INTERNATIONAL

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Standard Specification for Copper Alloy Strip for Use in Manufacture of Electrical Connectors or Spring Contacts[1]

This standard is issued under the fixed designation B888; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This specification establishes the requirements for copper alloy strip for use in the manufacture of electrical connectors or spring contacts produced from one of the following Copper Alloy UNS Nos.[2]: C14530, C15100, C15500, C17000, C17200, C17410, C17450, C17460, C17500, C17510, C19002, C19010, C19015, C19025, C19210, C19400, C19500, C19700, C23000, C26000, C40810, C40850, C40860, C42200, C42500, C42520, C42600, C50580, C50780, C51000, C51080, C51100, C51180, C51980, C52100, C52180, C52480, C63800, C64725, C65400, C68800, C70250, C70260, C70265, C70310, C75200, and C76200.

1.2 The requirements for the other copper alloys such as copper-nickel-tin spinodal, UNS C72650, C72700, and C72900, shall be as prescribed in the current edition of Specification B740.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

2. Referenced Documents

2.1 *ASTM Standards:*[3]

B193 Test Method for Resistivity of Electrical Conductor Materials
B248 Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar
B248M Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar (Metric)
B601 Classification for Temper Designations for Copper and Copper AlloysWrought and Cast
B740 Specification for Copper-Nickel-Tin Spinodal Alloy Strip
B820 Test Method for Bend Test for Determining the Formability of Copper and Copper Alloy Strip
B846 Terminology for Copper and Copper Alloys
E8 Test Methods for Tension Testing of Metallic Materials
E8M Test Methods for Tension Testing of Metallic Materials [Metric]
E54 Test Methods for Chemical Analysis of Special Brasses and Bronzes
E62 Test Methods for Chemical Analysis of Copper and Copper Alloys (Photometric Methods)
E75 Test Methods for Chemical Analysis of Copper-Nickel and Copper-Nickel-Zinc Alloys
E478 Test Methods for Chemical Analysis of Copper Alloys
E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

2.2 *ISO Standards:*

ISO 4744 Copper and Copper Alloys—Determination of Chromium Content—Flame Atomic Absorption Spectrometric Method[4]
ISO 7602 Copper and Copper Alloys—Determination of Tellurium Content[4]

[1] This specification is under the jurisdiction of Committee B05 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.01 on Plate, Sheet, and Strip.

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[2] The UNS system for copper and copper alloys (see Practice E527) is a simple expansion of the former standard designation system accomplished by the addition of a prefix "c" and a suffix "00." The suffix can be used to accommodate composition variations of the base alloy.

[3] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[4] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

***A Summary of Changes section appears at the end of this standard.**

3. Terminology

3.1 *Definitions*—For definition of terms used in this specification, refer to Terminology B846.

4. General Requirements

4.1 For product furnished under this specification in English units, the following sections of Specification B248 must constitute a part of this specification. For product furnished under this specification in the SI units, the following sections of Specification ~~B248M~~B248M must constitute a part of this specification.

4.1.1 Terminology,
4.1.2 Materials and Manufacture,
4.1.3 Dimensions, Weights, and Permissible Variations,
4.1.4 Workmanship, Finish, and Appearance,
4.1.5 Sampling,
4.1.6 Number of Tests and Retests,
4.1.7 Specimen Preparation,
4.1.8 Test Methods,
4.1.9 Significance of Numerical Limits,
4.1.10 Certification,
4.1.11 Test Reports, and
4.1.12 Packaging and Package Marking.

4.2 In the event of a conflict between this specification and Specification B248 or ~~B248M~~B248M, the requirements of this specification shall take precedence.

5. Classification

5.1 Product produced to this specification is classified as strip material to be used for spring contact or electrical and electronic connector applications only.

6. Ordering Information

6.1 Contract or purchase orders for product under this specification should include the following information:

6.1.1 ASTM designation and year of issue,
6.1.2 UNS alloy designation,
6.1.3 Dimensions, for example, thickness, width,
6.1.4 Quantity, and
6.1.5 Temper (Section 8).

6.2 The following options are available under this specification and shall be specified in the contract or purchase order when required:

6.2.1 Type of edge: slit, sheared, sawed, square corners, rounded corners, rounded edges, or full-rounded edges (Section 11),
6.2.2 Width and straightness tolerances, slit-metal tolerances, square-sheared metal tolerances, sawed metal tolerances, straightened or edge-rolled metal tolerances (Section 11),
6.2.3 Identification marking (Section 22),
6.2.4 Certification (Section 20),
6.2.5 Mill test report (Section 21), and
6.2.6 How packaged: coil wound in traverse or pancake style (Section 22).
6.2.6.1 Number of strip lengths per coil,
6.2.6.2 Size and weight of each coil, and
6.2.7 The electrical resistivity or any other physical and electrical properties (See Table X1.1).

7. Materials and Manufacture

7.1 *Material*—The material of manufacture shall be a cast bar, slab, cake, billet, or other form of the composition given in Table 1 for the specified alloy, suitable for processing into the product prescribed in this specification.

7.2 *Manufacture*—The product shall be produced by either hot- or cold-working operation. It shall be finished, unless otherwise specified, by such hot working, cold working, annealing, or heat treatment as may be necessary to meet the properties specified in Table 2.

7.3 *Edges*—The edges shall be slit or rolled edges as specified by the buyer. Slit edges shall be furnished unless otherwise specified or agreed upon between the purchaser and supplier or manufacturer.

8. Chemical Composition

8.1 The materials shall conform to the chemical compositional requirements in Table 1 for the corresponding Copper Alloy UNS Number designation specified in the ordering information.

TABLE *Continued*

Copper Alloy UNS No.	Elements Composition, %																	
	Copper	Aluminum	Beryllium	Cobalt	Iron	Lead	Magnesium	Manganese	Nickel	Phosphorus	Tin	Zinc	Chromium	Zirconium	Silicon	Silver	Tellurium	Other
C14530	99.90[A] min									0.001–0.010	0.003–0.023						0.003–0.023	
C15100[B]	99.80[C] min													0.05–0.15				
C15500	99.75[C] min						0.08–0.13			0.040–0.080						0.027–0.10		
C17000[D]	remainder[C]	0.20 max	1.60–1.79	0.20[E] min											0.20 max			
C17200[D]	remainder[C]	0.20 max	1.80–2.00	0.20[E] min											0.20 max			
C17410[D]	remainder[C]	0.20 max	0.15–0.50	0.35–0.6	0.20 max										0.20 max			
C17450[D]	remainder[C]	0.20 max	0.15–0.50		0.20 max				0.50–1.0		0.25 max			0.50 % max	0.20 max			
C17460[D]	remainder[C]	0.20 max	0.15–0.50		0.20 max				1.0–1.4		0.25 max			0.50 % max	0.20 max			
C17500[D]	remainder[C]	0.20 max	0.4–0.7	2.4–2.7	0.10 max										0.20 max			
C17510[D]	remainder[C]	0.20 max	0.2–0.6	0.3 max	0.10 max				1.4–2.2						0.20 max			
C19002[D]	remainder[C]				0.10	0.05	0.01		1.4–1.7[F]	0.05	0.02–0.30	0.04–0.35		0.005–0.05	0.20–0.35	0.02–0.50		
C19010[D]	remainder[C]								0.8–1.8	0.01–0.05					0.15–0.35			
C19015[G]	remainder[C]						0.02–0.15		0.50–2.4	0.02–0.20					0.10–.40			
C19025[H]	remainder[C]				0.10 max				0.8–1.2	0.03–0.07	0.7–1.1	0.20 max						
C19210[G]	remainder				0.05–0.15					0.025–0.04								
C19400[G]	97.0 min				2.1–2.6	0.03 max				0.015–0.15		0.05–0.20						
C19500[G]	96.0 min	0.02 max		0.30–1.3	1.0–2.0	0.02 max				0.01–0.35	0.10–1.0	0.20 max						
C19700[G]	remainder			0.05 max	0.30–1.2	0.05 max	0.01–0.20	0.05 max	0.05 max	0.10–0.40	0.20 max	0.20 max						
C23000[G]	84.0-86.0				0.05 max	0.05 max						remainder						
C26000[H]	68.5-71.5				0.05 max	0.07 max						remainder						
C40810[H]	94.5-96.5				0.08–0.12	0.05 max			0.11–0.20	0.028–0.04	1.8–2.2	remainder						

TABLE *Continued*

Copper Alloy UNS No.	Elements Composition, %																		
	Copper	Aluminum	Beryllium	Cobalt	Iron	Lead	Magnesium	Manganese	Nickel	Phosphorus	Tin	Zinc	Chromium	Zirconium	Silicon	Silver	Tellurium	Other
C40850[H]	94.5-96.5				0.05–0.20	0.05 max			0.05–0.20	0.01–0.20	2.6–4.0	remainder						
C40860[H]	94.0-96.0				0.01–0.05	0.05 max			0.05–0.20	0.02–0.04	1.7–2.3	remainder						
C42200[H]	86.0-89.0				0.05 max	0.05 max				0.35 max	0.8–1.4	remainder						
C42500[H]	87.0-90.0				0.05 max	0.05 max				0.35 max	1.5–3.0	remainder						
C42520[H]	88.0-91.0				0.05–0.20	0.05 max			0.05–0.20	0.01–0.20	1.5–3.0	remainder						
C42600[H]	87.0-90.0[C]				0.05–0.20	0.05 max			0.05–0.20[F]	0.01–0.20	2.5–4.0	remainder						
C50580[D]	remainder				0.05–0.20	0.05 max			0.05–0.20	0.01–0.35	1.0–1.7	0.30 max						
C50780[D]	remainder				0.05–0.20	0.05 max			0.05–0.20	0.01–0.35	1.7–2.3	0.30 max						
C51000[D]	remainder				0.10 max	0.05 max				0.03–0.35	4.2–5.8	0.30 max						
C51080[D]	remainder				0.05–0.20	0.05 max			0.05–0.20	0.01–0.35	4.8–5.8	0.30 max						
C51100[D]	remainder				0.10 max	0.05 max				0.03–0.35	3.5–4.9	0.30 max						
C51180[D]	remainder				0.05–0.20	0.05 max			0.05–0.20	0.01–0.35	3.5–4.9	0.30 max						
C51980[D]	remainder				0.05–0.20	0.05 max			0.05–0.20	0.01–0.35	5.5–7.0	0.30 max						
C52100[D]	remainder				0.10 max	0.05 max				0.03–0.35	7.0–9.0	0.20 max						
C52180[D]	remainder				0.05–0.20	0.05 max			0.05–0.20	0.01–0.35	7.0–9.0	0.30 max						
C52480[D]	remainder				0.05–0.20	0.05 max			0.05–0.20	0.01–0.35	9.0–11.0	0.30 max						
C63800[D]	remainder[C]	2.5-3.1		0.25–0.55	0.20 max	0.05 max		0.10 max	0.20 max			0.8 max			1.5–2.1			
C64725[D]	95.0 min[C]				0.25	0.01	0.20		1.3–2.7[F]		0.20–0.8	0.50–1.5	0.09		0.20–0.8			0.01 Calcium
C65400[D]	remainder[C]					0.05 max					1.2–1.9	0.50 max	0.01–0.12		2.7–3.4			
C68800[D]	remainder[C]	3.0-3.8[I]		0.25–0.55	0.20 max	0.05 max						21.3–24.1[I]						

TABLE *Continued*

Copper Alloy UNS No.	Elements Composition, %																	
	Copper	Aluminum	Beryllium	Cobalt	Iron	Lead	Magnesium	Manganese	Nickel	Phosphorus	Tin	Zinc	Chromium	Zirconium	Silicon	Silver	Tellurium	Other
C70250[D]	remainder[C]				0.20 max	0.05 max	0.05–0.30	0.10 max	2.2–4.2[F]			1.0 max			0.25–1.2			
C70260[D]	remainder[C]								1.0–3.0[F]	0.010 max					0.20–0.7			
C70265[D]	remainder[C]					0.05 max			1.0–3.0[F]	0.01 max	0.05–0.8	0.30 max			0.20–0.7			
C70310[D]	remainder[C]				0.10	0.05	0.01		1.0–4.0[F]	0.05	1.0	2.0		0.005–0.05	0.08–1.0	0.02–0.50		
C75200[D]	63.0-66.5[C]				0.25 max	0.05 max		0.50 max	16.5–19.5[F]			remainder						
C76200[D]	57.0-61.0[C]				0.25 max	0.09 max		0.50 max	11.0–13.5[F]			remainder						

[A] Includes silver + tin + tellurium + selenium.
[B] Copper + the sum of the named elements shall be 99.9 % min.
[C] Copper value includes silver.
[D] Copper + the sum of the named elements shall be 99.5 % min.
[E] Nickel + cobalt, 0.20 % min; nickel + iron +cobalt, 0.6 % max.
[F] Includes cobalt.
[G] Copper + the sum of the named elements shall be 99.8 % min.
[H] Copper + the sum of the named elements shall be 99.7 % min.
[I] Aluminum + zinc = 25.1–27.1.

TABLE 2 Mechanical Requirements

Temper Designation		Tensile Strength, ksi		Tensile Strength, MPa		Yield Strength (0.2 % Offset), ksi	Yield Strength (0.2 % Offset), MPa	Elongation, %
Standard	Former	min	max	min	max	min	min	min
				Copper Alloy UNS NO. C14530				
H01	¼ hard	35	45	240	310	26	180	7
H02	½ hard	40	50	275	345	33	230	5
H03	¾ hard	44	54	305	370	39	270	3
H04	hard	47	57	325	395	43	295	2
H06	extra hard	50	60	345	415	47	325	1
H08	spring	54	64	370	440	51	350	1
H10	extra spring	58	. . .	400	. . .	56	385	. . .
				Copper Alloy UNS NO. C15100				
O61	annealed	37	42	255	290	9	60	35
H01	¼ hard	40	45	275	310	26	180	11
H02	½ hard	43	51	295	350	35	240	3
H03	¾ hard	47	56	325	385	45	310	1
H04	hard	53	62	365	425	51	350	1
H06	extra hard	59	65	405	450	57	395	1
H08	spring	64	71	440	490	62	425	1
				Copper Alloy UNS NO. C15500				
O61	annealed	34	43	235	295	15	105	30
H02	½ hard	45	55	310	380	38	260	13
H04	hard	56	64	385	440	50	345	6
H06	extra hard	63	72	435	495	56	385	5
H08	spring	65	73	450	505	60	415	4
H10	extra spring	68	75	470	515	63	435	3
				Copper Alloy UNS NO. C17000				
TB00	A	60	78	410	540	30	210	35
TD01	¼ H	75	88	520	610	60	415	15
TD02	½ H	85	100	590	690	75	520	9
TD04	H	100	130	690	900	90	620	2
TF00	AT	150	180	1030	1240	130	900	3
TH01	¼ HT	160	190	1100	1310	135	930	2.5
TH02	½ HT	170	200	1170	1380	145	1000	1
TH04	HT	180	210	1240	1450	155	1070	1
AM	TM00	100	110	690	760	70	480	18
¼ HM	TM01	110	120	760	830	80	550	15
½ HM	TM02	120	135	830	930	95	660	12
HM	TM04	135	150	930	1030	110	760	9
SHM	TM05	150	160	1030	1100	125	860	9
XHM	TM06	155	175	1070	1210	135	930	3
				Copper Alloy UNS NO. C17200				
TB00	A	60	78	410	540	30	210	35
TD01	¼ H	75	88	520	610	60	415	20
TD02	½ H	85	100	590	690	75	520	12
TD04	H	100	130	690	900	90	620	2
TF00	AT	165	195	1140	1340	140	970	4
TH01	¼ HT	175	205	1210	1410	150	1030	3
TH02	½ HT	185	215	1280	1480	160	1100	2
TH04	HT	190	220	1310	1520	165	1140	1
AM	TM00	100	110	690	760	70	480	16
¼ HM	TM01	110	120	760	830	80	550	15
½ HM	TM02	120	135	830	930	95	660	12
HM	TM04	135	150	930	1030	110	760	9
SHM	TM05	150	160	1030	1100	125	860	9
XHM	TM06	155	175	1070	1210	135	930	4
XHMS	TM08	175	190	1210	1310	150	1030	3
				Copper Alloy UNS NO. C17410				
TH02	½ HT	95	115	665	790	80	550	10
TH04	HT	110	130	760	895	100	690	7
				Copper Alloy UNS NO. C17450				
TH02	½ HT	95	115	655	790	80	550	12
				Copper Alloy UNS NO. C17460				
TH03	¾ HT	115	135	790	930	95	655	11
TH04	HT	120	140	825	965	105	720	10

TABLE 2 *Continued*

Temper Designation		Tensile Strength, ksi		Tensile Strength, MPa		Yield Strength (0.2 % Offset), ksi	Yield Strength (0.2 % Offset), MPa	Elongation, %
Standard	Former	min	max	min	max	min	min	min
				Copper Alloy UNS NO. C17500				
TB00	A	35	55	240	380	25	170	20
TD04	H	70	85	480	585	55	380	3
TF00	AT	100	120	690	830	80	550	10
TH04	HT	110	130	760	900	95	655	8
HTR		120	150	830	1030	110	760	1
HTC		75	85	512	590	50	340	8
				Copper Alloy UNS NO. C17510				
TB00	A	35	55	240	380	25	170	20
TD04	H	70	85	480	585	55	380	2
TF00	AT	100	120	690	830	80	550	10
TH04	HT	110	140	760	965	95	655	8
				Copper Alloy UNS No. C19002				
TM04	HM	72	87	495	600	65	450	10
TM06	XHM	84	94	580	650	78	540	7
TM08	XHMS	89	101	615	695	82	565	5
TM05	SHM	84	94	580	650	75	515	8
				Copper Alloy UNS NO. C19010				
TM03	¾ HM	67	77	460	520	50	340	12
TM04	HM	71	81	490	560	60	410	10
TM06	XHM	75	86	520	590	64	440	8
TM08	SHM	84	...	580	...	74	510	6
H01	¼ hard	52	64	360	430	40	275	8
H02	½ hard	60	70	410	470	54	370	7
H03	¾ hard	67	77	460	520	62	410	5
H04	hard	71	81	490	560	66	435	4
H06	extra hard	75	86	520	590	72	460	3
H08	spring	84	95	580	655	78	520	2
H10	extra spring	95	...	655	...	85	585	1
				Copper Alloy UNS NO. C19015				
H020	½ Hard	53	64	365	440	38	260	7
H040	Hard	60	71	415	490	54	370	5
H060	Extra hard	66	75	455	515	64	440	2
TM02	½ HM	70	81	485	485	55	380	10
TM04	HM	64	86	440	595	64	440	8
				Copper Alloy UNS NO. C19025				
HR01	¼ hard	49	68	340	470	42	290	15
HR02	½ hard	63	76	435	525	58	400	9
HR04	hard	72	83	495	570	68	470	5
HR06	extra hard	78	89	540	615	74	510	4
HR08	spring	84	95	580	655	81	560	...
HR10	extra spring	91	106	625	730	88	605	...
				Copper Alloy UNS NO. 19210				
O61	annealed	27	42	190	290	16	110	30
H01	¼ hard	43	53	300	365	20	135	20
H02	½ hard	47	60	325	410	44	310	5
H03	¾ hard	52	62	355	425	50	345	4
H04	full hard	56	66	385	455	54	355	3
H06	extra hard	60	70	410	480	58	400	2
H08	spring hard	64	74	440	510	62	425	1
H10	extra spring	66	...	455	...	64	440	1
				Copper Alloy UNS NO. C19400				
O61	annealed	40	63	275	435	16	110	10
H02	½ hard	53	63	365	435	36	250	6
H04	full hard	60	70	415	485	53	365	3
H06	extra hard	67	73	460	505	64	440	2
H08	spring hard	70	76	485	525	67	460	2
H10	extra spring	73	80	505	550	70	485	1
				Copper Alloy UNS NO. C19500				
O61	annealed	50	60	345	415	21	145	22
H01	¼ hard	60	72	415	495	45	310	5
H02	½ hard	68	78	470	540	66	455	3

TABLE 2 *Continued*

Temper Designation		Tensile Strength, ksi		Tensile Strength, MPa		Yield Strength (0.2 % Offset), ksi	Yield Strength (0.2 % Offset), MPa	Elongation, %
Standard	Former	min	max	min	max	min	min	min
H03	¾ hard	75	85	515	585	72	495	2
H04	full hard	82	90	565	620	79	545	2
H08	spring	88	97	605	670	85	585	1
				Copper Alloy UNS NO. C19700				
O61	annealed	43	53	295	365	16	110	20
H02	½ hard	53	63	365	435	36	250	6
H04	full hard	60	70	415	485	53	365	2
H06	extra hard	67	73	460	505	64	440	2
H08	spring hard	70	76	485	525	67	460	2
H10	extra spring	73	80	505	550	70	485	1
				Copper Alloy UNS NO. C23000				
O61	annealed	39	47	270	325	8	55	43
H01	¼ hard	44	54	305	370	23	160	15
H02	½ hard	51	61	350	420	43	295	8
H03	¾ hard	57	67	395	460	51	350	4
H04	hard	63	72	435	495	57	395	4
H06	extra hard	72	80	495	550	65	450	3
H08	spring	78	86	540	595	69	475	3
H10	extra spring	82	90	565	620	73	505	2
				Copper Alloy UNS NO. C26000				
O61	annealed	45	61	310	420	10	70	40
H01	¼ hard	49	59	340	405	21	145	34
H02	½ hard	57	67	395	460	42	290	19
H03	¾ hard	64	74	440	510	55	380	8
H04	hard	71	81	490	560	67	460	6
H06	extra hard	83	92	570	635	79	545	2
H08	spring	91	100	625	690	82	565	1
H10	extra spring	95	104	655	715	86	595	1
				Copper Alloy UNS NO. C40810				
H02	½ hard	57	73	395	505	41	285	20
H04	hard	75	87	515	600	68	470	8
H06	extra hard	88	97	605	670	84	580	6
H08	spring	92	100	635	690	88	605	4
				Copper Alloy UNS NO. C40850				
H02	½ hard	57	73	395	505	41	285	20
H04	hard	75	87	515	600	68	470	8
H06	extra hard	88	97	605	670	84	580	6
H08	spring	92	104	635	715	90	620	4
				Copper Alloy UNS NO. C40860				
H02	½ hard	56	72	385	495	40	275	20
H04	hard	73	86	505	595	66	455	8
H06	extra hard	86	96	595	660	84	580	6
H08	spring	90	103	620	710	88	605	4
				Copper Alloy UNS NO. C42200				
O61	annealed	41	49	285	340	12	85	43
H01	¼ hard	47	57	325	395	21	145	17
H02	½ hard	54	65	370	450	48	330	6
H03	¾ hard	60	72	415	495	58	400	4
H04	hard	67	79	460	545	67	460	3
H06	extra hard	75	85	515	585	72	495	2
H08	spring	82	92	565	635	77	530	2
H10	extra spring	88	...	605	...	82	565	1
				Copper Alloy UNS NO. C42500				
O61	annealed	41	47	285	325	13	90	47
H01	¼ hard	49	59	340	405	20	140	24
H02	½ hard	57	69	395	475	51	350	13
H03	¾ hard	62	74	425	510	58	400	10
H04	hard	70	82	485	565	66	455	6
H06	extra hard	76	88	525	605	73	505	5
H08	spring	84	94	580	650	81	560	3
H10	extra spring	92	...	635	...	87	600	...
				Copper Alloy UNS NO. C42520				

TABLE 2 *Continued*

Temper Designation		Tensile Strength, ksi		Tensile Strength, MPa		Yield Strength (0.2 % Offset), ksi	Yield Strength (0.2 % Offset), MPa	Elongation, %
Standard	Former	min	max	min	max	min	min	min
H02	½ hard	67	82	460	565	60	415	20
H04	hard	80	95	550	655	75	515	8
H06	extra hard	90	105	620	725	85	585	6
H08	spring	95	110	655	760	90	620	4
H10	extra spring	100	115	690	795	95	655	3
				Copper Alloy UNS NO. C42600				
H02	½ hard	72	87	495	600	65	450	12
H04	hard	85	100	585	690	80	550	8
H06	extra hard	97	112	670	770	92	635	6
H08	spring	108	123	745	850	103	710	3
H10	extra spring	114	128	785	885	110	760	1
				Copper Alloy UNS NO. C50580				
H02	½ hard	56	71	385	490	51	350	15
H04	hard	69	84	475	580	66	455	8
H06	extra hard	74	89	510	615	71	490	6
H08	spring	79	94	545	650	77	530	5
				Copper Alloy UNS NO. C50780				
H02	½ hard	58	74	400	510	43	295	15
H04	hard	75	88	515	605	65	450	8
H06	extra hard	83	97	570	670	76	525	5
H08	spring	86	100	595	690	81	560	3
				Copper Alloy UNS NO. C51000				
O61	annealed	46	56	315	385	19	130	48
H01	¼ hard	49	61	340	420	22	150	32
H02	½ hard	58	73	400	505	47	325	10
H03	¾ hard	68	79	470	545	61	420	10
H04	hard	76	91	525	625	74	510	9
H06	extra hard	88	103	605	710	85	585	2
H08	spring	95	110	655	760	92	635	1
H10	extra spring	100	114	690	785	98	675	1
				Copper Alloy UNS NO. C51080				
H02	½ hard	87	102	600	705	83	670	8
H04	hard	100	115	690	795	96	660	6
H06	extra hard	105	120	725	825	101	695	4
H08	spring	110	125	760	860	107	740	1
				Copper Alloy UNS NO. C51100				
O61	annealed	46	54	315	370	16	110	45
H01	¼ hard	46	58	315	400	20	140	25
H02	½ hard	55	70	380	485	42	290	12
H03	¾ hard	67	82	460	565	64	440	6
H04	hard	72	87	495	600	70	485	2
H06	extra hard	84	99	580	685	81	560	1
H08	spring	91	105	625	725	88	605	1
H10	extra spring	96	109	660	750	92	635	1
				Copper Alloy UNS NO. C51180				
H02	½ hard	83	98	570	675	78	540	15
H04	hard	97	112	670	770	93	640	8
H06	extra hard	102	117	705	805	98	675	5
H08	spring	105	120	725	825	103	710	2
				Copper Alloy UNS NO. C51980				
H02	½ hard	90	105	620	725	86	595	18
H04	hard	103	118	710	815	99	685	10
H06	extra hard	109	124	750	855	105	725	6
H08	spring	115	130	795	895	112	770	2
				Copper Alloy UNS NO. C52100				
O61	annealed	56	65	385	450	23	160	60
H01	¼ hard	63	75	435	515	35	240	40
H02	½ hard	69	84	475	580	51	350	25
H03	¾ hard	80	92	550	635	70	485	18
H04	hard	85	100	585	690	78	540	12
H06	extra hard	97	112	670	770	92	635	10

TABLE 2 *Continued*

Temper Designation		Tensile Strength, ksi		Tensile Strength, MPa		Yield Strength (0.2 % Offset), ksi	Yield Strength (0.2 % Offset), MPa	Elongation, %
Standard	Former	min	max	min	max	min	min	min
H08	spring	105	119	725	820	100	690	3
H10	extra spring	110	122	760	840	105	725	2
			Copper Alloy UNS NO. C52180					
H02	½ hard	95	110	655	760	90	620	20
H04	hard	107	122	740	840	105	725	10
H06	extra hard	112	128	770	885	108	745	6
H08	spring	120	140	825	965	118	815	2
H10	extra spring	125	145	860	1000	120	825	2
			Copper Alloy UNS NO. C52480					
H02	½ hard	102	118	705	815	96	660	15
H04	hard	114	128	785	885	112	770	6
H06	extra hard	120	136	825	940	118	815	4
H08	spring	130	150	895	1035	127	875	2
H10	extra spring	136	156	940	1075	135	930	1
			Copper Alloy UNS NO. C63800					
O61	annealed	77	87	530	600	45	310	27
H01	¼ hard	90	102	620	705	75	515	12
H02	½ hard	100	112	690	770	87	600	7
H03	¾ hard	105	117	725	805	93	640	5
H04	hard	114	126	785	870	102	705	3
H06	extra hard	118	130	815	895	106	730	2
H08	spring	123	134	850	925	111	765	2
H10	extra spring	130	...	...	...	119	820	...
			Copper Alloy UNS NO. C64725					
TM02	½ HM	85	105	585	725	70	480	7
TM04	HM	95	120	655	825	85	585	5
TM06	XHM	100	120	690	825	95	655	3
TM08	XHMS	105	125	725	860	100	690	1
			Copper Alloy UNS NO. C65400					
H01	¼ hard	75	90	515	620	45	310	21
H02	½ hard	86	101	595	695	66	455	11
H03	¾ hard	97	112	670	770	82	565	6
H04	hard	108	120	745	825	94	650	3
H06	extra hard	116	126	800	870	102	705	2
H08	spring	124	133	855	915	112	770	2
H10	extra spring	131	140	905	965	118	815	1
			Copper Alloy UNS NO. C68800					
O61	annealed	77	87	530	600	44	305	30
H01	¼ hard	87	101	600	695	63	435	10
H02	½ hard	97	112	670	770	82	565	3
H04	hard	106	120	730	825	95	655	2
H06	extra hard	113	127	780	875	102	705	2
H08	spring	123	133	850	915	111	765	1
H10	extra spring	130	...	895	...	117	805	1
			Copper Alloy UNS NO. C70250					
TM00	AM	90	110	620	760	65	450	10
TM02	½ HM	95	120	655	825	83	585	7
TM03	¾ HM	100	125	690	860	95	655	5
			Copper Alloy UNS NO. C70260 and UNS NO. C70265					
TM00	AM	80	100	550	690	65	450	10
TM01	¼ HM	90	105	620	720	75	515	6
TM02	½ HM	90	110	620	760	85	585	4
TM03	¾ HM	105	120	720	825	95	655	2
TM04	HM	110	125	760	860	100	685	1
			Copper Alloy UNS NO. C70310					
TM02	½ HM	95	108	655	745	85	585	10
TM04	HM	100	117	690	805	95	655	6
TM08	XHMS	110	...	760		105	725	4
			Copper Alloy UNS NO. C75200					
O61	annealed	53	63	365	435	18	125	29