

Seamless stainless steel tubing

F-Line instrumentation and hydraulic tubing • ASTM A269 / ASTM A213



Precision tube. Traceable supply.

Cold-drawn, annealed seamless stainless steel tubing for the conveyance of air, liquids and gases in instrumentation, hydraulic and general-service systems. Supplied by Fluidline from Midrand, South Africa.

Specification	Product information
Core range	Stainless steel grades 304, 316, 316L and 316Ti. Confirm the exact grade and specification on the quotation.
Manufacture and finish	Seamless, cold drawn and annealed to the applicable ASTM A269 / ASTM A213 specification. Free of scale; pickled or bright-annealed finish.
Inspection certification	EN 10204 type 3.2 certification by TÜV as standard for F-Line straight tubing. Match the delivered heat identification to the inspection certificate.
Special materials	904L, SAF 2205 and MONEL alloy grades available on request; not standard stock. Material-specific standards and supply scope to be confirmed.

Installation benefits: tubing can be bent to reduce joints and potential leak points, and can offer a lighter, less bulky route than a comparable pipe installation. Tube fittings avoid threading the tube. Suitable tubing can also be welded or orbital welded using a qualified procedure.

Inside: selection and handling (p. 2) • pressure basis (p. 3) • fractional and metric pressure tables (pp. 4–5) • temperature factors (p. 6) • ordering and traceability (p. 7).



Tube selection & handling

Select the tube and the connection as one assembly.

Selection factor	What to check
Duty and environment	Process fluid, compatibility, operating and design pressures, pressure peaks, flow, temperature range, external corrosion and vibration.
Dimensions	Specify actual outside diameter (OD) × wall thickness. Tube OD is not nominal pipe size; metric and fractional fittings are not interchangeable.
Surface and condition	Inspect the sealing area for scratches, dents, ovality and contamination. Use tube free of scale and suitable for bending or flaring.
Hardness	Original tubing limit: maximum 90 HRB or 200 HV, with tube softer than the fitting. The selected fitting system may require a stricter hardness limit; confirm before ordering.
Connection compatibility	Check tube grade, OD, wall range and hardness against the selected compression, cutting-ring or welded connection. The tube table alone does not rate the fitting.

Gas service: wall thickness matters

Gas containment is particularly sensitive to tube surface defects and the way the fitting grips and seals the tube. Use a wall thickness approved for the selected fitting and gas duty. The shaded cells marked **G** in the pressure tables are excluded from the original gas-service selection guidance. An unshaded cell is not, by itself, approval for gas service.

Prepare and install with care

- 1. Protect:** keep tube ends and sealing surfaces clean. Do not drag tubing across racks or rough surfaces; protect it during transport and storage.
- 2. Cut:** use a suitable sharp tube cutter with controlled, progressive cuts, or a suitable sawing method. Make a square end and remove internal and external burrs without damaging the sealing surface.
- 3. Bend:** use the correct bender and radius for the material, OD and wall. Leave enough straight tube at the fitting for full insertion and assembly; obtain the required length from the selected fitting instructions.
- 4. Assemble:** follow that fitting system's instructions, including any size-specific assembly tools. Do not substitute an instruction from a different fitting design.
- 5. Support:** position tube supports to limit movement, vibration and loads at connections. Inspect the completed system under the project's approved procedure.

For oxygen service, request the required cleaning and packaging standard explicitly. Oxygen cleaning, plugged ends and individually wrapped tubes are available by arrangement; they are not implied by a normal tubing order.

Understanding the pressure data

Reference calculations for tubing • complete-system limits still apply

Calculation basis and limits

The original tables use equations from **ASME B31.3, Process Piping**, with **ASME B31.1, Power Piping** considerations where applicable. ASME piping codes superseded the former ASA piping codes. Confirm the applicable code edition, material allowable stress and project design basis before using these figures.

Calculations use maximum OD and minimum wall thickness, except where noted. **No corrosion or erosion allowance is included.** The tables are reference information and do not establish approval for design work or the pressure rating of a complete tube-and-fitting assembly. Use the lowest applicable limit of the tube, fitting, valve, seal and other components, including temperature and service effects.

Table	Basis retained from the existing Fluidline datasheet
Fractional • page 4	ASTM A269 tubing; allowable stress $S = 20,000$ psi (137.8 MPa), at -20 to 100°F (approximately -28 to 37°C), except as noted.
Metric • page 5	EN ISO 1127 dimensions: D4/T4 tolerance for 3–12 mm; D4/T3 for 14–50 mm. Stress 137.8 MPa (20,000 psi); tensile strength 516.4 MPa (74,900 psi), except as noted.
Additional original note	The existing metric table also states a 4:1 safety factor considering 75,000 psi tensile strength at room temperature. This note is retained; it is not a substitute for validating the calculation basis for a project.

Why dimensional tolerances matter

Example: 1/2 in. OD × 0.035 in. wall, ASTM A269.

With OD tolerance ± 0.005 in. and wall tolerance $\pm 10\%$, the pressure calculation uses **0.505 in. OD × 0.0315 in. wall**, rather than the nominal dimensions.

Welded-tube comparison

This datasheet's product is seamless tubing. For comparison, the original reference applies weld-integrity factors to welded-and-drawn tubing: **0.85 for double-welded** and **0.80 for single-welded** tubing. Do not apply these as a rating for an unspecified welded product; confirm its construction and governing code. ASTM A213 covers seamless tubing.

Blank table cells mean that no value is supplied, not zero pressure or approval to interpolate. Wall availability, grade, certificates and the selected connection must be confirmed with Fluidline.

Fractional pressure table

Tube wall thickness in in. across columns • working pressure in psig

OD in.	0.010	0.012	0.014	0.016	0.020	0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120	0.134	0.156	0.188
1/16	5 600	6 800	8 100	9 400	12 000											
1/8						8 500	10 900									
3/16						5 400	7 000	10 200								
1/4						4 000	5 100	7 500	10 200							
5/16							4 000	5 800	8 000							
3/8							3 300	4 800	6 500	7 500 R						
1/2							2 600 G	3 700	5 100	6 700						
5/8								2 900 G	4 000	5 200	6 000					
3/4								2 400 G	3 300	4 200	4 900	5 800				
7/8								2 000 G	2 800 G	3 600	4 200	4 800				
1									2 400 G	3 100	3 600	4 200	4 700			
1 1/4										2 400 G	2 800 G	3 300	3 600	4 100	4 900	
1 1/2											2 300 G	2 700 G	3 000 G	3 400	4 000	4 900
2												2 000 G	2 200 G	2 500 G	2 900 G	3 600

G / shaded: not for gas-service selection under the original guidance. **R:** this reference entry depends on connection-specific validation; it is not evidence of a F-Line fitting pressure test. Blank = no value supplied.

Reference basis: ASTM A269; S = 20,000 psi (137.8 MPa), -20 to 100°F (approximately -28 to 37°C). Apply the relevant temperature factor from page 6 and all limitations on page 3. The complete assembly may have a lower rating. Gas restrictions remain applicable after temperature derating.

Metric pressure table

Tube wall thickness in mm across columns • working pressure in bar

OD mm	0.8	1.0	1.2	1.5	1.8	2.0	2.2	2.5	2.8	3.0	3.5	4.0	4.5	5.0
3	670													
6	310	420	540	710										
8		310	390	520										
10		240	300	400	510	580								
12		200	250	330	410	470								
14		160 G	200	270	340	380	430							
15		150 G	190 G	250	310	360	400							
16			170 G	230	290	330	370	400 R						
18			150 G	200	260	290	320	370						
20			140 G	180 G	230	260	290	330	380					
22			140 G	160 G	200 G	230	260	300	340					
25					180 G	200 G	230	260	290	320				
28						180 G	200 G	230	260	280	330			
30						170 G	180 G	210 G	240	260	310			
32						160 G	170 G	200 G	220 G	240	290	330		
38							140 G	160 G	190 G	200 G	240	270	310	
50										150 G	180 G	210 G	240 G	270

G / shaded: not for gas-service selection under the original guidance. **R:** this reference entry depends on connection-specific validation; it is not evidence of a F-Line fitting pressure test. Blank = no value supplied.

Reference basis: EN ISO 1127 D4/T4 (3–12 mm), D4/T3 (14–50 mm); stress 137.8 MPa and tensile strength 516.4 MPa. See page 3 for the original additional safety-factor note. Apply page 6 temperature factors and the complete assembly's limits.



Temperature derating factors

Original reference factors retained • confirm material and service limits

Material	200°F ≈93°C	400°F ≈204°C	600°F ≈315°C	800°F ≈426°C	1000°F ≈537°C
Aluminium	1.00	0.40	—	—	—
Copper	0.80	0.50	—	—	—
Carbon steel [1]	0.95	0.87 [1]	—	—	—
304 / 304L [2]	1.00	0.93	0.82	0.76	0.69
316 / 316L [2]	1.00	0.96	0.85	0.79	0.76
317 / 317L [2]	1.00	0.96	0.85	0.79	0.76
Alloy 400	0.87	0.79	0.79	0.76 †	—
Alloy 20 [3]	1.00	0.96	0.85	0.79	—
Alloy C-276 [3]	1.00	0.96	0.85	0.79	0.35 †
Alloy 600 [3]	1.00	0.96	0.85	0.79	0.35
Titanium	0.86	0.61	0.45	—	—
SAF 2507	0.90	0.82	0.80	—	—
Alloy 825	1.00	0.90	0.84	0.81	—
Alloy 625	0.93	0.85	0.79	0.75	0.73

Use: multiply the applicable ambient reference pressure by the material factor for the stated temperature. Blank/— entries have no factor supplied. Factors for other alloys are retained for reference and do not imply stock availability or suitability of stainless steel pressure tables for those alloys.

[1] The carbon-steel factor 0.87 is based on **375°F (190°C) maximum**, despite its position in the 400°F column.

[2] Dual-certified grades must meet the chemistry and mechanical-property requirements of both grades.

[3] Original note: based on the lower stainless steel derating factor in accordance with ASME B31.3.

† **Confirmation required:** Alloy 400 at 800°F and Alloy C-276 at 1000°F have differing factors in the supplied technical documents. The existing Fluidline values are preserved above; obtain confirmed values before using these two entries. They are not used for 316/316L selection.

Worked example • type 316 stainless steel

For 1/2 in. OD × 0.035 in. wall at 1000°F (approximately 537°C):

2,600 psig × 0.76 = 1,976 psig.

This is the reference tube calculation only. That size is marked G on page 4, so it remains excluded from the gas-service selection guidance. Confirm fitting, seal and full-system temperature limits separately.



Ordering & traceability

Send a complete duty description for an accurate tubing selection.

Ordering item	Information to specify
Material and specification	Exact grade; ASTM A269 / ASTM A213 as applicable, plus required tests. The original ordering guidance also lists 304/304L, 316/316L and 317/317L; confirm availability.
Condition and finish	High-quality, fully annealed seamless tube; pickled or bright annealed; scratch-free and suitable for bending or flaring. Maximum 90 HRB or 200 HV unless the selected fitting requires a lower limit.
Fractional dimensions	Actual OD × wall in inches. Original small-tube requirement: OD tolerance no greater than ± 0.003 in. for 1/16 in. OD.
Metric dimensions	Actual OD × wall in mm, to EN ISO 1127 or agreed equivalent. Original small-tube requirement: OD tolerance no greater than ± 0.076 mm for 3 mm OD.
Quantity and delivery	Length per piece, number of lengths, total metres, required delivery date and destination. Table entries do not confirm stock.
Application	Medium, flow, pressure, temperature, connection type, environment and any special inspection or project requirements.
Special preparation	Plugged ends, oxygen cleaning and individual wrapping by request. Agree cleaning standard and packaging before supply.

Material identification and certification

Tube markings identify **OD × wall, material grade, specification and heat code**. Each length is traceable. Check the certificate against the delivered markings, dimensions, hardness and relevant test results. F-Line straight tubing is supplied with **TÜV EN 10204 type 3.2 certification as standard**. Retain the heat-to-certificate link through cutting and installation.

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Confirm the final specification, current product availability and application suitability with Fluidline. Selection, installation, operation and maintenance must follow the applicable codes and the selected connection system's instructions.