MILLARD WIRE

Specification Sheet

Last Modified: May 16, 2017

C51000

Phosphor Bronze, 5% A

Chemical Composition

(%max., unless shown as range or min.)

	Cu	Fe	Pb	P	Sn	Zn
Min./Max.	Rem.	0.1	0.05	.03-.35	4.2-5.8	0.3
Nominal	94.8	-	-	0.2	5	-

Note: Cu + Sum of Named Elements, 99.5% min.

Applicable Specifications

Product	Specification
Bar	AMS 4625 ASTM B139, B103
Bearings and Bushings	MILITARY MIL-B-13501
Bolts	ASTM F468
Bushing Stock	MILITARY MIL-B-13501
Nuts	ASTM F467
Plate	AMS 4510 ASTM B103
Plate, Bridge and Bearing	ASTM B100
Rod	AMS 4625 ASTM B139 SAE J461, J463
Screws	ASTM F468
Shapes	ASTM B139
Sheet	AMS 4510 ASTM B103 SAE J463, J461
Sheet, Bridge and Bearing	ASTM B100
Strip	AMS 4510 ASTM B103, B888 SAE J461, J463
Studs	ASTM F468
Tube	AMS 4625 MILITARY MIL-T-3595
Wire	AMS 4720 ASTM B159 SAE J461, J463
Wire, Metallizing	MILITARY MIL-W-6712

Millard Wire & Specialty Strip Co.

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Common Fabrication Processes

Blanking, Drawing, Forming and Bending, Heading and Upsetting, Roll Threading and Knurling, Shearing, Stamping

Fabrication Properties

Joining Technique	Suitability
Soldering	Excellent
Brazing	Excellent
Oxyacetylene Welding	Fair
Gas Shielded Arc Welding	Good
Coated Metal Arc Welding	Fair
Spot Weld	Good
Seam Weld	Fair
Butt Weld	Excellent
Capacity for Being Cold Worked	Excellent
Capacity for Being Hot Formed	Poor
Machinability Rating	20

Thermal Properties

Treatment	Temp./Time – US	Temp./Time – SI
Stress Temperature		
Solution Minimum		
Solution Maximum		
Solution Time		
Solution Medium	None	
Precipitation Value		
Precipitation Time		
Precipitation Medium	None	
Annealing Minimum	900	483
Annealing Maximum	1250	677
Annealing Time		
Hot Works Minimum		
Hot Works Maximum		

C51000 Specification Sheet

Mechanical Properties

(Measured at Room Temperature, 68°F (20°C))

	Section Size	Cold Work	Typ/Min	Temp	Tensile Strength	Yield Strength (0.5% ext. under load)	Yield Strength (0.2% offset)	Yield Strength (0.05% offset)	El	Rockwell Hardness				Vickens Hardness	Brinell Hardness		Shear Strength	Fatigue Strength	Izod Impact Strength
	in.	%		F	ksi	ksi	ksi	ksi	%	B	C	F	30T	500	500	3000	ksi	ksi	ft-lb
	mm.			C	MPa	MPa	MPa	MPa									MPa	MPa	J
Flat Products																			
M20	0	0	TYP	68	50	-	-	-	-	-	-	-	-	-	-	-	-	-	0
	0			20	345	-	-	-	-	-	-	-	-	-	-	-	-	-	0
OS015	0.04	0	TYP	68	53	22	-	-	50	34	-	79	-	-	-	-	-	-	0
	1			20	365	152	-	-	50	34	-	79	-	-	-	-	-	-	0
Wire																			
H08	0.08	84	TYP	68	140	-	-	-	2	-	-	-	-	-	-	-	-	-	0
	2			20	965	-	-	-	2	-	-	-	-	-	-	-	-	-	0
H01	0.08	0	TYP	68	68	60	-	-	24	-	-	-	-	-	-	-	-	-	0
	2			20	469	414	-	-	24	-	-	-	-	-	-	-	-	-	0
Flat Products																			
HR08	0	0	TYP	68	103	-	93	-	9	-	-	-	-	-	-	-	-	-	0
	0			20	710	-	641	-	9	-	-	-	-	-	-	-	-	-	0
O61	0	0	SMIN	68	46	-	13	-	47	-	-	-	-	-	-	-	-	-	0
	0			20	315	-	90	-	47	-	-	-	-	-	-	-	-	-	0
OS035	0.04	0	TYP	68	49	20	-	-	58	28	-	75	-	-	-	-	-	-	0
	1			20	338	138	-	-	58	28	-	75	-	-	-	-	-	-	0
H06	0.04	0	TYP	68	96	-	92	-	3	93	-	-	78	-	-	-	-	-	0
	1			20	662	-	634	-	3	93	-	-	78	-	-	-	-	-	0
H01	0	0	SMIN	68	49	-	20	-	24	-	-	-	-	-	-	-	-	-	0
	0			20	340	-	140	-	24	-	-	-	-	-	-	-	-	-	0
H04	0.04	0	TYP	68	84	-	80	-	7	87	-	-	75	-	-	-	-	25	0
	1			20	579	-	552	-	7	87	-	-	75	-	-	-	-	172	0
HR06	0	0	TYP	68	96	-	86	-	11	-	-	-	-	-	-	-	-	-	0
	0			20	662	-	593	-	11	-	-	-	-	-	-	-	-	-	0
HR02	0	0	TYP	68	66	-	54	-	28	-	-	-	-	-	-	-	-	-	0
	0			20	455	-	372	-	28	-	-	-	-	-	-	-	-	-	0
H08	0.04	0	TYP	68	103	-	99	-	3	95	-	-	79	-	-	-	-	22	0
	1			20	710	-	683	-	3	95	-	-	79	-	-	-	-	152	0
HR04	0	0	TYP	68	84	-	74	-	14	-	-	-	-	-	-	-	-	-	0
	0			20	579	-	510	-	14	-	-	-	-	-	-	-	-	-	0
Rod																			
H02	0.5	20	TYP	68	75	65	-	-	25	80	-	-	-	-	-	-	-	-	0
	12.7			20	517	448	-	-	25	80	-	-	-	-	-	-	-	-	0
H02	1	20	TYP	68	70	58	-	-	25	78	-	-	-	-	-	-	-	-	0
	25.4			20	483	400	-	-	25	78	-	-	-	-	-	-	-	-	0
Wire																			
H04	0.08	0	TYP	68	110	-	-	-	3	-	-	-	-	-	-	-	-	27	0
	2			20	758	-	-	-	3	-	-	-	-	-	-	-	-	186	0
OS035	0.08	0	TYP	68	50	20	-	-	58	-	-	-	-	-	-	-	-	-	0
	2			20	345	138	-	-	58	-	-	-	-	-	-	-	-	-	0
Flat Products																			
OS050	0.04	0	TYP	68	47	19	-	-	64	26	-	73	-	-	-	-	-	-	0
	1			20	324	131	-	-	64	26	-	73	-	-	-	-	-	-	0
Wire																			
H06	0.08	75	TYP	68	130	-	-	-	3	-	-	-	-	-	-	-	-	30	0
	2			20	896	-	-	-	3	-	-	-	-	-	-	-	-	207	0
H02	0.08	0	TYP	68	85	80	-	-	8	-	-	-	-	-	-	-	-	-	0
	2			20	586	552	-	-	8	-	-	-	-	-	-	-	-	-	0
Flat Products																			
H04	0.08	0	TYP	68	110	-	-	-	3	-	-	-	-	-	-	-	-	27	0
	2			20	758	-	-	-	3	-	-	-	-	-	-	-	-	186	0
OS035	0.08	0	TYP	68	50	20	-	-	58	-	-	-	-	-	-	-	-	-	0
	2			20	345	138	-	-	58	-	-	-	-	-	-	-	-	-	0
H04	0.08	0	TYP	68	110	-	-	-	3	-	-	-	-	-	-	-	-	27	0
	2			20	758	-	-	-	3	-	-	-	-	-	-	-	-	186	0
OS035	0.08	0	TYP	68	50	20	-	-	58	-	-	-	-	-	-	-	-	-	0
	2			20	345	138	-	-	58	-	-	-	-	-	-	-	-	-	0

*Fatigue Strength: 100 x 10^6 cycles, unless indicated as [N]X 10^6.

Physical Properties

Property	US Customary	Metric
Melting Point - Liquidus	1920° F	1049° C
Melting Point - Solidus	1750° F	954° C
Density	0.320 lb/in^3 at 68° F	8.86 gm/cm^3 @ 20° C
Specific Gravity	8.86	8.86
Electrical Resistivity	69.10 ohms-cmil/ft @ 68° F	11.49 microhm-cm @ 20° C
Electrical Conductivity*	15 %IACS @ 68° F	0.088 MegaSiemens/cm @ 20° C
Thermal Conductivity	40 Btu·ft/(hr·ft2·°F)at 68°F	69.2 W/m·°K at 20° C
Coefficient of Thermal Expansion	9.90·10^{-6} per °F (68-572° F)	17.8·10^{-6} per °C (20-300° C)
Specific Heat Capacity	0.090 Btu/lb/°F at 68° F	377.1 J/kg·°K at 293° K
Modulas of Elasticity in Tension	16000 ksi	110000 MPa
Modulus of Rigidity	6000 ksi	41370 MPa

*Determined on an alloy containing 5% tin and .2% phosphorus. This value will vary with the composition.

Tempers Most Commonly Used

Flat Products	
STRIP, ROLLED	H02, H04, H06, H08, H10, O60
WIRE, ROLLED	H08

Other	
ROD	H02
SHAPES	M30
TUBE	H80
WIRE	H00, H01, H02, H04, H06, H08

Typical Uses

Architecture

Bridge Bearing Plates

Electrical

Resistance Wire, Fuse Clips, Electromechanical Spring Components, Electrical Flexing Contact Blades, Electrical Connectors, Electronic Connectors, Wire Brushes, Switch Parts, Electronic and Precision Instrument Parts

Typical Uses (cont'd)

Fasteners

Fasteners, Cotter Pins, Lock Washers

Industrial

Bourdon Tubes, Bellows, Perforated Sheets, Chemical Hardware, Truss Wire, Springs, Sleeve Bushings, Diaphragms, Clutch Disks, Pressure Responsive Elements, Beater Bar, Textile Machinery, Welding Rods

Casting Characteristics

No casting characteristics available for this alloy.