



Designation: ~~B 371/B 371M-06~~ Designation: B371/B371M - 08

Standard Specification for Copper-Zinc-Silicon Alloy Rod¹

This standard is issued under the fixed designation B371/B371M; 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-zinc-silicon alloy rod produced in Copper Alloy UNS Nos. C69300, C69400, C69430, C69700, and C69710.

1.1.1 If the purchaser does not specify the alloy to be supplied, product is permitted to be furnished in any of the alloys named in 1.1.

1.2 ~~Units—Values—~~The values stated in either ~~inch-pound~~SI units or ~~SI~~inch-pound units are to be regarded separately as standard. ~~Within the text, SI units are shown in brackets.~~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 non-conformance with the standard.

1.3 The following safety hazard caveat pertains only to the test methods described in this specification. *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.* (

1.4 ~~Warning—Mercury is a definite health hazard in use and disposal.)—~~Mercury has been designated by EPA and many state agencies as a hazardous material that can cause central nervous system, kidney, and liver damage. Mercury, or its vapor, may be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury-containing products. See the applicable product Material Safety Data Sheet (MSDS) for details and EPA's website (<http://www.epa.gov/mercury/faq.htm>) for additional information. Users should be aware that selling mercury or mercury-containing products, or both, in your state may be prohibited by state law.

2. Referenced Documents

2.1 ASTM Standards:²

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

B858 Test Method for Ammonia Vapor Test for Determining Susceptibility to Stress Corrosion Cracking in Copper Alloys

E8 Test Methods for Tension Testing of Metallic Materials

E8M Test Methods for Tension Testing of Metallic Materials [Metric]

E54 Test Methods for Chemical Analysis of Special Brasses and Bronzes

E62 Test Methods for Chemical Analysis of Copper and Copper Alloys (Photometric Methods)

E478 Test Methods for Chemical Analysis of Copper Alloys

3. General Requirements

3.1 The following sections of Specification ~~B 249/B 249M~~B249/B249M constitutes a part of this specification:

3.1.1 Terminology,

3.1.2 Materials 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,

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, 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.

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

- 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, and
- 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 which supplement those appearing in Specification B-249/B-249MB249/B249M.

4. Ordering Information

4.1 Include the following information when placing orders for product under this specification, as applicable:

- 4.1.1 ASTM designation and year of issue,
- 4.1.2 Copper alloy UNS No. designation,
- 4.1.3 *Form*—Cross section such as round, hexagon, and so forth,
- 4.1.4 *Temper*—(Section 7),
- 4.1.5 *Dimensions*—Diameter or distance between parallel surfaces, nominal specific or stock length,
- 4.1.6 *Quantity*—Total weight, footage, or number of pieces, and
- 4.1.7 If product is purchased for agencies of the U.S. government (see Supplementary Requirements section of Specification B-249/B-249MB249/B249M).

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

- 4.2.1 Residual Stress Test (Performance Requirements section, Section 9),
 - 4.2.1.1 Ammonia Vapor Test or Mercurous Nitrate Test,
 - 4.2.1.2 For the Ammonia Vapor Test, pH value other than 10.
- 4.2.2 Certification (Specification B-249/B-249M), and
- 4.2.3 Mill test report (Specification B-249/B-249MB249/B249M).

5. Material and Manufacture

5.1 *Material*—The material of manufacture shall be cast billets, logs, or rods of Copper Alloy UNS Nos. C69300, C69400, C69430, C69700, or C69710 of such purity and soundness to be suitable for processing into the product prescribed herein.

5.2 *Manufacture*—The product shall be manufactured by hot extrusion and finished by such cold working, annealing, straightening, and cutting to length as may be necessary to meet the properties specified.

6. Chemical Composition

6.1 The material shall conform to the chemical compositional requirements specified in Table 1 for the Copper Alloy UNS No. designation specified in the ordering information.

6.1.1 These compositional 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 zinc is listed as “remainder,” either copper or zinc may be taken as the difference between the sum of results of all other elements determined and 100 %.

TABLE 1 Chemical Requirements

Element	Composition, %									
	Copper Alloy UNS No.									
	C69300		C69400		C69430		C69700		C69710	
	min	max	min	max	min	max	min	max	min	max
Copper ^A	73.0	77.0	80.0	83.0	80.0	83.0	75.0	80.0	75.0	80.0
Silicon	2.7	3.4	3.5	4.5	3.5	4.5	2.5	3.5	2.5	3.5
Lead	...	-0.10	...	-0.30	...	-0.30	-0.50	-1.5	-0.50	-1.5
Lead	...	0.09	...	0.30	...	0.30	0.50	1.5	0.50	1.5
Iron	...	0.10	...	0.20	...	0.20	...	0.20	...	0.20
Tin	...	0.20	...	...	...	...	...	...	...	...
Nickel	...	0.10	...	...	...	...	...	...	...	...
Manganese	...	0.10	...	...	...	...	...	0.40	...	0.40
Arsenic	...	...	...	...	0.03	0.06	...	...	0.03	0.06
Antimony	...	...	...	...	...	...	...	...	...	...
Phosphorus	0.04	0.15	...	...	...	...	...	...	...	...
Zinc	remainder		remainder		remainder		remainder		remainder	

^A Includes Silver.