



Designation: B672 – 02 (Reapproved 2018)

Standard Specification for Nickel-Iron-Chromium-Molybdenum-Columbium Stabilized Alloy (UNS N08700) Bar and Wire¹

This standard is issued under the fixed designation B672; 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 covers nickel-iron-chromium-molybdenum-columbium stabilized alloy (UNS N08700)² bar.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered 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 become familiar with all hazards including those identified in the appropriate Safety Data Sheet (SDS) for this product/material as provided by the manufacturer, to establish appropriate safety, health, and environmental practices, and determine the applicability of regulatory limitations 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:³

A262 Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels

B880 Specification for General Requirements for Chemical Check Analysis Limits for Nickel, Nickel Alloys and Cobalt Alloys

E8/E8M Test Methods for Tension Testing of Metallic Materials

¹ This specification is under the jurisdiction of ASTM Committee B02 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.07 on Refined Nickel and Cobalt and Their Alloys.

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² Designation established in accordance with ASTM E527 and SAE J1086, Practice for Numbering Metals and Alloys (UNS).

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.

E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

E1473 Test Methods for Chemical Analysis of Nickel, Cobalt and High-Temperature Alloys

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 The terms bar and wire as used in this specification are described as follows:

3.1.2 *bars, n*—hot-finished rounds, squares, octagons, and hexagons: $\frac{1}{4}$ in. (6.35 mm) and over in diameter or size. Hot-finished flats: $\frac{1}{4}$ in. to 10 in. (254 mm), inclusive, in width, $\frac{1}{8}$ in. (3.18 mm) and over in thickness. Cold-finished rounds, squares, octagons, hexagons, and shapes: over $\frac{1}{2}$ in. (12.7 mm) in diameter or size. Cold-finished flats: $\frac{3}{8}$ in. (9.52 mm) and over in width (see 3.1.2), $\frac{1}{8}$ in. and over in thickness.

(I) Thickness 0.125 in. to under 0.187 in. (3.18 mm to under 4.76 mm) can be cold-rolled as well as bar.

3.1.3 *wire, n*—Cold-finished only: round, square, octagon, hexagon, and shape wire, $\frac{1}{2}$ in. and under in diameter or size. Cold-finished only: flat wire, $\frac{3}{16}$ in. (4.76 mm) to under 0.375 in. (9.52 mm) in width, 0.010 in. (0.254 mm) to under $\frac{3}{16}$ in. thickness.

4. Ordering Information

4.1 Orders for material under this specification should include the following information:

4.1.1 Quantity (weight or number of pieces).

4.1.2 Name of material or UNS N08700.

4.1.3 Form (bar).

4.1.4 Dimensions.

4.1.5 Finish.

4.1.6 ASTM designation and year of issue.

4.1.7 *Corrosion Test*—State if intergranular corrosion test is required (Supplementary Requirements).

4.1.8 *Certification or Test Reports*—State if certification or test reports are required (Section 14).

NOTE 1—A typical ordering description is as follows: 200 bars, UNS N08700, 1 in. (25.4 mm) round by 10 to 14 ft (3.0 to 4.3 m), centerless ground, ASTM B672 dated____.

5. Materials and Manufacture

5.1 *Heat Treatment*—The final treatment shall be a solution anneal. Straightening or cold finishing, or both, may be performed after the final solution annealing operation. Cold drawing to more than a minor sizing reduction (preferred maximum 5 % in area) after final solution annealing is not recommended.

NOTE 2—The recommended solution anneal consists of heating to a minimum temperature of 2000°F (1090°C) and cooling rapidly to room temperature.

6. Chemical Composition

6.1 Heat analysis, on samples in accordance with 11.2, shall conform to the requirements as to chemical composition prescribed in Table 1.

6.2 If a product analysis is performed by the purchaser, the material shall conform to the composition limits within the product analysis variation prescribed in Specification B880.

7. Mechanical Properties

7.1 The material shall conform to the requirements as to the mechanical property prescribed in Table 2.

8. Dimensions and Permissible Variations

8.1 *Bar*—Bars shall conform to the variations in dimensions prescribed in Tables 3-11, inclusive, as applicable.

9. Workmanship, Finish, and Appearance

9.1 The product shall be uniform in quality and condition, smooth, commercially straight or flat, and free of injurious imperfections.

10. Sampling

10.1 *Lot*—Definition:

10.1.1 A lot for chemical analysis shall consist of one heat.

10.1.2 A lot for mechanical properties or corrosion testing (Supplementary Requirement S1) shall consist of all material from a heat and cross-sectional size, heat treated by the same practice.

10.2 *Test Material Selection*:

10.2.1 *Chemical Analysis*—A representative sample from each lot shall be taken during pouring or subsequent processing.

10.2.1.1 *Product Check Analysis* shall be wholly the responsibility of the purchaser.

10.2.2 *Mechanical Properties and Corrosion Test*—(Supplementary Requirement S1)—Samples of the material to provide test specimens shall be taken from such locations in each lot as to be representative of that lot.

11. Number of Tests

11.1 *Chemical Analysis*—One test per lot.

11.2 *Mechanical Properties and Corrosion Test (Supplementary Requirement S1)*—One test per lot.

12. Test Methods

12.1 Determine the chemical composition, mechanical properties, and corrosion resistance of the material as enumerated in this specification, in case of disagreement, in accordance with the following methods:

Test	ASTM Designation
Corrosion test (Supplementary Requirement S1)	A262, Practice C
Chemical analysis	E1473 ^A
Tension	E8/E8M
Rounding procedure	E29

^A Iron shall be determined arithmetically by difference.

13. Rejection and Rehearing

13.1 Material that fails to conform to the requirements of this specification may be rejected. Rejection should be reported to the producer or supplier promptly and in writing. In case of dissatisfaction with the results of the test, the producer or supplier may make claim for a rehearing.

14. Certification

14.1 When specified in the purchase order or contract, a manufacturer's certification shall be furnished to the purchaser stating that material has been manufactured, tested, and inspected in accordance with this specification, and that the test results on representative samples meet specification requirements. When specified in the purchase order or contract, a report of the test results shall be furnished.

15. Product Marking

15.1 Each bundle, box, or bar shall be properly tagged with metal tags showing heat number, UNS number, condition, specification number, and size to assure proper identification.

16. Packaging and Package Marking

16.1 Bars shall be bundled or boxed in such a manner as to assure safe delivery to their destination when properly transported by any common carrier.

17. Keywords

17.1 bar; nickel-iron-chromium-molybdenum-columbium; UNS N08700

TABLE 1 Chemical Requirements

Element	Composition, %
Nickel	24.0 to 26.0
Iron	remainder ^A
Chromium	19.0 to 23.0
Molybdenum	4.3 to 5.0
Columbium	8 × carbon to 0.40
Carbon, max	0.04
Silicon, max	1.00
Manganese, max	2.00
Phosphorus, max	0.040
Sulfur, max	0.030
Copper, max	0.50

^A Determined arithmetically by difference.