Designation: B 124/B 124M – 04

Standard Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes[1]

This standard is issued under the fixed designation B 124/B 124M; 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 Department of Defense.

1. Scope*

1.1 This specification establishes the requirements for copper and copper alloy rod, bar, and shapes intended for hot forging. The following coppers and copper alloys are involved:

Copper UNS Nos.	Copper Alloy UNS Nos.
C11000	C36500
C14500	C37000
C14700	C37700
	C46400
	C48200
	C48500
	C61900
	C62300
	C63000
	C63200
	C64200
	C64210
	C65500
	C67500
	C67600
	C70620
	C71520
	C77400

NOTE 1—Additional information about forging practice and forgings produced from these alloys is given in Appendix X1 and in Specification B 283.

1.2 *Units*—Values stated in either inch-pound units or in SI units are to be regarded separately as the standard. Within the text, the SI units are shown in brackets. The values stated in each system are not 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.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:* [2]

B 249/B 249M Specification for General Requirements for Wrought Copper and Copper-Alloy Rod, Bar, Shapes, and Forgings

B 283 Specification for Copper and Copper-Alloy Die Forgings (Hot-Pressed)

E 54 Test Methods for Chemical Analysis of Special Brasses and Bronzes[3]

E 62 Test Methods for Chemical Analysis of Copper and Copper Alloys (Photometric Methods)

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

E 76 Test Methods for Chemical Analysis of Nickel-Copper Alloys[3]

E 121 Test Methods for Chemical Analysis of Copper-Tellurium Alloys

E 478 Test Methods for Chemical Analysis of Copper Alloys

2.2 *ISO Standard:*

No. 3110, Part 2 (TC 26 Ref. No. N 670 E/F) Determination of Aluminum Content: Flame Atomic Absorption Spectrometric Method[4]

3. General Requirements

3.1 The following sections of Specification B 249/B 249M, as applicable, constitute a part of this specification:

3.1.1 Terminology,
3.1.2 Material and Manufacture,
3.1.3 Workmanship, Finish, and Appearance,
3.1.4 Sampling,
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,

[1] This specification is under the jurisdiction of ASTM Committee B05 on Copper and Copper Alloys and is the direct responsibility of Subcommittee B05.02 on Rod, Bar, Wire, Shapes and Forgings.

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[2] 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.

[3] Withdrawn.

[4] 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.**

3.1.10 Rejection and Rehearing,

3.1.11 Certification,

3.1.12 Mill Test Reports,

3.1.13 Packaging and Package Marking, and

3.1.14 Supplementary Requirements.

3.2 In addition, when a section with a title identical to that referenced in 3.1, appears in this specification, it contains additional requirements that supplement those appearing in Specification B 249/B 249M.

4. Ordering Information

4.1 Include the following information when placing orders for products under this specification:

4.1.1 ASTM designation and year of issue (B 124/B 124M – XX),

4.1.2 Copper or Copper-Alloy UNS No. designation,

4.1.3 Form (rod, bar, or shape) and size (Dimensions and Permissible Variations Section),

4.1.4 Permissible Variations (Dimensions and Permissible Variations Section),

4.1.5 Temper (Temper Section),

4.1.6 Length (Dimensions and Permissible Variations Section),

4.1.7 Quantity; total weight for each size and form,

4.1.8 If the product is purchased for agencies of the U.S. Government (see the Supplementary Requirements Section of this specification for additional requirements, if specified.)

4.2 The following options are available and, when required, should be specified at the time of placing of the order:

4.2.1 Mechanical Properties for Temper designated (Mechanical Properties Section),

4.2.2 Certification (B 249/B 249M),

4.2.3 Test Report (B 249/B 249M), and

4.2.4 When product is ordered for ASME Boiler and Pressure Vessel Code Application (see Certification Section of B 249/B 249M).

5. Materials and Manufacture

5.1 *Materials:*

5.1.1 The material of manufacture shall be a cast rod, bar, or billet of the designated copper or copper-alloy of such purity and soundness to be suitable for processing in to the products prescribed herein.

5.1.2 In the event 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.

5.2 *Manufacture*:

5.2.1 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.

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

6. Chemical Composition

6.1 The material shall conform to the chemical composition requirements in Table 1 for the copper or copper alloy UNS No. designation specified in the ordering information.

6.1.1 These composition limits do not preclude the presence of other elements. By agreement between the manufacturer and the purchaser, limits may be established and analysis required for unnamed elements.

6.2 For alloys in which either copper or zinc is listed as "remainder," copper or zinc is the difference between the sum of results of all elements determined and 100 %. When all elements in Table 1 for the specified copper-alloy are determined, the sum of results shall be as follows:

Copper Alloy UNS No.	Sum of Results, % min
C36500, C37000, C46400, C48200, C48500	99.6
C37700, C61900, C62300, C63000, C63200, C64200, C64210, C65500, C67500, C67600, C70620, C71520, C77400	99.5

7. Temper

7.1 The standard tempers for products described in this specification are as follows:

7.1.1 H50—Extruded and drawn.

7.1.2 M20—As hot-rolled.

7.1.3 M30—As hot-extruded.

8. Mechanical Property Requirements

8.1 Mechanical property requirements, if any, are to be established by agreement between the manufacturer and the purchaser.

9. Purchases for U.S. Government

9.1 When specified in the contract or purchase order, products purchased for agencies of the U.S. Government shall conform to the special governmental regulations specified in the Supplementary Requirements sections of this specification and of B 249/B 249M.

10. Dimensions and Permissible Variations

10.1 The dimensions and tolerances for product described by this specification shall be as specified in Specification B 249/B 249M with particular reference to the following tables and related paragraphs:

10.1.1 *Diameter or Distance Between Parallel Surfaces:*

10.1.1.1 For M30 rod, Copper Alloy UNS Nos. C36500, C37000, C37700, C46400, C48200, C48500, C61900, C62300, C63000, C63200, C64200, C64210, C67500, C67600, C70620, and C71520, refer to Table 4.

10.1.1.2 For M30 rod, Copper UNS Nos. C11000, C14500, and C14700 and Copper Alloy UNS Nos. C65500 and C77400, refer to Table 5.

10.1.1.3 For M20, round rod, refer to Table 6.

10.1.1.4 For H50 rod, refer to Table 1 for Copper UNS Nos. C11000, C14500, C14700, and Copper Alloy UNS Nos. C46400, C48200, and C48500.

10.1.1.5 For H50 rod, refer to Table 2 for Copper Alloy UNS Nos. C36500, C37000, C37700, C61900, C62300,