
This standard is issued under the fixed designation B434; 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 (´) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers nickel-molybdenum-chromium-iron alloys (UNS N10003 and UNS N10242)* 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, annealed, and descaled unless annealing is performed in an atmosphere yielding a bright finish.

1.2.2 Plate—Hot rolled, annealed, and descaled.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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:

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 plate, n—material ⅛ in. (4.76 mm) and over in thickness.

3.1.2 sheet and strip, n—material under ⅛ in. (4.76 mm) in thickness.

4. General Requirements

4.1 Material furnished under 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 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,

5.1.3 Purchase Inspection—State which tests or inspections are to be witnessed, and

5.1.4 Samples for Product (Check) Analysis—State whether samples shall be furnished.

6. Chemical Composition

6.1 The material shall conform to the requirements as to chemical composition prescribed 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 subject to the permissible tolerances in Specification B906.

7. Mechanical Properties and Other Requirements

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

7.2 Grain Size for Sheet and Strip—Sheet and strip shall conform to the grain size requirements given in Table 3.

8. Dimensions and Permissible Variations

8.1 Weight—For calculation of mass or weight, the following densities shall be used:
8.2 Thickness:

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

8.2.2 Sheet and Strip—The permissible variations in thickness of sheet and strip shall be as prescribed in Table A2.2 in Specification B906.

8.3 Width:

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

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

8.4 Length:

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

8.4.2 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 0 minus tolerance.

8.5 Straightness:

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

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

8.6 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\( \pm 0.15 \) deg (1/16 in. in 24 in. or 2.6 mm/m).

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

8.8 Edges:

8.8.1 Plate shall have sheared or abrasive cut edges.

8.8.2 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, 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; 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; UNS N10003 ; UNS N10242

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**TABLE 1 Chemical Requirements**

<table>
<thead>
<tr>
<th>Element</th>
<th>Composition, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UNS N10242</td>
</tr>
<tr>
<td>Chromium</td>
<td>7.0–9.0</td>
</tr>
<tr>
<td>Iron, max</td>
<td>2.0</td>
</tr>
<tr>
<td>Carbon</td>
<td>0.03 max</td>
</tr>
<tr>
<td>Silicon, max</td>
<td>0.80</td>
</tr>
<tr>
<td>Cobalt, max</td>
<td>1.00</td>
</tr>
<tr>
<td>Manganese, max</td>
<td>0.80</td>
</tr>
<tr>
<td>Tungsten, max</td>
<td>...</td>
</tr>
<tr>
<td>Vanadium, max</td>
<td>...</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>24.0–26.0</td>
</tr>
<tr>
<td>Phosphorus, max</td>
<td>0.030</td>
</tr>
<tr>
<td>Sulfur, max</td>
<td>0.015</td>
</tr>
<tr>
<td>Aluminum plus titanium, max</td>
<td>...</td>
</tr>
<tr>
<td>Copper, max</td>
<td>0.50</td>
</tr>
<tr>
<td>Boron, max</td>
<td>0.006</td>
</tr>
<tr>
<td>Nickel</td>
<td>remainder</td>
</tr>
<tr>
<td>Aluminum, max</td>
<td>0.50</td>
</tr>
</tbody>
</table>

**TABLE 2 Mechanical Properties for Plate and Sheet**

<table>
<thead>
<tr>
<th>UNS</th>
<th>Tensile Strength, min, ksi (MPa)</th>
<th>Yield Strength (0.2 % Offset), min, ksi (MPa)</th>
<th>Elongation in 2 in. (50.8 mm) or 4D(^4), min, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>N10003</td>
<td>100 (690)</td>
<td>40 (280)</td>
<td>40</td>
</tr>
<tr>
<td>N10242</td>
<td>105 (725)</td>
<td>45 (310)</td>
<td>40</td>
</tr>
</tbody>
</table>

\(4 D\) refers to the diameter of the tension specimen.

**TABLE 3 Grain Size for Annealed Sheets**

<table>
<thead>
<tr>
<th>Thickness, in. (mm)</th>
<th>ASTM Micrograin Size Number, max</th>
<th>Average Grain Diameter, max, in (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.125 (3.175) and under</td>
<td>3.0</td>
<td>0.0050 (0.127)</td>
</tr>
<tr>
<td>Over 0.125 (3.175)</td>
<td>1.5</td>
<td>0.0084 (0.214)</td>
</tr>
</tbody>
</table>

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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.

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