

Tubing volume/length conversion chart

1/16" OD tubing sold by VICI typically has an ID tolerance of ±0.025 mm. This is much tighter than normal commercial grades of tubing; however, it is enough to result in noticeable error if exact volumes are not measured, according to the equation

$$V = \Pi (\frac{1}{2} D)^2 L.$$

Tubing ID		Volume/length	
mm	inches	µl/cm	µl/in
0.050	.002"	0.02	0.05
0.064	.0025"	0.03	0.08
0.075	.003"	0.04	0.12
0.10	.004"	0.08	0.21
0.13	.005"	0.13	0.32
0.17	.0067"	0.23	0.58
0.18	.007"	0.25	0.63
0.25	.010"	0.51	1.29
0.38	.015"	1.14	2.90
0.50	.020"	2.03	5.15
0.64	.025"	3.17	8.04
0.75	.030"	4.56	11.58

Tubing ID		Volume/length	
mm	inches	µl/cm	µl/in
1.00	.040"	8.11	20.59
1.40	.055"	15.39	38.93
1.52	.060"	18.24	46.33
1.59	.062"	19.86	49.47
1.65	.065"	21.38	54.38
1.70	.067"	22.70	57.78
1.78	.070"	24.83	63.06
2.00	.079"	31.42	80.32
2.10	.083"	34.64	88.66
2.16	.085"	36.61	92.99
2.40	.094"	45.24	113.72
3.18	.125"	79.4	201
3.76	.148"	111	282
4.35	.171"	149	376

Maximum recommended working pressures for stainless steel tubing

PREMIUM GRADE STAINLESS TUBING			
OD	ID (mm)	bar	psi
1/32"	0.13	1735	25,160
	0.18	1601	23,225
	0.25	1395	20,230
	0.50	734	10,645
1/16"	0.13	1902	27,580
	0.18	1835	26,610
	0.25	1735	25,160
	0.50	1395	20,230
	0.75	1067	15,480
	1.00	734	10,645

OD	ID (mm)	bar	psi
1/8"	0.68	1622	23,520
	0.75	1572	22,800
	1.00	1406	20,400
	1.50	1075	15,600
	1.70	960	13,920
	2.16	662	9,600
	1/4"	4.65	554

WELDED STAINLESS TUBING			
OD	ID (mm)	bar	psi
1/16"	0.13	1871	27,140
	0.18	1794	26,025
	0.25	1717	24,910
	0.50	1384	20,080
	0.75	1076	15,610
	1.00	743	10,780
	1/8"	2.10	680
1/4"	4.65	538	7,800

WORKING PRESSURE FOR STAINLESS STEEL TUBING

The working pressure for stainless tubing is calculated from the burst pressure by dividing by 2.5. The theoretical burst pressure(s) were calculated using Lamé's formula and a safety factor of 2. Additionally, these results assume the tubing is not subject to any other stresses (e.g. temperature different from ambient, bends) that would influence the calculations. The end user must decide the safe maximum working pressure based on this information and the specific application.