



Standard Specification for Nickel-Chromium-Molybdenum-Cobalt-Tungsten-Iron-Silicon Alloy (UNS N06333) Seamless Pipe and Tube¹

This standard is issued under the fixed designation B722; 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 alloy N06333 in the form of hot-finished and cold-finished seamless pipe and tube intended for heat-resisting applications and general corrosive service. The general requirements for pipe and tube are covered in Specification B829.

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:*²

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

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 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 Quantity (feet or number of pieces).

4.1.4 *Dimensions:*

4.1.4.1 Pipe size.

4.1.4.2 Tube dimensions (outside or inside diameter and nominal wall thickness).

4.1.4.3 Length (specific or random).

4.1.5 *Hydrostatic Test or Nondestructive Electric Test*—Specify type of test (see 5.2).

4.1.6 *Certification*—State if certification is required.

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

4.1.8 *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.

5. Mechanical and Other Requirements

5.1 *Tension Test*—The mechanical properties of the material at room temperature shall conform to those shown in Table 1. The sampling and specimen preparation are covered in Specification B829.

5.2 *Hydrostatic or Nondestructive Electric Test*—Each pipe or tube shall be subjected to either the hydrostatic test or to 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.

6. Dimensions and Permissible Variations

6.1 The requirements of Specification B829 will apply except for hot-finished pipe and tube dimensional requirements shown in Table 2.

7. Chemical Requirements

7.1 The material shall conform to the requirements as to chemical composition specified in Table 3. One test is required for each lot as defined in Specification B829.

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 June 1, 2011. Published June 2011. Originally approved in 1983. Last previous edition approved in 2006 as B722 – 06. DOI: 10.1520/B0722-06R11.

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.



7.2 If a product (check) analysis is performed by the purchaser, the material shall conform to the product (check) analysis variations in Table 3 of Specification B829.

8. Number of Tests

8.1 *Chemical Analysis*—One test per lot.

8.2 *Tension Test*—One longitudinal tension test shall be made on a specimen from a pipe or tube representing 1 % of the pipe or tube for each lot.

8.3 *Hydrostatic or Nondestructive Electric Test*—Each length of pipe or tube.

9. Test Methods

9.1 *Hydrostatic Test*—The allowable fiber stress for hydrostatic testing purposes shall be 17 500 psi.

9.1.1 Any pipe or tube that shows leaks during hydrostatic testing shall be rejected, but any leaking areas may be cut out and the pipe or tube retested as above.

9.2 *Nondestructive Electric Test*—Each pipe or tube shall be examined with a nondestructive electric test as per prescribed in Specification B829.

10. Keywords

10.1 seamless pipe; seamless tube; UNS N06333

TABLE 1 Mechanical Properties

Tensile Strength, min psi (MPa)	Yield Strength, 0.2 % offset, min psi (MPa)	Elongation in 2 in. or 50 mm, or 4D, min. %	Hardness ^A
80 000 (551)	35 000 (241)	30	75 to 95 HRB

^A Hardness values are informative only and not to be construed as the basis for acceptance.

TABLE 2 Permissible Variations for Outside Diameter and Wall Thickness of Hot-Finished Pipe and Tube

NOTE 1—*Ovality*—For tube 5 in. (127 mm) and under in outside diameter the tolerance on the outside diameter applies for individual measurements and includes ovality. For tube over 5 in. (127 mm) in outside diameter, the mean outside diameter shall conform to the permissible variations of this table, and individual measurements shall not exceed twice the permissible variations of this table.

Nominal Outside Diameter, in. (mm)	Permissible Variations					
	Outside Diameter or Inside Diameter, in. (mm)		% of Thickness of Specified Average Wall		% of Thickness of Specified Minimum Wall	
	Plus	Minus	Plus	Minus	Plus	Minus
1/8 (3.2) to 1 1/2 (38), incl	0.015 (0.4)	0.031 (0.8)	12.5	12.5	28.5	0
Over 1 1/2 (38.1) to 4 (102), incl	0.031 (0.8)	0.031 (0.8)	12.5	12.5	28.5	0
Over 4 (102) to 8 (203), incl	0.062 (1.6)	0.031 (0.8)	12.5	12.5	28.5	0

TABLE 3 Chemical Requirements

Element	Composition Limits, %
Carbon	0.10 max
Manganese	2.0 max
Phosphorus	0.03
Sulfur	0.03
Silicon	1.5 max
Chromium	24.0–27.0
Nickel	44.0–48.0
Molybdenum	2.5–4.0
Cobalt	2.5–4.0
Tungsten	2.5–4.0
Iron ^A	remainder

^A Element may be determined arithmetically by difference.

SUMMARY OF CHANGES

Committee B02 has identified the location of selected changes to this standard since the last issue (B722 – 02) that may impact the use of this standard. (Approved December 1, 2006.)

(1) Introduction of nondestructive electric test in lieu of hydrostatic test at the option of the manufacturer.

(2) Revision of 4.1, 5.1, 5.2, 8.3, 9.1, and 9.2.



B722 – 06 (2011)

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