

ASTM A269/A269M TP321 (S32100) Engineering Datasheet

Full grade version with complete tables

1. Basic designation

Standard	Grade	UNS	Product form	Service scope
ASTM A269/A269M-15	TP321	S32100	Seamless and welded austenitic stainless steel tubing	General service; corrosion-resisting and low-/high-temperature service

2. Chemical composition (%)

C	Mn	P	S	Si	Ni	Cr	Mo	N	Ti	Cb/Ta	Cu	Other
0.08 max	2.00 max	0.045 max	0.030 max	1.00 max	9.0–12.0	17.0–19.0	—	0.10	5×(C+N) min, 0.70 max	—	—	—

3. Heat treatment and hardness requirements

Austenitizing temperature, min/range °F [°C]	Hardness, max	Heat treatment condition	Marking note
1900 [1040]	192 HBW / 200 HV / 90 HRB	Solution heat-treated condition	If final heat treatment is below 1900 °F [1040 °C] and specified on order, mark with suffix HT plus actual temperature

4. Mechanical / test requirements required by ASTM A269

Requirement	Details
Flaring test (seamless)	One test on one tube from each lot of finished tubes.
Flange test (welded)	One test on one tube from each lot of finished tubes.
Lot definition for flaring/flanging	Same nominal size and wall thickness from same heat; when final heat treatment is batch type, same furnace charge; when continuous or direct quench after hot forming, lot size per Table 3.
Hardness test	Brinell or Rockwell on specimens from two tubes from each lot.
Reverse flattening (welded tubes)	One reverse flattening test from each 1500 ft [460 m] of finished tubing; coiled tubing over 1500 ft sampled at both ends.
Hydrostatic or NDE electric test	Each tube shall be subjected to NDE electric test or hydrostatic test; type at manufacturer option unless specified in the purchase order.
Small size limitation	Mechanical property requirements do not apply to tubing smaller than 1/8 in. [3.2 mm] ID or 0.015 in. [0.38 mm] thickness.

Note: ASTM A269 does not provide a per-grade tensile/yield property table like ASTM A312. For A269, the grade-specific mandatory table is heat treatment and hardness (Table 2), while the mechanical test program is defined in Sections 9 to 11.

5. Lot size table for continuous process or direct quench after hot forming

Size of tube	Size of lot
2 in. [50 mm] and over OD and 0.200 in. [5.08 mm] and over wall	not more than 50 tubes
Less than 2 in. [50 mm] but over 1 in. [25 mm] OD, or over 1 in. [25 mm] OD and under 0.200 in. [5.08 mm] wall	not more than 75 tubes
1 in. [25 mm] or less OD	not more than 125 tubes

6. Permissible variations in dimensions

Group	Size, OD, in. [mm]	Permissible variation in OD, in. [mm]	Permissible variation in wall thickness, %	Cut length over, in. [mm]	Cut length under	Thin-walled tubes
1	Up to 1/2 [13]	±0.005 [0.13]	±15%	1/8 [3.2]	0	—

2	1/2 to 1-1/2 [13 to 38], excl	±0.005 [0.13]	±10%	1/8 [3.2]	0	less than 0.065 in. [1.65 mm] nominal
3	1-1/2 to 3-1/2 [38 to 89], excl	±0.010 [0.25]	±10%	3/16 [4.8]	0	less than 0.095 in. [2.41 mm] nominal
4	3-1/2 to 5-1/2 [89 to 140], excl	±0.015 [0.38]	±10%	3/16 [4.8]	0	less than 0.150 in. [3.81 mm] nominal
5	5-1/2 to 8 [140 to 203], excl	±0.030 [0.76]	±10%	3/16 [4.8]	0	less than 0.150 in. [3.81 mm] nominal
6	8 to 12 [203 to 305], excl	±0.040 [1.01]	±10%	3/16 [4.8]	0	less than 0.200 in. [5.08 mm] nominal
7	12 to 14 [305 to 356], excl	±0.050 [1.26]	±10%	3/16 [4.8]	0	less than 0.220 in. [5.59 mm] nominal

Table 4 notes: For tubes ordered with wall 3/4 in. [19.0 mm] or over, or ID 60% or less of OD, wall thickness tolerance is ±12.5%. For tubes less than 1/2 in. [12.7 mm] ID that cannot be successfully drawn over a mandrel, wall thickness may vary ±15%. Ovality provisions apply for thin-walled tubes. For cut lengths over 24 ft [7.3 m], the over tolerance increases by 1/8 in. [3 mm] for each 10 ft [3 m] or fraction thereof over 24 ft, or 1/2 in. [13 mm], whichever is less.

7. Optional supplementary requirements

Supplementary requirement	Requirement summary
S1 Stress-relieved annealed	For TP304L, TP316L, TP321, TP347, TP348; 1550–1650 °F [845–900 °C] after roll straightening; no mechanical straightening after stress relief.
S2 Pneumatic test	Air-under-water or pneumatic leak test in accordance with A1016/A1016M.
S3 Stabilizing heat treatment	After solution anneal, TP321, TP347, TP348 receive stabilizing treatment at a lower temperature as agreed between purchaser and vendor.
S4 Intergranular corrosion test	Per ASTM A262 Practice E when specified. S3 may be necessary for grades containing titanium or columbium.

8. Welding filler / weld repair note

Item	Statement
Filler metal table in ASTM A269	ASTM A269 does not contain a grade-by-grade filler metal table. If filler selection is needed for fabrication or repair, it should be specified separately by project documents, welding procedure, or applicable welding standards.

9. Purchase order description example

Example wording
ASTM A269/A269M TP321 Tubing, UNS S32100, seamless (or welded), OD 25.4 mm × WT 2.11 mm, random length, solution heat treated, hydrostatic test or NDE electric test, test report required, supplementary requirements as specified.