



C10200

Oxygen-Free

Chemical Composition

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

	Cu ⁽¹⁾	O
Min./Max.	99.95 min	0.0010
Nominal	-	-

(1) Cu value includes Ag.

Note: This is a high conductivity copper which has, in the annealed condition a minimum conductivity of 100% IACS except for Alloy C10200 which has a minimum conductivity of 101% IACS.

Applicable Specifications

Product	Specification
Bands, Projectile Rotating	MILITARY MIL-B-20292, MIL-B-18907
Bar	AMS 4602 ASME SB152, SB133 ASTM B152 SAE J463, J461
Bar, Bus	ASTM B187 SAE J463, J461
Brazing Filler Metal	FEDERAL QQ-B-650
Fittings	ASME B16.22
Foil, Printed Circuits	ASTM B451
Nipples	ASTM B687
Pipe	ASME SB42 ASTM B698, B42
Pipe, Bus	ASTM B188

Millard Wire & Specialty Strip Co.

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Applicable Specifications (cont'd)

Product	Specification
Plate	AMS 4501 ASME SB152 ASTM B152 SAE J463, J461
Plate, Clad	ASTM B432
Rod	AMS 4602 ASME SB133 SAE J463, J461
Rod, Bus	ASTM B187
Shapes	AMS 4602 SAE J461, J463
Shapes, Bus	ASTM B187
Sheet	AMS 4501 ASME SB152 ASTM B152 SAE J463, J461
Sheet, Clad	ASTM B506
Sheet, Printed Circuits	ASTM B451
Strip	AMS 4501 ASME SB152 ASTM B152 SAE J461, J463
Strip, Clad	ASTM B506
Strip, Printed Circuits	ASTM B451
Tube	ASTM B698
Tube, Air Conditioning and Refrigeration Field Service	SAE J461, J463
Tube, Bus	ASTM B188
Tube, Coils	ASTM B743
Tube, Condenser	ASME SB111 ASTM B111
Tube, Finned	ASME SB359 ASTM B359
Tube, Rectangular Waveguide	ASTM B372 MILITARY MIL-W-85
Tube, Seamless	ASME SB75 ASTM B641, B75 MILITARY MIL-T-24107



Applicable Specifications (cont'd)

Product	Specification
Tube, Seamless Bright Annealed	ASTM B68
Tube, Seamless for Air Conditioning and Refrigeration Field Service	SAE J461, J463
Tube, Seamless for Torpedo Use	MILITARY MIL-T-3235
Tube, U-Bend	ASME SB395 ASTM B395
Tube, Welded	ASTM B716, B641, B447 MILITARY MIL-T-24107 SAE J461, J463
Tube, Welded for Air Conditioning and Refrigeration Service	ASTM B640
Wire, Medium-Hard Drawn	ASTM B2 FEDERAL QQ-W-343
Wire, Coated With Lead Alloy	ASTM B189
Wire, Coated With Nickel	ASTM B355
Wire, Coated With Silver	ASTM B298
Wire, Coated With Tin	ASTM B33, B246
Wire, Flat	ASTM B272
Wire, Hard Drawn	ASTM B1 FEDERAL QQ-W-343
Wire, Metallizing	MILITARY MIL-W-6712
Wire, Soft	AMS 4701 ASTM B3, B738, B48, F9 FEDERAL QQ-W-343
Wire, Stranded	ASTM B8, B174, B470, B172, B173, B286, B496, B226 FEDERAL QQ-B-575

Common Fabrication Processes

Blanking, Coining, Coppersmithing, Drawing, Etching, Forming and Bending, Heading and Upsetting, Hot Forging and Pressing, Piercing and Punching, Roll Threading and Knurling, Shearing, Spinning, Squeezing and Swaging, Stamping



Fabrication Properties

Joining Technique	Suitability
Soldering	Excellent
Brazing	Excellent
Oxyacetylene Welding	Fair
Gas Shielded Arc Welding	Good
Coated Metal Arc Welding	Not Recommended
Spot Weld	Not Recommended
Seam Weld	Not Recommended
Butt Weld	Good
Capacity for Being Cold Worked	Excellent
Capacity for Being Hot Formed	Excellent
Forgeability Rating	65
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	700	371
Annealing Maximum	1200	649
Annealing Time		
Hot Works Minimum	1400	761
Hot Works Maximum	1600	872



C10200 Specification Sheet

Mechanical Properties

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

Temper	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)	EI	Rockwell Hardness				Vickers Hardness	Brinell Hardness		Shear Strength	Fatigue Strength	Izod Impact Strength
										B	C	F	30T		500	3000			
	in.	%		F	ksi	ksi	ksi	ksi	%					500	3000	ksi	ksi	ft-lb	
	mm.			C	MPa	MPa	MPa	MPa								MPa	MPa	J	
Wire																			
H08	0.08	0.0	TYP	68	66	-	-	-	1	-	-	-	-	-	-	33	-	0.0	
	2			20	455	-	-	-	1	-	-	-	-	-	-	228	-	0.0	
Flat Products																			
H02	0.04	0.0	TYP	68	42	36	-	-	14	40	-	84	50	-	-	26	13	0.0	
	1			20	290	248	-	-	14	40	-	84	50	-	-	179	90	0.0	
M20	0.25	0.0	TYP	68	32	10	-	-	50	-	-	40	-	-	22	-	0.0		
	6.35			20	221	69	-	-	50	-	-	40	-	-	152	-	0.0		
H04	0.25	0.0	TYP	68	50	45	-	-	12	50	-	90	-	-	28	-	0.0		
	6.35			20	345	310	-	-	12	50	-	90	-	-	193	-	0.0		
Rod																			
M20	1	0.0	TYP	68	32	10	-	-	55	-	-	40	-	-	22	-	0.0		
	25.4			20	221	69	-	-	55	-	-	40	-	-	152	-	0.0		
Shapes																			
M30	0.5	0.0	typ	68	32	10	-	-	50	-	-	40	-	-	22	-	0.0		
	12.7			20	221	69	-	-	50	-	-	40	-	-	152	-	0.0		
M20	0.5	0.0	typ	68	32	10	-	-	50	-	-	40	-	-	22	-	0.0		
	12.7			20	221	69	-	-	50	-	-	40	-	-	150	-	0.0		
Wire																			
OS050	0.08	0.0	TYP	68	35	-	-	-	35	-	-	-	-	-	24	-	0.0		
	2			20	241	-	-	-	35	-	-	-	-	-	165	-	0.0		
Flat Products																			
H04	0.04	0.0	TYP	68	50	45	-	-	6	50	-	90	57	-	-	28	13	0.0	
	1			20	345	310	-	-	6	50	-	90	57	-	-	193	90	0.0	
Rod																			
H04	0.25	40	TYP	68	55	50	-	-	10	60	-	94	-	-	29	-	0.0		
	6.35			20	379	345	-	-	10	60	-	94	-	-	200	-	0.0		
Flat Products																			
H01	0.25	0.0	TYP	68	38	30	-	-	35	25	-	70	-	-	25	-	0.0		
	6.35			20	262	207	-	-	35	25	-	70	-	-	172	-	0.0		
H08	0.04	0.0	TYP	68	55	50	-	-	4	60	-	94	63	-	29	14	0.0		
	1			20	379	345	-	-	4	60	-	94	63	-	200	97	0.0		
Rod																			
OS050	1	0.0	TYP	68	32	10	-	-	55	-	-	40	-	-	22	-	0.0		
	25.4			20	221	69	-	-	55	-	-	40	-	-	152	-	0.0		
Flat Products																			
H04	1	0.0	TYP	68	45	40	-	-	20	45	-	85	-	-	26	-	0.0		
	25.4			20	310	276	-	-	20	45	-	85	-	-	179	-	0.0		
OS050	0.25	0.0	TYP	68	32	10	-	-	50	-	-	40	-	-	22	-	0.0		
	6.35			20	221	69	-	-	50	-	-	40	-	-	152	-	0.0		
H00	0.25	0.0	TYP	68	36	28	-	-	40	10	-	60	-	-	25	-	0.0		
	6.35			20	248	193	-	-	40	10	-	60	-	-	172	-	0.0		
Rod																			
H04	2	16	TYP	68	45	40	-	-	20	45	-	85	-	-	26	-	0.0		
	51			20	310	276	-	-	20	45	-	85	-	-	179	-	0.0		
H04	1	35	TYP	68	48	44	-	-	16	47	-	87	-	-	27	17	0.0		
	25.4			20	331	303	-	-	16	47	-	87	-	-	186	117	0.0		
Tube																			
OS025	0.065	0.0	TYP	68	34	11	-	-	45	-	-	45	-	-	23	-	0.0		
	1.65			20	234	76	-	-	45	-	-	45	-	-	159	-	0.0		
H80	0.065	40	TYP	68	55	50	-	-	8	60	-	95	63	-	20	-	0.0		
	1.65			20	379	245	-	-	8	60	-	95	63	-	200	-	0.0		
H55	0.065	15	TYP	68	40	32	-	-	25	35	-	77	45	-	26	-	0.0		
	1.65			20	276	221	-	-	25	35	-	77	45	-	179	-	0.0		

*Fatigue Strength: 100×10^6 cycles, unless indicated as $[N] \times 10^6$.



Mechanical Properties (cont'd)

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

Temper	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)	EI	Rockwell Hardness				Vickers Hardness	Brinell Hardness			Shear Strength	Fatigue Strength	Izod Impact Strength
						ksi	ksi	ksi		B	C	F	30T	500	500	3000	ksi	ksi	ft-lb	
	in.	%		F	ksi	ksi	ksi	ksi	%								ksi	ksi	ft-lb	
	mm.			C	MPa	MPa	MPa	MPa									MPa	MPa	J	
Flat Products																				
M20	0.04	0.0	TYP	68	34	10	-	-	45	-	-	45	-	-	-	-	23	-	0.0	
	1			20	234	69	-	-	45	-	-	45	-	-	-	-	159	-	0.0	
Shapes																				
OS050	0.5	0.0	typ	68	32	10	-	-	50	-	-	45	-	-	-	-	22	-	0.0	
	12.7			20	220	69	-	-	50	-	-	45	-	-	-	-	150	-	0.0	
Flat Products																				
OS050	0.04	0.0	TYP	68	32	10	-	-	45	-	-	40	-	-	-	-	22	-	0.0	
	1			20	221	69	-	-	45	-	-	40	-	-	-	-	152	-	0.0	
Shapes																				
H04	0.5	15	TYP	68	40	32	-	-	30	35	-	-	-	-	-	-	26	-	0.0	
	12.7			20	276	221	-	-	30	35	-	-	-	-	-	-	179	-	0.0	
Tube																				
OS050	0.065	0.0	TYP	68	32	10	-	-	45	-	-	40	-	-	-	-	22	-	0.0	
	1.65			20	221	69	-	-	45	-	-	40	-	-	-	-	152	-	0.0	
Flat Products																				
H10	0.04	0.0	TYP	68	57	53	-	-	4	62	-	95	64	-	-	-	29	-	0.0	
	1			20	393	365	-	-	4	62	-	95	64	-	-	-	200	-	0.0	
H01	0.04	0.0	TYP	68	38	30	-	-	25	25	-	70	36	-	-	-	25	-	0.0	
	1			20	262	207	-	-	25	25	-	70	36	-	-	-	172	-	0.0	
H00	0.04	0.0	TYP	68	36	28	-	-	30	10	-	60	25	-	-	-	25	-	0.0	
	1			20	248	193	-	-	30	10	-	60	25	-	-	-	172	-	0.0	
OS025	0.04	0.0	TYP	68	34	11	-	-	45	-	-	45	-	-	-	-	23	11	0.0	
	1			20	234	76	-	-	45	-	-	45	-	-	-	-	159	76	0.0	

Physical Properties

Property	US Customary	Metric
Melting Point - Liquidus	1981° F	1083° C
Melting Point - Solidus	1981° F	1083° C
Density*	0.323 lb/in ³ at 68° F	8.94 gm/cm ³ @ 20° C
Specific Gravity	8.94	8.94
Electrical Resistivity	10.30 ohms-cmil/ft @ 68° F	1.71 microhm-cm @ 20° C
Electrical Conductivity**	101 %IACS @ 68° F	0.591 MegaSiemens/cm @ 20° C
Thermal Conductivity	226 Btu·ft/(hr·ft ² ·°F) at 68° F	391.1 W/m·°K at 20° C
Coefficient of Thermal Expansion	9.40·10 ⁻⁶ per °F (68-212° F)	16.9·10 ⁻⁶ per °C (20-100° C)
Coefficient of Thermal Expansion	9.60·10 ⁻⁶ per °F (68-392° F)	17.3·10 ⁻⁶ per °C (20-200° C)
Coefficient of Thermal Expansion	9.80·10 ⁻⁶ per °F (68-572° F)	17.6·10 ⁻⁶ per °C (20-300° C)
Specific Heat Capacity	0.092 Btu/lb/°F at 68° F	393.5 J/kg·°K at 293° K
Modulus of Elasticity in Tension	17000 ksi	117000 MPa
Modulus of Rigidity	6400 ksi	44130 MPa

*Volume and weight basis, minimum value.

Tempers Most Commonly Used

Flat Products	
BAR, DRAWN	H01, H04, H06, O60
BAR, ROLLED	H01, H04, H06, M20, O60
PLATE	H00, M20
SHEET	H00, H02, M20, O60
STRIP, DRAWN	H04, O60
STRIP, ROLLED	H00, H01, H02, H04, H08, H10, M20, O60, OS025, OS050
WIRE, DRAWN	H04, H06, O60
WIRE, ROLLED	H04, O60

Other	
PIPE	H58
ROD	H04, H08, M20, M30, O60, OS050
SHAPES	H04, M20, M30, O60, OS050
TUBE	H55, H58, H80, O60, OS025, OS050
WIRE	H00, H01, H04, H08, O60, OS050

Typical Uses

Electrical

Microwave Tubes, Copper to Glass Seals in Electronic Appliances, Wave Guides, Bus Conductors, Busbars, Klystrons, Coaxial Cables, Electrical Conductors, Lead In Wire, Transistor Components

Industrial

Billet Mold Tube, Coaxial Tube, Extrusion Cans for Powder Metallurgy, Vacuum Seals, Tubing, LP Gas Service, Tubing, Medical Gas- Oxygen

Other

Tubular

Casting Characteristics

No casting characteristics available for this alloy.