



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 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:³

B 906 Specification for General Requirements for Flat-Rolled Nickel and Nickel Alloys Plate, Sheet, and Strip

E 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.

5. Ordering Information

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:

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

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

5.1.3 Optional Requirement:

5.1.3.1 *Plate*—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 (Specification **B 906**, Section 18).

5.1.5 *Samples for Product (Check) Analysis*—State whether samples should be furnished (Specification **B 906**, Section 7.2.2).

6. Chemical Composition

6.1 The material shall conform to the composition limits specified in **Table 1**.

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**.

7. Mechanical Properties and Other Requirements

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

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.

Current edition approved Nov. 1, 2008. Published November 2008. Originally approved in 1977. Last previous edition 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* volume information, refer to the standard's Document Summary page on the ASTM website.

TABLE 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.

TABLE 2 Mechanical Property Requirements

Tensile Strength min, psi (MPa)	Yield Strength (0.2 % Offset) min, psi (MPa)	Elongation in 2 in. (50.8 mm) or 4D ^A min, %	Rockwell Hardness, ^B max
75 000 (517)	28 000 (193)	35	95 HRB

^A D refers to the diameter of the tension specimen.

^B Hardness values are shown for information purposes only and are not to be used as a basis for rejection or acceptance. For approximate hardness conversions, see Hardness Conversion Tables E 140.

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

8. Dimensions, Mass, and Permissible Variations

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

8.2 Thickness:

8.2.1 **Sheet and Strip**—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.

8.3 Length:

8.3.1 Sheet and Strip:

Sheet and strip may be ordered to cut lengths, in which case a variation of $\frac{1}{8}$ in. (3.175 mm) over the specified length shall be permitted with a zero minus tolerance.

8.4 Straightness:

8.4.1 The edgewise curvature (depth of cord) of flat sheet, strip, and plate shall not exceed 0.05 in. multiplied by the length in feet or 0.04 mm multiplied by the length in centimetres.

8.4.2 Straightness for coiled strip is subject to agreement between the manufacturer and the purchaser.

8.5 **Squareness (Sheet)**—For sheets of all thicknesses and widths of 6 in. (152.4 mm) or more, the angle between adjacent sides shall be 90 ± 0.15 deg ($\frac{1}{16}$ in./24 in. or 2.6 mm/m).

8.6 **Flatness**—Plate, sheet, and strip shall be commercially flat.

8.7 Edges:

8.7.1 Plate shall have sheared or abrasive cut or plasma-torch-cut edges as specified.

8.7.2 Sheet and strip shall have sheared or slit edges.

9. Product Marking

9.1 Each plate, sheet, or strip shall be marked on one face with the specification number, alloy, heat number, manufacturer's identification, and size. The markings shall have no deleterious effect on the material or its performance and shall be sufficiently stable to withstand normal handling.

9.2 Each bundle or shipping container shall be marked with the name of the material; this specification number; alloy; the size; gross, tare, and net weight; consignor and consignee address; contract or order number; and such other information as may be defined in the contract or order.

10. Keywords

10.1 plate; sheet; strip; N08320

APPENDIX

(Nonmandatory Information)

X1. HEAT TREATMENT

X1.1 Proper heat treatment during or subsequent to fabrication is necessary for optimum performance, and the manu-

facturer shall be consulted for details.

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).