

Acoustic Velocities for Common Liquids and Solids

&

Common Pipe Sizes

**Instrumart
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Longitudinal Acoustic Velocities for Common Liquids at 25 deg C or other temperature indicate

<u>Substance</u>	<u>ft/sec</u>	<u>m/sec</u>
Acetone	3852	1174
Alcohol - Ethyl	3960	1207
Alcohol - Isopropyl	3839	1170
Amonia (-33)	5671	1729
n-Amyl Alcohol	4015	1224
Aminobenzene	5376	1639
Benzene	4284	1306
n-Butane (-5)	3559	1085
Carbon Tetrachloride	3037	926
Carbon Tetraflouride (-150)	2870	875
Cetane (20)	4389	1338
Chloroform (20)	3054	931
Cyclohexane (20)	4212	1284
Diesel fuel	4100	1250
Dimethyl Siloxan (Dow Corning 200)	2991	912
Ether	3231	985
Formaldehyde, methylester	3697	1127
Hexane	3647	1112
n-Hexane (20)	3552	1083
Kerosene	4343	1324
Naptha	4018	1225
Octane	3844	1172
n-Octane (20)	3910	1192
l-Octene	3854	1175
Oil, Auto crankcase - SAE 20	2854	870
Oil, Fuel AA gravity	4871	1485
Oil, Lube - X200	5018	1530
Refrigerant 11 (0)	2716	828
Refrigerant 12 (-40)	2539	774
Refrigerant 14 (-150)	2870	875
Refrigerant 21 (0)	2922	891
Refrigerant 22 (50)	2932	894
Refrigerant 113 (0)	2572	784
Refrigerant 114 (-10)	2181	665
Refrigerant 115 (-50)	10590	656
Refrigerant C318 (-10)	1883	574
Toluol	4290	1308
Tricloro-ethene	3372	1028
Triflouorotrichloroethene - Freon 113	2572	784
Turpentine	4116	1255
Water	4864	1483
Water, distilled	4913	1498
Water, heavy	4592	1400
Water, sea	5022	1531

Acoustic Velocities for Solids at 25 deg C (longitudinal)

<u>Material</u>	<u>ft/sec</u>	<u>m/sec</u>
Acrylic	8954	2730
Aluminum	10102	3080
Aluminum (rolled)	9971	3040
Aluminum (2024)	10365	3160
Asbestos Cement	7216	2200
Brass (Naval)	6724	2050
Carbon Steel	10516	3206
Cast Iron	10594	3230
Copper	7413	2260
Copper (annealed)	7626	2325
Copper (rolled)	7446	2270
Copper-Nickel (70-30)	8331	2540
Copper-Nickel (90-10)	6757	2060
Ductile Iron	9840	3000
FRP	8216	2505
Glass, Crown	9315	2840
Glass, Pyrex	10758	3280
Glass, Quartz	11546	3520
Gold	3936	1200
Inconel	9906	3020
Iron	10611	3235
Iron, Ductile	9840	3000
Lead	7118	2170
Lucite	4133	1260
Mild steel	10611	3235
Monel	8922	2720
Mortar	8200	2500
Nickel	9709	2960
Nylon	7872	2400
Nylon, 6-6	3510	1070
Polyethylene (LD)	6363	1940
Polyethylene (HD)	7577	2310
PVC, CPVC	7872	2400
Steel, 1% carbon	10562	3220
Steel, galvanized - standard	10590	3223
Steel, hardened 1% carbon	10332	3150
Stainless Steel - 302	10234	3120
Stainless Steel - 303	10234	3120
Stainless Steel - 304	10516	3206
Stainless Steel - 316	10414	3175
Stainless Steel - 347	10168	3100
Stainless Steel - 410	9807	2990
Stainless Steel - 430	11021	3360
Tar epoxy	6560	2000
Tin, rolled	5478	1670
Titanium	10250	3125
Tungsten, annealed	9479	2890
Tungsten, drawn	8659	2640
Tungsten, carbide	13054	3980
Zinc, rolled	8003	2440

Common Pipe Sizes for Welded Steel, Aluminum, and Copper

Nominal Diameter		ALUMINUM	COPPER TUBING			Copper & Brass Pipe	WELDED STEEL											
			Type K	Type L	Type M		16 Gage	14 Gage	12 Gage	10 Gage	7 Gage	3 Gage	1/4	5/16	3/8	7/16	1/2	
1/2"	O.D.		0.625	0.625	0.625	0.840												
	Wall		0.049	0.040	0.028	0.108												
	I.D.		0.527	0.545	0.569	0.625												
5/8"	O.D.		0.750	0.750	0.750													
	Wall		0.049	0.042	0.030													
	I.D.		0.652	0.666	0.690													
3/4"	O.D.		0.875	0.875	0.875	1.050												
	Wall		0.065	0.045	0.032	0.114												
	I.D.		0.745	0.785	0.811	0.822												
1"	O.D.		1.125	1.125	1.125	1.315												
	Wall		0.065	0.050	0.035	0.127												
	I.D.		0.995	1.025	1.055	1.062												
1-1/4"	O.D.		1.375	1.375	1.375	1.660												
	Wall		0.065	0.055	0.042	0.146												
	I.D.		1.245	1.265	1.291	1.368												
1-1/2"	O.D.		1.625	1.625	1.625	1.900												
	Wall		0.072	0.060	0.027	0.150												
	I.D.		1.481	1.505	1.571	1.600												
2"	O.D.		2.125	2.125	2.125	2.375												
	Wall		0.083	0.070	0.058	0.157												
	I.D.		1.959	1.985	2.009	2.062												
2-1/2"	O.D.	2.500	2.625	2.625	2.625	2.875												
	Wall	0.050	0.095	0.080	0.065	0.188												
	I.D.	2.400	2.435	2.465	2.495	2.500												
3"	O.D.	3.000	3.125	3.125	3.125	3.500												
	Wall	0.050	0.109	0.090	0.072	0.219												
	I.D.	2.900	2.907	2.945	2.981	3.062												
3-1/2"	O.D.		3.625	3.625	3.625	4.000												
	Wall		0.120	0.100	0.083	0.250												
	I.D.		3.385	3.425	3.459	3.500												
4"	O.D.	4.000	4.125	4.125	4.125	4.500	4.000	4.000	4.000	4.000								
	Wall	0.063	0.134	0.110	0.095	0.250	0.060	0.075	0.105	0.135								
	I.D.	3.874	3.857	3.905	3.935	4.000	3.880	3.851	3.791	3.731								
4-1/2"	O.D.					5.000	4.500	4.500	4.500	4.500								
	Wall					0.250	0.060	0.075	0.105	0.135								
	I.D.					4.500	4.380	4.351	4.291	4.231								
5"	O.D.	5.000	5.125	5.125	5.125	5.563	5.000	5.000	5.000	5.000	5.000							
	Wall	0.063	0.160	0.125	0.109	0.250	0.060	0.075	0.105	0.135	0.179							
	I.D.	4.875	4.805	4.875	4.907	5.063	4.880	4.851	4.791	4.731	4.641							
6"	O.D.	6.000	6.125	6.125	6.125	6.625	6.000	6.000	6.000	6.000	6.000							
	Wall	0.063	0.192	0.140	0.122	0.250	0.060	0.075	0.105	0.135	0.179							
	I.D.	5.874	5.741	5.845	5.881	6.125	5.880	5.851	5.791	5.731	5.641							
6-5/8"	O.D.					6.625	6.625	6.625	6.625	6.625								
	Wall					0.060	0.075	0.105	0.135	0.179								
	I.D.					6.505	6.476	6.416	6.356	6.266								
7"	O.D.	7.000				7.625	7.000	7.000	7.000	7.000	7.000	7.000						
	Wall	0.078				0.282	0.060	0.075	0.105	0.135	0.179	0.239						
	I.D.	6.844				7.062	6.880	6.851	6.791	6.731	6.641	6.522						
8"	O.D.	8.000	8.125	8.125	8.125	8.625	8.000	8.000	8.000	8.000	8.000	8.000						
	Wall	0.094	0.271	0.200	0.170	0.313	0.060	0.075	0.105	0.135	0.179	0.239						
	I.D.	7.812	7.583	7.725	7.785	8.000	7.880	7.851	7.791	7.731	7.641	7.522						
8-5/8"	O.D.					8.625	8.625	8.625	8.625	8.625	8.625							
	Wall					0.060	0.075	0.105	0.135	0.179	0.239							
	I.D.					8.505	8.476	8.416	8.356	8.266	8.147							

10"	O.D.	10.000			10.000	10.000	10.000	10.000	10.000												
	Wall	0.094			0.075	0.105	0.135	0.179	0.239												
	I.D.	9.812			9.851	9.791	9.731	9.641	9.522												
10-3/4"	O.D.				10.750	10.750	10.750	10.750	10.750												
	Wall				0.075	0.105	0.135	0.179	0.239												
	I.D.				10.601	10.541	10.481	10.391	10.272												
12"	O.D.				12.000	12.000	12.000	12.000	12.000												
	Wall				0.075	0.105	0.135	0.179	0.239												
	I.D.				11.851	11.791	11.731	11.641	11.522												
12-3/4"	O.D.				12.750	12.750	12.750	12.750	12.750												
	Wall				0.075	0.105	0.135	0.179	0.239												
	I.D.				12.601	12.541	12.481	12.391	12.272												
14"	O.D.				14.000	14.000	14.000	14.000	14.000												
	Wall				0.075	0.105	0.135	0.179	0.239												
	I.D.				13.851	13.791	13.731	13.641	13.522												
16"	O.D.				16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000								
	Wall				0.075	0.105	0.135	0.179	0.239	0.250	0.315	0.375									
	I.D.				15.851	15.791	15.731	15.641	15.522	15.500	15.370	15.250									
18"	O.D.				18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000								
	Wall				0.075	0.105	0.135	0.179	0.239	0.250	0.315	0.375									
	I.D.				17.851	17.791	17.731	17.641	17.522	17.500	17.370	17.250									
20"	O.D.				20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000							20.000
	Wall				0.075	0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438								
	I.D.				19.851	19.791	19.731	19.641	19.522	19.500	19.370	19.250	19.124								
22"	O.D.				22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000							
	Wall				0.075	0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438								
	I.D.				21.851	21.791	21.731	21.641	21.522	21.500	21.370	21.250	21.124								
24"	O.D.				24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000						24.000
	Wall				0.075	0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500							
	I.D.				23.851	23.791	23.731	23.641	23.522	23.500	23.370	23.250	23.124	23.000							
30"	O.D.				30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000						30.000
	Wall				0.075	0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500							
	I.D.				29.851	29.791	29.731	29.641	29.522	29.500	29.370	29.250	29.124	29.000							
36"	O.D.				36.000	36.000	36.000	36.000	36.000	36.000	36.000	36.000	36.000	36.000	36.000						36.000
	Wall				0.075	0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500							
	I.D.				35.851	35.791	35.731	35.641	35.522	35.500	35.370	35.250	35.124	35.000							
42"	O.D.				42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000						42.000
	Wall				0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500								
	I.D.				41.791	41.731	41.641	41.522	41.500	41.370	41.250	41.124	41.000								
48"	O.D.				48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000						48.000
	Wall				0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500								
	I.D.				47.791	47.731	47.641	47.522	47.500	47.370	47.250	47.124	47.000								
54"	O.D.				54.000	54.000	54.000	54.000	54.000	54.000	54.000	54.000	54.000	54.000	54.000						54.000
	Wall				0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500								
	I.D.				53.791	53.731	53.641	53.522	53.500	53.370	53.250	53.124	53.000								
60"	O.D.				60.000	60.000	60.000	60.000	60.000	60.000	60.000	60.000	60.000	60.000	60.000						60.000
	Wall				0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500								
	I.D.				59.791	59.731	59.641	59.522	59.500	59.370	59.250	59.124	59.000								
66"	O.D.				66.000	66.000	66.000	66.000	66.000	66.000	66.000	66.000	66.000	66.000	66.000						66.000
	Wall				0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500								
	I.D.				65.791	65.731	65.641	65.522	65.500	65.370	65.250	65.124	65.000								
72"	O.D.				72.000	72.000	72.000	72.000	72.000	72.000	72.000	72.000	72.000	72.000	72.000						72.000
	Wall				0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500								
	I.D.				71.791	71.731	71.641	71.522	71.500	71.370	71.250	71.124	71.000								

Common Pipe Sizes for Steel

CARBON STEEL

STAINLESS STEEL

Nominal Diameter		Schedule 10	Schedule 20	Schedule 30	Schedule 40	Schedule 60	Schedule 80	Schedule 100	Schedule 120	Schedule 140	Schedule 160	Standard Weight	Extra Strong	Double Extra Strong	Schedule 5	Schedule 10	Schedule 40	Schedule 80
1/2"	O.D.				0.840		0.840				0.840	0.840	0.840	0.840				
	Wall				0.109		0.147				0.187	0.109	0.147	0.294				
	I.D.				0.612		0.546				0.466	0.612	0.546	0.252				
3/4"	O.D.				1.050		1.050				1.050	1.050	1.050	1.050				
	Wall				0.113		0.154				0.218	0.113	0.154	0.308				
	I.D.				0.824		0.742				0.614	0.824	0.742	0.434				
1"	O.D.				1.315		1.315				1.315	1.315	1.315	1.315	1.315	1.315	1.315	1.315
	Wall				0.133		0.179				0.250	0.133	0.179	0.358	0.065	0.109	0.133	0.179
	I.D.				1.049		0.957				0.815	1.049	0.957	0.559	1.185	1.097	1.049	0.957
1-1/4"	O.D.				1.660		1.660				1.660	1.660	1.660	1.660	1.660	1.660	1.660	1.660
	Wall				0.140		0.191				0.250	0.140	0.191	0.382	0.065	0.109	0.140	0.191
	I.D.				1.380		1.278				1.160	1.380	1.278	0.896	1.530	1.442	1.380	1.278
1-1/2"	O.D.				1.900		1.900				1.900	1.900	1.900	1.900	1.900	1.900	1.900	1.900
	Wall				0.145		0.200				0.281	0.145	0.200	0.400	0.065	0.109	0.145	0.200
	I.D.				1.610		1.500				1.338	1.610	1.500	1.100	1.770	1.682	1.610	1.500
2"	O.D.				2.375		2.375				2.375	2.375	2.375	2.375	2.375	2.375	2.375	2.375
	Wall				0.154		0.218				0.343	0.154	0.218	0.436	0.065	0.109	0.154	0.218
	I.D.				2.067		1.939				1.689	2.067	1.939	1.503	2.245	2.157	2.067	1.939
2-1/2"	O.D.				2.875		2.875				2.875	2.875	2.875	2.875	2.875	2.875	2.875	2.875
	Wall				0.203		0.276				0.375	0.203	0.276	0.552	0.083	0.120	0.203	0.276
	I.D.				2.469		2.323				2.125	2.469	2.323	1.771	2.709	2.635	2.469	2.323
3"	O.D.				3.500		3.500				3.500	3.500	3.500	3.500	3.500	3.500	3.500	3.500
	Wall				0.216		0.300				0.438	0.216	0.300	0.600	0.083	0.120	0.216	0.300
	I.D.				3.067		2.900				2.624	3.068	2.900	2.300	3.334	3.260	3.068	2.900
3-1/2"	O.D.				4.000		4.000				4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000
	Wall				0.226		0.318				0.438	0.226	0.318	0.636	0.083	0.120	0.226	0.318
	I.D.				3.548		3.364			4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500
4"	O.D.				4.500		4.500		4.500		4.500	4.500	4.500	4.500	4.500	4.500	4.500	4.500
	Wall				0.237		0.337		0.438		0.531	0.237	0.337	0.674	0.083	0.120	0.237	0.337
	I.D.				4.026		3.826		3.626		3.438	4.026	3.826	3.152	4.334	4.260	4.026	3.826
5"	O.D.				5.563		5.563		5.563		5.563	5.563	5.563	5.563	5.563	5.563	5.563	5.563
	Wall				0.258		0.375		0.500		0.625	0.258	0.375	0.750	0.083	0.134	0.258	0.375
	I.D.				5.047		4.813		4.563		4.313	5.047	4.813	4.063	5.397	5.295	5.047	4.813
6"	O.D.				6.625		6.625		6.625		6.625	6.625	6.625	6.625	6.625	6.625	6.625	6.625
	Wall				0.280		0.432		0.562		0.718	0.280	0.432	0.897	0.109	0.134	0.280	0.432
	I.D.				6.065		5.761		5.501		5.189	6.065	5.761	4.897	6.407	6.357	6.065	5.761
8"	O.D.		8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625	8.625
	Wall		0.250	0.277	0.322	0.406	0.500	0.593	0.718	0.812	0.906	0.322	0.500	0.875	0.109	0.148	0.322	0.500
	I.D.		8.125	8.071	7.981	7.813	7.625	7.439	7.189	7.001	6.813	7.981	7.625	6.875	8.407	8.329	7.981	7.625
10"	O.D.		10.750	10.750	10.750	10.750	10.750	10.750	10.750	10.750	10.750	10.750	10.750	10.750	10.750	10.750	10.750	10.750
	Wall		0.250	0.307	0.365	0.500	0.593	0.718	0.843	1.000	1.125	0.365	0.500	1.000	0.134	0.165	0.365	0.500
	I.D.		10.250	10.136	10.020	9.750	9.564	9.314	9.064	8.750	8.500	10.020	9.750	8.750	10.482	10.420	10.020	9.750
12"	O.D.		12.750	12.750	12.750	12.750	12.750	12.750	12.750	12.750	12.750	12.750	12.750	12.750	12.750	12.750	12.750	12.750
	Wall		0.250	0.330	0.406	0.562	0.687	0.843	1.000	1.125	1.312	0.375	0.500	1.000	0.156	0.180	0.375	0.500
	I.D.		12.250	12.090	11.938	11.626	11.376	11.064	10.750	10.500	10.126	12.000	11.750	10.750	12.438	12.390	12.000	11.750
14"	O.D.	14.000	14.000	14.000	14.000	14.000	14.000	14.000	14.000	14.000	14.000	14.000	14.000	14.000	14.000	14.000	14.000	14.000
	Wall	0.250	0.312	0.375	0.438	0.593	0.750	0.937	1.093	1.250	1.406	0.375	0.500	0.156	0.188	0.156	0.188	0.156
	I.D.	13.500	13.375	13.250	13.124	12.814	12.500	12.126	11.814	11.500	11.188	13.250	13.000	13.688	13.624	13.688	13.624	13.688
16"	O.D.	16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000
	Wall	0.250	0.312	0.375	0.500	0.656	0.843	1.031	1.218	1.438	1.593	0.375	0.500	0.165	0.188	0.165	0.188	0.165
	I.D.	15.500	15.375	15.250	15.000	14.688	14.314	13.938	13.564	13.124	12.814	15.250	15.000	15.670	15.624	15.670	15.624	15.670
18"	O.D.	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000
	Wall	0.250	0.312	0.438	0.562	0.750	0.937	1.156	1.375	1.562	1.781	0.375	0.500	0.165	0.188	0.165	0.188	0.165
	I.D.	17.500	17.375	17.124	16.876	16.500	16.126	15.688	15.250	14.876	14.438	17.250	17.000	17.670	17.624	17.670	17.624	17.670
20"	O.D.	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000
	Wall	0.250	0.375	0.500	0.593	0.812	1.031	1.281	1.500	1.750	1.968	0.375	0.500	0.188	0.218	0.188	0.218	0.188
	I.D.	19.500	19.250	19.000	18.814	18.376	17.938	17.438	17.000	16.500	16.064	19.250	19.000	19.624	19.564	19.624	19.564	19.624

22"	O.D.	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000
	Wall	0.250	0.375	0.500	0.594	0.812	1.031	1.281	1.500	1.750	1.969	0.375	0.500	0.188	0.218	
	I.D.	21.500	21.250	21.000	20.812	20.376	19.938	19.438	19.000	18.500	18.062	21.250	21.000	21.624	21.564	
24"	O.D.	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000
	Wall	0.250	0.375	0.562	0.687	0.968	1.218	1.531	1.812	2.062	2.343	0.375	0.500	0.218	0.250	
	I.D.	23.500	23.250	22.875	22.626	22.064	21.564	20.938	20.376	19.876	19.314	23.250	23.000	23.564	23.500	
26"	O.D.	26.000	26.000									26.000	26.000			
	Wall	0.312	0.500									0.375	0.500			
	I.D.	25.376	25.000									25.250	25.000			
28"	O.D.	28.000	28.000	28.000								28.000	28.000			
	Wall	0.312	0.500	0.625								0.375	0.500			
	I.D.	27.376	27.000	26.750								27.250	27.000			
30"	O.D.	30.000	30.000	30.000	30.000							30.000	30.000	30.000	30.000	
	Wall	0.312	0.500	0.625	0.750							0.375	0.500	0.250	0.312	
	I.D.	29.376	29.000	28.750	28.500							29.250	29.000	29.500	29.376	
32"	O.D.	32.000	32.000	32.000	32.000							32.000	32.000			
	Wall	0.312	0.500	0.625	0.688							0.375	0.500			
	I.D.	31.376	31.000	30.750	30.624							31.250	31.000			
34"	O.D.	34.000	34.000	34.000	34.000							34.000	34.000			
	Wall	0.344	0.500	0.625	0.688							0.375	0.500			
	I.D.	33.312	33.000	32.750	32.624							33.250	33.000			
36"	O.D.	36.000	36.000	36.000	36.000							36.000	36.000			
	Wall	0.312	0.500	0.625	0.750							0.375	0.500			
	I.D.	35.312	35.000	34.750	34.500							35.250	35.000			
42"	O.D.		42.000	42.000	42.000							42.000	42.000			
	Wall		0.500	0.625	0.750							0.375	0.500			
	I.D.		41.000	40.750	40.500							41.250	41.000			
48"	O.D.											48.000	48.000			
	Wall											0.375	0.500			
	I.D.											47.250	47.000			

Common Pipe Sizes for Welded Steel, Aluminum, and Copper (all dimensions in inches)

Nominal Diameter		ALUMINUM	COPPER TUBING			Copper & Brass Pipe	WELDED STEEL												
			Type K	Type L	Type M		16 Gage	14 Gage	12 Gage	10 Gage	7 Gage	3 Gage	1/4	5/16	3/8	7/16	1/2		
1/2"	O.D.		0.625	0.625	0.625	0.840													
	Wall		0.049	0.040	0.028	0.108													
	I.D.		0.527	0.545	0.569	0.625													
5/8"	O.D.		0.750	0.750	0.750														
	Wall		0.049	0.042	0.030														
	I.D.		0.652	0.666	0.690														
3/4"	O.D.		0.875	0.875	0.875	1.050													
	Wall		0.065	0.045	0.032	0.114													
	I.D.		0.745	0.785	0.811	0.822													
1"	O.D.		1.125	1.125	1.125	1.315													
	Wall		0.065	0.050	0.035	0.127													
	I.D.		0.995	1.025	1.055	1.062													
1-1/4"	O.D.		1.375	1.375	1.375	1.660													
	Wall		0.065	0.055	0.042	0.146													
	I.D.		1.245	1.265	1.291	1.368													
1-1/2"	O.D.		1.625	1.625	1.625	1.900													
	Wall		0.072	0.060	0.027	0.150													
	I.D.		1.481	1.505	1.571	1.600													
2"	O.D.		2.125	2.125	2.125	2.375													
	Wall		0.083	0.070	0.058	0.157													
	I.D.		1.959	1.985	2.009	2.062													
2-1/2"	O.D.	2.500	2.625	2.625	2.625	2.875													
	Wall	0.050	0.095	0.080	0.065	0.188													
	I.D.	2.400	2.435	2.465	2.495	2.500													
3"	O.D.	3.000	3.125	3.125	3.125	3.500													
	Wall	0.050	0.109	0.090	0.072	0.219													
	I.D.	2.900	2.907	2.945	2.981	3.062													
3-1/2"	O.D.		3.625	3.625	3.625	4.000													
	Wall		0.120	0.100	0.083	0.250													
	I.D.		3.385	3.425	3.459	3.500													
4"	O.D.	4.000	4.125	4.125	4.125	4.500	4.000	4.000	4.000	4.000									
	Wall	0.063	0.134	0.110	0.095	0.250	0.060	0.075	0.105	0.135									
	I.D.	3.874	3.857	3.905	3.935	4.000	3.880	3.851	3.791	3.731									
4-1/2"	O.D.					5.000	4.500	4.500	4.500	4.500									
	Wall					0.250	0.060	0.075	0.105	0.135									
	I.D.					4.500	4.380	4.351	4.291	4.231									
5"	O.D.	5.000	5.125	5.125	5.125	5.563	5.000	5.000	5.000	5.000	5.000								
	Wall	0.063	0.160	0.125	0.109	0.250	0.060	0.075	0.105	0.135	0.179								
	I.D.	4.875	4.805	4.875	4.907	5.063	4.880	4.851	4.791	4.731	4.641								
6"	O.D.	6.000	6.125	6.125	6.125	6.625	6.000	6.000	6.000	6.000	6.000								
	Wall	0.063	0.192	0.140	0.122	0.250	0.060	0.075	0.105	0.135	0.179								
	I.D.	5.874	5.741	5.845	5.881	6.125	5.880	5.851	5.791	5.731	5.641								
6-5/8"	O.D.						6.625	6.625	6.625	6.625	6.625								
	Wall						0.060	0.075	0.105	0.135	0.179								
	I.D.						6.505	6.476	6.416	6.356	6.266								
7"	O.D.	7.000				7.625	7.000	7.000	7.000	7.000	7.000	7.000							
	Wall	0.078				0.282	0.060	0.075	0.105	0.135	0.179	0.239							
	I.D.	6.844				7.062	6.880	6.851	6.791	6.731	6.641	6.522							
8"	O.D.	8.000	8.125	8.125	8.125	8.625	8.000	8.000	8.000	8.000	8.000	8.000							
	Wall	0.094	0.271	0.200	0.170	0.313	0.060	0.075	0.105	0.135	0.179	0.239							
	I.D.	7.812	7.583	7.725	7.785	8.000	7.880	7.851	7.791	7.731	7.641	7.522							

Common Pipe Sizes for Welded Steel, Aluminum, and Copper (all dimensions in inches)

Nominal Diameter		ALUMINUM	COPPER TUBING			Copper & Brass Pipe	WELDED STEEL												
			Type K	Type L	Type M		16 Gage	14 Gage	12 Gage	10 Gage	7 Gage	3 Gage	1/4	5/16	3/8	7/16	1/2		
8-5/8"	O.D.					8.625	8.625	8.625	8.625	8.625	8.625								
	Wall					0.060	0.075	0.105	0.135	0.179	0.239								
	I.D.					8.505	8.476	8.416	8.356	8.266	8.147								
10"	O.D.	10.000				10.000	10.000	10.000	10.000	10.000	10.000								
	Wall	0.094				0.075	0.105	0.135	0.135	0.179	0.239								
	I.D.	9.812				9.851	9.791	9.731	9.641	9.522									
10-3/4"	O.D.					10.750	10.750	10.750	10.750	10.750	10.750								
	Wall					0.075	0.105	0.135	0.135	0.179	0.239								
	I.D.					10.601	10.541	10.481	10.391	10.272									
12"	O.D.					12.000	12.000	12.000	12.000	12.000	12.000								
	Wall					0.075	0.105	0.135	0.135	0.179	0.239								
	I.D.					11.851	11.791	11.731	11.641	11.522									
12-3/4"	O.D.					12.750	12.750	12.750	12.750	12.750	12.750								
	Wall					0.075	0.105	0.135	0.135	0.179	0.239								
	I.D.					12.601	12.541	12.481	12.391	12.272									
14"	O.D.					14.000	14.000	14.000	14.000	14.000	14.000								
	Wall					0.075	0.105	0.135	0.135	0.179	0.239								
	I.D.					13.851	13.791	13.731	13.641	13.522									
16"	O.D.					16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000	16.000					
	Wall					0.075	0.105	0.135	0.135	0.179	0.239	0.250	0.315	0.375					
	I.D.					15.851	15.791	15.731	15.641	15.522	15.500	15.370	15.250						
18"	O.D.					18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000	18.000					
	Wall					0.075	0.105	0.135	0.135	0.179	0.239	0.250	0.315	0.375					
	I.D.					17.851	17.791	17.731	17.641	17.522	17.500	17.370	17.250						
20"	O.D.					20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000	20.000					20.000
	Wall					0.075	0.105	0.135	0.135	0.179	0.239	0.250	0.315	0.375	0.438				
	I.D.					19.851	19.791	19.731	19.641	19.522	19.500	19.370	19.250	19.124					
22"	O.D.					22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000	22.000					22.000
	Wall					0.075	0.105	0.135	0.135	0.179	0.239	0.250	0.315	0.375	0.438				
	I.D.					21.851	21.791	21.731	21.641	21.522	21.500	21.370	21.250	21.124					
24"	O.D.					24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000	24.000					24.000
	Wall					0.075	0.105	0.135	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500			
	I.D.					23.851	23.791	23.731	23.641	23.522	23.500	23.370	23.250	23.124	23.000				
30"	O.D.					30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000	30.000					30.000
	Wall					0.075	0.105	0.135	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500			
	I.D.					29.851	29.791	29.731	29.641	29.522	29.500	29.370	29.250	29.124	29.000				
36"	O.D.					36.000	36.000	36.000	36.000	36.000	36.000	36.000	36.000	36.000					36.000
	Wall					0.075	0.105	0.135	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500			
	I.D.					35.851	35.791	35.731	35.641	35.522	35.500	35.370	35.250	35.124	35.000				
42"	O.D.					42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000	42.000					42.000
	Wall					0.105	0.135	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500				
	I.D.					41.791	41.731	41.641	41.522	41.500	41.370	41.250	41.124	41.000					
48"	O.D.					48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000					48.000
	Wall					0.105	0.135	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500				
	I.D.					47.791	47.731	47.641	47.522	47.500	47.370	47.250	47.124	47.000					
54"	O.D.					54.000	54.000	54.000	54.000	54.000	54.000	54.000	54.000	54.000					54.000
	Wall					0.105	0.135	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500				
	I.D.					53.791	53.731	53.641	53.522	53.500	53.370	53.250	53.124	53.000					
60"	O.D.					60.000	60.000	60.000	60.000	60.000	60.000	60.000	60.000	60.000					60.000
	Wall					0.105	0.135	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500				
	I.D.					59.791	59.731	59.641	59.522	59.500	59.370	59.250	59.124	59.000					

Common Pipe Sizes for Welded Steel, Aluminum, and Copper (all dimensions in inches)

Nominal Diameter	ALUMINUM	COPPER TUBING			Copper & Brass Pipe	WELDED STEEL											
		Type K	Type L	Type M		16 Gage	14 Gage	12 Gage	10 Gage	7 Gage	3 Gage	1/4	5/16	3/8	7/16	1/2	
66"	O.D.							66.000	66.000	66.000	66.000	66.000	66.000	66.000	66.000	66.000	66.000
	Wall							0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500	
	I.D.							65.791	65.731	65.641	65.522	65.500	65.370	65.250	65.124	65.000	
72"	O.D.							72.000	72.000	72.000	72.000	72.000	72.000	72.000	72.000	72.000	72.000
	Wall							0.105	0.135	0.179	0.239	0.250	0.315	0.375	0.438	0.500	
	I.D.							71.791	71.731	71.641	71.522	71.500	71.370	71.250	71.124	71.000	

Common Pipe Sizes for PVC (all dimensions in inches)

Nominal Diameter		PVC IPS CLASS					SCHEDULE		PVC Cast Iron O.D.							PVC	PVC PIP CLASS						
		100 SDR-41	125 SDR-32.5	160 SDR-26	200 SDR-21	315 SDR-13.5	PVC Sch. 40 Sch. 80		100 psi DR-41	125 psi DR-32.5	100 psi DR-25	165 psi DR-25	200 psi DR-21	150 psi DR-18	235 psi DR-18	200 psi DR-14	Sewer DR-35	100 Foot Head	63 SDR-64	80 SDR-51	100 SDR-41	125 SDR-32.5	160 SDR-26
27"	O.D.															27.953							
	Wall															0.801							
	I.D.															26.351							
30"	O.D.	30.000	30.000	30.000	30.000																		
	Wall	0.732	0.923	1.154	1.428																		
	I.D.	28.536	28.154	27.692	27.144																		
36"	O.D.	36.000	36.000	36.000	36.000																		
	Wall	0.878	1.108	1.385	1.714																		
	I.D.	34.244	33.784	33.230	32.572																		

Common Pipe Sizes for Ductile Iron and Cast Iron (all dimensions in inches)

Nominal Diameter		DUCTILE IRON						CAST IRON								
		CLASS 50	CLASS 51	CLASS 52	CLASS 53	CLASS 54	CLASS 55	CLASS 56	Class A	Class B	Class C	Class D	Class E	Class F	Class G	Class H
3"	O.D.		3.960	3.960	3.960	3.960	3.960	3.960	3.800	3.960	3.960	3.960				
	Wall		0.250	0.280	0.310	0.340	0.370	0.400	0.390	0.420	0.450	0.480				
4"	I.D.		3.460	3.400	3.340	3.280	3.220	3.160	3.020	3.120	3.060	3.000				
	O.D.		4.800	4.800	4.800	4.800	4.800	4.800	4.800	5.000	5.000	5.000				
6"	Wall		0.260	0.290	0.320	0.350	0.380	0.410	0.420	0.450	0.480	0.520				
	I.D.		4.280	4.220	4.160	4.100	4.040	3.980	3.960	4.100	4.040	3.960				
8"	O.D.	6.900	6.900	6.900	6.900	6.900	6.900	6.900	6.900	7.100	7.100	7.100	7.220	7.220	7.380	7.380
	Wall	0.250	0.280	0.310	0.340	0.370	0.400	0.430	0.440	0.480	0.510	0.550	0.580	0.610	0.650	0.690
10"	I.D.	6.400	6.340	6.280	6.220	6.160	6.100	6.040	6.020	6.140	6.080	6.000	6.060	6.000	6.080	6.000
	O.D.	9.050	9.050	9.050	9.050	9.050	9.050	9.050	9.050	9.050	9.300	9.300	9.420	9.420	9.600	9.600
12"	Wall	0.270	0.300	0.330	0.360	0.390	0.420	0.450	0.460	0.510	0.560	0.600	0.660	0.660	0.750	0.800
	I.D.	8.510	8.450	8.390	8.330	8.270	8.210	8.150	8.130	8.030	8.180	8.100	8.100	8.100	8.100	8.000
14"	O.D.	11.100	11.100	11.100	11.100	11.100	11.100	11.100	11.100	11.100	11.400	11.400	11.600	11.600	11.840	11.840
	Wall	0.290	0.320	0.350	0.380	0.410	0.440	0.470	0.500	0.570	0.620	0.680	0.740	0.800	0.860	0.920
16"	I.D.	10.520	10.460	10.400	10.340	10.280	10.220	10.160	10.100	9.960	10.100	10.400	10.120	10.000	10.120	10.000
	O.D.	13.200	13.200	13.200	13.200	13.200	13.200	13.200	13.200	13.200	13.500	13.500	13.780	13.780	14.080	14.080
18"	Wall	0.310	0.340	0.370	0.400	0.430	0.460	0.490	0.540	0.620	0.680	0.750	0.820	0.890	0.970	1.040
	I.D.	12.580	12.520	12.460	12.400	12.340	12.280	12.220	12.120	11.960	12.140	12.000	12.140	12.000	12.140	12.000
20"	O.D.	15.300	15.300	15.300	15.300	15.300	15.300	15.300	15.300	15.300	15.650	15.650	15.980	15.980	16.320	16.320
	Wall	0.330	0.360	0.390	0.420	0.450	0.480	0.510	0.570	0.660	0.740	0.820	0.900	0.990	1.070	1.160
24"	I.D.	14.640	14.580	14.520	14.460	14.400	14.340	14.280	14.160	13.980	14.170	14.010	14.180	14.000	14.180	14.000
	O.D.	17.400	17.400	17.400	17.400	17.400	17.400	17.400	17.400	17.400	17.800	17.800	18.160	18.160	18.540	18.540
28"	Wall	0.340	0.370	0.400	0.430	0.460	0.490	0.520	0.600	0.700	0.800	0.890	0.980	1.050	1.180	1.270
	I.D.	16.720	16.660	16.600	16.540	16.480	16.420	16.360	16.200	16.000	16.200	16.020	16.200	16.000	16.180	16.000
32"	O.D.	19.500	19.500	19.500	19.500	19.500	19.500	19.500	19.500	19.500	19.920	19.920	20.340	20.340	20.780	20.780
	Wall	0.350	0.380	0.410	0.440	0.470	0.500	0.530	0.640	0.750	0.870	0.960	1.070	1.170	1.280	1.390
36"	I.D.	18.800	18.740	18.680	18.620	18.560	18.500	18.440	18.220	18.000	18.180	18.000	18.200	18.000	18.220	18.000
	O.D.	21.600	21.600	21.600	21.600	21.600	21.600	21.600	21.600	21.600	22.060	22.060	22.540	22.540	23.020	23.020
40"	Wall	0.360	0.390	0.420	0.450	0.480	0.510	0.540	0.670	0.800	0.920	1.030	1.150	1.270	1.390	1.510
	I.D.	20.880	20.820	20.760	20.700	20.640	20.580	20.520	20.260	20.000	20.220	20.000	20.240	20.000	20.240	20.000
44"	O.D.	25.800	25.800	25.800	25.800	25.800	25.800	25.800	25.800	25.800	26.320	26.320	26.900	26.900	27.760	27.760
	Wall	0.380	0.410	0.440	0.470	0.500	0.530	0.560	0.760	0.890	1.050	1.160	1.310	1.450	1.750	1.880
48"	I.D.	25.040	24.980	24.920	24.860	24.800	24.740	24.680	24.280	24.020	24.220	24.000	24.280	24.000	24.260	24.000
	O.D.	32.000	32.000	32.000	32.000	32.000	32.000	32.000	31.740	32.000	32.400	32.740	33.100	33.460		
52"	Wall	0.390	0.430	0.470	0.510	0.550	0.590	0.630	0.880	1.030	1.200	1.370	1.550	1.730		
	I.D.	31.220	31.140	31.060	30.980	30.900	30.820	30.740	29.980	29.940	30.000	30.000	30.000	30.000	30.000	
56"	O.D.	38.300	38.300	38.300	38.300	38.300	38.300	38.300	37.960	38.300	38.700	39.160	39.600	40.040		
	Wall	0.430	0.480	0.530	0.580	0.630	0.680	0.730	0.990	1.150	1.360	1.580	1.800	2.020		
60"	I.D.	37.440	37.340	37.240	37.140	37.040	36.940	36.840	35.980	36.000	35.980	36.000	36.000	36.000		
	O.D.	44.500	44.500	44.500	44.500	44.500	44.500	44.500	44.200	44.500	45.100	45.580				
64"	Wall	0.470	0.530	0.590	0.650	0.710	0.770	0.830	1.100	1.280	1.540	1.780				
	I.D.	43.560	43.440	43.320	43.200	43.080	42.960	42.840	42.000	41.940	42.020	42.020				
72"	O.D.	50.800	50.800	50.800	50.800	50.800	50.800	50.800	50.500	50.800	51.400	51.980				
	Wall	0.510	0.580	0.650	0.720	0.790	0.860	0.930	1.260	1.420	1.710	1.990				
84"	I.D.	49.780	49.640	49.500	49.360	49.220	49.080	48.940	47.980	47.960	47.980	48.000				
	O.D.	57.100	57.100	57.100	57.100	57.100	57.100	57.100	56.660	57.100	57.800	58.400				
96"	Wall	0.570	0.650	0.730	0.810	0.890	0.970	1.050	1.350	1.550	1.900	2.230				
	I.D.	55.960	55.800	55.640	55.480	55.320	55.160	55.000	53.960	54.000	54.000	53.940				

Common Pipe Sizes for Ductile Iron and Cast Iron (all dimensions in inches)

Nominal Diameter	DUCTILE IRON							CAST IRON							
	CLASS 50	CLASS 51	CLASS 52	CLASS 53	CLASS 54	CLASS 55	CLASS 56	Class A	Class B	Class C	Class D	Class E	Class F	Class G	Class H
60"	O.D.							62.800	63.400	64.200	64.820				
	Wall							1.390	1.670	2.000	2.380				
	I.D.							60.020	60.060	60.200	60.060				
72"	O.D.							75.340	76.000	76.880					
	Wall							1.620	1.950	2.390					
	I.D.							72.100	72.100	72.100					

Common Pipe Sizes for Galvanized Steel Tubing and Pipe (all dimensions in inches)

Nominal Diameter		Sch 5	Sch 10	Sch 20	Sch 30	Sch 40	Std.	Sch 60	Sch 80	E.H.	Sch 100	Sch 120	Sch 140	Sch 160	Double E.H.
0.375	O.D.	0.6750	0.6750			0.6750			0.6750						
(3/8")	Wall	0.0490	0.0650			0.0910			0.1260						
	I.D.	0.5770	0.5450			0.4930			0.4230						
0.500	O.D.	0.8400	0.8400			0.8400			0.8400						
(1/2")	Wall	0.0490	0.0650			0.0880			0.1190						
	I.D.	0.7420	0.7100			0.6640			0.6020						
0.750	O.D.	1.0500	1.0500			1.0500			1.0500						
(3/4")	Wall	0.0650	0.0830			0.1130			0.1540						
	I.D.	0.9200	0.8840			0.8240			0.7420						
1.000	O.D.	1.3150	1.3150			1.3150			1.3150					1.3150	1.3150
	Wall	0.0650	0.0830			0.1090			0.1790					0.2500	0.4000
	I.D.	1.1850	1.1490			1.0970			0.9570					0.8150	0.5150
1.250	(1 O.D.	1.6600	1.6600			1.6600			1.6600					1.6600	1.6600
1/4")	Wall	0.0650	0.1090			0.1400			0.1910					0.2500	0.3820
	I.D.	1.5300	1.4420			1.3800			1.2780					1.1600	0.8960
1.500	(1 O.D.	1.9000	1.9000			1.9000			1.9000					1.9000	1.9000
1/2")	Wall	0.0650	0.1090			0.1450			0.2000					0.2810	0.4000
	I.D.	1.7700	1.6820			1.6100			1.5000					1.3380	1.1000
2.000	O.D.	2.3750	2.3750			2.3750			2.3750					2.3750	2.3750
	Wall	0.0650	0.1090			0.1540			0.2180					0.3430	0.4360
	I.D.	2.2450	2.1570			2.0670			1.9390					1.6890	1.5030
2.500	(2 O.D.	2.8750	2.8750			2.8750			2.8750					2.8750	2.8750
1/2")	Wall	0.0830	0.1200			0.2030			0.2760					0.3750	0.5520
	I.D.	2.7090	2.6350			2.4690			2.3230					2.1250	1.7710
3.000	O.D.	3.5000	3.5000			3.5000			3.5000					3.5000	3.5000
	Wall	0.0830	0.1200			0.2160			0.3000					0.4370	0.6000
	I.D.	3.3340	3.2600			3.0680			2.9000					2.6260	2.3000
3.500	(3 O.D.	4.0000	4.0000			4.0000			4.0000					4.0000	4.0000
1/2")	Wall	0.0830	0.1200			0.2260			0.3180						0.6360
	I.D.	3.8340	3.7600			3.5480			3.3640						2.7280
4.000	O.D.	4.5000	4.5000			4.5000		4.5000	4.5000			4.5000		4.5000	4.5000
	Wall	0.0830	0.1200			0.2370		0.2810	0.3370			0.4370		0.5310	0.6740
	I.D.	4.3340	4.2600			4.0260		3.9380	3.8260			3.6260		3.4380	3.1520
4.500	(4 O.D.						5.0000			5.0000					5.0000
1/2")	Wall						0.2470			0.3550					0.7100
	I.D.						4.5060			4.2900					3.5800
5.000	O.D.	5.5630	5.5630			5.5630			5.5630			5.5630		5.5630	5.5630
	Wall	0.1090	0.1340			0.2580			0.3750			0.5000		0.6250	0.7500
	I.D.	5.3450	5.2950			5.0470			4.8130			4.5630		4.3130	4.0630

Common Pipe Sizes for Galvanized Steel Tubing and Pipe (all dimensions in inches)

Nominal Diameter		Sch 5	Sch 10	Sch 20	Sch 30	Sch 40	Std.	Sch 60	Sch 80	E.H.	Sch 100	Sch 120	Sch 140	Sch 160	Double E.H.
6.000	O.D.	6.6250	6.6250			6.6250			6.6250			6.6250		6.6250	6.6250
	Wall	0.1090	0.1340			0.2800			0.4320			0.5620		0.7180	0.8640
	I.D.	6.4070	6.3570			6.0650			5.7610			5.5010		5.1890	4.8970
7.000	O.D.						7.6250			7.6250					7.6250
	Wall						0.3010			0.5000					0.8750
	I.D.						7.0230			6.6250					5.8750
8.000	O.D.	8.6250	8.6250	8.6250	8.6250	8.6250		8.6250	8.6250		8.6250	8.6250	8.6250	8.6250	8.6250
	Wall	0.1090	0.1480	0.2500	0.2770	0.3220		0.4060	0.5000		0.5930	0.7180	0.8120	0.9060	0.8750
	I.D.	8.4070	8.3290	8.1250	8.0710	7.9810		7.8130	7.6250		7.4390	7.1890	7.0010	6.8130	6.8750
9.000	O.D.						9.6250			9.6250					
	Wall						0.3420			0.5000					
	I.D.						8.9410			8.6250					
10.000	O.D.	10.7500	10.7500	10.7500	10.7500	10.7500		10.7500	10.7500	10.7500	10.7500	10.7500	10.7500	10.7500	10.7500
	Wall	0.1340	0.1650	0.2500	0.3070	0.3650		0.5000	0.5930	0.5000	0.7180	0.8430	1.0000	1.1250	
	I.D.	10.4820	10.4200	10.2500	10.1360	10.0200		9.7500	9.5640	9.7500	9.3140	9.0640	8.7500	8.5000	
11.000	O.D.						11.7500			11.7500					
	Wall						0.3750			0.5000					
	I.D.						11.0000			10.7500					
12.000	O.D.	12.7500	12.7500	12.7500	12.7500	12.7500	12.7500	12.7500	12.7500	12.7500	12.7500	12.7500	12.7500	12.7500	12.7500
	Wall	0.1650	0.1800	0.2500	0.3300	0.4060	0.3750	0.5620	0.6870	0.5000	0.8430	1.0000	1.1250	1.3120	
	I.D.	12.4200	12.3900	12.2500	12.0900	11.9380	12.0000	11.6260	11.3760	11.7500	11.0640	10.7500	10.5000	10.1260	
14.000	O.D.		14.0000	14.0000	14.0000	14.0000	14.0000	14.0000	14.0000	14.0000	14.0000	14.0000	14.0000	14.0000	14.0000
	Wall		0.2500	0.3120	0.3750	0.4370	0.3750	0.5930	0.7500	0.5000	0.9370	1.0930	1.2500	1.4060	
	I.D.		13.5000	13.3760	13.2500	13.1260	13.2500	12.8140	12.5000	13.0000	12.1260	11.8140	11.5000	11.1880	
16.000	O.D.		16.0000	16.0000	16.0000	16.0000	16.0000	16.0000	16.0000	16.0000					
	Wall		0.2500	0.3120	0.3750	0.5000	0.3750	0.6560	0.8430	0.5000					
	I.D.		15.5000	15.3760	15.2500	15.0000	15.2500	14.6880	14.3140	15.0000					