Suggested Allowable Pressure Tables

Figure and tables are for reference only. No implication is made that these values can be used for design work. Applicable codes and practices in industry should be considered. ASME Codes are the successor to and replacement of ASA Piping Codes.

- All pressures are calculated from equations in ASME B31.3, Process Piping. See factors for ASTM A269 tubing at –20 to 100°F (–28 to 37°C), as listed in ASME B31.3 and ASME B31.1.
- Hardness - For use with tube fittings the tube should not exceed RB90 and be made of a softer material than the tube fittings.
- Wall Thickness – The wall thickness determines the recommended pressure the tube can withstand as listed in ASME B31.3. The table identifies the allowable working pressures. (see tables below)

Table 01: Fractional Stainless Steel Seamless Tubing

<table>
<thead>
<tr>
<th>OD Tolerance ± 10 %</th>
<th>0.010</th>
<th>0.012</th>
<th>0.014</th>
<th>0.016</th>
<th>0.020</th>
<th>0.028</th>
<th>0.035</th>
<th>0.049</th>
<th>0.063</th>
<th>0.095</th>
<th>0.109</th>
<th>0.120</th>
<th>0.134</th>
<th>0.156</th>
<th>0.188</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16</td>
<td>5 600</td>
<td>6 800</td>
<td>8 100</td>
<td>9 400</td>
<td>10 200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/8</td>
<td>8 500</td>
<td>10 900</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/32</td>
<td>5 400</td>
<td>7 000</td>
<td>10 200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4</td>
<td>4 000</td>
<td>5 700</td>
<td>5 700</td>
<td>10 200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/32</td>
<td>3 300</td>
<td>4 800</td>
<td>6 500</td>
<td>7 500</td>
<td>7 500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/8</td>
<td>2 600</td>
<td>3 700</td>
<td>5 100</td>
<td>6 700</td>
<td>6 700</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5/8</td>
<td>2 200</td>
<td>3 200</td>
<td>4 000</td>
<td>5 200</td>
<td>6 000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7/8</td>
<td>2 400</td>
<td>3 300</td>
<td>4 200</td>
<td>4 900</td>
<td>5 800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2 800</td>
<td>3 600</td>
<td>4 200</td>
<td>4 800</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 1/4</td>
<td>2 400</td>
<td>3 200</td>
<td>4 000</td>
<td>4 400</td>
<td>4 900</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 1/2</td>
<td>2 300</td>
<td>2 700</td>
<td>3 000</td>
<td>3 400</td>
<td>4 000</td>
<td>4 900</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2 000</td>
<td>2 200</td>
<td>2 500</td>
<td>2 900</td>
<td>3 600</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Example: 1/2 in. OD x 0.035 in. wall stainless steel tubing purchased to ASTM A269:
OD Tolerance ± 0.005 in. / Wall Thickness ± 10 %
Calculations are based on 0.505 in. OD x 0.0315 in. wall tubing.

Seamless stainless steel tubes cold drawn and annealed to ASTM A269 & ASTM A213 in Grades 304, 316, 316L & 316Ti material. Speciality alloy Grades such as 904L, SAF2205 & MONEL are also available upon request and are not a standard stock item.

Applications
Tube is used for the conveyance of air, liquid and gas in instrumentation, hydraulic and general service applications.

Key features
- Ease of installation – Tube provides many advantages over traditional piping systems, it is easy to bend with a tube bender which reduces the number of connections and potential leak points, it is less heavy and bulky than pipe and there is no need to thread the tube.
- Weldability – Seamless tubes are able to be welded and orbital welded or used in conjunction with tube fittings.
- Surface finish – Seamless tube is required to be ‘free of scale’ and can be supplied pickled or bright annealed.
- Certification – certified and manufactured in accordance with ASTM A269 & ASTM A213.
- Traceability – In accordance with the above specifications each material and dimensions i.e. the OD size and the wall thickness, the hardness of the tube and the ASTM test results.
- No allowance is made for corrosion or erosion.

Suggested Ordering Information
High-quality, fully annealed (Type 304, 304/304L, 316, 316/316L, 317, 317/317L) (seamless or welded and drawn) stainless steel hydraulic tubing, ASTM A269 or A213, or equivalent. Hardness not to exceed 90 HRB or 200 HV. Tubing to be free of scratches, suitable for bending and flaring. OD tolerances not to exceed ± 0.003 in. for 1/16 in. OD tubing.

Note: Dual-certified grades such as 304/304L, 316/316L, and 317/317L meet the minimum chemistry and the mechanical properties of both alloy grades.
Table 02: Metric Stainless Steel Seamless Tubing

Allowable working pressures are based on equations from ASME B31.3 and ASME B31.1 for EN ISO 1127 tubing (D4, T4 tolerance for 3 to 12 mm; D4, T3 tolerance 14 to 50 mm), using a stress value of 137.8 MPa (20 000 psi) and tensile strength of 516.4 MPa (74 900 psi), except as noted.

For Welded Tubing

For welded and drawn tubing, a derating factor must be applied for weld integrity:

- for double-welded tubing, multiply working pressure by 0.85
- for single-welded tubing, multiply working pressure by 0.80.

Pressure Ratings at Elevated Temperatures

Table 03: Elevated Temperature Factors

To determine allowable working pressure at elevated temperatures, multiply allowable working pressures from Tables 1 and 2 by a factor shown in Table 3.

Example: Type 316 stainless steel 1/2 in. OD 3 0.035 in. wall at 1000°F

1. The allowable working pressure at –20 to 100°F (–28 to 37°C) is 2600 psig (Table 1)
2. The elevated temperature factor for 1000°F (537°C) is 0.76 (Table 3):
   2600 psig 3 0.76 = 1976 psig
   The allowable working pressure for 316 SS 1/2 in. OD 3 0.035 in. wall tubing at 1000°F (537°C) is 1976 psig.

For more information contact our sales team on:
Tel +27(0)11 312 9339 Fax +27(0)11 312 9338 Email sarah@fluidline.co.za or www.fluidline.co.za

Suggested Ordering Information

High-quality, fully annealed (Type 304, 304/304L, 316, 316/316L, 317, 317/317L) stainless steel tubing, EN ISO 1127 or equivalent. Hardness not to exceed 90 HRE or 200 HV. Tubing to be free of scratches, suitable for bending or flaring. OD tolerances not to exceed ± 0.076 mm for 3 mm OD tubing.

Note: Dual-certified grades such as 304/304L, 316/316L, and 317/317L meet the minimum chemistry and the mechanical properties of both alloy grades.