

**FRICION LOSS CHART**  
Friction Loss (in feet) per 100 Feet of Run

Flow Rate @ Static Head		Schedule 40 PVC Pipe															
		3/4 Inch		1 Inch		1 1/4 Inch		1 1/2 Inch		2 Inch		3 Inch		4 Inch		6 Inch	
GPM	GPH	Rigid Pipe	Flex Pipe	Rigid Pipe	Flex Pipe	Rigid Pipe	Flex Pipe	Rigid Pipe	Flex Pipe	Rigid Pipe	Flex Pipe	Rigid Pipe	Flex Pipe	Rigid Pipe	Flex Pipe	Rigid Pipe	Flex Pipe
1	60	0.51	0.83														
2	120	1.02	1.64	0.55	0.71	0.14	0.24	0.07	0.11								
5	300	5.73	8.89	1.72	2.19	0.44	0.74	0.22	0.30	0.07	0.09						
7	420	10.52	17.04	3.17	4.12	0.81	1.37	0.38	0.58	0.11	0.14						
10	600	20.04	32.10	6.02	7.90	1.55	2.66	0.72	1.09	0.21	0.28	0.03	0.04				
15	900	42.46	67.88	12.77	16.72	3.28	5.63	1.53	2.31	0.45	0.58	0.07	0.09				
20	1,200	72.34	115.45	21.75	28.40	5.59	9.61	2.61	3.95	0.76	0.97	0.11	0.13				
25	1,500			32.88	42.95	8.45	14.50	3.95	5.98	1.15	1.48	0.17	0.21				
30	1,800			46.08	60.26	11.85	20.32	5.53	8.36	1.62	2.06	0.23	0.28	0.06	0.07		
35	2,100					15.76	27.02	7.36	11.13	2.15	2.75	0.31	0.37	0.08	0.09		
40	2,400					20.18	34.64	9.43	14.25	2.75	3.51	0.40	0.48	0.11	0.12		
45	2,700					25.10	42.95	11.73	17.71	3.43	4.36	0.50	0.60	0.13	0.15		
50	3,000					30.51	52.41	14.25	21.52	4.16	5.31	0.60	0.74	0.16	0.18	0.02	0.02
60	3,600							19.98	30.26	5.84	7.43	0.85	1.04	0.22	0.25	0.03	0.03
70	4,200									7.76	9.88	1.13	1.36	0.30	0.34	0.04	0.05
75	4,500									8.82	11.22	1.28	1.56	0.34	0.38	0.05	0.06
80	4,800									9.94	12.65	1.44	1.78	0.38	0.43	0.06	0.07
90	5,400									12.37	15.72	1.80	2.19	0.47	0.53	0.06	0.07
100	6,000									15.03	19.12	2.18	2.66	0.58	0.65	0.08	0.09
125	7,500											3.31	4.02	0.88	0.99	0.12	0.14
150	9,000											4.63	5.61	1.22	1.39	0.16	0.19
175	10,500											6.16	7.48	1.63	1.85	0.22	0.26
200	12,000											7.88	9.56	2.08	2.36	0.28	0.33
250	15,000											11.93	14.45	3.15	3.56	0.43	0.50
300	18,000													4.41	4.99	0.60	0.69
350	21,000													5.87	6.63	0.79	0.92
400	24,000													7.52	8.50	1.01	1.18
450	27,000															1.25	1.48
500	30,000															1.53	1.78

This chart is based on the Hazen-Williams Formula with C=150 for Rigid Pipe, C=140 for Flex Pipe for actual pipe ID.  
Source: Spears & Pacific Echo

**Example of how to use this chart**

If you have 3000gph flowing thru 50' of 2" flex pipe with 2 90 degree elbows and 1 swing check valve, your friction loss would be:  
 $((50' + 8.6 + 8.6 + 19.1) / 100) * 5.31 = (86.3 * 5.31) = 4.58'$   
 Using 1.5" rigid pipe, your friction loss would be = 12.3'

**Notes:**

Friction loss can vary by 20% due to temperature.  
 Bends can increase friction loss by 50%.  
 To convert from feet of head to PSI, divide by 2.309  
 To convert from U.S. gallons per minute to cubic feet per minute, multiply by 0.1337

**Friction Loss in Equivalent Feet of Straight Pipe**

PVC Fittings	Pipe ID ->	3/4"	1"	1 1/4"	1 1/2"	2"	3"	4"
Std Elbow, 90 degree		4.5	5.3	6.7	7.5	8.6	11.1	13.1
Std Elbow, 45 degree		0.9	1.4	1.8	2.2	2.8	4.1	5.6
Coupling		0.8	1.0	1.25	1.5	2.0	3.0	4.0
Male / Female Adapter		1.5	2.0	2.75	3.5	4.5	6.5	9.0
Tee (Straight Thru)		2.5	3.3	4.7	5.7	7.8	12.1	17.1
Tee (Thru Branch)		5.4	6.7	8.8	10.0	12.1	17.1	21.2
Swing Check Valve		8.9	11.2	13.1	15.2	19.1	27.1	38.2
Gate Valve (Full Open)		0.7	0.9	1.2	1.3	1.6	2.0	2.7