Designation: B 424 – 05

Standard Specification for Ni-Fe-Cr-Mo-Cu Alloy (UNS N08825 and UNS N08221)* Plate, Sheet, and Strip[1]

This standard is issued under the fixed designation B 424; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 This specification[2] covers rolled nickel-iron-chromium-molybdenum-copper alloy (UNS N08825 and UNS N08221)* plate, sheet, and strip.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

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

B 906 Specification for General Requirements for Flat-Rolled Nickel, Nickel Alloy 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.

4. General Requirements

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

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 ASTM designation and year of issue.

5.1.2 Alloy name or UNS number.

5.1.3 *Condition*—Table 3 and Appendix X1.

5.1.4 *Finish*—Appendix X1.

5.1.5 *Dimensions*—Thickness, width, and length.

5.1.6 *Quantity.*,

5.1.7 *Optional Requirements*:

5.1.7.1 *Sheet and Strip*—Whether to be furnished in coil, in cut straight lengths, or in random straight lengths.

5.1.7.2 *Strip*—Whether to be furnished with commercial slit edge, square edge, or round edge.

5.1.7.3 *Plate*—Whether to be furnished specially flattened (see 8.7); also how plate is to be cut (Table 4).

[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-424 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.

***A Summary of Changes section appears at the end of this standard.**

TABLE 2 Chemical Requirements

Element	UNS N08825	UNS N08221
Nickel	38.0 to 46.0	39.0 to 46.0
Chromium	19.5 to 23.5	20.0 to 22.0
Iron	22.0 min[A]	balance
Manganese	1.0 max	1.0 max
Carbon	0.05 max	0.025 max
Copper	1.5 to 3.0	1.5 to 3.0
Silicon	0.5 max	0.5 max
Sulfur	0.03 max	0.03 max
Aluminum	0.2 max	0.2 max
Titanium	0.6 to 1.2	0.6 to 1.0
Molybdenum	2.5 to 3.5	5.0 to 6.5

[A]Element shall be determined arithmetically by difference.

TABLE 3 Mechanical Properties for Plate, Sheet, and Strip
(All Thicknesses and Sizes Unless Otherwise Indicated)

Alloy	Condition	Tensile Strength, min, ksi (MPa)	Yield Strength[A] (0.2 % Offset), min, ksi (MPa)	Elongation in 2 in. or 50 mm (or 4 *D*), min, %
Hot-Rolled Plate:				
UNS N08825	annealed	85 (586)	35 (241)	30
UNS N08221	annealed	79 (544)	34 (235)	30
Cold-Rolled Plate:				
UNS N08825	annealed	85 (586)	35 (241)	30
UNS N08221	annealed	79 (544)	34 (235)	30
Hot-Rolled Sheet:				
UNS N08825	annealed	85 (586)	35 (241)	30
UNS N08221	annealed	79 (544)	34 (235)	30
Cold-Rolled Sheet:				
UNS N08825	annealed	85 (586)	35 (241)	30
UNS N08221	annealed	79 (544)	34 (235)	30
Cold-Rolled Strip:				
UNS N08825	annealed	85 (586)[B]	35 (241)	30[B]
UNS N08221	annealed	79 (544)[B]	34 (235)	30[B]

[A]Yield strength requirements do not apply to material under 0.020 in. (0.51 mm) in thickness.
[B]Not applicable for thickness under 0.010 in. (0.25 mm).

5.1.8 *Certification*—State if certification is required (Specification B 906, section on Material Test Report and Certification).

5.1.9 *Samples for Product (Check) Analysis*—Whether samples for product (check) analysis should be furnished (see Specification B 906, 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 B 906, 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 B 960.

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 B 906, Permissible Variations in Thickness and Overweight of Rectangular Plates Table.

8.1.1.1 For use with Specification B 906, Permissible Variations in Thickness and Overweight of Rectangular Plates Table, plate shall be assumed to weigh 0.294 lb/in.^{3}(8.138 g/cm^3).

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 B 906, 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 B 906, Permissible Variations in Thickness of Sheet and Strip Table. The thickness of strip and sheet shall be measured with the micrometer spindle ⅜ 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*:

8.2.1 *Plate*—The permissible variations in width of rectangular plates and diameter of circular plates shall be as prescribed in Specification B 906, Permissible Variations in Width of Sheared, Plasma Torch-Cut, and Abrasive-Cut Rectangular Plate Table and Permissible Variations in Diameter for Circular Plates Table.

8.2.2 *Sheet and Strip*—The permissible variations in width for sheet and strip shall be as prescribed in Specification B 906, Permissible Variations in Width of Sheet and Strip Table.