

ASTM A270 / ASME SA270

Standard Specification for Seamless and Welded Austenitic Stainless Steel Sanitary Tubing

This specification covers grades of seamless and welded austenitic stainless steel sanitary tubing intended for use in the dairy and food industry and having special surface finishes. Pharmaceutical quality may be requested, as a supplementary requirement.

This specification covers tubes in sizes up to and including 4 in. (101.6 mm) in outside diameter.

A. General Requirements :-

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

B. Heat Treatment :-

1. All material shall be furnished in the heat-treated condition. The heat treatment procedure, except for N08926 and N08367, shall consist of heating the material to a minimum temperature of 1900°F (1040°C) and quenching in water or rapid cooling by other means.
2. N08926 shall be heat-treated to a minimum temperature of 2010°F [1100°C] followed by quenching in water or rapidly cooling by other means. UNS N08367 should be solution annealed from 2025°F (1107°C) minimum followed by rapid quenching.

C. Chemical Composition :-

The steel shall conform to the requirements as to chemical composition as prescribed in Table 1.

Table 1

Grade	TP 304	TP 304L	...	TP 316	TP 316L	...	...
UNS Designation ^A	S30400	S30403	S31254	S31600	S31603	N08926	N08367
Element							
Carbon, max	0.08	0.035 ^B	0.02	0.08	0.035 ^B	0.02	0.03
Manganese, max	2.0	2.0	1.0	2.0	2.0	2.0	2.0
Phosphorus, max	0.04	0.04	0.03	0.04	0.04	0.03	0.04
Sulfur, max	0.03	0.03	0.01	0.03	0.03	0.01	0.03
Silicon, max	0.75	0.75	1.0	0.75	0.75	0.5	1.0
Nickel	8.0–11.0	8.0–13.0	17.5–18.5	10.0–14.0	10.0–15.0	24.0–26.0	23.5–25.5
Chromium	18.0–20.0	18.0–20.0	19.5–20.5	16.0–18.0	16.0–18.0	19.0–21.0	20.0–22.0
Molybdenum	...	...	6.0–6.5	2.0–3.0	2.0–3.0	6.0–7.0	6.0–7.0
Nitrogen ^C	...	...	0.18–0.22	...	...	0.15–0.25	0.18–0.25
Copper	...	...	0.50–1.00	...	...	0.5–1.5	0.75 max

D. Reverse Flattening Test

1. For welded tubes, one reverse flattening test shall be made on a specimen from each 1500 ft (457 m) of finished tubing.

E. Hydrostatic or Nondestructive Electric Test :-

1. Each tube shall be subjected to the nondestructive electric test or the hydrostatic test.

2. The type of test to be used shall be at the option of the manufacturer, unless otherwise specified in the purchase order.

F. Supplementary Requirements :-

1. Intergranular Corrosion Test:
 - i. Tests shall be performed in accordance with Practice E of Practices A 262.
2. Pharmaceutical Quality Tubing:
 - i. *Chemistry:*
 - a. When S31600 and S31603 are ordered, sulphur content shall be restricted to the range of 0.005 to 0.017 %.
 - ii. *Tensile Requirements:*
 - a. The material shall conform to the tensile requirements in Table 2.

Table 2

Grade	UNS Designation	Tensile Strength min, ksi (MPa)	Yield Strength min, ksi (MPa)	Elongation in 2 in. min, %	Rockwell Hardness Number, max.
TP304	S30400	75(515)	30(205)	35	B90
TP304L	S30403	70(485)	25(170)	35	B90
TP316	S31600	75(515)	30(205)	35	B90
TP316L	S31603	70(485)	25(170)	35	B90

- iii. *Hardness Requirements:*
 - a. The hardness shall meet the requirements in Table 2.
- iv. *Manipulation Tests:*
 - a. Flattening test.
 - b. Flange test.

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