Designation: B726 – 02 (Reapproved 2021)

Standard Specification for Nickel-Chromium-Molybdenum-Cobalt-Tungsten-Iron-Silicon Alloy (UNS N06333) Welded Tube[1]

This standard is issued under the fixed designation B726; 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 UNS N06333 in the form of welded tube intended for heat-resisting applications and 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 *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 Safety Data Sheet (SDS) 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]

B718 Specification for Nickel-Chromium-Molybdenum-Cobalt-Tungsten-Iron-Silicon Alloy (UNS N06333) Plate, Sheet, and Strip

B751 Specification for General Requirements for Nickel and Nickel Alloy Welded Tube

3. General Requirement

3.1 Material furnished under this specification shall conform to the applicable requirements of Specification B751 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 to this specification. Examples of such requirements include, but are not limited to, the following:

4.1.1 Alloy or UNS number,

4.1.2 ASTM designation and date of issue,

4.1.3 Dimensions (outside or inside diameter and nominal-wall thickness),

4.1.4 Length (specific or random),

4.1.5 Quantity (feet or number of pieces),

4.1.6 *Certification*—State if certification is required,

4.1.7 *Samples for Product (Check) Analysis*—State whether samples should be furnished, and

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. Materials and Manufacture

5.1 The tube shall be made from flat-rolled alloy conforming to Specification B718, by an automatic welding process with no addition of filler metal.

5.2 Tube shall be furnished annealed after welding, with oxide removed. When the final heat treatment is performed in a protective atmosphere, descaling is not necessary.

6. Chemical Composition

6.1 The material shall conform to the requirements as to chemical composition specified in Table 1.

6.2 If a product (check) analysis is performed by the purchaser, the material shall conform to the product (check) analysis variations in Specification B751.

7. Mechanical and Other Requirements

7.1 The mechanical properties of the material at room temperature shall conform to those shown in Tables 2-4.

[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 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.

TABLE 1 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 to 27.0
Nickel	44.0 to 48.0
Molybdenum	2.5 to 4.0
Cobalt	2.5 to 4.0
Tungsten	2.5 to 4.0
Iron[A]	remainder

[A] Element may be determined arithmetically by difference.

TABLE 2 Mechanical Properties

Tensile Strength, min, psi (MPa)	Yield Strength, 0.2 % offset, min, psi (MPa)	Elongation in 2 in. or 50 mm, or 4*D*, 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.

7.2 One test is required for each lot as defined in Specification B751.

7.3 *Flattening Test*—A flattening test shall be made on each end of one tube per lot. Superficial ruptures resulting from surface imperfections shall not be cause for rejection.

7.4 *Flange Test*—A flange test shall be made on each end of one tube per lot.

7.5 *Nondestructive Test Requirements:*

7.5.1 Tubes shall be subjected to a pressure test or nondestructive electric test at the manufacturer's option.

7.5.1.1 *Leak Test*—Hydrostatic or pneumatic (air underwater).

TABLE 3 Permissible Variations in Outside Diameter, Ovality, and Wall Thickness of Welded Tube

NOTE 1—
(1) These permissible variations in outside diameter apply only to tubes as finished at the mill before subsequent swaging, expanding, bending, polishing, or other fabricating operations.
(2) Wall thickness variation shall not exceed ±15 % of the nominal wall thickness for tube under ½-in. (12.7-mm) outside diameter, and ±10 % of nominal wall thickness for tube of outside diameter ½ in. (12.7 mm) and over.
(3) For ovality values, the tolerance for average outside diameter at any one cross section does not exceed the outside diameter tolerance for the applicable outside diameter.

Outside Diameter, in. (mm)	Permissible Variations in Outside Diameter, in. (mm)	
	Plus	Minus
Under 1 (25.4)	0.004 (0.10)	0.004 (0.10)
1 (25.4) to 1½ (38.1), incl	0.006 (0.15)	0.006 (0.15)
Over 1½ (38.1) to 2 (50.8), excl	0.008 (0.20)	0.008 (0.20)
2 (50.8) to 2½ (63.5), excl	0.010 (0.25)	0.010 (0.25)
2½ (63.5) to 3 (76.2), excl	0.012 (0.30)	0.012 (0.30)
3 (76.2) to 4 (102), incl	0.015 (0.38)	0.015 (0.38)
Over 4 (102) to 5 (127), incl	0.015 (0.38)	0.025 (0.63)

TABLE 4 Permissible Variations in Length[A]

Outside Diameter, in. (mm)	Cut Length, in. (mm)	
	Over	Under
Under 2 (50.8)	⅛ (3.2)	0
2 (50.8) and over	3⁄16 (4.8)	0

[A] These permissible variations in length apply to tube before bending. They apply to cut lengths up to and including 24 ft (7.3 m). For lengths over 24 ft (7.3 m), and additional overtolerance of ⅛ in. (3.2 mm) for each 10 ft (3.0 m) or fraction thereof shall be permissible up to a maximum additional overtolerance of ½ in. (12.7 mm).

7.5.1.2 *Electric Test*—Eddy current or ultrasonic.

8. Keywords

8.1 UNS N06333; welded tube