



Designation: ~~B150/B150M – 12 (Reapproved 2017)~~ B150/B150M – 19

Standard Specification for Aluminum Bronze Rod, Bar, and Shapes¹

This standard is issued under the fixed designation B150/B150M; 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 aluminum bronze rod, bar, and shapes for Copper Alloys UNS Nos. C61300, C61400, C61900, C62300, C62400, C63000, C63020, C63200, C64200, and C64210.

NOTE 1—Product intended for hot forging is described in Specification [B124/B124M](#).

NOTE 2—**Warning**—Mercury has been designated by many regulatory agencies as a hazardous material substance that can cause serious medical issues. Mercury, or its vapor, has been demonstrated to be hazardous to health and corrosive to materials. ~~Caution should be taken~~ Use caution when handling mercury and ~~mercury-containing~~ mercury-containing products. See the applicable product Safety Data Sheet (SDS) for additional information. ~~Users should be aware~~ The potential exists that selling mercury and/or mercury-containing products into your state or country may be prohibited by law or mercury-containing products, or both, is prohibited by local or national law. Users must determine legality of sales in their location.

1.2 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~~ are not necessarily exact equivalents; therefore, to ensure conformance with the standard, each system shall be used independently of the other. ~~Combining other, and~~ values from the two systems ~~may result in non-conformance with the standard~~ shall not be combined.

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, safety, health, and health environmental practices and determine the applicability of regulatory requirements prior to use.*

1.4 *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:*²

[B124/B124M](#) Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes

[B154](#) Test Method for Mercurous Nitrate Test for Copper Alloys

[B249/B249M](#) Specification for General Requirements for Wrought Copper and Copper-Alloy Rod, Bar, Shapes and Forgings

[B601](#) Classification for Temper Designations for Copper and Copper Alloys—Wrought and Cast

[B858](#) Test Method for Ammonia Vapor Test for Determining Susceptibility to Stress Corrosion Cracking in Copper Alloys

[E8/E8M](#) Test Methods for Tension Testing of Metallic Materials

[E18](#) Test Methods for Rockwell Hardness of Metallic Materials

[E53](#) Test Method for Determination of Copper in Unalloyed Copper by Gravimetry

[E62](#) Test Methods for Chemical Analysis of Copper and Copper Alloys (Photometric Methods) (Withdrawn 2010)³

[E118](#) Test Methods for Chemical Analysis of Copper-Chromium Alloys (Withdrawn 2010)³

[E478](#) Test Methods for Chemical Analysis of Copper Alloys

3. General Requirements

3.1 The following sections of Specification [B249/B249M](#) constitute a part of this specification:

3.1.1 ~~Terminology~~; Terminology;

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.

Current edition approved April 1, 2017/April 1, 2019. Published April 2017/April 2019. Originally approved in 1941. Last previous edition approved in 2012/2017 as B150/B150M-12-12 (2017). DOI: [10.1520/B0150-B0150M-12R17.10.1520/B0150_B0150M-19](#).

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 The last approved version of this historical standard is referenced on [www.astm.org](#).

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



- 3.1.2 ~~Materials and Manufacture~~; Manufacture;
- 3.1.3 ~~Workmanship, Finish, and Appearance~~; Appearance;
- 3.1.4 ~~Sampling~~; Sampling;
- 3.1.5 ~~Number of Tests and Retests~~; Retests;
- 3.1.6 ~~Specimen Preparation~~; Preparation;
- 3.1.7 ~~Test Methods~~; Methods;
- 3.1.8 ~~Significance of Numerical Limits~~; Limits;
- 3.1.9 ~~Inspection~~; Inspection;
- 3.1.10 ~~Rejection and Rehearing~~; Rehearing;
- 3.1.11 ~~Certification~~; Certification;
- 3.1.12 ~~Mill Test Report~~; Report;
- 3.1.13 ~~Packaging and Package Marking, Preservation and Delivery~~; Delivery; and
- 3.1.14 ~~Supplementary Requirements~~.

3.2 In addition, when a section with a title identical to those referenced in 3.1, appears in this specification, it contains additional requirements that supplement those appearing in Specification B249/B249M.

4. Ordering Information

- 4.1 Include the following information when placing orders for product under this specification, as applicable:
 - 4.1.1 Specification designation and year of issue,
 - 4.1.2 Copper alloy UNS No. (See Table 1),
 - 4.1.3 Temper (see Temper section),
 - 4.1.3.1 When Alloy UNS No. C63000 is specified, specify standard strength or high strength temper (See Table 2),
 - 4.1.4 Product cross-section (for example round, hexagonal, square, and so forth),
 - 4.1.5 Dimensions (diameter or distance between parallel surfaces and length) and permissible variations (Section 10),
 - 4.1.5.1 When product of Copper Alloy UNS No. C63020 is specified, the tolerances for diameter, thickness, width, and length shall be part of the contract or purchase order and shall be agreed upon between the supplier and the purchaser.
 - 4.1.5.2 *Shapes*—When product is shapes, the dimensional tolerances shall be as agreed upon between the manufacturer and the purchaser and shall be specified.
 - 4.1.6 Quantity, total weight, footage, or number of pieces for each size.
 - 4.1.7 If product is being purchased for agencies of the U.S. government.
- 4.2 The following options are available and should be specified at the time of placing the order when required:
 - 4.2.1 If Copper Alloy C61300 material is intended for subsequent welding applications (See Note B, Table 2),
 - 4.2.2 Certification,
 - 4.2.3 Mill test reports,
 - 4.2.4 Residual stress test (Performance Requirements section)
 - 4.2.4.1 Ammonia Vapor Test or Mercurous Nitrate Test,

TABLE 1 Chemical Requirements

Elements	Composition, %									
	C61300	C61400	C61900	C62300	Copper Alloy UNS No. C62400 C63000		C63020	C63200	C64200	C64210
Aluminum	6.0–7.5	6.0–8.0	8.5–10.0	8.5–10.0	10.0–11.5	9.0–11.0	10.0–11.0	8.7–9.5	6.3–7.6	6.3–7.0
Copper, incl silver	remainder	remainder	remainder	remainder	remainder	remainder	74.5 min	remainder	remainder	remainder
Iron	2.0–3.0	1.5–3.5	3.0–4.5	2.0–4.0	2.0–4.5	2.0–4.0	4.0–5.5	3.5–4.3 ^A	0.30 max	0.30 max
Nickel, incl cobalt	0.15 max	...	...	1.0 max	...	4.0–5.5	4.2–6.0	4.0–4.8 ^A	0.25 max	0.25 max
Manganese	0.20 max	1.0 max	...	0.50 max	0.30 max	1.5 max	1.5 max	1.2–2.0	0.10 max	0.10 max
Silicon	0.10 max	...	...	0.25 max	0.25 max	0.25 max	...	0.10 max	1.5–2.2	1.5–2.0
Tin	0.20–0.50	...	0.6 max	0.6 max	0.20 max	0.20 max	0.25 max	...	0.20 max	0.20 max
Zinc, max	0.10 ^B	0.20	0.8	...	...	0.30	0.30	...	0.50	0.50
Lead, max	0.01	0.01	0.02	...	...	...	0.03	0.02	0.05	0.05
Arsenic, max	...	...	...	...	...	...	...	...	0.15	0.15
Arsenic, max	...	...	...	...	...	...	...	...	0.09	0.09
Phosphorus, max	0.015	0.015	...	...	...	...	...	...	...	...
Other named elements	^B ...	...	...	...	...	...	^C ...	...	...	...

^A Iron content shall not exceed nickel content.

^B When the product is for subsequent welding applications and is so specified by the purchaser, chromium shall be 0.05 % max, cadmium 0.05 % max, zirconium 0.05 % max, and zinc 0.05 % max.

^C Chromium shall be 0.05 max and cobalt shall be 0.20 max.



TABLE 2 Tensile Requirements

Code	Temper Designation Name	Diameter or Distance Between Parallel Surfaces, ^A in. [mm]	Tensile Strength, min ksi [MPa]	Yield Strength, min ksi [MPa], at 0.5 % Extension Under Load	Elongation in 4 × Diameter or Thickness of Specimen min, % ^B
Copper Alloy UNS No. C61300					
HR50	drawn and stress relieved	<i>rod (round only):</i> ½ [12] and under over ½ [12] to 1 [25], incl over 1 [25] to 2.0 [50] incl over 2 [50] to 3 [80], incl	80 [550] 75 [515] 72 [495] 70 [485]	50 [345] 45 [310] 40 [275] 35 [240]	30 30 30 30
HR50	drawn and stress relieved	<i>rod (hexagonal and octagonal) and bar:</i> ½ [12] and under over ½ [12] to 1 [25], incl over 1 [25] to 2 [50], incl	80 [550] 75 [515] 70 [485]	40 [275] 35 [240] 32 [220]	30 30 30
Copper Alloy UNS No. C61400					
HR50	drawn and stress relieved	<i>rod (round only):</i> ½ [12] and under over ½ [12] to 1 [25], incl over 1 [25] to 2 [50], incl over 2 [50] to 3 [80], incl	80 [550] 75 [515] 70 [485] 70 [485]	40 [275] 35 [240] 32 [220] 30 [205]	30 30 30 30
Copper Alloy UNS No. C61900					
HR50	drawn and stress relieved	<i>rod (round only):</i> ½ [12] and under over ½ [12] to 1 [25], incl over 1 [25] to 2 [50], incl over 2 [50] to 3 [80], incl	90 [620] 88 [605] 85 [585] 78 [540]	50 [345] 44 [305] 40 [275] 37 [255]	15 15 20 25
M20	as hot rolled	over 3 [80]	75 [515]	30 [205]	20
M20	as hot rolled	} <i>shapes, all sizes</i>	75 [515]	30 [205]	20
M30	as hot extruded				
O20	hot forged and annealed				
O25	hot rolled and annealed				
O30	hot extruded and annealed				
HR50	drawn and stress relieved				
Copper Alloy UNS No. C62300					
HR50	drawn and stress relieved	<i>rod (round only):</i> ½ [12] and under over ½ [12] to 1 [25], incl over 1 [25] to 2 [50], incl over 2 [50] to 3 [80], incl	90 [620] 88 [605] 84 [580] 76 [525]	50 [345] 44 [305] 40 [275] 37 [255]	12 15 15 20
M20	as hot rolled	} over 3 [80]	75 [515]	30 [205]	20
M30	as hot extruded				
O20	hot forged and annealed				
O25	hot rolled and annealed				
O30	hot extruded and annealed				
HR50	drawn and stress relieved				
HR50	drawn and stress relieved	<i>rod (hexagonal and octagonal) and bar:</i> 1 [25] and under over 1 [25] to 2 [50], incl	80 [550] 78 [540]	35 [240] 32 [220]	15 15
M20	as hot rolled	over 2 [50]	75 [515]	30 [205]	20
M20	as hot rolled	} <i>shapes, all sizes</i>	75 [515]	30 [205]	20
M30	as hot extruded				
O20	hot forged and annealed				
O25	hot rolled and annealed				
O30	hot extruded and annealed				
HR50	drawn and stress relieved				
Copper Alloy UNS No. C62400					
HR50	drawn and stress relieved	<i>rod (round only):</i> ½ [12] and under over ½ [12] to 1 [25], incl over 1 [25] to 2 [50], incl over 2 [50] to 3 [80], incl	95 [655] 95 [655] 90 [620] 90 [620]	45 [310] 45 [310] 43 [295] 40 [275]	10 12 12 12
M20	as hot rolled	} over 3 [80] to 5 [125] incl	90 [620]	35 [240]	12
M30	as hot extruded				
O20	hot forged and annealed	} <i>rod (hexagonal and octagonal) and bar:</i>	90 [620]	35 [240]	12
O25	hot rolled and annealed				
O30	hot extruded and annealed				
		<i>shapes, all sizes</i>	90 [620]	35 [240]	12