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Friction Loss Characteristics

Schedule 40 Standard Steel Pipe

psi Loss Per 100 Feet of Pipe (psi/100 ft.)

Sizes 1/2" through 6" Flow 1 through 600 GPM

Size	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	6"										
O.D.	0.840	1.050	1.315	1.660	1.900	2.375	2.875	3.500	4.500	6.625										
I.D.	0.622	0.824	1.049	1.380	1.610	2.067	2.469	3.068	4.026	6.065										
Wall Thk	0.109	0.113	0.133	0.140	0.145	0.154	0.203	0.216	0.237	0.280										
Flow GPM	Velocity fps	psi Loss	Velocity fps	psi Loss	Velocity fps	psi Loss	Velocity fps	psi Loss	Velocity fps	psi Loss	Velocity fps	psi Loss	Velocity fps	psi Loss	Velocity fps	psi Loss	Velocity fps	psi Loss		
1	1.05	0.91	0.60	0.23	0.37	0.07	0.21	0.02	0.15	0.01	0.09	0.00								
2	2.10	3.28	1.20	0.84	0.74	0.26	0.42	0.07	0.31	0.03	0.19	0.01	0.13	0.00						
3	3.16	6.95	1.80	1.77	1.11	0.55	0.64	0.14	0.47	0.07	0.28	0.02	0.20	0.01	0.13	0.00				
4	4.21	11.85	2.40	3.02	1.48	0.93	0.85	0.25	0.62	0.12	0.38	0.03	0.26	0.01	0.17	0.01				
5	5.27	17.91	3.00	4.56	1.85	1.41	1.07	0.37	0.78	0.18	0.47	0.05	0.33	0.02	0.21	0.01				
6	6.32	25.10	3.60	6.39	2.22	1.97	1.28	0.52	0.94	0.25	0.57	0.07	0.40	0.03	0.26	0.01				
7	7.38	33.40	4.20	8.50	2.59	2.63	1.49	0.69	1.10	0.33	0.66	0.10	0.46	0.04	0.30	0.01				
8	8.43	42.77	4.80	10.89	2.96	3.36	1.71	0.89	1.25	0.42	0.76	0.12	0.53	0.05	0.34	0.02	0.20	0.00		
9	9.49	53.19	5.40	13.54	3.33	4.18	1.92	1.10	1.41	0.52	0.85	0.15	0.60	0.06	0.39	0.02	0.22	0.01		
10	10.54	64.65	6.00	16.46	3.70	5.08	2.14	1.34	1.57	0.63	0.95	0.19	0.66	0.08	0.43	0.03	0.25	0.01		
11	11.60	77.13	6.60	19.63	4.07	6.07	2.35	1.60	1.73	0.75	1.05	0.22	0.73	0.09	0.47	0.03	0.27	0.01		
12	12.65	90.62	7.21	23.07	4.44	7.13	2.57	1.88	1.88	0.89	1.14	0.26	0.80	0.11	0.52	0.04	0.30	0.01		
14	14.76	20.56	8.41	30.69	5.19	9.48	2.99	2.50	2.20	1.18	1.33	0.35	0.93	0.15	0.60	0.05	0.35	0.01		
16	16.87	54.39	9.61	39.30	5.93	12.14	3.42	3.20	2.51	1.51	1.52	0.45	1.07	0.19	0.69	0.07	0.40	0.02		
18	18.98	92.02	10.81	48.88	6.67	15.10	3.85	3.98	2.83	1.88	1.71	0.56	1.20	0.23	0.78	0.08	0.45	0.02		
20			12.01	59.41	7.41	18.35	4.28	4.83	3.14	2.28	1.90	0.68	1.33	0.29	0.86	0.10	0.50	0.03		
22			13.21	70.88	8.15	21.90	4.71	5.77	3.46	2.72	2.10	0.81	1.47	0.34	0.95	0.12	0.55	0.03	0.24	0.00
24			14.42	83.27	8.89	25.72	5.14	6.77	3.77	3.20	2.29	0.95	1.60	0.40	1.04	0.14	0.60	0.04	0.26	0.01
26			15.62	96.57	9.64	29.83	5.57	7.86	4.09	3.71	2.48	1.10	1.74	0.46	1.12	0.16	0.65	0.04	0.28	0.01
28			16.82	110.8	10.38	34.22	5.99	9.01	4.40	4.26	2.67	1.26	1.87	0.53	1.21	0.18	0.70	0.05	0.31	0.01
30			18.02	125.9	11.12	38.89	6.42	10.24	4.72	4.84	2.86	1.43	2.00	0.60	1.30	0.21	0.75	0.06	0.33	0.01
35					12.97	51.74	7.49	13.62	5.50	6.44	3.34	1.91	2.34	0.80	1.51	0.28	0.88	0.07	0.38	0.01
40					14.83	66.25	8.56	17.45	6.29	8.24	3.81	2.44	2.67	1.03	1.73	0.36	1.00	0.10	0.44	0.01
45					16.68	82.40	9.64	21.70	7.08	10.25	4.29	3.04	3.01	1.28	1.95	0.44	1.13	0.12	0.49	0.02
50					18.53	100.2	10.71	26.37	7.87	12.46	4.77	3.69	3.34	1.56	2.16	0.54	1.25	0.14	0.55	0.02
55						11.78	31.47	8.65	14.86	5.25	4.41	3.68	1.86	2.38	0.65	1.38	0.17	0.61	0.02	
60						12.85	36.97	9.44	17.46	5.72	5.18	4.01	2.18	2.60	0.76	1.51	0.20	0.66	0.03	
65						13.92	42.88	10.23	20.25	6.20	6.00	4.35	2.53	2.81	0.88	1.63	0.23	0.72	0.03	
70						14.99	49.18	11.01	23.23	6.68	6.89	4.68	2.90	3.03	1.01	1.76	0.27	0.77	0.04	
75						16.06	55.89	11.80	26.40	7.16	7.83	5.01	3.30	3.25	1.15	1.88	0.31	0.83	0.04	
80						17.13	62.98	12.59	29.75	7.63	8.82	5.35	3.72	3.46	1.29	2.01	0.34	0.88	0.05	
85						18.21	70.47	13.37	33.29	8.11	9.87	5.68	4.16	3.68	1.44	2.13	0.39	0.94	0.05	
90						19.28	78.33	14.16	37.00	8.59	10.97	6.02	4.62	3.90	1.61	2.26	0.43	0.99	0.06	
95						14.95	40.90	9.07	12.13	6.35	5.11	4.11	1.78	2.39	0.47	1.05	0.12	0.10	0.07	
100						15.74	44.97	9.54	13.33	6.69	5.62	4.33	1.95	2.51	0.52	1.10	0.12	0.10	0.07	
110						17.31	53.66	10.50	15.91	7.36	6.70	4.76	2.33	2.76	0.62	1.22	0.12	0.10	0.07	
120						18.88	63.04	11.45	18.69	8.03	7.87	5.20	2.74	3.02	0.73	1.33	0.13	0.10	0.07	
130						12.41	21.68	8.70	9.13	5.63	3.17	3.27	0.85	1.44	0.12					
140						13.36	24.87	9.37	10.47	6.06	3.64	3.52	0.97	1.55	0.13					
150						14.32	28.26	10.03	11.90	6.50	4.14	3.77	1.10	1.66	0.15					
160						15.27	31.84	10.70	13.41	6.93	4.66	4.02	1.24	1.77	0.17					
170						16.23	35.63	11.37	15.01	7.36	5.22	4.27	1.39	1.88	0.19					
180						17.18	39.61	12.04	16.68	7.80	5.80	4.53	1.55	1.99	0.21					
190						18.14	43.78	12.71	18.44	8.23	6.41	4.78	1.71	2.10	0.23					
200						19.09	48.14	13.38	20.28	8.66	7.05	5.03	1.88	2.21	0.26					
225								15.05	25.22	9.75	8.76	5.66	2.34	2.49	0.32					
250								16.73	30.65	10.83	10.55	6.29	2.84	2.77	0.39					
275								18.40	36.57	11.92	12.71	6.92	3.39	3.05	0.46					
300										13.00	14.93	7.55	3.98	3.32	0.54					
325										14.08	17.32	8.18	4.62	3.60	0.63					
350										15.17	19.87	8.81	5.30	3.88	0.72					
375										16.25	22.57	9.43	6.02	4.15	0.82					
400										17.33	25.44	10.06	6.78	4.43	0.92					
425										18.42	28.46	10.69	7.59	4.71	1.03					
450										19.50	31.64	11.32	8.43	4.99	1.15					
475												11.95	9.32	5.26	1.27					
500												12.58	10.25	5.54	1.40					
550												13.84	12.23	6.10	1.67					
600												15.10	14.37	6.65	1.96					

Note: Dark shaded area of chart indicates velocities over 5' per second. Use with caution.

Velocity of flow values are computed from the general equation $V = .408 \sqrt{h}$

Friction pressure loss values are computed from the equation: $hf = 0.2083 \left(\frac{100}{C} \right)^{1.852} \frac{0.1852}{24.866} \times 4.33$ for psi loss per 100' of pipe