Designation: ~~B621 – 02 (Reapproved 2011)~~ B621 – 02 (Reapproved 2016)

Standard Specification for Nickel-Iron-Chromium-Molybdenum Alloy (UNS N08320) Rod[1]

This standard is issued under the fixed designation B621; 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[2] covers nickel-iron chromium-molybdenum alloy (UNS N08320)~~–~~[*3] rod for use in general corrosive service.

1.2 The following products are covered under this specification:

1.2.1 Rods 5⁄16 to ¾ in. (7.94 to 19.05 mm) excl in diameter, hot or cold finished, solution annealed and pickled or mechanically descaled.

1.2.2 Rods ¾ to 3½ in. (19.05 to 88.9 mm) incl in diameter, hot or cold finished, solution annealed, ground or turned.

1.3 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.

1.4 *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 ~~Material~~ Safety Data Sheet ~~(MSDS)~~(SDS) for this product/material as provided by the manufacturer, to establish appropriate safety and health practices, and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[4]

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

E8 Test Methods for Tension Testing of Metallic Materials

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

E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

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 *rod, n*—a product of round solid section furnished in straight lengths.

4. Ordering Information

4.1 It is the responsibility of the purchaser to specify all requirements that are necessary for material ordered under this specification. Examples of such requirements include but are not limited to the following:

4.1.1 *Dimensions*—Nominal diameter and length. The shortest useable multiple length shall be specified (Table 1).

4.1.2 *Certification*—State if certification or a report of test results is required (Section 15).

4.1.3 *Purchaser Inspection*—State which tests or inspections are to be witnessed (Section 13).

4.1.4 *Samples for Product (Check) Analysis*—State whether samples shall be furnished (9.2.2).

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[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] For ASME Boiler and Pressure Vessel Code applications see related Specification SB-621 in Section II of that Code.

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~~*~~ ~~New~~New designation established in accordance with ASTM E527 and SAE J1086, Recommended Practice for Numbering Metals and Alloys (UNS).

[4] 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~~standard's Document Summary page on the ASTM website.

TABLE 1 Permissible Variations in Length of Rods

Random mill lengths	2 to 12 ft (610 to 3660 mm) long with not more than 25 weight % under 4 ft (1.22 m).
Multiple lengths	Furnished in multiples of a specified unit length, within the length limits indicated above. For each multiple, an allowance of ¼ in. (6.35 mm) shall be made for cutting, unless otherwise specified. At the manufacturer's option, individual specified unit lengths may be furnished.
Nominal lengths	Specified nominal lengths having a range of not less than 2 ft (610 mm) with no short lengths allowed.
Cut lengths	A specified length to which all rods shall be cut with a permissible variation of + ⅛ in. (3.17 mm) - 0.

5. Chemical Composition

5.1 The material shall conform to the composition limits specified in Table 2.

5.2 If a product (check) analysis is made by the purchaser, the material shall conform to the requirements specified in Table 2 subject to the permissible tolerances in Specification B880.

6. Mechanical Properties and Other Requirements

6.1 The mechanical properties of the material at room temperature shall conform to those shown in Table 3.

TABLE 2 Chemical Requirements

~~Element~~	Composition Limits,%
~~Nickel~~	~~25.0–27.0~~
~~Iron~~	~~remainder[A]~~
~~Chromium~~	~~21.0–23.0~~
~~Molybdenum~~	~~4.0–6.0~~
~~Manganese, max~~	~~2.5~~
~~Carbon, max~~	~~0.05~~
~~Titanium, min~~	~~4 × carbon~~
~~Silicon, max~~	~~1.00~~
~~Phosphorus, max~~	~~0.04~~
~~Sulfur, max~~	~~0.03~~

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[A] See 12.1.1.