machining Technique	Suitability
Soldering	Excellent
Brazing	Good
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Not Recommended
Coated Metal Arc Welding	Not Recommended
Machinability Rating	70

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TIN BRONZE (C90300)

TYPICAL USES

C90300 SAE 620 Tin Bronze is often used in high load, low speed applications. C903 Bronze has excellent wear properties. As the name may imply “Navy G” bronze is used in various marine applications due to its excellent resistance to corrosion. A member of the High Tin Bronze Alloy family C90300 Bronze is used in similar ways as the other alloys of this family.

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TIN BRONZE (C90300)

TYPICAL USES

Product Category	Product	Reason
Building	Heavy Construction Equipment	Corrosion Resistance, Wear Resistance, Moderate Strength, Pressure Tight up to 260 C
Fasteners	Swivel	Corrosion Resistance, Low Co-efficient of Friction, Wear Resistance, Moderate Strength
Industrial	Bearings	Corrosion Resistancec, Low Co-efficient of Friction, Wear Resistance, Moderate Strength
	Bushings	Corrosion Resistancec, Low Co-efficient of Friction, Wear Resistance, Moderate Strength
	Gear Blanks	Corrosion Resistancec, Low Co-efficient of Friction, Wear Resistance, Moderate Strength
	Gears	Corrosion Resistance, Wear Resistance, Moderate Strength
	Piston Rings	Corrosion Resistance, Wear Resistance, Moderate Strength, Pressure Tight up to 260 C
	Pump Bodies	Corrosion Resistance, Moderate Strength, Pressure Tight up to 260 C
	Pump Impellers	Corrosion Resistance, Wear Resistance, Moderate Strength
	Valve Bodies	Corrosion Resistance, Wear Resistance, Machinability - Good, Moderate Strength, Pressure Tight up to 260 C
	Valves	Corrosion Resistance, Wear Resistance, Machinability - Good, Moderate Strength
Plumbing	Steam Fittings	Corrosion Resistance, Wear Resistance, Moderate Strength, Pressure Tight up to 260 C

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TIN BRONZE (C90300)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.5% Ext (ksi)	Elongation (%)	Brinell Hardness, 500 kg load	Izod (ft-lbs)	Charpy V-Notch Impact Strength (ft-lbs)	Compressive Strength .001 in. set/in. (ksi)
As Centrifugal Cast	M02	40 Min for Standard 40 Min for Standard 45 Typ	18 Min for Standard 18 Min for Standard 21 Typ	20 Min for Standard 20 Min for Standard 30 Typ	70 Typ		14 Typ	13 Typ
As Continuous Cast	M07	44 Min for Standard 44 Min for Standard	22 Min for Standard 22 Min for Standard	18 Min for Standard 18 Min for Standard				
As Sand Cast	M01	40 Min for Standard 40 Min for Standard 45 Typ	18 Min for Standard 18 Min for Standard 21 Typ	20 Min for Standard 20 Min for Standard 30 Typ	70 Typ	14 Typ	14 Typ	13 Typ

* Measured at room temperature, 68°F (20°C).

CHEMICAL PROPERTIES

	Element										
	Cu(1,2)	Pb	Sn	Zn	Fe	P(3)	Ni(4)	Al	S	Sb	Si
Min (%)	86		7.5	3							
Max (%)	89	0.3	9	5	0.2	0.05	1	0.005	0.05	0.2	0.005

(1) In determining Cu min., Cu may be calculated as Cu + Ni.
(2) Cu + Sum of Named Elements 99.4% min.
(3) For continuous castings P shall be 1.5% max.
(4) Ni value includes Co.

FABRICATION PROPERTIES

Machining Technique	Suitability
Soldering	Excellent
Brazing	Good
Oxyacetylene Welding	Fair
Gas Shielded Arc Welding	Fair
Coated Metal Arc Welding	Fair
Machinability Rating	30

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TIN BRONZE (C90500)

TYPICAL USES

C90500 SAE62 Bronze is also referred to as “Gun Metal”. This Bronze alloy belongs to the High Tin Bronze Family of Alloys. As with the other alloys in this family, C905 Bronze has excellent qualities for applictions requiring heavy load bearing capabiltiy under slow speeds.

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TIN BRONZE (C90500)

TYPICAL USES

Product Category	Product	Reason
Builders Hardware	Clamps	Corrosion Resistance, Moderate Strength
Building	Heavy Construction Equipment	Corrosion Resistance, Wear Resistance, Moderate Strength, Pressure Tight up to 260 C
Electrical	Connectors	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance, Moderate Strength
Fasteners	Nuts	Corrosion Resistance, Moderate Strength
Industrial	Bearings	Corrosion Resistance, Low Co-efficient of Friction, Low Co-efficient of Friction, Wear Resistance, Moderate Strength
	Bushings	Corrosion Resistance, Low Co-efficient of Friction, Wear Resistance, Moderate Strength
	Expansion Bearings	Corrosion Resistance, Wear Resistance, Moderate Strength
	Finishing Dies for Wood Pulp Industry	Corrosion Resistance, Wear Resistance, Moderate Strength, Pressure Tight up to 260 C
	Gear Blanks	Corrosion Resistance, Wear Resistance, Machinability - Good, Moderate Strength
	Gears	Corrosion Resistance, Low Co-efficient of Friction, Wear Resistance, Machinability - Good, Moderate Strength
	Piston Rings	Corrosion Resistance, Wear Resistance, Moderate Strength, Pressure Tight up to 260 C
	Pump Bodies	Corrosion Resistance, Moderate Strength, Pressure Tight up to 260 C
	Pump Bodies	Corrosion Resistance to Fresh Water
	Pump Impellers	Corrosion Resistance, Wear Resistance, Moderate Strength, Pressure Tight up to 260 C
	Seal Rings	Corrosion Resistance, Wear Resistance, Moderate Strength
	Valve Bodies	Corrosion Resistance, Wear Resistance, Moderate Strength, Pressure Tight up to 260 C
	Valves	Corrosion Resistance, Wear Resistance, Moderate Strength
	Worm Gears	Corrosion Resistance, Wear Resistance, Moderate Strength
Plumbing	Steam Fittings	Corrosion Resistance, Moderate Strength, Pressure Tight up to 260 C
	Water Conditioners	Corrosion Resistance, Moderate Strength

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TIN BRONZE (C90500)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.5% Ext (ksi)	Elongation (%)	Brinell Hardness, 500 kg load	Izod (ft-lbs)	Compressive Strength .01 in. set/ in. (ksi)	Fatigue Strength** (ksi)	Reduction of Area (%)
As Centrifugal Cast	M02	40 Min for Standard 40 Min for Standard 45 Typ	18 Min for Standard 18 Min for Standard 22 Typ	20 Min for Standard 20 Min for Standard 25 Typ	75 Typ	10 Typ	40 Typ	13 Typ	
As Continuous Cast	M07	44 Min for Standard 44 Min for Standard	25 Min for Standard 25 Min for Standard	10 Min for Standard 10 Min for Standard					
As Sand Cast	M01	40 Min for Standard 40 Min for Standard 45 Typ	18 Min for Standard 18 Min for Standard 22 Typ	20 Min for Standard 20 Min for Standard 25 Typ	75 Typ	10 Typ	40 Typ	13 Typ 13 Typ	40 Typ

* Measured at room temperature, 68°F (20°C).

CHEMICAL PROPERTIES

	Element										
	Cu(1,2)	Pb	Sn	Zn	Fe	P(3)	Ni(4)	Al	S	Sb	Si
Min (%)	86.0		9.0	1.0							
Max (%)	89.0	0.30	11.0	3.0	0.20	0.05	1.0	0.005	0.05	0.20	0.005

(1) Cu + Sum of Named Elements 99.7% min.
(2) In determining Cu min., Cu may be calculated as Cu + Ni.
(3) For continuous castings P shall be 1.5% max.
(4) Ni value includes Co.

FABRICATION PROPERTIES

Machining Technique	Suitability
Soldering	Excellent
Brazing	Good
Oxyacetylene Welding	Fair
Gas Shielded Arc Welding	Fair
Coated Metal Arc Welding	Fair
Machinability Rating	30

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TIN BRONZE (C90700)

TYPICAL USES

The Bronze Alloy of choice for worm gears is C90700 (SAE65) High Tin Bronze. This has been the predominant bronze alloy for gear manufacturing throughout the 20th century, and continues to prevail today. High Tin Bronze Alloys include those which contain at least 6% tin. The addition of tin to these alloys is designed to strengthen the bronze.

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TIN BRONZE (C90700)

TYPICAL USES

Product Category	Product	Reason
Industrial	Bearings	Corrosion Resistance, Low Co-efficient of Friction, Wear Resistance, Moderate Strength
	Bearings for Heavy Loads and Relatively Low Speeds	Corrosion Resistance, Low Co-efficient of Friction, Wear Resistance, Moderate Strength
	Gear Boxes	Good Resistance to Corrosion, Wear Resistance, Machinability - Good, Moderate Strength, Pressure Tight up to 260 C
	Gears	Corrosion Resistance, Low Co-efficient of Friction, Wear Resistance, Machinability - Good, Moderate Strength
	Restaurant Equipment	Appearance, Corrosion Resistance, Machinability - Good, Moderate Strength, Pressure Tight up to 260 C
	Speed Reducers	Corrosion Resistance, Low Co-efficient of Friction, Wear Resistance, Moderate Strength
	Valve Bodies	Wear Resistance, Moderate Strength, Pressure Tight up to 260 C
	Worm Gears	Low Co-efficient of Friction, Wear Resistance, Machinability - Good, Moderate Strength
	Worm Wheels	Corrosion Resistance, Low Co-efficient of Friction, Wear Resistance, Machinability - Good, Moderate Strength

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TIN BRONZE (C90700)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.5% Ext (ksi)	Elongation (%)	Brinell Hardness, 500 kg load	Fatigue Strength** (ksi)
As Centrifugal Cast	M02	50 Min for Standard	28 Min for Standard	12 Min for Standard	95 Min for Standard	
		55 Typ	30 Typ	16 Typ	102 Typ	
As Continuous Cast	M07	40 Min for Standard	25 Min for Standard	10 Min for Standard		
		40 Min for Standard	25 Min for Standard	10 Min for Standard		
As Permanent Mold Cast	M05	55 Typ	30 Typ	16 Typ	102 Typ	
As Sand Cast	M01	35 Min for Standard	17 Min for Standard	10 Min for Standard	65 Min for Standard	25 Typ

* Measured at room temperature, 68°F (20°C).
** Fatigue Strength: 100 x 106 cycles, unless indicated as [N] x 106.

CHEMICAL PROPERTIES

Element											
	Cu(1,2)	Pb	Sn	Zn	Fe	P(3)	Ni(4)	Al	S	Sb	Si
Min (%)	88		10								
Max (%)	90	0.5	12	0.5	0.15	0.3	0.5	0.005	0.05	0.2	0.005

(1) Cu + Sum of Named Elements 99.4% min.
(2) In determining Cu min., Cu may be calculated as Cu + Ni.
(3) For continuous castings P shall be 1.5% max.
(4) Ni value includes Co.

FABRICATION PROPERTIES

Machining Technique	Suitability
Soldering	Excellent
Brazing	Good
Oxyacetylene Welding	Fair
Gas Shielded Arc Welding	Fair
Coated Metal Arc Welding	Fair
Machinability Rating	20

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LEADED TIN BRONZE (C93200)

TYPICAL USES

Bronze Bars C93200 (SAE 660) are high quality smooth machine finish stock for general utility bearings and bushings and which are highly resistant to impact, wear and corrosion. It is a general purpose bearing alloy possessing good anti-friction properties, ample strength and hardness, adequate ductility and excellent machinability. It is used as bearings, bushings, light duty gears and sprockets, impellers, wear strips, plates, automotive fittings and washers. It is used extensively in pumps, cylinders, machine tools, earth moving machinery and a myriad of general purpose applications.

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LEADED TIN BRONZE (C93200)

TYPICAL USES

Product Category	Product	Reason
Automotive	Automotive Fittings	Corrosion Resistance, Machinability - Good, Relatively Low Strength
Fasteners	Washers	Corrosion Resistance, Machinability - Good, Relatively Low Strength
Industrial	Bearings	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Bearings for Cranes	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Bushings	Corrosion Resistance, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Diesel Engine Wrist Pin Bushings	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Fittings	Corrosion Resistance, Machinability - Good, Relatively Low Strength
	Forging Press Toggle Lever Bearings	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Fuel Pump Bushings	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	General Purpose Bushings	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Hydraulic Press Main Lining	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Hydraulic Press Stuffing Box	Corrosion Resistance, Machinability - Good, Relatively Low Strength, Pressure Tight
	Insert Bearings	Corrosion Resistance, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Linkage Bushings for Presses	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Machine Parts	Thermal Conductivity, Corrosion Resistance, Anti-Seizing Properties, Wear Resistance, Machinability - Good, Relatively Low Strength
	Machine Tool Bearings	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Main Spindle Bearings	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Pump Fixtures	Corrosion Resistance, Machinability - Good, Relatively Low Strength
	Pump Impellers	Corrosion Resistance, Wear Resistance, Machinability - Good, Relatively Low Strength
	Pumps	Corrosion Resistance, Wear Resistance, Machinability - Good, Relatively Low Strength, Pressure Tight
	Roll Neck Bearings	Corrosion Resistance, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Rolling Mill Bearings	Corrosion Resistance, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Thrust Washers	Corrosion Resistance, Wear Resistance, Machinability - Good, Relatively Low Strength
	Trunion Bearings	Corrosion Resistance, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength
	Water Pump Bushings	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Machinability - Good, Relatively Low Strength

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LEADED TIN BRONZE (C93200)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.5% Ext (ksi)	Elongation (%)	Brinell Hardness, 500 kg load	Izod (ft-lbs)	Compressive Strength .1 in. set/in. (ksi)	Fatigue Strength** (ksi)	Proportional Limit (ksi)
As Centrifugal Cast	M02	30 Min for Standard	14 Min for Standard	15 Min for Standard					
As Continuous Cast	M07	35 Min for Standard 35 Min for Standard	20 Min for Standard 20 Min for Standard	10 Min for Standard 10 Min for Standard					
As Sand Cast	M01	30 Min for Standard 30 Min for Standard 35 Typ	14 Min for Standard 14 Min for Standard 18 Typ	15 Min for Standard 15 Min for Standard 20 Typ	65 Typ	6 Typ	46 Typ	16 Typ	8.5 Typ

* Measured at room temperature, 68°F (20°C).
** Fatigue Strength: 100 x 106 cycles, unless indicated as [N] x 106.

CHEMICAL PROPERTIES

	Element										
	Cu(1,2)	Pb	Sn	Zn	Fe	P(3)	Ni(4)	Al	S	Sb	Si
Min (%)	81	6	6.3	1							
Max (%)	85	8	7.5	4	0.2	0.15	1	0.005	0.08	0.35	0.005

(1) Cu + Sum of Named Elements 99.0% min.
(2) In determining Cu min., Cu may be calculated as Cu + Ni.
(3) For continuous castings P shall be 1.5% max.
(4) Ni value includes Co.

FABRICATION PROPERTIES

Machining Technique	Suitability
Soldering	Excellent
Brazing	Good
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Not Recommended
Coated Metal Arc Welding	Not Recommended
Machinability Rating	70

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HIGH LEADED TIN BRONZE (C93700)

TYPICAL USES

C93700 SAE 64 Bearing Bronze is a good general bearing material. Alloy C937 is known for it's corrosion resistance to mildly acidic mine waters and paper mill sulfite. The addition of lead to this alloy makes it easy to machine. C93700 has a machinability rating of 80.

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HIGH LEADED TIN BRONZE (C93700)

TYPICAL USES

Product Category	Product	Reason
Builders Hardware	Brackets	Corrosion Resistance, Machinability - Good, Relatively Low Strength
Fasteners	Nuts	Corrosion Resistance, Wear Resistance, Excellent Machinability
	Washers for Engines	Corrosion Resistance, Wear Resistance, Excellent Machinability
Industrial	Applications Requiring Acid Resistance to Sulphite Fluids	Corrosion Resistance, Wear Resistance, Excellent Machinability
	Bearing Plates	Corrosion Resistance, Wear Resistance, Machinability - Good, Relatively Low Strength
	Bearings	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Excellent Machinability
	Bushings	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Excellent Machinability
	Bushings for high speed and heavy pressure.	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance
	Corrosion Resistant Castings	Corrosion Resistance, Wear Resistance, Excellent Machinability
	Crank Shafts	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Excellent Machinability
	High Speed, Heavy Load Bearings	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance, Excellent Machinability
	Impellers	Corrosion Resistance, Wear Resistance, Excellent Machinability
	Machine Parts	Thermal Conductivity, Corrosion Resistance, Anti-Seizing Properties, Wear Resistance, Excellent Machinability
	Parts for Steel Mill Maintenance	Corrosion Resistance, Wear Resistance, Excellent Machinability, Retains Strength at Elevated Temperatures
	Pressure Tight Castings	Corrosion Resistance, Wear Resistance, Excellent Machinability, Pressure Tight to 260 C
	Pumps	Corrosion Resistance, Anti-Seizing Properties, Wear Resistance
	Slide Guides for Steel Mills	Corrosion Resistance, Wear Resistance, Excellent Machinability, Retains Strength at Elevated Temperatures
Marine	Large Bearings for Ships	Corrosion Resistance, Anti-Seizing Properties, Low Coefficient of Friction, Wear Resistance

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HIGH LEADED TIN BRONZE (C93700)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.2% Offset	YS-0.5% Ext (ksi)	Elongation (%)	Brinell Hardness, 500 kg load	Shear Strength (ksi)	Izod (ft-lbs)	Charpy V-Notch Impact Strength (ft-lbs)	Compressive Strength .001 in. set/in. (ksi)	Compressive Strength .1 in. set/in. (ksi)	Creep Strength (0.1% per 10,000 hours) (ksi)	Fatigue Strength** (ksi)	Proportional Limit (ksi)
As Centrifugal Cast	M02	30 Min for Standard 30 Min for Standard		12 Min for Standard 12 Min for Standard	15 Min for Standard 15 Min for Standard									
As Continuous Cast	M07	35 Min for Standard 35 Min for Standard 40 Min for Standard		25 Min for Standard 20 Min for Standard 20 Min for Standard	6 Min for Standard 6 Min for Standard									
As Sand Cast	M01	30 Min for Standard 30 Min for Standard 30 Min for Standard 35 Typ	16 Typ	12 Min for Standard 12 Min for Standard 12 Min for Standard 18 Typ	15 Min for Standard 15 Min for Standard 20 Typ	60 Typ	18 Typ	5 Typ	11 Typ	13 Typ	47 Typ	10 Typ 1.4 Typ 7.4 Typ	13 Typ	8 Typ

* Measured at room temperature, 68°F (20°C).
** Fatigue Strength: 100 x 106 cycles, unless indicated as [N] x 106.

CHEMICAL PROPERTIES

	Element										
	Cu(1)	Pb	Sn	Zn	Fe(2)	P(3)	Ni(4)	Al	S	Sb	Si
Min (%)	78	8	9								
Max (%)	82	11	11	0.8	0.7	0.1	0.5	0.005	0.08	0.5	0.005

(1) Cu + Sum of Named Elements 99.0% min.
(2) Fe shall be 0.35% max. when used for steel-backed bearings
(3) For continuous castings P shall be 1.5% max.
(4) Ni value includes Co.

FABRICATION PROPERTIES

Machining Technique	Suitability
Soldering	Good
Brazing	Good
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Not Recommended
Coated Metal Arc Welding	Not Recommended
Machinability Rating	80

CONTACT US
360 Sheldon Drive
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519-622-7900
barstock@bearingbronze.com

ALUMINUM BRONZE (C95400)

TYPICAL USES

C95400 Aluminum Bronze is a tough, hard, aluminum bronze that resists wear, abrasion, and deformations under high compressive loads. When mating with dissimilar metals, C95400 Aluminum Bronze prolongs part life, cuts maintenance costs, friction, galling, and seizing are reduced.

CONTACT US

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ALUMINUM BRONZE (C95400)

TYPICAL USES

Product Category	Product	Reason
Automotive	Weld Guns	Thermal Conductivity, Corrosion Resistance (Excellent), Wear Resistance, Machinability - Good, High Strength, Moderate Strength, Retains Strength at Elevated Temperatures
Fasteners	Large Hold Down Screws	Corrosion Resistance (Excellent), Machinability - Good, High Strength
	Nuts	Corrosion Resistance (Excellent), High Strength
Industrial	Bearing Segments for the Steel Industry	Corrosion Resistance (Excellent), Wear Resistance, High Strength, Retains Strength at Elevated Temperatures, Toughness
	Bearings	Corrosion Resistance (Excellent), Wear Resistance, High Strength, Retains Strength at Elevated Temperatures, Toughness
	Bushings	Corrosion Resistance (Excellent), Wear Resistance, Machinability - Good, High Strength
	Gears	Corrosion Resistance (Excellent), Wear Resistance, Excellent Machinability, High Strength
	Heavily Loaded Worm Gears	Corrosion Resistance (Excellent), Wear Resistance, Machinability - Good, High Strength
	High Strength Clamps	Corrosion Resistance (Excellent), High Strength
	Landing Gear Parts	Corrosion Resistance (Excellent), Wear Resistance, Fatigue Properties, High Strength
	Machine Parts	Thermal Conductivity, Corrosion Resistance (Excellent), Wear Resistance, Excellent Machinability, High Strength, Retains Strength at Elevated Temperatures
	Pawl	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Pickling Hooks	Corrosion Resistance (Excellent), Corrosion Resistance to Acids, Wear Resistance, High Strength
	Pressure Blocks for the Steel Industry	Corrosion Resistance (Excellent), Wear Resistance, High Strength, Retains Strength at Elevated Temperatures
	Pump Parts	Corrosion Resistance (Excellent), Wear Resistance, Machinability - Good, High Strength
	Spur Gears	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Valve Bodies	Corrosion Resistance (Excellent), Wear Resistance, Machinability - Good, High Strength
	Valve Guides	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Valve Seats	Corrosion Resistance (Excellent), Wear Resistance, Excellent Machinability, High Strength
	Valves	Corrosion Resistance (Excellent), Wear Resistance, Machinability - Good, High Strength
	Worm Gears	Corrosion Resistance (Excellent), Wear Resistance, Machinability - Good, High Strength
Marine	Covers for Marine Hardware	Appearance, Corrosion Resistance (Excellent), Corrosion Resistance to Salt Water, High Strength
	Ship Building	Appearance, Corrosion Resistance (Excellent), Corrosion Resistance to Salt Water, Wear Resistance, High Strength
Ordnance	Government Fittings	Corrosion Resistance (Excellent), Wear Resistance, Excellent Machinability, High Strength

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ALUMINUM BRONZE (C95400)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.5% Ext (ksi)	Elongation (%)	Brinell Hardness, 3000 kg load	Shear Strength (ksi)	Izod (ft-lbs)	Charpy V-Notch Impact Strength (ft-lbs)	Charpy Un-Notched Impact Strength	Compressive Strength .1 in. set/in. (ksi)	Creep Strength (0.1% per 10,000 hours) (ksi)	Fatigue Strength**	Proportional Limit (ksi)
As Centrifugal Cast	M02	75 Min for Standard 75 Min for Standard 75 Min for Standard	30 Min for Standard 30 Min for Standard 30 Min for Standard	12 Min for Standard 12 Min for Standard	150 Min for Standard								
	TQ50	90 Min for Standard 90 Min for Standard	45 Min for Standard 45 Min for Standard	6 Min for Standard 6 Min for Standard	190 Min for Standard								
As Continuous Cast	M07	85 Min for Standard 85 Min for Standard	32 Min for Standard 32 Min for Standard	12 Min for Standard 12 Min for Standard									
	TQ50	95 Min for Standard 95 Min for Standard	45 Min for Standard 45 Min for Standard	10 Min for Standard 10 Min for Standard									
As Permanent Mold Cast	M05	100 Min for Standard 105 Typ	40 Min for Standard 46 Typ	10 Min for Standard 11 Typ									
As Sand Cast	M01	75 Min for Standard 75 Min for Standard	30 Min for Standard 30 Min for Standard	12 Min for Standard	150 Min for Standard								
	M01	75 Min for Standard 75 Min for Standard 75 Min for Standard 85 Typ	30 Min for Standard 30 Min for Standard 30 Min for Standard 35 Typ	12 Min for Standard 12 Min for Standard 18 Typ	150 Min for Standard 170 Typ	47 Typ	16 Typ		11 Typ	100 Typ	7.4 Typ 2.9 Typ 17 Typ 4.4 Typ	28 Typ	17 Typ
	TQ50	90 Min	45 Min	6 Min	190 Min								
	TQ50	90 Min for Standard 90 Min for Standard 105 Typ	45 Min for Standard 45 Min for Standard 54 Typ	6 Min for Standard 6 Min for Standard 8 Typ	190 Min for Standard 195 Typ	50 Typ	11 Typ	7 Typ		120 Typ		35 Typ	28 Typ

* Measured at room temperature, 68°F (20°C).
** Fatigue Strength: 100 x 106 cycles, unless indicated as [N] x 106.

CHEMICAL PROPERTIES

Element					
	Cu(1)	Fe	Ni(2)	Al	Mn
Min (%)	83	3		10	
Max (%)		5	1.5	11.5	0.5

(1) Cu + Sum of Named Elements 99.5% min.
(2) Ni value includes Co.

FABRICATION PROPERTIES

Machining Technique	Suitability
Soldering	Good
Brazing	Good
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Good
Coated Metal Arc Welding	Good
Machinability Rating	60

CONTACT US

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NICKEL ALUMINUM BRONZE (C95500)

TYPICAL USES

C95500 9D Nickel Aluminum Bronze is know for its excellent corrosion resistance in sea water. C955 can be used in heavy duty application that may see wear, fatigue, and abrasion.

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519-622-7900
barstock@bearingbronze.com

GET A QUOTE

NICKEL ALUMINUM BRONZE (C95500)

TYPICAL USES

Product Category	Product	Reason
Builders Hardware	Window Hardware	Appearance, Corrosion Resistance (Excellent), Excellent Machinability, High Strength
Consumer	Musical Instruments	Appearance, Corrosion Resistance (Excellent), Resonant Frequency, Damping Capacity, Wear Resistance, Excellent Machinability, High Strength
	Piano Keys	Appearance, Corrosion Resistance (Excellent), Wear Resistance, Excellent Machinability, High Strength
Electrical	Electrical Hardware	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance (Excellent), High Strength
Fasteners	Stuffing Box Nuts	Corrosion Resistance (Excellent), Wear Resistance, High Strength
Industrial	Air Craft Components	Corrosion Resistance (Excellent), Wear Resistance, High Strength, Retains Strength at Elevated Temperatures, Toughness
	Bearings	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Bushings	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Gears	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Glands	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Glass Molds	Corrosion Resistance (Excellent), Wear Resistance, High Strength, Retains Strength at Elevated Temperatures
	Hand Gun Recoil Mechanisms	Corrosion Resistance (Excellent), High Strength, Toughness
	Hot Mill Guides	Corrosion Resistance (Excellent), High Strength, Retains Strength at Elevated Temperatures, Toughness
	Landing Gear Parts	Corrosion Resistance, Corrosion Resistance (Excellent), Wear Resistance, Fatigue Properties, Fatigue Strength, High Strength, Retains Strength at Elevated Temperatures
	Machine Parts	Thermal Conductivity, Corrosion Resistance (Excellent), Wear Resistance, Excellent Machinability, High Strength
	Pickling Equipment	Corrosion Resistance (Excellent), Corrosion Resistance to Acids, High Strength
	Piston Guides	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Pump Fluid Ends	Corrosion Resistance (Excellent), High Strength
	Sewage Treatment Applications	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Valve Bodies	Corrosion Resistance (Excellent), Excellent Machinability, High Strength
	Valve Components	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Valve Guides	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Valve Seats	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Wear Plates	Corrosion Resistance (Excellent), Wear Resistance, Toughness
	Welding Jaws	Thermal Conductivity, Corrosion Resistance (Excellent), High Strength, Retains Strength at Elevated Temperatures, Toughness
	Worms	Corrosion Resistance (Excellent), Wear Resistance, Machinability - Good, High Strength
	Worms Wheels	Corrosion Resistance (Excellent), Wear Resistance, Toughness
Marine	Covers for Marine Hardware	Appearance, Corrosion Resistance (Excellent), High Strength
	Marine Applications	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Marine Hardware	Appearance, Corrosion Resistance (Excellent), High Strength
	Ship Building	Corrosion Resistance (Excellent), Wear Resistance, Machinability - Good, High Strength
Ordnance	Government Fittings	Corrosion Resistance (Excellent), High Strength, Toughness

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NICKEL ALUMINUM BRONZE (C95500)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	YS-0.5% Ext (ksi)	Elongation (%)	Rockwell B scale	Brinell Hardness, 3000 kg load	Shear Strength (ksi)	Izod (ft-lbs)	Charpy V-Notch Impact Strength (ft-lbs)	Compressive Strength .1 in. set/in. (ksi)	Creep Strength (0.1% per 10,000 hours) (ksi)	Fatigue Strength** (ksi)	Proportional Limit (ksi)
As Centrifugal Cast	M02	90 Min for Standard 90 Min for Standard	40 Min for Standard 40 Min for Standard	6 Min for Standard 6 Min for Standard		190 Min for Standard							
	TQ50	110 Min for Standard 110 Min for Standard	60 Min for Standard 60 Min for Standard	5 Min for Standard 5 Min for Standard		200 Min for Standard							
As Continuous Cast	M07	95 Min for Standard 95 Min for Standard	42 Min for Standard 42 Min for Standard	10 Min for Standard 10 Min for Standard									
	TQ50	110 Min for Standard 110 Min for Standard	62 Min for Standard 62 Min for Standard	8 Min for Standard 8 Min for Standard									
As Permanent Mold Cast	M05	110 Min for Standard	60 Min for Standard	5 Min for Standard									
As Sand Cast	M01	90 Min for Standard 90 Min for Standard 100 Typ	40 Min for Standard 40 Min for Standard 44 Typ	6 Min for Standard 6 Min for Standard 12 Typ	87 Typ	190 Min for Standard 195 Typ	48 Typ	13 Typ	10 Typ	120 Typ	11 Typ 3 Typ 6 Typ	31 Typ	28 Typ
	TQ50	110 Min for Standard 110 Min for Standard 120 Typ	60 Min for Standard 60 Min for Standard 68 Typ	5 Min for Standard 5 Min for Standard 10 Typ		200 Min for Standard 230 Typ	70 Typ	15 Typ		150 Typ		38 Typ	45 Typ

* Measured at room temperature, 68°F (20°C).
** Fatigue Strength: 100 x 106 cycles, unless indicated as [N] x 106.

CHEMICAL PROPERTIES

Element					
	Cu(1)	Fe	Ni(2)	Al	Mn
Min (%)	78	3	3	10	
Max (%)		5	5.5	11.5	3.5

(1) Cu + Sum of Named Elements 99.5% min.
(2) Ni value includes Co.

FABRICATION PROPERTIES

Machining Technique	Suitability
Soldering	Good
Brazing	Fair
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Good
Coated Metal Arc Welding	Good
Machinability Rating	50

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NICKEL ALUMINUM BRONZE (C95510)

TYPICAL USES

C95510 is a continous cast heat treated alloy. It is often used as a substitution for the wrought Nickel Aluminum Bronze alloy C630000. This is possible due to the high mechanical stregnth properties of C95510 AMS 4880. The advantage of C95510 is that it is available in cored bar form. This provided excellent savings in cost due to scrap reduction.

CONTACT US

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NICKEL ALUMINUM BRONZE (C95510)

TYPICAL USES

Product Category	Product	Reason
Builders Hardware	Window Hardware	Appearance, Corrosion Resistance (Excellent), Excellent Machinability, High Strength
Consumer	Musical Instruments	Appearance, Corrosion Resistance (Excellent), Resonant Frequency, Damping Capacity, Wear Resistance, Excellent Machinability, High Strength
	Piano Keys	Appearance, Corrosion Resistance (Excellent), Wear Resistance, Excellent Machinability, High Strength
Electrical	Electrical Hardware	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance (Excellent), High Strength
Fasteners	Stuffing Box Nuts	Corrosion Resistance (Excellent), Wear Resistance, High Strength
Industrial	Air Craft Components	Corrosion Resistance (Excellent), Wear Resistance, High Strength, Retains Strength at Elevated Temperatures, Toughness
	Bearings	Corrosion Resistance (Excellent), Wear Resistance, High Strength, Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Gears	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Glands	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Glass Molds	Corrosion Resistance (Excellent), Wear Resistance, High Strength, Retains Strength at Elevated Temperatures
	Hand Gun Recoil Mechanisms	Corrosion Resistance (Excellent), High Strength, Toughness
	Hot Mill Guides	Corrosion Resistance (Excellent), High Strength, Retains Strength at Elevated Temperatures, Toughness
	Landing Gear Parts	Corrosion Resistance, Wear Resistance, Fatigue Properties, Fatigue Strength, High Strength, Retains Strength at Elevated Temperatures
	Machine Parts	Thermal Conductivity, Corrosion Resistance (Excellent), Wear Resistance, Excellent Machinability, High Strength
	Pickling Equipment	Corrosion Resistance (Excellent), High Strength
	Piston Guides	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Pump Fluid Ends	Corrosion Resistance (Excellent), High Strength
	Sewage Treatment Applications	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Valve Bodies	Corrosion Resistance (Excellent), Excellent Machinability, High Strength
	Valve Components	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Valve Guides	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Valve Seats	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Wear Plates	Corrosion Resistance (Excellent), Wear Resistance, Toughness
	Welding Jaws	Thermal Conductivity, Corrosion Resistance (Excellent), High Strength, Retains Strength at Elevated Temperatures, Toughness
	Worms	Corrosion Resistance (Excellent), Wear Resistance, Machinability, Good, High Strength
	Worms Wheels	Corrosion Resistance (Excellent), Wear Resistance, High Strength
Marine	Covers for Marine Hardware	Appearance, Corrosion Resistance (Excellent), High Strength
	Marine Applications	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Marine Hardware	Appearance, Corrosion Resistance (Excellent), High Strength
	Ship Building	Corrosion Resistance (Excellent), Wear Resistance, Machinability, Good, High Strength
Ordnance	Government Fittings	Corrosion Resistance (Excellent), High Strength, Toughness

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NICKEL ALUMINUM BRONZE (C95510)

CHEMICAL PROPERTIES

Elements							
	Cu(1)	Sn	Zn	Fe	Ni(2)	Al	Mn
Min (%)	78			2	4.5	9.7	
Max (%)		0.2	0.3	3.5	5.5	10.9	1.5

(1) Cu + Sum of Named Elements 99.5% min.
(2) Cu value includes Ag.

FABRICATION PROPERTIES

Technique	Suitability
Soldering	Good
Brazing	Fair
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Good
Coated Metal Arc Welding	Good
Machinability Rating	50

CONTACT US

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NICKEL ALUMINUM BRONZE (C95520)

TYPICAL USES

AMS 4881 is offered in solid and hollow bars. The additional heat treating process improves mechanical properties and the strength to weight ratio exceeding the range of typical aluminum bronzes. AMS 4881 is commonly used in applications involving heavy loads abrasion, friction, and deformation at high temperatures. In many cases AMS 4881 can replace AMS 4590/C63020 with the advantage of this material being available in tube form, which provides economic cost savings to you the customer.

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NICKEL ALUMINUM BRONZE (C95520)

TYPICAL USES

Product Category	Product	Reason
Builders Hardware	Window Hardware	Appearance, Corrosion Resistance (Excellent), Excellent Machinability, High Strength
Consumer	Musical Instruments	Appearance, Corrosion Resistance (Excellent), Resonant Frequency, Damping Capacity, Wear Resistance, Excellent Machinability, High Strength
	Piano Keys	Appearance, Corrosion Resistance (Excellent), Wear Resistance, Excellent Machinability, High Strength
Electrical	Electrical Hardware	Electrical Conductivity, Thermal Conductivity, Corrosion Resistance (Excellent), High Strength
Fasteners	Stuffing Box Nuts	Corrosion Resistance (Excellent), Wear Resistance, High Strength
Industrial	Air Craft Components	Corrosion Resistance (Excellent), Wear Resistance, High Strength, Retains Strength at Elevated Temperatures, Toughness
	Bearings	Corrosion Resistance (Excellent), Wear Resistance, High Strength, Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Gears	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Glands	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Glass Molds	Corrosion Resistance (Excellent), Wear Resistance, High Strength, Retains Strength at Elevated Temperatures
	Hand Gun Recoil Mechanisms	Corrosion Resistance (Excellent), High Strength, Toughness
	Hot Mill Guides	Corrosion Resistance (Excellent), High Strength, Retains Strength at Elevated Temperatures, Toughness
	Landing Gear Parts	Corrosion Resistance, Wear Resistance, Fatigue Properties, Fatigue Strength, High Strength, Retains Strength at Elevated Temperatures
	Machine Parts	Thermal Conductivity, Corrosion Resistance (Excellent), Wear Resistance, Excellent Machinability, High Strength
	Pickling Equipment	Corrosion Resistance (Excellent), High Strength
	Piston Guides	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Pump Fluid Ends	Corrosion Resistance (Excellent), High Strength
	Sewage Treatment Applications	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Valve Bodies	Corrosion Resistance (Excellent), Excellent Machinability, High Strength
	Valve Components	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Valve Guides	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Valve Seats	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Wear Plates	Corrosion Resistance (Excellent), Wear Resistance, Toughness
	Welding Jaws	Thermal Conductivity, Corrosion Resistance (Excellent), High Strength, Retains Strength at Elevated Temperatures, Toughness
	Worms	Corrosion Resistance (Excellent), Wear Resistance, Machinability, Good, High Strength
	Worms Wheels	Corrosion Resistance (Excellent), Wear Resistance, High Strength
Marine	Covers for Marine Hardware	Appearance, Corrosion Resistance (Excellent), High Strength
	Marine Applications	Corrosion Resistance (Excellent), Wear Resistance, High Strength
	Marine Hardware	Appearance, Corrosion Resistance (Excellent), High Strength
	Ship Building	Corrosion Resistance (Excellent), Wear Resistance, Machinability, Good, High Strength
Ordnance	Government Fittings	Corrosion Resistance (Excellent), High Strength, Toughness

CONTACT US

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NICKEL ALUMINUM BRONZE (C95520)

MECHANICAL PROPERTIES

Form	Temper Code	Tensile Strength (ksi)	Elongation (%)	Brinell Hardness, 3000 kg load
As Centrifugal Cast	M02	125 Min for Standard	2 Min for Standard	262 Min for Standard
As Continuous Cast	TH04	125 Min for Standard	2 Min for Standard	262 Min for Standard
As Sand Cast	M01	125 Min for Standard	2 Min for Standard	255 Min for Standard
* Measured at room temperature, 68°F (20°C).				

CHEMICAL PROPERTIES

Elements											
	Cu(1)	Pb	Sn	Zn	Fe	Ni(2)	Al	Co	Cr	Mn	Si
Min (%)	74.5				4.0	4.2	10.5				
Max (%)		0.03	0.25	0.30	5.5	6.0	11.5	0.20	0.05	1.5	0.15
(1) Cu + Sum of Named Elements 99.5% min. (2) Cu value includes Ag.											

FABRICATION PROPERTIES

Technique	Suitability
Soldering	Good
Brazing	Fair
Oxyacetylene Welding	Not Recommended
Gas Shielded Arc Welding	Good
Coated Metal Arc Welding	Good
Machinability Rating	50

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ALUMINUM BRONZE (C95900)

TYPICAL USES

C95900 Aluminum Bronze is for heavier loads under abrasive conditions where impact is not present. Utilized in the tool and die and roll forming industries. C959 is a very popular aluminum bronze alloy.

MECHANICAL PROPERTIES

Form	Temper Code	Brinell Hardness, 3000 kg load
As Centrifugal Cast	M02	241 Min for Standard
As Continuous Cast	M07	241 Min for Standard
As Sand Cast	M01	241 Min for Standard

* Measured at room temperature, 68°F (20°C)

CHEMICAL PROPERTIES

Element					
	Cu(1)	Fe	Ni(2)	Al	Mn
Min (%)		3		12	
Max (%)	Rem	5	0.5	13.5	1.5

(1) Cu + Sum of Named Elements 99.5% min.
(2) Ni value includes Co.

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360 Sheldon Drive
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GET A QUOTE

POWDERED METAL BRONZE (SAE841)

TYPICAL USES

Manufactured through powdered metallurgy, this process gives the bearings tiny pores formed throughout the structure of the bearing. These interconnected pores serve as a reservoir for lubricant providing a passage for flow to the bearing surface. This flow of oil to the surface of the bearing is the result of a slight increase of surface temperature when the bearing/shaft are in motion. When the rotation of the bearing and shaft commences the oil is absorbed back into the pores.

Applications include agriculture equipment, business machines, automotive, conveyors, cranes, appliances, machine tools, packaging machinery, and many more. Additional capabilities include secondary operations such as grooving, milling, and broaching.

CONTACT US

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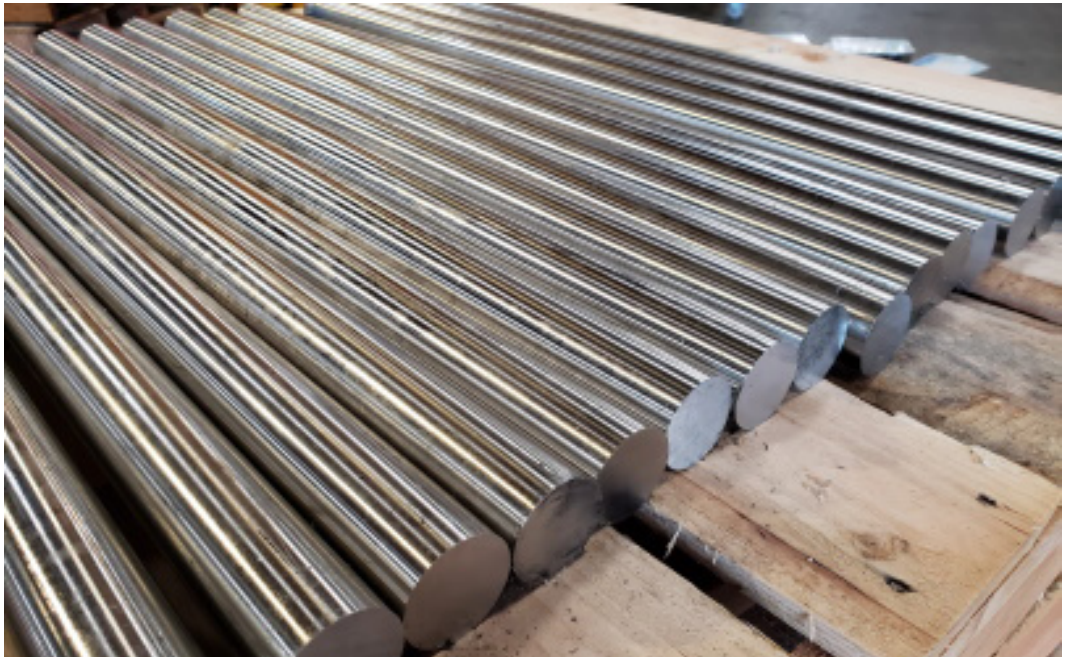
GET A QUOTE

15-5 PH STAINLESS STEEL (AMS 5659)

TYPICAL USES

15-5 PH stainless steel is a martensitic precipitation-hardening stainless steel with approximately 15% Chromium and 5% Nickel. It has high strength, high hardness, and excellent corrosion resistance. Strength can be further increased by a single low temperature heat treatment. Compared to 17-4 PH, it offers better transverse toughness and ductility; better mechanical properties in larger cross-sections, and better forgeability. It is readily weldable. It can be machined in any of the several Thermal Conditions available to this grade.



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15-5 PH STAINLESS STEEL (AMS 5659)

MECHANICAL PROPERTIES

Condition	Tensile Strength (ksi)	YS-0.2% offset (ksi)	Elongation (%)	Rockwell Hardness	Reduction of Area
H900	190 Typ	170 Typ	6 Typ	C40	15%
H1025	155 Typ	145 Typ	8 Typ	C35	27%
H1075	145 Typ	125 Typ	9 Typ	C32	28%
H1150	135 Typ	105 Typ	11 Typ	C28	30%
H1150-M	115 Typ	75 Typ	14 Typ	C25	35%
Ann				C33	

CHEMICAL PROPERTIES

Element								
	Cu(1,2)	Mn	Si	P	S	Cr	Ni(3)	Cu
Min (%)						14.0	3.5	2.5
Max (%)	Rem	1.0	1.0	.04	.03	15.5	5.5	4.5
(1) Cu + Sum of Named Elements 99.5% min.(2) Cu value includes Ag.								

CONTACT US

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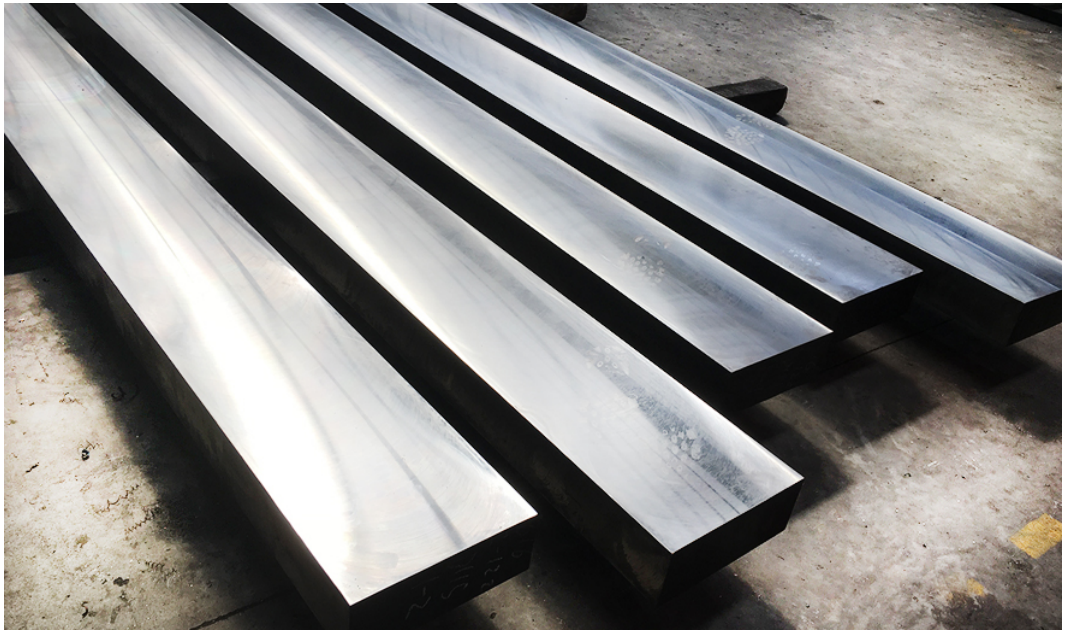
17-4 STAINLESS STEEL (AMS 5643)

TYPICAL USES

17-4 Stainless is suitable for a wide variety of applications in the commercial, oil and gas, aerospace, and nuclear industries. It's suitable for intricate parts requiring corrosion resistance and high strength that can be heat treated and welded with minimal distortion due to its precipitation hardening capabilities.



CONTACT US

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GET A QUOTE

17-4 STAINLESS STEEL (AMS 5643)

MECHANICAL PROPERTIES

Condition	Tensile Strength (ksi)	YS-0.2% offset (ksi)	Elongation (%)	Rockwell Hardness	Reduction of Area
H900	190 Typ	170 Typ	10 Typ	40-47 HRC	40% (35% >3")
H925	170 Typ	155 Typ	10 Typ	38-45 HRC	44% (38% >3")
H1025	155 Typ	145 Typ	12 Typ	34-42 HRC	45%
H1075	145 Typ	125 Typ	13 Typ	31-38 HRC	45%
H1100	140 Typ	115 Typ	14 Typ	30-37 HRC	45%
H1150	135 Typ	105 Typ	16 Typ	28-37 HRC	50%
Ann				39 HRC Max	

CHEMICAL PROPERTIES

Element										
	Cu(1,2)	Mn	Si	P	S	Cr	Ni(3)	Cb (Nb)	Cu	Mo
Min (%)						15.0	3.0	5 times C	3.0	
Max (%)	Rem	1.0	1.0	.04	.03	17.5	5.0	.45	5	.5
(1) Cu + Sum of Named Elements 99.5% min.(2) Cu value includes Ag.										

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