Standard Specification for
Ni-Fe-Cr-Mo-Cu Alloy (UNS N08825, UNS N08221, and
UNS N06845) Plate, Sheet, and Strip

1. Scope

1.1 This specification covers rolled nickel-iron-chromium-molybdenum-copper alloy (UNS N08825, UNS N08221, and UNS N06845) plate, sheet, and strip.

1.2 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.

1.3 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:

B425 Specification for Ni-Fe-Cr-Mo-Cu Alloy (UNS N08825, UNS N08221, and UNS N06845) Rod and Bar

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: Descriptions of Terms Specific to This Standard—The terms given in Table 1 shall apply.

#A A Summary of Changes section appears at the end of this standard.
### TABLE 2 Chemical Requirements

<table>
<thead>
<tr>
<th>Element</th>
<th>UNS N08825</th>
<th>UNS N08221</th>
<th>UNS N06845</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nickel</td>
<td>38.0 to 46.0</td>
<td>39.0 to 46.0</td>
<td>44.0 to 50.0</td>
</tr>
<tr>
<td>Chromium</td>
<td>19.5 to 23.5</td>
<td>20.0 to 22.0</td>
<td>20.0 to 25.0</td>
</tr>
<tr>
<td>Iron</td>
<td>22.0 min²</td>
<td>Balance⁻²</td>
<td>Remainder⁻²</td>
</tr>
<tr>
<td>Manganese</td>
<td>1.0</td>
<td>1.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Carbon</td>
<td>0.05</td>
<td>0.25</td>
<td>0.05</td>
</tr>
<tr>
<td>Copper</td>
<td>1.5 to 3.0</td>
<td>1.5 to 3.0</td>
<td>2.0 to 4.0</td>
</tr>
<tr>
<td>Silicon</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Sulfur</td>
<td>0.03</td>
<td>0.03</td>
<td>0.010</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.2</td>
<td>0.2</td>
<td>...</td>
</tr>
<tr>
<td>Titanium</td>
<td>0.6 to 1.2</td>
<td>0.6 to 1.0</td>
<td>...</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>2.5 to 3.5</td>
<td>5.0 to 6.5</td>
<td>5.0 to 7.0</td>
</tr>
<tr>
<td>Tungsten</td>
<td>...</td>
<td>...</td>
<td>2.0 to 5.0</td>
</tr>
</tbody>
</table>

¹ Maximum unless range or minimum is given. Where ellipses (…) appear in this table, there is no requirement and analysis for the element need not be determined or reported.
² Element shall be determined arithmetically by difference.

5.1.9 Samples for Product (Check) Analysis—Whether samples for product (check) analysis should be furnished (see Specification B906, section on Sampling).

5.1.10 Purchaser Inspection—If the purchaser wishes to witness 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 (Specification B906, section on Inspection).

### 6. Chemical Composition

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

6.2 If a product (check) analysis is performed by the purchaser, the material shall conform to the product (check) analysis per Specification B906.

### 7. Mechanical Properties

7.1 Mechanical Properties—The material shall conform to the mechanical properties specified in Table 3.

### 8. Dimensions and Permissible Variations

8.1 Thickness and Weight:

8.1.1 Plate—For plate up to 2 in. (50.8 mm), inclusive, in thickness, the permissible variation under the specified thickness and permissible excess in overweight shall not exceed the amounts prescribed in Specification B906, Permissible Variations in Thickness and Overweight of Rectangular Plates Table.

8.1.1.1 For use with Specification B906, Permissible Variations in Thickness and Overweight of Rectangular Plates Table, plate shall be assumed to weigh 0.294 lb/in.³ (8.138 g/cm³).

8.1.2 Plate—For plate over 2 in. (50.8 mm) in thickness, the permissible variations over the specified thickness shall not exceed the amounts prescribed in Specification B906, Permissible Variations in Thickness for Rectangular Plates Over 2 in. (51 mm) in Thickness Table.

8.1.3 Sheet and Strip—The permissible variations in thickness of sheet and strip shall be as prescribed in Specification B906, Permissible Variations in Thickness of Sheet and Strip Table. The thickness of strip and sheet shall be measured with the micrometer spindle ⅝ in. (9.5 mm) or more from either edge for material 1 in. (25.4 mm) or over in width and at any place on the strip under 1 in. (25.4 mm) in width.

8.2 Width or Diameter:
# 8.3 Length:

8.3.1 Sheet and strip of all sizes may be ordered to cut lengths, in which case a variation of 1/8 in. (3.2 mm) over the specified length shall be permitted.

8.3.2 Permissible variations in length of rectangular plate shall be as prescribed in Specification B906, Permissible Variations in Length of Sheared, Plasma Torch-Cut, and Abrasive-Cut Rectangular Plate Table.

8.4 Straightness:

8.4.1 The edgewise curvature (depth of chord) of flat sheet, strip, and plate shall not exceed 0.05 in. (1.27 mm) multiplied by the length in feet (0.04 mm multiplied by the length in centimetres).

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

8.5 Edges:

8.5.1 When finished edges of strip are specified in the contract or order, the following descriptions shall apply:

8.5.1.1 Square-edge strip shall be supplied with finished edges, with sharp, square corners, without bevel or rounding.

8.5.1.2 Round-edge strip shall be supplied with finished edges, semicircular in form, the diameter of the circle forming the edge being equal to the strip thickness.

8.5.1.3 When no description of any required form of strip edge is given, it shall be understood that edges such as those resulting from slitting or shearing will be acceptable.

8.5.1.4 Sheet shall have sheared or slit edges.

8.5.1.5 Plate shall have sheared or cut (machined, abrasive cut, powder cut, or inert arc cut) edges, as specified.

8.6 Squareness (Sheet)—For sheets of all thicknesses, the angle between adjacent sides shall be 90 ± 0.15° (1/8 in. in 24 in.) (1.6 mm in 610 mm).

8.7 Flatness—Standard flatness tolerances for plate shall conform to the requirements of Table 4. “Specifically-flattened” plate, when so specified, shall have permissible variations in flatness as agreed upon between the manufacturer and the purchaser.

## 9. Product Marking

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

## 10. Keywords

10.1 N08825; N08221; N06845; plate; sheet; strip
X1. CONDITIONS AND FINISHES NORMALLY SUPPLIED

X1.1 Scope

X1.1.1 This appendix lists the conditions and finishes in which plate, sheet, and strip are normally supplied. These are subject to change, and the manufacturer should be consulted for the latest information available.

X1.2 Plate

X1.2.1 Hot-rolled, annealed, and descaled.

X1.2.2 Cold-rolled, annealed, and descaled.

X1.3 Sheet

X1.3.1 Hot-rolled, annealed, and descaled.

X1.3.2 Cold-rolled, annealed, and descaled or bright annealed.

X1.4 Strip

X1.4.1 Cold-rolled, annealed, descaled, or bright annealed.

SUMMARY OF CHANGES

Committee B02 has identified the location of selected changes to this standard since the last issue (B424 – 05 (20009)) that may impact the use of this standard. (Approved October 1, 2011.)

(1) Revised Title, subsection 1.1, Section 10, Table 2, and Table 3 to add UNS N06845.

(2) Corrected UNS number of N08221 in Section 10.

(3) Revised Table 2 to add new footnote A, renumber old footnote A to B, and to add footnote B to the iron content for N08221.