Designation: B582 – 07 (Reapproved 2013)

Standard Specification for Nickel-Chromium-Iron-Molybdenum-Copper Alloy Plate, Sheet, and Strip[1]

This standard is issued under the fixed designation B582; 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 The specification[2] covers plate, sheet, and strip of nickel-chromium-iron-molybdenum-copper alloys (UNS N06007, N06975, N06985, and N06030)* as shown in Table 1, 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 or cold 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]

B906 Specification for General Requirements for Flat-Rolled Nickel and Nickel Alloys Plate, Sheet, and Strip

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *cold-rolled plate, n*—material 3⁄16 to 3⁄8 in. (4.76 to 9.52 mm), inclusive, in thickness.

3.1.2 *hot-rolled plate, n*—material 3⁄16 in. (4.76 mm) and over in thickness.

3.1.3 *plate, n*—material 3⁄16 in. (4.76 mm) and over in thickness.

3.1.4 *sheet and strip, n*—material under 3⁄16 in. (4.76 mm) in thickness.

4. General Requirements

4.1 Materials furnished to this specification shall conform to the applicable requirements of Specification B906 unless otherwise provided herein.

5. Ordering Information

5.1 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:

5.1.1 *Alloy*—Table 1,

5.1.2 *Dimensions*—Thickness (in decimals of an inch), width, and length (inch or fractions of an inch),

5.1.3 *Optional Requirement, Plate*—How the plate is to be cut (see 8.1 and Specification B906, Table A2.3),

5.1.4 *Certification*—State if certification or a report of test results is required (Specification B906),

5.1.5 *Purchaser Inspection*—State which tests or inspections are to be witnessed (Specification B906), and

5.1.6 *Samples for Product (Check) Analysis*—State whether samples should be furnished (Section 6).

6. Chemical Composition

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

6.2 *Product (Check) Analysis*—If a product (check) analysis is made by the purchaser, the material shall conform to the requirements specified in Table 1 subject to the permissible tolerances in Specification B906.

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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-582 in Section II of that Code.

* New 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.

TABLE 1 Chemical Requirements

Element	Composition Limits, %			
	Alloy N06007	Alloy N06975	Alloy N06985	Alloy N06030
Nickel	remainder[A]	47.0 to 52.0	remainder[A]	remainder[A]
Chromium	21.0 to 23.5	23.0 to 26.0	21.0 to 23.5	28.0 to 31.5
Iron	18.0 to 21.0	remainder[A]	18.0 to 21.0	13.0 to 17.0
Molybdenum	5.5 to 7.5	5.0 to 7.0	6.0 to 8.0	4.0 to 6.0
Copper	1.5 to 2.5	0.70 to 1.20	1.5 to 2.5	1.0 to 2.4
Manganese	1.0 to 2.0	1.0 max	1.0 max	1.5 max
Cobalt, max	2.5	...	5.0	5.0
Carbon, max	0.05	0.03	0.015	0.03
Tungsten	1.0 max	...	1.5 max	1.5 to 4.0
Silicon, max	1.0	1.0	1.0	0.8
Phosphorus, max	0.04	0.03	0.04	0.04
Sulfur, max	0.03	0.03	0.03	0.02
Columbium + tantalum	1.75 to 2.50	...	0.50 max	0.30 to 1.50
Titanium	...	0.70–1.50	...	...

[A] The composition of the remainder element shall be determined arithmetically by difference.

7. Mechanical Properties and Other Requirements

7.1 *Tensile Properties*—The material shall conform to the mechanical property requirements prescribed in Table 2.

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

8. Edges

8.1 Plates shall have sheared or cut machined, abrasive cut, powder cut, or inert arc cut edges, as specified.

8.2 Sheet and strip shall have sheared or slit edges.

9. Permissible Variations in Dimensions

9.1 *Weight*—For calculation of mass or weight, the following densities shall be used:

Alloy	Density lb/in.^{3}	Density g/cm^3
N06007	0.300	8.31
N06975	0.295	8.17
N06985	0.300	8.31
N06030	0.297	8.22

9.2 *Thicknesses:*

9.2.1 *Plate*—The permissible variations in thickness of plate shall be as prescribed in Specification B906, Table A2.1.

9.2.2 *Sheet and Strip*—The permissible variations in thickness of sheet and strip shall be as prescribed in Specification B906, Table A2.2. The thickness shall be measured with the micrometer spindle ⅜ in. (9.52 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. (25.4 mm) in width.

9.3 *Width:*

TABLE 2 Mechanical Property Requirements

Alloy	Thickness, in. (mm)	Tensile Strength min, psi (MPa)	Yield Strength (0.2 % Offset), min, psi (MPa)	Elongation in 2 in. or 50.8 mm or 4D[A] min, %	Rockwell Hardness,[B] max
		Annealed Plate			
N06007	3/16 to ¾ (4.76 to 19.05), incl	90 000 (621)	35 000 (241)	35	100 HRB
	Over ¾ to 2½ (19.05 to 63.5), incl	85 000 (586)	30 000 (207)	30	100 HRB
N06975	3/16 to 2½ (4.76 to 63.5), incl	85 000 (586)	32 000 (221)	40	100 HRB
N06985	3/16 to ¾ (4.76 to 19.05), incl	90 000 (621)	35 000 (241)	45	100 HRB
	Over ¾ to 2½ (19.05 to 63.5), incl	85 000 (586)	30 000 (207)	35	100 HRB
N06030	...	85 000 (586)	35 000 (241)	30	...
		Annealed Sheet			
N06985	Over 0.020 (0.51)	90 000 (621)	35 000 (241)	45	100 HRB
		Annealed Sheet and Strip			
N06007	Over 0.020 (0.51)	90 000 (621)	35 000 (241)	40	100 HRB
N06975	Over 0.020 (0.51)	85 000 (586)	32 000 (221)	40	100 HRB
N06030	Over 0.020 (0.51)	85 000 (586)	35 000 (241)	30	...

[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 Specification B906.

9.3.1 *Plate*—The permissible variations in width of rectangular plates shall be as prescribed in Specification B906, Table A2.3.

9.3.2 *Sheet and Strip*—The permissible variations in width for sheet and strip shall be as prescribed in Specification B906, Table A2.4.

9.4 *Length:*

9.4.1 *Plate*—Permissible variations in the length of rectangular plate shall be as prescribed in Specification B906, Table A2.3.

9.4.2 *Sheet and Strip*—Sheet and strip may be ordered to cut lengths, in which case a variation of ⅛ in. (3.18 mm) over the specified length shall be permitted, with a 0 minus tolerance.

9.5 *Straightness*—The edgewise curvature (depth of cord) of sheet, strip, and plate shall not exceed 0.05 in./ft (4.2 mm/m).

9.6 *Squareness (Sheet)*—For sheets of all thickness and widths of 6 in. (152.4 mm) or more, the angle between adjacent sides shall be 90 ± 0.15° (1/16 in. in 24 in. or 2.6 mm/m).

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

10. Product Marking and Package Marking

10.1 Each plate, sheet, or strip shall be marked on one face with the specification number, 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.

10.2 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.

11. Keywords

11.1 plate; sheet; strip; N06007; N60975; N06985; N06030

APPENDIX

(Nonmandatory Information)

X1. HEAT TREATMENT

X1.1 Proper heat treatment during or subsequent to fabrication is necessary for optimum performance, and the manufacturer shall be consulted for details.