



Standard Specification for High-Frequency Induction Welded, Unannealed, Austenitic Steel Condenser Tubes¹

This standard is issued under the fixed designation A 851; 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 nominal-wall-thickness tubes intended for use as steam surface condenser tubes. These tubes are made from the austenitic steels listed in Table 1 using a high-frequency induction welding process where post-weld solution heat treatment is not necessary for corrosion resistance.

1.2 The tubing sizes and thickness usually furnished to this specification are $\frac{5}{8}$ in. (15.9 mm) to $3\frac{1}{8}$ in. (79.4 mm) in outside diameter and 0.015 to 0.109 in. (0.40 to 2.8 mm), inclusive, in wall thickness. Tubing having other dimensions may be furnished, provided such tubes comply with all other requirements of this specification.

1.3 Optional supplementary requirements are provided in this specification and, when one or more of these are desired, each shall be so stated in the order.

1.4 The values stated in inch-pound units are to be regarded as the standard.

2. Referenced Documents

2.1 ASTM Standards:

A 262 Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels²

A 450/A450M-85a Specification for General Requirements for Carbon, Ferritic Alloy, and Austenitic Alloy Steel Tubes³

E 426 Practice for Electromagnetic (Eddy-Current) Examination of Seamless and Welded Tubular Products, Austenitic Stainless Steel and Similar Alloys⁴

3. Ordering Information

3.1 Orders for material under this specification should include the following, as required, to describe the desired material adequately:

3.1.1 Quantity (feet, metres, or number of lengths),

¹ This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel, and Related Alloys and is the direct responsibility of Subcommittee A01.10 on Tubing.

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² Annual Book of ASTM Standards, Vol 01.03.

³ Annual Book of ASTM Standards, Vol 01.01.

⁴ Annual Book of ASTM Standards, Vol 03.03.

TABLE 1 Chemical Requirements

Grade:	Composition, %	
	TP304	TP304L
UNS Designation ^A	S30400	S30403
Carbon, max	0.08	0.035
Manganese, max	2.00	2.00
Phosphorus, max	0.040	0.040
Sulfur, max	0.030	0.030
Silicon, max	0.75	0.75
Nickel	8.00–11.0	8.00–13.0
Chromium	18.0–20.0	18.0–20.0

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

3.1.2 Name of material (high-frequency, induction-welded, unannealed tubes),

3.1.3 Grade (see Table 1),

3.1.4 Size (outside diameter and nominal wall thickness),

3.1.5 Length (specific or random),

3.1.6 Optional requirement (Section 10),

3.1.7 Test report required (see Certification Section of Specification A 450/A 450M),

3.1.8 Specification designation, and

3.1.9 Special requirements and any supplementary requirements (S1, S2, S3, or S4) selected.

4. General Requirements

4.1 Material furnished under this specification should conform to the applicable requirements of the current edition of Specification A 450/A 450M, unless otherwise provided herein.

5. Materials and Manufacture

5.1 The tubes shall be manufactured from flat-rolled steel by a high-frequency induction welding process with no addition of filler metal.

5.2 The high-frequency welded tubes shall be manufactured by heating the edges of the formed strip to the required welding temperature using high-frequency electric current and pressing them firmly together causing a forge-type joint to be formed with internal and external flash or bead.

5.3 The external flash, that portion of the weld that extends beyond the nominal wall, shall always be removed.

5.4 The internal flash shall be removed to the extent that it shall not exceed 0.006 in. (0.15 mm) in height or 10 % of the nominal wall thickness, whichever is greater.