



Designation: B 639 – 97

Standard Specification for Precipitation Hardening Cobalt-Containing Alloys (UNS R30155 and UNS R30816) Rod, Bar, Forgings, and Forging Stock for High-Temperature Service¹

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1. Scope

1.1 This specification covers hot- and cold-worked precipitation hardenable cobalt-containing alloys (UNS R30155 and UNS R30816) rod, bar, forgings, and forging stock for high-temperature service.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced Documents

2.1 ASTM Standards:

E 8 Test Methods for Tension Testing of Metallic Materials²

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications³

E 38 Methods for Chemical Analysis of Nickel-Chromium and Nickel-Chromium-Iron Alloys⁴

E 139 Practice for Conducting Creep, Creep-Rupture, and Stress-Rupture Tests of Metallic Materials²

E 1473 Test Methods for Chemical Analysis of Nickel, Cobalt, and High-Temperature Alloys⁵

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *bar*—material of rectangular (flats), hexagonal, octagonal, or square solid section in straight lengths.

3.1.2 *rod*—material 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 the safe and satisfactory

performance of material ordered under this specification. Examples of such requirements include, but are not limited to, the following:

4.1.1 *Alloy Name or UNS Number* (see Table 1).

4.1.2 *ASTM Designation*, including year of issue. Table 2 Table 3

4.1.3 *Condition* (temper) (Table 4).

4.1.4 *Section*—Rod or bar (round, rectangle, square, hexagon, octagon).

4.1.4.1 *Forging* (sketch or drawing).

4.1.5 *Dimensions*, including length.

4.1.6 *Quantity* (mass or number of pieces).

4.1.7 *Forging stock*—Specify if material is stock for reforging.

4.1.8 *Finish*.

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

4.1.10 *Samples for Product (Check) Analysis*—Whether samples for product (check) analysis should be furnished (9.2).

4.1.11 *Purchaser Inspection*—If the purchaser wishes to witness the tests or inspection of material at the place of manufacture, the purchase order must so state indicating which tests or inspections are to be witnessed (Section 13).

5. Chemical Composition

5.1 The material shall conform to the chemical composition limits specified in Table 1.

5.2 If a product (check) analysis is performed by the purchaser, the material shall conform to the product (check) analysis variations in Table 1.

6. Mechanical Requirements

6.1 *Tensile and Hardness Requirements*—The material shall conform to the requirements for tensile and hardness properties in Table 2.

6.2 *Stress-Rupture Requirements*—The material shall conform to the requirements for stress-rupture properties in Table 3.

7. Dimensions and Permissible Variations

7.1 *Diameter, Thickness, or Width*—The permissible variations from the specified dimensions of cold-worked rod and bar

¹ This specification is under the jurisdiction of ASTM Committee B-2 on Nonferrous Metals and Alloys and is the direct responsibility of Subcommittee B02.07 on Refined Nickel and Cobalt and Their Alloys.

* New designation established in accordance with Practices E 527 and SAE J1086, Practice for Numbering Metals and Alloys (UNS).

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² *Annual Book of ASTM Standards*, Vol 03.01.

³ *Annual Book of ASTM Standards*, Vol 14.02.

⁴ Discontinued—See 1989 *Annual Book of ASTM Standards*, Vol 03.05.

⁵ *Annual Book of ASTM Standards*, Vol 03.06.