Designation: B 423 – 99

Standard Specification for Nickel-Iron-Chromium-Molybdenum-Copper Alloy (UNS N08825 and N08221)* Seamless Pipe and Tube[1]

This standard is issued under the fixed designation B 423; 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 This specification[2] covers nickel-iron-chromium-molybdenum-copper alloys (UNS N08825 and N08221)* in the form of cold-worked and hot-finished seamless pipe and tube intended for general corrosive service. The general requirements for pipe and tube are covered in Specification B 829.

1.2 The following precautionary caveat pertains only to the test methods portion, Section 9, of this specification: *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 establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

B 829 Specification for General Requirements for Nickel and Nickel Alloy Seamless Pipe and Tube[3]

3. General Requirement

3.1 Material furnished under this specification shall conform to the applicable requirements of Specification B 829 unless otherwise provided herein.

4. Ordering Information

4.1 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:

4.1.1 Alloy name or UNS number,

4.1.2 ASTM designation,

4.1.3 Condition (see Appendix X2),

4.1.4 Finish (see Appendix X2),

4.1.5 *Dimensions*:

4.1.5.1 *Tube*—Specify outside diameter and nominal or minimum wall,

4.1.5.2 *Pipe*—Specify standard pipe size and schedule,

4.1.5.3 *Length*—Cut to length or random,

4.1.6 *Quantity*—Feet (or metres) or number of pieces,

4.1.7 *Hydrostatic Pressure Requirements*—Specify test pressure if other than required by 9.1.1,

4.1.8 *Certification*— State if certification is required,

4.1.9 *Samples for Product (Check) Analysis*—State whether samples for product (check) analysis should be furnished (see 5.2),

4.1.10 *Purchaser Inspection*—If purchaser wishes to witness tests or inspection of material at place of manufacture, the purchase order must so state indicating which tests or inspections are to be witnessed, and

4.1.11 *Small-Diameter and Light-Wall Tube (Converter Sizes)*—See Appendix X1.

5. Chemical Composition

5.1 The material shall conform to the composition limits specified in Table 1. One test is required for each lot as defined in Specification B 829.

5.2 If a product (check) analysis is performed by the purchaser, the material shall conform to the product (check) analysis variations of Specification B 829.

6. Mechanical Properties and Other Requirements

6.1 *Tension Test*— The material shall conform to the tensile properties specified in Table 2. The sampling and specimen preparation are as covered in Specification B 829.

---

[1] This specification is under the jurisdiction of ASTM Committee B-2 on Nonferrous Metals and Alloysand is the direct responsibility of Subcommittee B02.07on Refined Nickel and Cobalt and Their Alloys.

Current edition approved May 10, 1999. Published July 1999. Originally published as B 423 – 64 T. Last previous edition B 423 – 95.

* New designation established in accordance with Practice E 527 and SAE J 1086, Practice for Numbering Metals and Alloys (UNS).

[2] For ASME Boiler and Pressure Vessel Code applications see related specification SB-423 in Section II of that code.

[3] *Annual Book of ASTM Standards*, Vol 02.04.

TABLE 1 Chemical Requirements

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

6.1.1 Tensile properties for material specified as small-diameter and light-wall tube (converter sizes) shall be as prescribed in Table X1.1.

6.2 *Hydrostatic Test*— If any pipe or tube shows leaks during hydrostatic testing, it shall be rejected.

7. Dimensions and Permissible Variations

7.1 *Diameter and Wall Thickness*—The permissible variations in the outside diameter and wall thickness shall conform to the permissible variations prescribed in Tables 3, 4, and 5 of Specification B 829.

7.2 Permissible variations for material specified as small-diameter and light-wall tube (converter size) shall conform to the permissible variations prescribed in Table X1.2.

8. Number of Tests

8.1 *Chemical Analysis*—One test per lot.

8.2 *Tension*—One test per lot.

8.3 *Hydrostatic*—Each piece in each lot.

9. Test Methods

9.1 *Hydrostatic Test*—Each pipe or tube with an outside diameter ⅛ in. (3 mm) and larger and with wall thickness of 0.015 in. (0.38 mm) and over shall be tested based on allowable fiber stress for material in the condition furnished as follows:

UNS N08825 hot finished, annealed:	16 600 psi (114 MPa)
UNS N08825 cold-worked, annealed:	21 200 psi (146 MPa)
UNS N08221 cold finished, annealed:	19 700 psi (138 MPa)

9.1.1 When so agreed upon between the manufacturer and purchaser, pipe or tube may be tested to 1½times the allowable fiber stress given in 9.1.

10. Keywords

10.1 N08221; N08825; seamless pipe; seamless tube