



Designation: B122/B122M – 20

Standard Specification for Copper-Nickel-Tin Alloy, Copper-Nickel-Zinc Alloy (Nickel Silver), and Copper-Nickel Alloy Plate, Sheet, Strip, and Rolled Bar¹

This standard is issued under the fixed designation B122/B122M; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This specification establishes the requirements for copper-nickel-tin alloy, copper-nickel-zinc alloy (nickel silver), and copper-nickel alloy plate, sheet, strip, and rolled bar. The following alloys are covered:

Copper Alloy UNS No. ²	Previously Used Designation	Nominal Composition, %				Chro- mium
		Copper	Nickel	Zinc	Tin	
C70600	...	90	10	...	...	...
C70620	...	90	10	...	...	...
C71000	6	80	20	...	...	...
C71500	5	70	30	...	...	...
C71520	...	70	30	...	...	...
C72200	...	85	15	...	...	0.5
C72500	...	89	9	...	2	...
C73500	1	72	18	10	...	...
C74000	9	70	10	20	...	...
C74500	3	65	10	25	...	...
C75200	2	65	18	17	...	...
C76200	8	59	12	29	...	...
C77000	4	55	18	27	...	...

NOTE 1—Plates of copper-nickel alloy Copper Alloy UNS Nos. C70600, C70620, C71500, C71520, and C72200 for use as tube plates in surface condensers and heat exchangers are covered by Specification [B171/B171M](#).

1.2 *Units*—The values stated in either inch-pound units or SI units are to be regarded separately as standard. Within the text, SI units are shown in brackets. The values stated in each system are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other, and values from the two systems shall not be combined.

¹ This specification is under the jurisdiction of ASTM 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.

1.3 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:³

- [B171/B171M](#) Specification for Copper-Alloy Plate and Sheet for Pressure Vessels, Condensers, and Heat Exchangers
- [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 Alloys—Wrought and Cast
- [B846](#) Terminology for Copper and Copper Alloys
- [E8/E8M](#) Test Methods for Tension Testing of Metallic Materials
- [E112](#) Test Methods for Determining Average Grain Size
- [E255](#) Practice for Sampling Copper and Copper Alloys for the Determination of Chemical Composition
- [E478](#) Test Methods for Chemical Analysis of Copper Alloys
- [E527](#) Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

3. General Requirements

3.1 The following sections of Specification [B248](#) or Specification [B248M](#) constitute a part of this specification:

- 3.1.1 Terminology
- 3.1.2 Materials and Manufacture

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.

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

- 3.1.3 Workmanship, Finish, and Appearance
- 3.1.4 Sampling—except for chemical analysis
- 3.1.5 Number of Tests and Retests
- 3.1.6 Specimen Preparation
- 3.1.7 Test Methods
- 3.1.8 Significance of Numerical Limits
- 3.1.9 Inspection
- 3.1.10 Rejection and Rehearing
- 3.1.11 Certification
- 3.1.12 Test Report
- 3.1.13 Packaging and Package Marking
- 3.1.14 Supplementary Requirements

3.2 In addition, when a section with a title identical to that referenced in 3.1, above, appears in this specification, it contains additional requirements that supplement those appearing in Specification B248 or Specification B248M.

4. Terminology

4.1 For definitions of terms related to copper and copper alloys, refer to Terminology B846.

5. Ordering Information

5.1 Include the following specified choices when placing orders for product under this specification, as applicable:

- 5.1.1 ASTM designation and year of issue;
- 5.1.2 Copper [Alloy] UNS No. designation;
- 5.1.3 Temper (Section 8);
- 5.1.4 Dimensions, thickness and width (Section 11);
- 5.1.5 How furnished: straight lengths or coils;
- 5.1.6 Quantity—Total weight or total length or number of pieces of each size;
- 5.1.7 Type of edge (slit, sheared, sawed, square corners, round corners, rounded edges, or full rounded edges), if required;
- 5.1.8 Length (Section 11); and
- 5.1.9 Intended application.

5.2 The following options are available but may not be included unless specified at the time of placing of the order, when required:

- 5.2.1 Heat identification or traceability details,
- 5.2.2 Certification,
- 5.2.3 Test Report, and

5.2.4 If product is purchased for agencies of the U.S. government (see the Supplementary Requirements of Specification B248 or Specification B248M for additional requirements).

6. Materials and Manufacture

6.1 Materials:

6.1.1 The material of manufacture shall be a form (cast bar, cake, slab, et cetera) of Copper Alloy UNS No. C70600, C70620, C71000, C71500, C71520, C72200, C72500, C73500, C74000, C74500, C75200, C76200, or C77000 of such purity and soundness as to be suitable for processing into the products prescribed herein.

6.1.2 When specified in the contract or purchase order that heat identification or traceability is required, the purchaser shall specify the details desired.

NOTE 2—Due to the discontinuous nature of the processing of castings into wrought products, it is not always practical to identify a specific casting analysis with a specific quantity of finished material.

6.2 Manufacture:

6.2.1 The product shall be manufactured by such hot working, cold working, and annealing processes as to produce a uniform wrought structure in the finished product.

6.2.2 The product shall be hot or cold worked to the finished size, and subsequently annealed when required, to meet the temper properties specified.

6.3 Edges:

6.3.1 Slit edges shall be furnished unless otherwise specified in the contract or purchase order.

TABLE 1 Chemical Requirements

Copper Alloy UNS No.	Composition, %								
	Copper, incl Silver	Nickel, incl Cobalt	Lead, max	Iron, max	Manganese, max	Zinc	Tin	Chromium	Other Named Elements
C70600	remainder	9.0–11.0 ^A	0.05 ^B	1.0–1.8	1.0	1.0 ^B max	...	...	^B
C70620	86.5 min	9.0–11.0	0.02	1.0–1.8	1.0	0.50 max	...	...	^C
C71000	remainder	19.0–23.0	0.05 ^B	1.0 max	1.0	1.0 ^B max	...	...	^B
C71500	remainder	29.0–33.0 ^A	0.05 ^B	0.40–1.0	1.0	1.0 ^B max	...	...	^B
C71520	65.0 min	29.0–33.0	0.02	0.40–1.0	1.0	0.50 max	...	...	^C
C72200	remainder	15.0–18.0	0.05 ^B	0.50–1.0	1.0	1.0 ^B	...	0.30–0.7	^{B, D}
C72500	remainder	8.5–10.5	0.05	0.6	0.20	0.50 max	1.8–2.8	...	...
C73500	70.5–73.5	16.5–19.5	0.09	0.25 max	0.50	remainder	...	...	...
C74000	69.0–73.5	9.0–11.0	0.05	0.25 max	0.50	remainder	...	...	...
C74500	63.5–66.5	9.0–11.0	0.09	0.25 max	0.50	remainder	...	...	...
C75200	63.0–66.5	16.5–19.5	0.05	0.25 max	0.50	remainder	...	...	...
C76200	57.0–61.0	11.0–13.5	0.09	0.25 max	0.50	remainder	...	...	...
C77000	53.5–56.5	16.5–19.5	0.05	0.25 max	0.50	remainder	...	...	...

^A Copper plus elements with specific limits, 99.5 % min.

^B When the product is for subsequent welding applications and so specified by the purchaser, zinc shall be 0.50 % max, lead 0.02 % max, phosphorus 0.02 % max, sulfur 0.02 % max, and carbon 0.05 % max.

^C Phosphorus at 0.02 % max, sulfur at 0.02 % max, and carbon at 0.05 % max.

^D Silicon and titanium each at 0.03 % max.