



Designation: B 888 – 98

Standard Specification for Copper Alloy Strip for Use in the Manufacture of Electrical Connectors or Spring Contacts¹

This standard is issued under the fixed designation B 888; 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 covers 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, C19400, C19500, C19700, C23000, C26000, C42200, C42500, C51000, C51100, C52100, C63800, C65400, C68800, C70250, C70260, C75200, and C76200.

1.2 The requirements for the other copper alloys such as beryllium copper UNS C17000, C17200, C17400, C17410, C17500, and C17510 shall be as prescribed in the current edition of Standards B 194, B 768 and B 534.

1.3 The values stated in either inch-pound units or SI 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 noncompliance with this specification.

2. Referenced Documents

2.1 ASTM Standards:

- B 193 Test Method for Resistivity of Electrical Conductor Material³
- B 194 Specification for Copper-Beryllium Alloy Plate, Sheet, Strip, and Rolled Bar⁴
- B 248 Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar⁴
- B 248M Specification for General Requirements for Wrought Copper and Copper-Alloy Plate, Sheet, Strip, and Rolled Bar [Metric]⁴
- B 534 Specification for Copper-Cobalt-Beryllium Alloy and Copper-Nickel-Beryllium Alloy Plate, Sheet, Strip, and Rolled Bar⁴

- B 601 Practice for Temper Designations for Copper and Copper Alloys—Wrought and Cast⁴
- B 768 Specification for Copper-Cobalt-Beryllium Alloy Strip and Sheet⁴
- B 820 Test Method for Bend Test for Formability of Copper Alloy Spring Material⁴
- B 846 Terminology for Copper and Copper Alloys⁴
- E 8 Test Methods for Tension Testing of Metallic Materials⁵
- E 8M Test Methods for Tension Testing of Metallic Materials [Metric]⁵
- E 54 Test Methods for Chemical Analysis of Special Brasses and Bronzes⁶
- E 62 Test Methods for Chemical Analysis of Copper and Copper Alloys (Photometric Method)⁶
- E 75 Test Methods for Chemical Analysis of Copper-Nickel and Copper-Nickel-Zinc Alloys⁶
- E 478 Test Methods for Chemical Analysis of Copper Alloys⁶
- E 527 Test Practice for Numbering Metals and Alloys (UNS)⁷

2.2 ISO Standards:

- ISO 4744 Copper and Copper Alloys—Determination of Chromium Content - Flame Atomic Absorption Spectrometric Method⁸
- ISO 7602 Copper and Copper Alloys—Determination of Tellurium Content⁸

3. Terminology

3.1 *Definitions*—For definition of terms used in this specification, refer to Terminology B 846.

4. General Requirements

4.1 For product furnished under this specification in English units, the following sections of Specification B 248 must constitute a part of this specification. For product furnished under this specification in the SI units, the following sections of Specification B 248M must constitute a part of this specification.

¹ This standard is under the jurisdiction of Committee B-5 on Copper and is the direct responsibility of Subcommittee B05.01 on Plate, Sheet, and Strip. Current edition approved May 10, 1998. Published September 1998.

² The UNS system for copper and copper alloys (see Practice E 527) 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 *Annual Book of ASTM Standards*, Vol 02.03.

⁴ *Annual Book of ASTM Standards*, Vol 02.01.

⁵ *Annual Book of ASTM Standards*, Vol 03.01.

⁶ *Annual Book of ASTM Standards*, Vol 03.05.

⁷ *Annual Book of ASTM Standards*, Vol 01.01.

⁸ Available from American National Standards Institute, 11 W. 42nd St., New York, NY 10036-8002.

- 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 B 248 or B 248M, 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.

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<https://standards.iteh.ai/catalog/standards/sist/b5659531-0d01-4bc1-a2f1-a997cb7d0d87/astm-b888-98>

TABLE 1 Chemical Requirements

Copper Alloy UNS No.	Elements Composition, %															
	Copper	Aluminum	Cobalt	Iron	Lead	Magnesium	Manganese	Nickel	Phosphorus	Tin	Zinc	Chromium	Zirconium	Silicon	Silver	Tellurium
C14530	99.90 min.															0.003-0.023 ^A
C15100	99.82 min.	0.005 max. ^B		0.005 max. ^B		0.005 max. ^B		0.001- 0.010	0.003- 0.023			0.05-0.15				
C15500	99.75 ^C min.					0.08-0.13		0.04-0.08						0.027-010		
C19400	97.0 min.			2.1-2.6	0.03 max.			0.015-0.15			0.05-0.20					
C19500	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	remainder		0.05 max.	0.3-1.2	0.05 max.	0.01-0.20	0.05 max.	0.10-0.40	0.20 max.		remainder					
C23000	84.0-86.0			0.05 max.	0.05 max.											
C26000	68.5-71.5			0.05 max.	0.07 max.			0.35 max.	0.8-1.4		remainder					
C42200	86.0-89.0			0.05 max.	0.05 max.			0.35 max.	1.5-3.0		remainder					
C42500	87.0-90.0			0.05 max.	0.05 max.			0.03-0.35	4.2-5.8		0.30 max.					
C51000	remainder			0.10 max.	0.05 max.			0.03-0.35	3.5-4.9		0.30 max.					
C52100	remainder			0.10 max.	0.05 max.			0.03-0.35	7.0-9.0		0.20 max.					
C63800	remainder	2.5-3.1	0.25-0.55	0.20 max.	0.05 max.		0.10 max.	0.20 max.	1.2-1.9		0.8 max.	0.01-0.12		1.5-2.1		
C65400	remainder ^D			0.05 max.	0.05 max.						0.50 max.			2.7-3.4		
C68800	remainder ^D	3.0-3.8 ^C	0.25-0.55	0.20 max.	0.05 max.		2.2-4.2 ^E				21.3-24.1 ^C			0.25-1.2		
C70250	remainder ^F			0.20 max.	0.05 max.	0.05-0.30	0.10 max.	1.0-3.0 ^F	0.005 max. ^F		1.0 max.			0.20-0.70 ^F		
C75200	63.5-66.5			0.25 max.	0.05 max.		0.50 max.	16.5-19.5 ^E			remainder					
C76200	57.0-61.0			0.25 max.	0.10 max.		0.50 max.	11.0-13.5 ^E			remainder					

^AIncludes Te + Se.

^BAluminum + Iron + manganese not to exceed 0.01 %.

^CAluminum + Zinc = 25.1 – 27.1.

^DIncluding silver.

^EIncluding cobalt.

^FCopper + nickel + phosphorus + silicon 99.5 min.



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. 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
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