

Pin-pricked Hose Covers

Air and other gases will slowly pass through most elastomers. This is easily shown by balloons and car tires gradually becoming flat even though they are sealed. Some gases (freon, for example) are much more aggressive at moving through certain hose materials and may even require specialized hose to contain them. Since cover compounds may allow gas leakage at different rates than the tube compound used on the same hose, most air, welding, steam and other hoses used for gaseous products have pin-pricked covers. The pin-pricks allow trapped gas to escape rather than having it build up until the pressure

separates the cover from the reinforcement, resulting in cover blisters. However when detectable amounts of gas are noticed leaking from cover pin-pricks, there is a tube failure somewhere in the hose. Often the failure will be at the junction of hose and fitting, where severe sideways pull has caused the tube to be cut by the fitting stem (such as can occur when a portable compressor is dragged along by the hose). Other times, for example in air nailing hose applications, a nail has punctured the hose, and the resulting hole has been repaired with tape rather than with a mender and clamps. This allows air to leak from the perforated tube into the reinforcement and to escape via the cover pinpricks.

Water Hose Flow Rates...

Flow of water through 100 foot lengths hose
(straight with smooth bore)
U.S. Gallons per minute

These are maximum recommended flow rates, and this chart is based on a maximum acceptable pressure drop of 15% per 100 feet of hose. Where pressure drop must be reduced, hose size must be increased.

PSI at Hose Inlet	Nominal Hose Diameters											
	1/2"	5/8"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"	8"
20	4	8	12	26	47	76	161	290	468	997	2895	6169
30	5	9	15	32	58	94	200	360	582	1240	3603	7679
40	6	11	18	38	68	110	234	421	680	1449	4209	8970
50	7	12	20	43	77	124	264	475	767	1635	4748	10118
60	8	14	22	47	85	137	291	524	846	1804	5239	11165
75	9	15	25	53	95	154	329	591	955	2035	5910	12595
100	10	18	29	62	112	180	384	690	1115	2377	6904	14712
125	11	20	33	70	126	203	433	779	1258	2681	7788	16595
150	12	22	36	77	139	224	478	859	1388	2958	8593	18313
200	15	26	42	90	162	262	558	1004	1621	3455	10038	21390

Figures are to be used as a guide only, since the type of fittings used, variance of hose I.D., and orifice restriction all influence the actual discharge.

Air Line Sizing

Maximum recommended air flow in standard cubic feet per minute (scfm) as a guide in sizing hose and piping in compressed air systems.

MAXIMUM RECOMMENDED AIR FLOW (SCFM)

System Pressure (psi)	Nominal pipe size or hose i.d.										
	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"
5	0.5	1.2	2.7	4.9	6.6	13	27	40	80	135	240
10	0.8	1.7	3.9	7.7	11	21	44	64	125	200	370
20	1.3	3.0	6.6	13	18	35	75	110	215	350	600
40	2.5	5.5	12	23	34	62	135	200	385	640	1100
60	3.5	8.0	18	34	50	93	195	290	560	900	1600
80	4.7	10	23	44	65	120	255	380	720	1200	2100
100	5.8	13	29	54	80	150	315	470	900	1450	2600
150	8.6	20	41	80	115	220	460	680	1350	2200	3900
200	11	26	58	108	155	290	620	910	1750	2800	5000
250	14	33	73	135	200	370	770	1150	2200	3500	6100

TECHNICAL SPECIFICATIONS

Air Hose Friction Loss...

Approximate pressure loss in psi through 100 foot hose lengths complete with couplings.

I D. of Hose	Gauge Pressure (psi)	Cubic feet of air per minute (SCFM)															
		40	50	60	70	80	90	100	110	120	130	140	150				
1/2"	50	20.2	36.2														
	60	16.8	29.6	46.8													
	70	14.0	24.8	40.0	56.8												
	80	12.0	21.6	34.8	50.4	69.2											
	90	10.8	19.0	29.6	44.0	61.0	82.0										
	100	9.6	16.8	26.6	38.6	54.4	73.3										
	110	8.6	15.2	24.0	35.2	49.2	66.6	89.0									
3/4"	50	3.0	4.8	7.0	8.8	13.0	17.0	22.8	28.4								
	60	2.4	3.8	5.6	7.6	10.4	13.6	17.2	22.4	28.2							
	70	1.8	3.0	4.6	6.4	8.4	11.0	14.0	17.6	22.0							
	80	1.6	2.6	3.8	5.6	7.2	9.4	11.6	14.4	17.6	21.2						
	90	1.4	2.2	3.2	4.6	6.2	8.0	10.0	12.4	15.0	18.0	21.6					
	100	1.2	2.0	2.8	4.0	5.4	7.0	8.8	10.8	13.2	15.8	18.8	22.2				
	110	1.0	1.8	2.6	3.6	4.8	6.2	7.8	9.8	11.8	14.2	16.8	19.8				
1"	50	0.6	1.0	1.6	2.2	3.0	4.0	5.2	7.0	9.6	14.0						
	60	0.6	0.8	1.2	1.6	2.4	3.0	4.0	5.2	6.6	8.2	11.0	14.4				
	70	0.4	0.8	1.0	1.4	2.0	2.6	3.2	4.0	5.0	6.2	7.6	9.4				
	80	0.4	0.6	1.0	1.4	1.6	2.2	2.8	3.4	4.0	4.8	5.4	7.0				
	90	0.4	0.6	0.8	1.2	1.4	1.8	2.4	2.8	3.4	4.0	4.8	5.6				
	100	0.4	0.4	0.8	1.0	1.2	1.6	2.0	2.4	3.0	3.6	4.2	4.8				
	110	0.4	0.4	0.6	0.8	1.2	1.4	1.8	2.2	2.6	3.0	3.6	4.2				
1 1/4"	50		0.4	0.4	0.6	0.8	1.0	1.4	2.0								
	60		0.2	0.4	0.6	0.6	1.0	1.2	1.6	2.0	2.4	3.0					
	70			0.4	0.4	0.6	0.8	0.8	1.2	1.4	1.6	2.0	2.6				
	80			0.2	0.4	0.4	0.6	0.8	1.0	1.2	1.4	1.6	2.0				
	90				0.4	0.4	0.6	0.6	0.8	1.0	1.2	1.4	1.6				
	100				0.2	0.4	0.4	0.6	0.8	0.8	1.0	1.2	1.4				
	110				0.2	0.4	0.4	0.6	0.6	0.8	1.0	1.0	1.2				
1 1/2"	50					0.4	0.4	0.4	0.6	0.8	0.8	1.0	1.2				
	60					0.2	0.4	0.4	0.4	0.6	0.6	0.8	1.0				
	70						0.2	0.4	0.4	0.6	0.6	0.6	0.8				
	80							0.2	0.4	0.4	0.4	0.6	0.8				
	90								0.2	0.4	0.4	0.4	0.6				
	100									0.4	0.4	0.4	0.4				
	110									0.4	0.4	0.4	0.4				

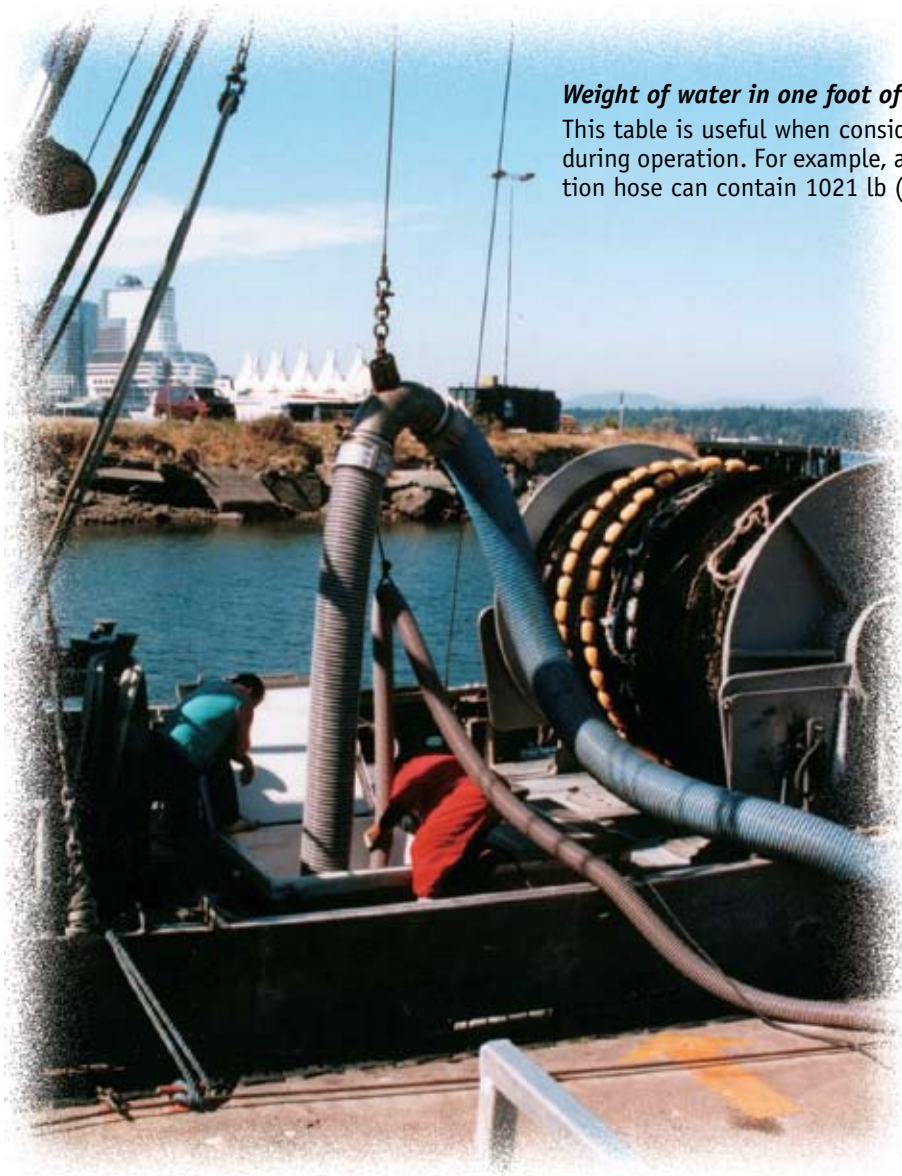
TECHNICAL SPECIFICATIONS

Water Hose Friction Loss...

Approximate pressure loss expressed in pounds per square inch (psi) per 100 foot length of straight, smooth bore hose.

Flow of water in U.S. Gal. per min.	Hose Inside Diameter:														
	1/2"	5/8"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"	10"	12"
1	1.41														
2	5.09	1.72	0.71												
5	27.7	9.36	3.85	0.95	0.32	0.13									
10	100	33.7	13.9	3.42	1.15	0.47	0.12								
15		71.4	29.4	7.24	2.44	1.00	0.25	0.08							
20		122	50.0	12.3	4.16	1.71	0.42	0.14							
25			75.6	18.6	6.28	2.59	0.64	0.21							
30			106	26.1	8.80	3.62	0.89	0.30	0.12						
35			141	34.7	11.7	4.82	1.19	0.40	0.16						
40				44.4	15.0	6.17	1.52	0.51	0.21						
45				55.3	18.6	7.67	1.89	0.64	0.26						
50				67.1	22.7	9.32	2.30	0.77	0.32						
60				94.1	31.7	13.1	3.22	1.09	0.45						
70				125	42.2	17.4	4.28	1.44	0.59						
80					54.0	22.2	5.48	1.85	0.76						
90					67.2	27.7	6.81	2.30	0.95	0.23					
100					81.7	33.6	8.28	2.79	1.15	0.28					
125					123	50.8	12.5	4.22	1.74	0.43					
150						71.1	17.5	5.91	2.43	0.60	0.20				
175						94.6	23.3	7.86	3.24	0.80	0.27				
200						121	29.8	10.1	4.14	1.02	0.34				
225							37.1	12.5	5.15	1.27	0.43				
250							45.1	15.2	6.26	1.54	0.52				
275							53.8	18.1	7.47	1.84	0.62				
300							63.2	21.3	8.77	2.16	0.73	0.30			
350								84.0	28.3	11.7	2.87	0.97	0.40		
400								108	36.3	14.9	3.68	1.24	0.51		
450									45.1	18.6	4.57	1.54	0.64		
500									54.8	22.6	5.56	1.88	0.77	0.19	
600									76.8	31.6	7.79	2.63	1.08	0.27	
700									102	42.1	10.4	3.49	1.44	0.35	0.12
800									131	53.8	13.3	4.47	1.84	0.45	0.15
1000										81.4	20.0	6.76	2.78	0.69	0.23
1200										114	28.1	9.47	3.90	0.96	0.32
1400										152	37.3	12.6	5.18	1.28	0.43
1600											47.8	16.1	6.64	1.64	0.55
1800											59.5	20.0	8.25	2.03	0.69
2000											72.2	24.4	10.0	2.47	0.83
2500												36.8	15.2	3.73	1.26
3000												51.6	21.2	5.23	1.76

Figures are to be used as a guide only, since factors such as temperature and hose bends can greatly affect friction loss.



Weight of water in one foot of hose...

This table is useful when considering support requirements for hoses during operation. For example, a 30 ft length of G941W-1000 fish suction hose can contain 1021 lb (over half a ton) of water when filled

Hose I.D.	lb	kg
1/4"	0.021	0.010
3/8	0.048	0.022
1/2	0.085	0.039
5/8	0.133	0.060
3/4	0.191	0.087
1	0.340	0.154
1 1/4	0.532	0.241
1 1/2	0.766	0.347
2	1.361	0.618
2 1/2	2.127	0.965
3	3.063	1.389
4	5.445	2.470
5	8.509	3.859
6	12.252	5.558
8	21.782	9.880
10	34.034	15.438
12	49.009	22.230

Force (in pounds) acting on end fittings...

The figures in this table demonstrate the importance of good fitting selection and installation. For example, a 4" water discharge hose rated for 150 psi has 1885 lb of force acting on the end fitting when operating at full pressure.

Hose ID	50 psi	100 psi	150 psi	300 psi	500 psi	1000 psi
1/4"	2	2	7	15	25	49
3/8	6	11	17	33	55	110
1/2	10	20	29	59	98	196
3/4	22	44	66	133	221	442
1	39	79	118	236	393	785
1 1/4	61	123	184	368	614	1227
1 1/2	88	177	265	530	884	1767
2	157	314	471	942	1571	3142
2 1/2	245	491	726	1473	2454	4909
3	353	707	1060	2121	3534	7070
4	628	1257	1885	3770	6283	12566
5	982	1964	2945	5891	9818	19635
6	1414	2827	4241	8482	14137	28274
8	2513	5027	7540	15080	25133	50274
10	3927	7854	11781	23562	39270	78540
12	5655	11310	16965	33929	56549	113100