



Designation: B 888 – 03

Standard Specification for Copper Alloy Strip for Use in 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 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, C19025, C19400, C19500, C19700, C23000, C26000, C40810, C40850, C40860, C42200, C42500, C42520, C42600, C50580, C50780, C51000, C51080, C51100, C51180, C51980, C52100, C52180, C52480, 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 Specifications B 194, B 768, and B 534, and copper-nickel-tin spinodal, UNS C72650, C72700, and C72900 shall be as prescribed in the current edition of Specification B 740.

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 Classification for Temper Designations for Copper and Copper Alloys—Wrought and Cast⁴

B 740 Specification for Copper-Nickel-Tin Spinodal Alloy Strip⁴

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)⁷

E 75 Test Methods for Chemical Analysis of Copper-Nickel and Copper-Nickel-Zinc Alloys⁷

E 478 Test Methods for Chemical Analysis of Copper Alloys⁷

E 527 Practice for Numbering Metals and Alloys (UNS)⁸

2.2 ISO Standards:

ISO 4744 Copper and Copper Alloys—Determination of Chromium Content - Flame Atomic Absorption Spectrometric Method⁹

ISO 7602 Copper and Copper Alloys—Determination of Tellurium Content⁹

3. Terminology

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

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 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 Discontinued; see 2001 *Annual Book of ASTM Standards*, Vol 03.05.

⁷ *Annual Book of ASTM Standards*, Vol 03.05.

⁸ *Annual Book of ASTM Standards*, Vol 01.01.

⁹ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

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



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.

- 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.

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.

8.2 These composition limits do not preclude the presence of other elements. Limits for unnamed elements may be established and analysis required by agreement between manufacturer or supplier and purchaser when required.

8.3 Copper, when given as the remainder, is determined as the difference between the sum of results for all elements determined and 100 %.

8.4 Zinc, when given as the remainder, is determined as the difference between the sum of results for all elements determined and 100 %.

8.4.1 For those copper alloys in which zinc is given as the remainder, copper may be determined by difference; however, when so determined, the result shall conform to the limits prescribed in Table 1.

8.5 When all elements listed in Table 1 for the Copper Alloy UNS Number specified in the ordering information are determined, the sum of results shall be 99.8 % minimum, except for UNS No. C26000, C42200, and C42500, which shall be 99.7 % minimum, and UNS C51000, C51100, C52100, C70260, C75200, and C76200, which shall be 99.5 % minimum.

9. Temper

9.1 Tempers, as defined in Classification B 601, available under this specification are as follows:

*Temper Designation*¹⁰

<i>Standard</i>	<i>Former</i>
O61	annealed
H01	¼hard
H02	½hard
H03	¾hard
H04	hard
H06	extra hard
H08	spring
H10	extra spring
TM00	AM
TM02	½HM
TM03	¾HM

9.2 *Rolled (H) Material*—The standard tempers of rolled products are as designated in Table 2 with the prefix “H.”

¹⁰ All tempers are subject to product limitations, and the manufacturer should be consulted.





TABLE 1 Chemical Requirements

Elements Composition, %																
Copper Alloy UNS No.	Copper	Aluminum	Cobalt	Iron	Lead	Magnesium	Manganese	Nickel	Phosphorus	Tin	Zinc	Chromium	Zirconium	Silicon	Silver	Tellurium
C14530	99.90 min								0.001- 0.010	0.003- 0.023						0.003- 0.023 ^A
C15100	99.82 min	0.005 max ^B		0.005 max ^B		0.005 max ^B							0.05-0.15			
C15500	99.75 ^C min remainder ^D			0.10 max		0.08-0.13		0.8-1.2	0.04-0.08						0.027-0.10	
C19025	97.0 min			2.1-2.6	0.03 max				0.03-0.07	0.7-1.1	0.20 max					
C19400									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					0.10-1.0	0.20 max					
C19700	remainder		0.05 max	0.3-1.2	0.05 max			0.05 max	0.01-0.35	0.20 max						
C23000	84.0-86.0			0.05 max	0.05 max	0.01-0.20	0.05 max		0.10-0.40		remainder					
C26000	68.5-71.5			0.05 max	0.07 max						remainder					
C40810	94.5-96.5 ^D			0.08-0.12	0.05 max			0.11-0.20	0.028-0.04	1.8-2.2	remainder					
C40850	94.5-96.5 ^D			0.05-0.20	0.05 max			0.05-0.20	0.02-0.04	2.6-4	remainder					
C40860	94-96 ^D			0.01-0.05	0.05 max			0.05-0.20	0.02-0.04	1.7-2.3	remainder					
C42200	86.0-89.0			0.05 max	0.05 max				0.35 max	0.8-1.4	remainder					
C42500	87.0-90.0			0.05 max	0.05 max				0.35 max	1.5-3.0	remainder					
C42520	88-91 ^D			0.05-0.20	0.05 max			0.05-0.20	0.02-0.04	1.5-3	remainder					
C42600	87.0-90.0			0.05-0.20	0.05 max			0.05-0.20	0.02-0.05	2.5-4.0	remainder					
C50580	remainder ^E			0.05-0.20	0.05 max			0.05-0.20	0.02-0.10	1.0-1.7	0.3 max					
C50780	remainder ^E			0.05-0.20	0.05 max			0.05-0.20	0.02-0.10	1.7-2.3	0.3 max					
C51000	remainder			0.10 max	0.05 max			0.05-0.20	0.03-0.35	4.2-5.8	0.30 max					
C51080	remainder ^E			0.05-0.20	0.05 max			0.05-0.20	0.02-0.10	4.8-5.8	0.3 max					
C51100	remainder			0.10 max	0.05 max				0.03-0.35	3.5-4.9	0.30 max					
C51180	remainder ^E			0.05-0.20	0.05 max			0.11-0.20	0.02-0.10	3.5-4.9	0.3 max					
C51980	remainder ^E			0.05-0.20	0.05 max			0.05-0.20	0.02-0.10	5.5-7.0	0.3 max					
C52100	remainder			0.10 max	0.05 max			0.05-0.20	0.03-0.35	7.0-9.0	0.20 max					
C52180	remainder ^E			0.05-0.20	0.05 max			0.05-0.20	0.02-0.10	7.0-9.0	0.3 max					
C52480	remainder ^E			0.05-0.20	0.05 max			0.05-0.20	0.02-0.10	9.0-11.0	0.3 max					
C63800	remainder	2.5-3.1	0.25-0.55	0.20 max	0.05 max	0.10 max					0.8 max			1.5-2.1		
C65400	remainder ^F				0.05 max						0.50 max	0.01-0.12		2.7-3.4		
C68800	remainder ^F	3.0-3.8 ^C	0.25-0.55	0.20 max	0.05 max			2.2-4.2 ^G			21.3-24.1 ^C			0.25-1.2		
C70250	remainder			0.20 max	0.05 max	0.05-0.30	0.10 max	1.0-3.0 ^H	0.005 max ^H		1.0 max			0.20-0.70 ^H		
C70260	remainder ^H				0.05 max						remainder					
C75200	63.5-66.5			0.25 max	0.05 max		0.50 max	16.5-19.5 ^G			remainder					
C76200	57.0-61.0			0.25 max	0.10 max		0.50 max	11.0-13.5 ^G			remainder					

^A Includes Te + Se.^B Aluminum + iron + manganese not to exceed 0.01 %.^C Aluminum + zinc = 25.1 – 27.1.^D Copper + other elements 99.7 % min.^E Copper + other elements 99.5 % min.^F Including silver.^G Including cobalt.^H Copper + nickel + phosphorus + silicon 99.5 min.