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: A269/A269M – 15a

Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service[1]

This standard is issued under the fixed designation A269/A269M; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope*

1.1 This specification covers grades of nominal-wall-thickness, stainless steel tubing for general corrosion-resisting and low- or high-temperature service, as designated in Table 1.

1.2 The tubing sizes and thicknesses usually furnished to this specification are ¼ in. [6.4 mm] in inside diameter and larger and 0.020 in. [0.51 mm] in nominal wall-thickness and heavier.

1.3 Mechanical property requirements do not apply to tubing smaller than ⅛ in. [3.2 mm] in inside diameter or 0.015 in. [0.38 mm] in thickness.

NOTE 1—Additional testing requirements may apply for use in ASME B31.3 applications.

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

1.5 The values stated in either SI units or inch-pound units are to be regarded separately as standard. Within the text, SI units are shown in brackets. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard. The inch-pound units shall apply unless the "M" designation of this specification is specified in the order.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

A262 Practices for Detecting Susceptibility to Intergranular Attack in Austenitic Stainless Steels

A480/A480M Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip

A632 Specification for Seamless and Welded Austenitic Stainless Steel Tubing (Small-Diameter) for General Service

A1016/A1016M Specification for General Requirements for Ferritic Alloy Steel, Austenitic Alloy Steel, and Stainless Steel Tubes

E527 Practice for Numbering Metals and Alloys in the Unified Numbering System (UNS)

2.2 *ASME Piping Code:*

ASME B31.3 Process Piping[3]

2.3 *Other Standard:*

SAE J1086 Practice for Numbering Metals and Alloys (UNS)[4]

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),

3.1.2 Name of material (seamless or welded tubes),

3.1.3 Grade (Table 1),

3.1.4 Size (outside diameter and nominal wall thickness),

3.1.5 Length (specific or random),

3.1.6 Optional requirements (heat treatment, see Section 6; hydrostatic or nondestructive electric test, see Section 10),

3.1.7 Test report required (see Section on Inspection of Specification A1016/A1016M),

3.1.8 Specification designation, and

3.1.9 Special requirements and any supplementary requirements selected.

[1] This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.10 on Stainless and Alloy Steel Tubular Products.

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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.

[3] Available from American Society of Mechanical Engineers (ASME), ASME International Headquarters, Two Park Ave., New York, NY 10016-5990, http://www.asme.org.

[4] Available from Society of Automotive Engineers (SAE), 400 Commonwealth Dr., Warrendale, PA 15096-0001, http://www.sae.org.

*A Summary of Changes section appears at the end of this standard

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TABLE 1 Chemical Requirements[C] %

Grade	Composition, %																	
	TP 201	TP 201LN	TP 304	TP 304L	TP 304LN	TP 316	TP 316L	TP 316LN	TP . . .	TP 317	. . .	TP 321	TP 347	TP 348	TP XM-10	TP XM-11	TP XM-15	TP XM-19
UNS Designation[A]	S20100	S20153	S30400	S30403	S30453	S31600	31603	S31653	S31655	S31700	S31730	S32100	S34700	S34800	S21900	S21904	S38100	S20910
Carbon	0.15	0.03	0.08	0.035[B]	0.035[B]	0.08	0.035[B]	0.035[B]	0.030	0.08	0.030	0.08	0.08	0.08	0.08	0.04	0.08	0.06
Manganese	5.5–7.5	6.4–7.5	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	8.00–10.00	8.00–10.00	2.00	4.0–6.0
Phosphorus	0.060	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.040	0.045	0.045	0.045	0.045	0.045	0.030	0.045
Sulfur	0.030	0.015	0.030	0.030	0.030	0.030	0.030	0.030	0.015	0.030	0.010	0.030	0.030	0.030	0.030	0.030	0.030	0.030
Silicon	1.00	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.50–2.50	1.00
Nickel	3.5–5.5	4.0–5.0	8.0–11.0	8.0–12.0	8.0–11.0	10.0–14.0	10.0–15.0	10.0–13.0	8.0–9.5	11.0–15.0	15.0–16.5	9.0–12.0	9.0–12.0	9.0–12.0	5.5–7.5	5.5–7.5	17.5–18.5	11.5–13.5
Chromium	16.0–18.0	16.0–17.5	18.0–20.0	18.0–20.0	18.0–20.0	16.0–18.0	16.0–18.0	16.0–18.0	19.5–21.5	18.0–20.0	17.0–19.0	17.0–19.0	17.0–19.0	17.0–19.0	19.0–21.5	19.0–21.5	17.0–19.0	20.5–23.5
Molybdenum	. . .	. . .	. . .	. . .	. . .	2.00–3.00	2.00–3.00	2.00–3.00	0.5–1.5	3.0–4.0	3.0–4.0	. . .	. . .	. . .	. . .	. . .	. . .	1.50–3.00
Titanium	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	[D]	. . .	. . .	. . .	. . .	. . .	. . .
Columbium	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	10 × C min 1.10 max	[E]	. . .	. . .	. . .	0.10–0.30
Tantalum	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.10	. . .	. . .	. . .	. . .
Nitrogen[F]	0.25	0.10–0.25	. . .	. . .	0.10–0.16	. . .	. . .	0.10–0.16	0.14–0.25	. . .	0.45	. . .	. . .	. . .	0.15–0.40	0.15–0.40	. . .	0.20–0.40
Vanadium	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .			. . .	0.10–0.30
Copper	. . .	1.00	. . .	. . .	. . .	. . .	. . .	. . .	1.00	. . .	4.0–5.0	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Others	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	Co 0.20 max	. . .	. . .	. . .	. . .

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Grade	Composition, %														
	TP XM-29	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
UNS Designation[A]	S24000	S31254	S31266	S31725	S31726	S31727	S32053	S30600[A]	S32654	S34565	S35045	N08367	N08925	N08926	N08904
Carbon	0.08	0.020	0.030 max	0.035	0.035	0.030	0.030	0.018	0.020	0.030	0.06–0.10	0.030	0.020	0.020	0.020
Manganese	11.5–14.5	1.00	2.00–4.00	2.00	2.00	1.00	1.00	2.0	2.0–4.0	5.0–7.0	1.50	2.00	1.00	2.00	2.00
Phosphorus	0.060	0.030	0.035	0.045	0.045	0.030	0.030	0.020	0.030	0.030	0.045	0.040	0.045	0.030	0.040
Sulfur.	0.030	0.015	0.020	0.030	0.030	0.030	0.010	0.020	0.005	0.010	0.015	0.030	0.030	0.010	0.030
Silicon	1.00	0.80	1.00	1.00	1.00	1.00	1.00	3.7–4.3	0.50	1.00	1.00	1.00	0.50	0.50	1.00
Nickel	2.3–3.7	17.5–18.5	21.0–24.0	13.5–17.5	14.5–17.5	14.5–16.5	24.0–26.0	14.0–15.5	21.0–23.0	16.0–18.0	32.0–37.0	23.5–25.5	24.0–26.0	24.0–26.0	23.0–28.0
Chromium	17.0–19.0	19.5–20.5	23.0–25.0	18.0–20.0	17.0–20.0	17.5–19.0	22.0–24.0	17.0–18.5	24.0–25.0	23.0–25.0	25.0–29.0	20.0–22.0	19.0–21.0	19.0–21.0	19.0–23.0
Molybdenum	...	6.0–6.5	5.2–6.2	4.0–5.0	4.0–5.0	3.8–4.5	5.0–6.0	0.20 max	7.0–8.0	4.0–5.0		6.0–7.0	6.0–7.0	6.0–7.0	4.0–5.0
Titanium	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.15–0.60	. . .	. . .	. . .	. . .
Columbium	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.10 max	. . .	. . .	. . .	. . .	. . .
Tantalum	. . .	. . .	. . .	. . .	. . .		. . .		. . .	. . .	. . .	. . .	. . .	. . .	. . .
Nitrogen[F]	0.20–0.40	0.18–0.25	0.35–0.60	0.20 max	0.10–0.20	0.15–0.21	0.17–0.22		0.45–0.55	0.40–0.60	. . .	0.18–0.25	0.10–0.20	0.15–0.25	0.10 max
Vanadium	. . .			. . .	. . .		. . .		. . .		. . .	. . .	. . .	. . .	. . .
Copper	. . .	0.50–1.00	1.00–2.50	. . .	. . .	2.8–4.0	. . .	0.50 max	0.30–0.60	. . .	0.75	0.75 max	0.80–1.50	0.50–1.50	1.00–2.00
Others	. . .	. . .	W 1.50–2.50	. . .	. . .	. . .	. . .	. . .	. . .	. . .	Al 0.15–0.60	. . .	. . .	. . .	. . .

[A] New designation established in accordance with Practice E527 and SAE J1086.
[B] For small diameter or thin walls, or both, where many drawing passes are required, a carbon maximum of 0.040 % is necessary in grades TP 304L, TP 304LN, 316L and 316LN. Small outside diameter tubes are defined as those with less than 0.500 in. [12.7 mm] in outside diameter and light walls are those less than 0.049 in. [1.2 mm] in minimum wall thickness.
[C] Maximum, unless otherwise indicated. Where ellipses (. . .) appear in this table, there are no requirements and analysis for the element need not be determined or reported.
[D] Grade TP 321 shall have a titanium content of not less than five times the sum of the carbon and nitrogen content and not more than 0.70 %.
[E] Grade TP 348 shall have a columbium plus tantalum content of not less than ten times the carbon content and not more than 1.10 %.
[F] The method of analysis for nitrogen shall be a matter of agreement between the purchaser and manufacturer.

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