

TUBING DATA

TABLE 1: STAINLESS STEEL INCH TUBING																
Tubing O.D.	WALL THICKNESS OF TUBE IN INCH															
inch	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	5600	6860	8150	9480	11890											
1/8						8550	10730									
3/16						5500	7100	10150								
1/4						4100	5200	7600	10150							
5/16							4100	5900	7975							
3/8							3350	4850	6525							
1/2							2650	3750	5150	6525						
5/8								2950	4050	5250	5945					
3/4								2450	3350	4250	4950	5655				
7/8								2050	2850	3650	4250	4843				
1									2100	2700	3200	3700	3987			
1 1/4										2400	2800	3300	3600	4100	4785	
1 1/2											2300	2700	3000	3400	4000	4785
2												2000	2200	2500	2900	3600

Annealed 304 or 316 stainless steel tubing complying with ASTM A213, A269 or equivalent specifications. For metal temp. from -20°F - 100°F (-29°C - 37°C). Suggested ordering information: Fully annealed high quality (Type 304 or 316) stainless steel hydraulic tubing ASTM A269 or A213 or equivalent, seamless or welded and drawn with a hardness of 90HRB (200HV) or less. Tubing should be without scratches and suitable for flaring and bending.

Working pressure (psig) for seamless tubing;
Multiply pressure rating by .80 for single welded tubing.
Multiply pressure rating by .85 for double welded tubing.

TABLE 2: STAINLESS STEEL METRIC TUBING															
Tubing O.D.	WALL THICKNESS OF TUBE IN MM														
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										
12		200	250	330	410	470									
14		160	200	270	340	380	430								
15		150	190	250	310	360	400								
16			170	230	290	330	370	400							
18			150	200	260	290	320	370							
20			140	180	230	260	290	330	380						
22			120	160	200	230	260	300	340						
25					180	200	230	260	290	320					
38							140	160	190	200	240	270	310		
50										150	180	210	240	270	

Annealed 304 or 316 stainless steel tubing complying with ASTM A213, A269 or equivalent specifications. For metal temp. from -20°F - 100°F (-29°C - 37°C). Suggested ordering information: Fully annealed high quality (Type 304 or 316) stainless steel hydraulic tubing ASTM A269 or A213 or equivalent, seamless or welded and drawn with a hardness of 90HRB (200HV) or less. Tubing should be without scratches and suitable for flaring and bending.

Working pressure (bar) for seamless tubing;
Multiply pressure rating by .80 for single welded tubing.
Multiply pressure rating by .85 for double welded tubing.

WARNING! The system designer and user have the sole responsibility to select products suitable for their special application requirements and to ensure the proper installation, operation and maintenance of the product. Please consider application details, material compatibility and product ratings when making your selection. Improper selection or use of products can cause property damage or personal injury.

TUBING DATA

TABLE 3: COPPER TUBING WALL THICKNESS OF TUBE IN INCHES

Tubing O.D.		0.028	0.035	0.049	0.065	0.083	0.095	0.109	0.120
mm	inch								
2	1/8	2700	3600						
3	3/16	1800	2300	3400					
6	1/4	1300	1600	2500	3500				
8	5/16		1300	1900	2700				
10	3/8		1000	1600	2200				
12	1/2		800	1100	1600	2100			
16	5/8			900	1200	1600	1900		
20	3/4			700	1000	1300	1500	1800	
22	7/8			600	800	1100	1300	1500	
25	1			500	700	900	1100	1300	1500

Annealed copper seamless tubing complying with ASTM B68 and ASTM B75 specified in temper designation 060. Based on ultimate tensile strength of 30,000 psi (2067 bar). For metal temperatures from -20°C to 37°C. Suggested ordering information: High quality soft annealed seamless copper tubing ASTM B75 or equivalent.

TABLE 4: FACTORS USED TO DETERMINE ALLOWABLE PRESSURE AT HIGHER TEMPERATURES

°F	°C	A.I.S.I. 316	Copper
200	93	1	0.80
400	204	0.96	0.50
600	316	0.85	-
800	427	0.79	-
1000	538	0.76	-
1200	649	0.37	-

To determine allowable pressure at higher temperatures, multiply allowable working pressure from Tables 1 & 2 & 3 by factor shown in Table 4.

For example: The allowable pressure for Type 316 stainless steel, size 1/2" OD x .049" wall at 800°F (427°C) would be equivalent to 3750 psi x 0.79 = 2962.5 psi.

TABLE 5: GAS APPLICATION TUBING

INCH		METRIC	
Tubing O.D.	Min. Nominal Wall Thickness	Tubing O.D.	Min. Nominal Wall Thickness
1/8"	0.028"	3 mm	0.8 mm
3/16"	0.028"	6 mm	0.8 mm
1/4"	0.028"	8 mm	1.0 mm
5/16"	0.035"	10 mm	1.0 mm
3/8"	0.035"	12 mm	1.0 mm
1/2"	0.049"	14 mm	1.2 mm
5/8"	0.065"	16 mm	1.5 mm
3/4"	0.065"	18 mm	1.5 mm
7/8"	0.083"	20 mm	1.8 mm
1"	0.083"	22 mm	2.0 mm
1 1/4"	0.109"	25 mm	2.2 mm
1 1/2"	0.134"	38 mm	3.5 mm
2"	0.188"	50 mm	5.0 mm

Gases are characterized by small molecules, which can escape through the smallest leak path. For gas applications, we recommend to select tubing with greater wall thickness. Table 5 shows the recommended wall thicknesses for greater safety and efficiency.

WARNING! For Your Safety The system designer and user have the sole responsibility to select products suitable for their special application requirements and to ensure the proper installation, operation and maintenance of the product. Please consider application details, material compatibility and product ratings when making your selection. Improper selection or use of products can cause property damage or personal injury.

PRESSURE RATINGS

Pressure Ratings for HAM-LET Tube Fittings

To ensure leak-tight systems, it is important to carefully select high-quality tubing (see page 11 - allowable working pressure).

Pipe End Thread (NPT and ISO 7) Pressure Ratings

Allowable pressure for male and female tapered pipe thread ends: Stainless Steel 316 and Brass.

NPT / ISO Pipe Size	Stainless Steel 316		Brass	
	Male	Female	Male	Female
inch	psi			
1/16	11000	6700	5500	3300
1/8	10000	6500	5000	3200
1/4	8000	6600	4000	3300
3/8	7800	5300	3900	2600
1/2	7700	4900	3800	2400
3/4	7300	4600	3600	2300
1	5300	4400	2600	2200
1 1/4	6000	5000	3000	2500
1 1/2	5000	4600	2500	2300
2	3900	3900	1900	1900

Note: If the pressure on the LET-LOK® end is higher than the pipe side, then the pipe side needs a heavier wall thickness of the tapered pipe thread side.

Pressure Ratings for End Fittings per SAE J1926 (LOB) Surrounding Temperature

Pressure ratings are based on SAE J1926 at surrounding temperature.

(LOB) SAE J1926 Thread Size	Stainless Steel 316	
	Nonpositionable	Positionable
inch	psi	
5/16 - 24	4568	4568
7/16 - 20	4568	4568
1/2 - 20	4568	4568
9/16 - 18	4568	3626
3/4 - 16	4568	3626
7/8 - 14	3626	2900
1 1/16 - 12	3626	2900
1 3/16 - 12	2900	2320
1 5/16 - 12	2900	2320
1 5/8 - 12	2320	1813
1 7/8 - 12	2320	1813
2 1/2 - 12	1813	1450

Note: 37° FLARE (AN) and LO ends can have lower pressure

O-Seal Pressure Ratings (page 45)

Stainless steel 316 O-seal fittings up to 1" and 25 mm are rated to 3000 psi.

Positionable, ISO/BSP Parallel Thread (G) Pressure Ratings

Pressure ratings are at surrounding temperature.

(G) ISO / BSP Male Pipe Size	Stainless Steel 316
inch	psi
1/8	4568
1/4	4568
3/8	4568
1/2	2320
3/4	2320
1	2320