



~~Designation: B 424-05~~ **Designation: B424 – 05 (Reapproved 2009)**

Standard Specification for Ni-Fe-Cr-Mo-Cu Alloy (UNS N08825 and UNS N08221)*N08221) Plate, Sheet, and Strip¹

This standard is issued under the fixed designation B424; 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 specification² 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.~~

1.2 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:*³

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

B906 Specification for General Requirements for Flat-Rolled Nickel, 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.

4. General Requirements

4.1 Material furnished under this specification shall conform to the applicable requirements of Specification B-~~906~~B906.

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:*

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 May 1, 2005. Published June 2005. Originally approved in 1964. Last previous edition approved in 1998 as B 424-98a.~~

Current edition approved Oct. 1, 2009. Published October 2009. Originally approved in 1964. Last previous edition approved in 2005 as B424-05. DOI: 10.1520/B0424-05R09.

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 1 Product Description

| Product | Thickness, in. (mm) |
|--------------------------------|---------------------------------------|
| Hot-rolled plate ^A | 3/16 (4.76) and over |
| Cold-rolled plate ^A | 3/16 to 3/8 (4.8 to 9.5), incl |
| Hot-rolled sheet ^A | 0.018 to 0.250 (0.46 to 6.4), incl |
| Cold-rolled sheet ^B | 0.018 to 0.250 (0.46 to 6.4), incl |
| Cold-rolled strip ^B | 0.005 to 0.250 (0.13 to 6.4), incl |

^A Material 3/16 to 1/4 in. (4.8 to 6.4 mm), incl, in thickness may be furnished as sheet or plate provided the material meets the specification requirements for the condition ordered.

^B Material under 48 in. (1219 mm) in width may be furnished as sheet or strip provided the material meets the specification requirements for the condition ordered.

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, % |
|---------------------------|-----------|-------------------------------------|---|--|
| <i>Hot-Rolled Plate:</i> | | | | |
| UNS N08825 | annealed | 85 (586) | 35 (241) | 30 |
| UNS N08221 | annealed | 79 (544) | 34 (235) | 30 |
| <i>Cold-Rolled Plate:</i> | | | | |
| UNS N08825 | annealed | 85 (586) | 35 (241) | 30 |
| UNS N08221 | annealed | 79 (544) | 34 (235) | 30 |
| <i>Hot-Rolled Sheet:</i> | | | | |
| UNS N08825 | annealed | 85 (586) | 35 (241) | 30 |
| UNS N08221 | annealed | 79 (544) | 34 (235) | 30 |
| <i>Cold-Rolled Sheet:</i> | | | | |
| UNS N08825 | annealed | 85 (586) | 35 (241) | 30 |
| UNS N08221 | annealed | 79 (544) | 34 (235) | 30 |
| <i>Cold-Rolled Strip:</i> | | | | |
| 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).

5.1.7.1 *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).

5.1.8 *Certification*—State if certification is required (Specification B-906B906, 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-906B906, 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-906B906, section on Inspection).

6. Chemical Composition

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