



~~Designation: B620-98a~~ Designation: B 620 - 03 (Reapproved 2008)

Standard Specification for Nickel-Iron-Chromium-Molybdenum Alloy (UNS N08320) Plate, Sheet, and Strip¹

This standard is issued under the fixed designation B 620; 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 specification² covers rolled nickel-iron-chromium-molybdenum alloy (UNS N08320)* plate, sheet, and strip, for use in general corrosive service.

1.2 The following products are covered under this specification:

1.2.1 *Sheet and Strip*—Hot or cold rolled, solution annealed, and descaled unless solution anneal is performed in an atmosphere yielding a bright finish.

1.2.2 *Plate*—Hot rolled, solution annealed, and descaled.

~~1.3 The values stated in inch-pound units are to be regarded as the standard.~~

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) 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: B880 Specification for General Requirements for Chemical Check Analysis Limits for Nickel, Nickel Alloys and Cobalt Alloys³~~

~~E8 Test Methods for Tension Testing of Metallic Materials B 906 Specification for General Requirements for Flat-Rolled Nickel and Nickel Alloys Plate, Sheet, and Strip~~

~~E18 Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials⁴~~

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

~~E55 Practice for Sampling Wrought Nonferrous Metals and Alloys for Determination of Chemical Composition~~

~~E140 Hardness Conversion Tables for Metals (Relationship Between Brinell Hardness, Vickers Hardness, Rockwell Hardness, Rockwell Superficial Hardness, and Knoop Hardness)⁴~~

~~E1473 Test Methods for Chemical Analysis of Nickel, Cobalt, and High-Temperature Alloys- 140 Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, and Scleroscope Hardness~~

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *plate*, *n*—material $\frac{3}{16}$ in. (4.76 mm) and over in thickness.

3.1.2 *sheet and strip*, *n*—material under $\frac{3}{16}$ in. (4.76 mm) in thickness.

4. General Requirements

4.1 Material furnished under this specification shall conform to the applicable requirements of Specification B 906 unless otherwise provided herein.

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

Current edition approved Oct. 10, 1998; Nov. 1, 2008. Published November 1998-2008. Originally published as B620-77; approved in 1977. Last previous edition B620-93; approved in 2003 as B 620 - 03.

² For ASME Boiler and Pressure Vessel Code applications see related Specification SB-620 in Section II of that Code.

* New designation established in accordance with ASTM E 527 and SAE J1086, Recommended 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*, Vol 02.04, volume information, refer to the standard's Document Summary page on the ASTM website.

5. Ordering Information

~~4.1.1~~ 5.1 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~~ 5.1.1 *Dimensions*—Thickness (in decimals of an inch), width, and length (inch or fraction of an inch).

~~4.1.2~~

~~5.1.2~~ *Certification*—State if certification or a report of test results is required (Section 15).

~~4.1.3~~ *State if certification or a report of test results is required (Specification B 906, Section 21).*

~~5.1.3~~ *Optional Requirement:*

~~4.1.3.1~~

~~5.1.3.1~~ *Plate*—State how plate is to be cut (see 7.8.1 and Table 1).

~~4.1.4~~ *State how plate is to be cut (Specification B 906, Table A2.3).*

~~5.1.4~~ *Purchase Inspection*—State which tests or inspections are to be witnessed (Section 13).

~~4.1.5~~ *State which tests or inspections are to be witnessed (Specification B 906, Section 18).*

~~5.1.5~~ *Samples for Product (Check) Analysis*—State whether samples should be furnished (9.2.2).

~~5.~~ State whether samples should be furnished (Specification B 906, Section 7.2.2).

6. Chemical Composition

~~5.1~~ 6.1 The material shall conform to the composition limits specified in Table 2~~1~~.

~~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 per B880

~~6.2~~ If a product (check) analysis is made by the purchaser, the material shall conform to the requirements specified in Table 1 and Specification B 906.

~~6.~~

7. Mechanical Properties and Other Requirements

~~6.1~~

~~7.1~~ *Tensile Properties*—The material shall conform to the room temperature tensile properties prescribed in Table 3~~2~~.

~~6.2~~

~~7.2~~ *Hardness*—The hardness values given in Table 3~~2~~ are informative only.

~~7.~~

8. Dimensions, Mass, and Permissible Variations

~~7.1~~

~~8.1~~ *Weight*—The material covered by this specification shall be assumed to weigh 0.291 lb/in.³ (8.05 g/cm³).

~~7.2~~

~~8.2~~ *Thickness:*

~~7.2.1~~ *Plate*—The permissible variations in thickness of plate shall be as prescribed in Table 4.

~~7.2.2~~

~~8.2.1~~ *Sheet and Strip*—The permissible variations in thickness of sheet and strip shall be as prescribed in Table 5. The thickness shall be measured with the micrometer spindle $\frac{3}{8}$ in. (9.525 mm) or more from any edge for material 1 in. (25.4 mm) or over in width and at any place on material under 1 in. in width.

~~7.3~~ *Width:*

~~7.3.1~~ *Plate*—The permissible variations in width of rectangular plates shall be as prescribed in Table 1.

TABLE 2 1 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 |

^A See Specification B 906 4.2.1.1.