Designation: B150/B150M – 12

Standard Specification for Aluminum Bronze Rod, Bar, and Shapes[1]

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 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.

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 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 *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]

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 Test Methods for Tension Testing of Metallic Materials

E8M Test Methods for Tension Testing of Metallic Materials [Metric] (Withdrawn 2008)[3]

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,
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,
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 Mill Test Report,
3.1.13 Packaging and Package Marking, Preservation and 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

[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] 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**

TABLE 1 Chemical Requirements

Elements	Composition, %									
	Copper Alloy UNS No.									
	C61300	C61400	C61900	C62300	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
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.

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,

4.2.4.2 For Ammonia Vapor Test, pH value other than 10.

4.2.5 If piston finish or shafting is required, (Performance Requirements and Workmanship sections), and

4.2.6 When tensile test is required for alloys with hardness requirements in Table 3 (see 8.2.1).

5. Materials and Manufacture

5.1 *Manufacture:*

5.1.1 *Copper Alloy UNS C63020*—Rod and Bar shall be heat-treated to 26 Rockwell hardness (C scale) (HRC) minimum as follows:

5.1.2 Heat to 1550°/1650°F [850/900°C] for 2 h minimum and quenched in water.

5.1.3 Temper at 900°/1000°F [480/540°C] for 2 h minimum and air cool to room temperature.

5.2 *Copper Alloy UNS C63200*—Rod and Bar shall be heat-treated as follows:

5.2.1 Heat to 1550°F [850°C] minimum for 1 h minimum at temperature and quench in water or other suitable medium,

5.2.2 Temper anneal at 1300 ± 25°F [700 ± 15°C] for 3 to 9 h at temperature as required to obtain desired mechanical properties, and

5.2.3 Heat treatment is not mandatory for sections that exceed 12 in. [300 mm] in diameter or thickness.

6. Chemical Composition

6.1 The material shall conform by alloy to the chemical composition requirements in Table 1 for the copper alloy UNS designation specified in the ordering information.

6.2 For alloys in which copper is listed as "remainder," copper is the difference between the sum of all elements determined and 100 %.

6.2.1 When all elements in Table 1 are determined, the sum of results shall be 99.5 % minimum for all alloys except C61300 which shall be 99.8 % min.

TABLE 2 Tensile Requirements

Temper Designation		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]
Code	Name				
		Copper Alloy UNS No. C61300			
HR50	drawn and stress relieved	*rod (round only):*			
		½ [12] and under	80 [550]	50 [345]	30
		over ½ [12] to 1 [25], incl	75 [515]	45 [310]	30
		over 1 [25] to 2.0 [50] incl	72 [495]	40 [275]	30
		over 2 [50] to 3 [80], incl	70 [485]	35 [240]	30
HR50	drawn and stress relieved	*rod (hexagonal and octagonal) and bar:*			
		½ [12] and under	80 [550]	40 [275]	30
		over ½ [12] to 1 [25], incl	75 [515]	35 [240]	30
		over 1 [25] to 2 [50], incl	70 [485]	32 [220]	30
		Copper Alloy UNS No. C61400			
HR50	drawn and stress relieved	*rod (round only):*			
		½ [12] and under	80 [550]	40 [275]	30
		over ½ [12] to 1 [25], incl	75 [515]	35 [240]	30
		over 1 [25] to 2 [50], incl	70 [485]	32 [220]	30
		over 2 [50] to 3 [80], incl	70 [485]	30 [205]	30
		Copper Alloy UNS No. C61900			
HR50	drawn and stress relieved	*rod (round only):*			
		½ [12] and under	90 [620]	50 [345]	15
		over ½ [12] to 1 [25], incl	88 [605]	44 [305]	15
		over 1 [25] to 2 [50], incl	85 [585]	40 [275]	20
		over 2 [50] to 3 [80], incl	78 [540]	37 [255]	25
M20	as hot rolled	over 3 [80]	75 [515]	30 [205]	20
M20	as hot rolled	*shapes, all sizes*	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	*rod (round only):*			
		½ [12] and under	90 [620]	50 [345]	12
		over ½ [12] to 1 [25], incl	88 [605]	44 [305]	15
		over 1 [25] to 2 [50], incl	84 [580]	40 [275]	15
		over 2 [50] to 3 [80], incl	76 [525]	37 [255]	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	*rod (hexagonal and octagonal) and bar:*			
		1 [25] and under	80 [550]	35 [240]	15
		over 1 [25] to 2 [50], incl	78 [540]	32 [220]	15
M20	as hot rolled	over 2 [50]	75 [515]	30 [205]	20
M20	as hot rolled	*shapes, all sizes*	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	*rod (round only):*			
		½ [12] and under	95 [655]	45 [310]	10
		over ½ [12] to 1 [25], incl	95 [655]	45 [310]	12
		over 1 [25] to 2 [50], incl	90 [620]	43 [295]	12
		over 2 [50] to 3 [80], incl	90 [620]	40 [275]	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	*rod (hexagonal and octagonal) and bar:*			
O25	hot rolled and annealed				
O30	hot extruded and annealed	½ [12] to 5 [125], incl	90 [620]	35 [240]	12
		shapes, all sizes	90 [620]	35 [240]	12

TABLE 2 *Continued*

Temper Designation		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]
Code	Name				
TQ50	quench hardened and temper annealed	*rod (round only):*			
		over 3 [80] to 5 [125], incl	95 [655]	45 [310]	10
		Copper Alloy UNS No. C63000			
		1—*standard strength rod:*			
HR50	drawn and stress relieved	½ [12] to 1 [25], incl	100 [690]	50 [345]	5
		over 1 [25] to 2 [50], incl	90 [620]	45 [310]	6
		over 2 [50] to 3 [80], incl	85 [585]	42.5 [295]	10
M20	as hot rolled				
M30	as hot extruded				
O20	hot forged and annealed	over 3 [80] to 4 [100], incl	85 [585]	42.5 [295]	10
O25	hot rolled and annealed	over 4 [100]	80 [550]	40 [275]	12
O30	hot extruded and annealed				
HR50	drawn and stress relieved				
		bar:			
HR50	drawn and stress relieved	½ [12] to 1 [25], incl	100 [690]	50 [345]	5
		over 1 [25] to 2 [50], incl	90 [620]	45 [310]	6
M20	as hot rolled				
M30	as hot extruded				
O20	hot forged and annealed	over 2 [50] to 4 [100], incl	85 [585]	42.5 [295]	10
O25	hot rolled and annealed	over 4 [100]	80 [550]	40 [275]	12
O30	hot extruded and annealed				
HR50	drawn and stress relieved				
M20	as hot rolled				
M30	as hot extruded				
O20	hot forged and annealed	*shapes, all sizes*	85 [585]	42.5 [295]	10
O25	hot rolled and annealed				
O30	hot extruded and annealed				
HR50	drawn and stress relieved				
		2—*high strength rod:*			
HR50	drawn and stress relieved	1 [25] and under	110 [760]	68 [470]	10
		over 1 [25] to 2 [50], incl	110 [760]	60 [415]	10
HR50	drawn and stress relieved	over 2 [50] to 3 [80], incl	105 [725]	55 [380]	10
O26	hot rolled and temper annealed				
TQ50	quench hardened and temper annealed	over 3 [80] to 5 [125], incl	100 [690]	50 [345]	10
032	hot extruded and temper annealed				
O26	hot rolled and temper annealed				
		Copper Alloy UNS No C63020			
TQ30	quenched hardened and tempered	*rod and bar:*			
		up to 1 [25] incl	135 [930]	100 [690][C]	6
		over 1 [25] to 2 [50], incl	130 [890]	95 [650][C]	6
		over 2 [50] to 4 [100], incl	130 [890]	90 [620][C]	6
		Copper Alloy UNS No. C63200			
TQ50	quench hardened and temper annealed	*rod and bar:*			
		up to 3 [80], incl	90 [620]	50 [345]	15
		over 3 [80] to 5 [125], incl	90 [620]	45 [310]	15
TQ55	quench hardened, temper annealed, drawn, and stress relieved	over 5 [125] to 12 [300], incl	90 [620]	40 [275]	15
		shapes, all sizes	90 [620]	40 [275]	15
O20	hot forged and annealed	bar and shapes			
O25	hot rolled and annealed	all sizes	90 [620]	40 [275]	15
		Copper Alloy UNS Nos. C64200 and C64210			
HR50	drawn and stress relieved	*rod and bar:*			
		½ [12] and under	90 [620]	45 [310]	9
		over ½ [12] to 1 [25], incl	85 [585]	45 [310]	12
		over 1 [25] to 2 [50], incl	80 [550]	42 [290]	12
		over 2 [50] to 3 [80], incl	75 [515]	35 [240]	15

TABLE 2 *Continued*

Temper Designation		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]
Code	Name				
M10	as hot forged–air cooled	over 3 [80] to 4 [100] incl	70 [485]	30 [205]	15
M20	as hot rolled	over 4 [100]	70 [485]	25 [170]	15
M30	as hot extruded				
M30	as hot extruded	*shapes, all sizes*	70 [485]	30 [205]	15

[A] For rectangular bar, the Distance Between Parallel Surfaces as used in this table refers to the thickness.
[B] Elongation values are based on 5.65 times the square root of the area for dimensions greater than 0.10 in. [2.5 mm]. In any case, a minimum gage length of 1 in. [25 mm] shall be used.
[C] Yield strength at 0.2 % offset.

TABLE 3 Rockwell Hardness Requirements[A]

Temper Designation		Diameter or Distance Between Parallel Surfaces, in. [mm]	Rockwell Hardness Determined on the Cross Section Midway Between Surface and Center
Code	Name		
Copper Alloy UNS No. C63020			
TQ30	Quench hardened and tempered	all sizes	C26 min
Copper Alloys UNS Designations C64200 and C64210			
HR50	drawn and stress relieved	0.5 [12] to 1.0 [25], incl.	B80 – 100
		over 1.0 [25] to 2.0 [50], incl.	B80 – 100
		over 2.0 [50] to 3.0 [80], incl.	B70 – 95
M30	as hot-extruded	over 3.0 [80] to 4.0 [100], incl.	B65 – 95
		over 4.0 [100]	B65 – 95
		shapes, all sizes	B65–95

[A] Rockwell hardness requirements are not established for diameters less than 0.5 in. [12 mm].

6.3 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.

7. Temper

7.1 The standard tempers for products described in this specification, and as defined in Classification B601, are given in Tables 2 and 3.

7.1.1 Annealed tempers O20, O25, and O30.

7.1.2 Cold worked and stress relieved temper HR50.

7.1.3 As-manufactured tempers M10, M20, M30.

7.1.4 Heat treated tempers O26, O32, TQ30, TQ50 and TQ55.

NOTE 3—UNS No. C63000 has two available strength levels available in rod, standard strength and high strength.

8. Mechanical Property Requirements

8.1 Product furnished under this specification shall conform to the mechanical property requirements prescribed in Table 2 and Table 3 for the Copper Alloy UNS No. designation specified in the ordering information.

8.2 *Rockwell Hardness Requirement* —For the alloys and tempers listed in Table 3, product 0.5 in. [12 mm] and over in diameter or distance between parallel surfaces shall conform with the requirements prescribed in Table 3, when tested in accordance with Test Methods E18.

8.2.1 For Copper Alloys UNS Nos. C64200 and C64210 in tempers listed in Table 3, Rockwell hardness shall be the basis of acceptance or rejection for mechanical properties except when the tensile test is specified in the contract or purchase order.

8.3 *Tensile Strength Requirements*—Product furnished under this specification shall conform to the tensile requirements in Table 2 when tested in accordance with Test Methods E8 or E8M.

9. Performance Requirements

9.1 *Residual Stress Test:*

9.1.1 When specified in the contract or purchase order, the product shall be tested for residual stress according to the requirements of Test Method B154 or Test Method B858, and show no signs of cracking.

Warning—Mercury is a definite health hazard. With the Mercurous Nitrate Test, equipment for the detection and removal of mercury vapor produced in volatilization, and the use of protective gloves is recommended.

9.1.2 When the ammonia vapor test is used, the test pH value appropriate for the intended application shall be 10 unless otherwise specified by the purchaser.

NOTE 4—A residual stress test provides information about the adequacy of the stress relief of the material. Bar straightening is a method of mechanical stress relief. Stress relief annealing is a method of thermal stress relief.

9.2 *Piston Finish*—When specified, round rod over 0.5 in. [12 mm] in diameter shall be furnished piston finished. Refer to Specification B249/B249M.

10. Dimensions and Permissible Variations

10.1 The dimensions and tolerances for product described by this specification shall be as specified in Specification B249/B249M with particular reference to the following tables and related paragraphs:

10.1.1 *Diameter or Distance between Parallel Surfaces, Rod (Round, Hexagonal, Octagonal):*

10.1.1.1 *Rod: Cold Drawn Tempers*—Refer to applicable Table 2 on Tolerances for Diameter or Distances Between Parallel Surfaces of Cold-Drawn Rod.

10.1.1.2 *Rod, M30, O30, and O32 tempers*—Refer to Table 4 on Tolerances for Diameter or Distance Between Parallel Surfaces of As-Extruded Rod and Bar.

10.1.1.3 *Round Rod, M20 temper*—Refer to Table 6 on Diameter Tolerances for Hot-Rolled Round Rod.

10.1.1.4 *Piston Finish Rod*—Refer to Table 3 on Diameter Tolerances for Piston-Finished Rod.

10.1.2 *Distance between Parallel Surfaces, Bar (Rectangular and Square):*

10.1.2.1 *Bar, Drawn Tempers*—Refer to Table 9 on Thickness Tolerances for Rectangular and Square Bar, and Table 11 on Width Tolerances for Rectangular Bar.

10.1.2.2 *Bar, M30, O30, and O32 Tempers*—Refer to Table 4 on Tolerances for Diameter or Distance Between Parallel Surfaces of As-Extruded Rod and Bar.

10.1.3 *Length of Rod, Bar and Shapes*—Refer to Table 13 on Length Tolerances for Rod, Bar, and Shapes, and Table 15 on Schedule of Lengths (Specific and Stock) with Ends for Rod and Bar.

10.1.4 *Straightness:*

10.1.4.1 *Rod and Bar*—Refer to Table 16 on Straightness Tolerances for Rod, Bar, and Shapes.

10.1.4.2 *Shafting Rod*—Refer to Table 17 on Straightness Tolerances for Shafting.

10.1.4.3 *Rod, Bar and Shapes of M20, M30, O30, and O32 Temper*—They shall be of sufficient straightness to meet the requirements of the intended application.

10.1.5 *Edge Contours*—Refer to section entitled, "Edge Contours."

10.2 *Shapes*—The cross section dimensional tolerances for shapes shall be as agreed upon between the manufacturer and the purchaser.

11. Workmanship, Finish, and Appearance

11.1 When specified in the contract or purchase order, round rod over ½ in. [12 mm] in diameter shall be furnished as piston finish rod or shafting.

12. Test Methods

12.1 *Chemical Analysis:*

12.1.1 In cases of disagreement, determine the composition using the following methods:

Element	ASTM Test Methods
Aluminum	E478, Titrimetric
Arsenic	E62
Copper	E478
Iron	E478, Photometric
Lead	E478, Atomic absorption
Manganese	E62
Nickel	E478, Photometric
Phosphorous	E62
Silicon	E62
Tin	E478, Photometric
Zinc	E478, Atomic absorption
Cadmium	E53
Chromium	E118

12.1.2 Test methods to be followed for the determination of elements resulting from contractual or purchase order agreement shall be as agreed upon between the manufacturer or supplier and the purchaser.

13. Keywords

13.1 aluminum bronze bar; aluminum bronze rod; aluminum bronze shapes; UNS Alloy No. C61300; UNS Alloy No. C61400; UNS Alloy No. C61900; UNS Alloy No. C62300; UNS Alloy No. C62400; UNS Alloy No. C63000; UNS Alloy No. C63020; UNS Alloy No. C63200; UNS Alloy No. C64200; UNS Alloy No. C64210

SUMMARY OF CHANGES

Committee B05 has identified the principal changes to this specification that have been incorporated since the 2008 issue as follows:

(1) Added temper designation O26, hot rolled and temper annealed, to Section 7 and Table 2 for C63000, high strength rod over 2 in. [50 mm] diameter.