



The K values given below are for making estimates of friction loss in cases not covered in the previous tables.

Type of Fitting	K Value
Disk or Wobble Meter	3.4 - 10
Rotary Meter (Star or Cog-Wheel Piston)	10
Reciprocating Piston Meter	15
Turbine Wheel (Double-Flow) Meter	5 - 7.5
Bends w/Corrugated Inner Radius	1.3 - 1.6 times value for smooth bend

Example: Determine L (friction loss in pipe fittings in terms of equivalent length in feet of straight pipe).

Assume a 6" angle valve for Schedule 40 pipe size.

Select the appropriate K value for such and select D and f for Schedule 40 pipe from the table below where K is the pipe diameter in feet.

Pipe Inches Sch. 40	D feet	f	Pipe Inches Sch.	D feet	f	Pipe Inches Sch.	D feet	f	Pipe Inches Sch. 40	D feet	f
½	0.0518	0.027	2½	0.206	0.018	10	0.835	0.01	24	1.89	0.012
¾	0.0687	0.025	3	0.256	0.018	12	0.995	0.01	30	2.33	0.011
1	0.0874	0.023	4	0.336	0.017	14	1.094	0.01	36	2.83	0.011
1¼	0.115	0.022	5	0.421	0.016	16	1.25	0.01	42	3.33	0.01
1½	0.1342	0.021	6	0.505	0.015	18	1.406	0.01	48	3.83	0.01
2	0.1723	0.019	8	0.665	0.014	20	1.568	0.01			

Friction Loss of Water in Pipe Fittings in Terms of Equivalent Length - Feet of Straight Pipe

Nominal pipe size	Actual inside diameter inches d	Friction factor f	Gate valve - full open	90° elbow	Long radius 90° or 45° std elbow	Std tee - thru flow	Std tee - branch flow	Close return bend	Swing check valve - full open	Angle valve - full open	Globe valve - full valve	Butterfly valve	90° Welding elbow		Mitre bend	
													r/d = 1	r/d = 2	45°	90°
													1/2	0.622	0.027	0.41
3/4	0.824	0.025	0.55	2.06	1.1	1.37	4.12	3.43	6.86	10.3	23.3					
1	1.049	0.023	0.7	2.62	1.4	1.75	5.25	4.37	8.74	13.1	29.7					
1 1/4	1.38	0.022	0.92	3.45	1.84	2.3	6.9	5.75	11.5	17.3	39.1					
1 1/2	1.61	0.021	1.07	4.03	2.15	2.68	8.05	6.71	13.4	20.1	45.6					
2	2.067	0.019	1.38	5.17	2.76	3.45	10.3	8.61	17.2	25.8	58.6	7.75	3.45	2.07	2.58	10.3
2 1/2	2.469	0.018	1.65	6.17	3.29	4.12	12.3	10.3	20.6	30.9	70	9.26	4.12	2.47	3.08	12.3
3	3.068	0.018	2.04	7.67	4.09	5.11	15.3	12.8	25.5	38.4	86.9	11.5	5.11	3.07	3.84	15.3
4	4.026	0.017	2.68	10.1	5.37	6.71	20.1	16.8	33.6	50.3	114	15.1	6.71	4.03	5.03	20.1
5	5.047	0.016	3.36	12.6	6.73	8.41	25.2	21	42.1	63.1	143	18.9	8.41	5.05	6.31	25.2
6	6.065	0.015	4.04	15.2	8.09	10.1	30.3	25.3	50.5	75.8	172	22.7	10.1	6.07	7.58	30.3
8	7.981	0.014	5.32	20	10.6	13.3	39.9	33.3	66.6	99.8	226	29.9	13.3	7.98	9.98	39.9
10	10.02	0.014	6.68	25.1	13.4	16.7	50.1	41.8	83.6	125	284	29.2	16.7	10	12.5	50.1
12	11.938	0.013	7.96	29.8	15.9	19.9	59.7	49.7	99.4	149	338	34.8	19.9	11.9	14.9	59.7
14	13.124	0.013	8.75	32.8	17.5	21.8	65.6	54.7	109.4	164	372	38.3	21.8	13.1	16.4	65.6
16	15	0.013	10	37.5	20	25	75	62.5	125	188	425	31.3	25	15	18.8	75
18	16.876	0.012	16.9	42.2	22.5	28.1	84.4	70.3	140.6	210	478	35.2	28.1	16.9	21.1	84.4
20	18.814	0.012	12.5	47	25.1	31.4	94.1	78.4	156.8	235	533	39.2	31.4	18.8	23.5	94.1
24	22.628	0.12	15.1	56.6	30.2	37.7	113	94.3	188.6	283	641	47.1	37.7	22.6	28.3	113
30	28	0.011	18.7	70	37.3	46.7	140	117	234				46.7	28	35	140
36	34	0.011	22.7	85	45.3	56.7	170	142	284				56.7	34	43	170
42	40	0.01	26.7	100	53.3	66.7	200	167	334				66.7	40	50	200
48	46	0.01	30.7	115	61.3	76.7	230	192	384				76.7	46	58	230
L/D									1/2 to 6 100 24 to 48 50	150	340	20	12	15	60	