This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.

Designation: B729 – 20

Standard Specification for Seamless Nickel-Iron-Chromium-Molybdenum-Copper Nickel Alloy Pipe and Tube[1]

This standard is issued under the fixed designation B729; 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 covers UNS N08020, UNS N08026, and UNS N08024 seamless, cold-worked or hot finished pipe and tube intended for general corrosive service.

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 The following safety hazards caveat pertains only to the test methods portion, Section 10, 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 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, health, and environmental practices, and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

B829 Specification for General Requirements for Nickel and Nickel Alloys Seamless Pipe and Tube

E8 Test Methods for Tension Testing of Metallic Materials [Metric] E0008_E0008M

3. General Requirement

3.1 Material furnished under this specification shall conform to the applicable requirements of Specification B829 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 and year of issue.

4.1.3 Finish.

4.1.4 *Dimensions:*

4.1.4.1 *Tube*—Specify outside diameter and the average or minimum wall thickness.

4.1.4.2 *Pipe*—Specify standard pipe size and schedule.

4.1.4.3 *Length,* (cut to length or random).

4.1.5 Quantity (feet or number of pieces).

4.1.6 *Hydrostatic Test or Nondestructive Electric Test*—Specify type of test (see 7.2):

4.1.6.1 *Hydrostatic Pressure Requirements*—Specify test pressure if other than required by 10.1.

4.1.7 *Ends*—Plain ends cut and deburred will be furnished. If threaded ends or ends beveled for welding are desired, give details.

4.1.8 *Samples for Product (Check) Analysis*—State whether samples for product (check) analysis should be furnished (see 6.2).

4.1.9 *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.

5. Materials and Manufacture

5.1 The product of UNS N08020 alloy shall be furnished in the stabilized-annealed condition. The product of UNS N08026 alloy shall be furnished in the solution-annealed condition. The product of UNS N08024 alloy shall be furnished in the annealed condition.

NOTE 1—The recommended annealing temperatures all followed by

[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 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

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TABLE 1 Chemical Requirements

Element	Composition, %		
	UNS N08026	UNS N08020	UNS N08024
Carbon, max	0.03	0.07	0.03
Manganese, max	1.00	2.00	1.00
Phosphorus, max	0.03	0.045	0.035
Sulfur, max	0.03	0.035	0.035
Silicon, max	0.50	1.00	0.50
Nickel	33.00–37.20	32.00–38.00	35.00–40.00
Chromium	22.00–26.00	19.00–21.00	22.50–25.00
Molybdenum	5.00–6.70	2.00–3.00	3.50–5.00
Copper	2.00–4.00	3.00–4.00	0.50–1.50
Columbium (Nb) + tantalum	...	8 × carbon-1.00	0.15–0.35
Nitrogen	0.10–0.16	...	...
Iron	remainder[A]	remainder[A]	remainder[A]

[A] By difference.

quenching in water or rapidly cooling by other means are as follows: 1800 to 1850°F (982 to 1010°C) for UNS N08020, 2050 to 2200°F (1121 to 1204°C) for UNS N08026, and 1925 to 1975°F (1052 to 1079°C) for UNS N08024.

6. Chemical Composition

6.1 The material shall conform to the composition limits specified in Table 1. One test is required for each lot as defined in Specification B829.

6.2 If a product analysis is performed by the purchaser, the material shall conform to the composition limits specified in Table 1 subject to the product analysis tolerances specified in Table 1 of Specification B829.

7. Mechanical and Other Properties

7.1 *Mechanical Properties*—The material shall conform to the mechanical property requirements specified in Table 2.

7.2 *Hydrostatic or Nondestructive Electric Test*—Each pipe and tube shall be subjected to either the hydrostatic test or the nondestructive electric test. The type of test to be used shall be at the option of the manufacturer, unless otherwise specified in the purchase order.

8. Sampling

8.1 *Product (Check) Analysis* shall be wholly the responsibility of the purchaser.

9. Number of Tests

9.1 *Chemical Analysis*—One test per lot.

9.2 *Mechanical Properties*—One test per lot.

9.3 *Hydrostatic or Nondestructive Electric Test*—Each piece in each lot.

TABLE 2 Mechanical Property Requirements

Tensile Strength, min		Yield Strength,[A] min		Elongation in 2 in. (50.8 mm) or 4D min, %
ksi	MPa	ksi	MPa	
80	550	35	240	30.0

[A] Yield strength shall be determined by the offset method at 0.2 % limiting permanent set in accordance with Test Methods E8.

10. Test Methods

10.1 *Hydrostatic Test:*

10.1.1 Each pipe or tube shall be hydrostatically tested in accordance with Specification B829. The allowable fiber stress for material in the condition (temper) furnished is 20 000 psi (138 MPa),

10.1.2 Visual examination is to be made when the material is under pressure. The full length of material must be examined for leaks.

10.1.3 When so agreed upon between the manufacturer and the purchaser, pipe or tube may be tested to one and one-half times the allowable fiber stress given in 10.1.1.

10.1.4 If any pipe or tube shows leak during hydrostatic testing, it shall be rejected. Any leaking areas may be cut out and the pipe retested as above.

10.2 *Nondestructive Electric Test*—Each pipe or tube shall be examined with a nondestructive electric test in accordance with Specification B829.

10.2.1 Test signals produced by imperfections such as the following, may be judged as injurious or noninjurious, depending on visual observation of their severity or the type of signal they produce on the testing equipment, or both.

10.2.1.1 Dinges,

10.2.1.2 Straightener marks,

10.2.1.3 Scratches,

10.2.1.4 Steel die stamps, and

10.2.1.5 Stop marks.

11. Certification

11.1 A manufacturer's certification shall be furnished to the purchaser stating that the material was manufactured, tested, and inspected in accordance with this specification and that test results on representative samples meet specification requirements. A report of the test results shall be furnished.

12. Keywords

12.1 nickel-iron-chromium-molybdenum-copper-columbium; seamless pipe; seamless tube; UNS N08020; UNS N08024; UNS N08026

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