

FRICTION HEAD LOSS SCHEDULE 80 IPS PVC PRESSURE PIPE

FRICTION HEAD LOSS IN FEET OF WATER PER 100 FT. OF PIPE

SIZE	1/2" PIPE		3/4" PIPE		1" PIPE		1 1/4" PIPE		1 1/2" PIPE		2" PIPE		2 1/2" PIPE		3" PIPE		SIZE
	0.546" INSIDE DIA.		0.742" INSIDE DIA.		0.957" INSIDE DIA.		1.278" INSIDE DIA.		1.500" INSIDE DIA.		1.939" INSIDE DIA.		2.323" INSIDE DIA.		2.900" INSIDE DIA.		
GALLONS PER MINUTE	VELOCITY FEET PER SECOND	HEAD LOSS FEET	VELOCITY FEET PER SECOND	HEAD LOSS FEET	VELOCITY FEET PER SECOND	HEAD LOSS FEET	VELOCITY FEET PER SECOND	HEAD LOSS FEET	VELOCITY FEET PER SECOND	HEAD LOSS FEET	VELOCITY FEET PER SECOND	HEAD LOSS FEET	VELOCITY FEET PER SECOND	HEAD LOSS FEET	VELOCITY FEET PER SECOND	HEAD LOSS FEET	GALLONS PER MINUTE
1	1.370	1.868	0.742	0.420	0.446	0.122											1
2	2.741	6.742	1.484	1.516	0.892	0.440	0.500	0.108									2
3	4.111	14.285	2.226	3.212	1.338	0.931	0.750	0.228	0.545	0.105							3
4	5.481	24.337	2.968	5.472	1.784	1.587	1.000	0.388	0.726	0.178							4
5	6.851	36.792	3.710	8.272	2.230	2.399	1.251	0.587	0.908	0.269							5
6	8.222	51.570	4.452	11.595	2.676	3.362	1.501	0.823	1.089	0.378	0.652	0.108					6
8	10.962	87.858	5.936	19.753	3.568	5.728	2.001	1.402	1.452	0.643	0.869	0.185	0.606	0.077			8
10			7.420	29.862	4.460	8.659	2.501	2.120	1.816	0.972	1.087	0.279	0.757	0.116			10
15	4" PIPE		11.130	63.276	6.691	18.347	3.752	4.491	2.723	2.060	1.630	0.591	1.136	0.245	0.729	0.083	15
20	3.826" INSIDE DIA.				8.921	31.257	5.002	7.652	3.631	3.510	2.173	1.007	1.514	0.418	0.972	0.142	20
25	VELOCITY FEET PER SECOND	HEAD LOSS FEET			11.151	47.253	6.253	11.567	4.539	5.306	2.716	1.522	1.893	0.632	1.214	0.215	25
30							7.503	16.213	5.447	7.438	3.260	2.133	2.271	0.886	1.457	0.301	30
35	0.977	0.104					8.754	21.570	6.354	9.895	3.803	2.838	2.650	1.178	1.700	0.400	35
40	1.116	0.133					10.004	27.622	7.262	12.671	4.346	3.634	3.028	1.509	1.943	0.513	40
45	1.256	0.166							8.170	15.760	4.889	4.520	3.407	1.876	2.186	0.638	45
50	1.395	0.201							9.078	19.155	5.433	5.494	3.785	2.281	2.429	0.775	50
60	1.674	0.282	6" PIPE						10.893	26.849	6.519	7.700	4.542	3.197	2.914	1.086	60
70	1.953	0.375	5.761" INSIDE DIA.								7.606	10.244	5.299	4.253	3.400	1.445	70
80	2.233	0.481	VELOCITY FEET PER SECOND	HEAD LOSS FEET							8.692	13.118	6.056	5.446	3.886	1.851	80
90	2.512	0.598									9.779	16.316	6.813	6.774	4.372	2.302	90
100	2.791	0.727	1.231	0.099							10.865	19.832	7.570	8.233	4.857	2.798	100
125	3.488	1.098	1.539	0.150									9.463	12.446	6.072	4.229	125
150	4.186	1.539	1.846	0.210									11.355	17.445	7.286	5.928	150
175	4.884	2.048	2.154	0.280											8.500	7.886	175
200	5.581	2.623	2.462	0.358											9.715	10.099	200
225	6.279	3.262	2.769	0.445											10.929	12.561	225
250	6.977	3.965	3.077	0.541													250
275	7.674	4.730	3.385	0.646													275
300	8.372	5.557	3.693	0.759													300
325	9.070	6.445	4.000	0.880													325
350	9.767	7.393	4.308	1.009													350
375	10.465	8.401	4.616	1.147													375
400			4.923	1.292													400
425			5.231	1.446													425
450			5.539	1.607													450
475			5.846	1.777													475
500			6.154	1.954													500
550			6.770	2.331													550
600			7.385	2.738													600
650			8.000	3.176													650
700			8.616	3.643													700
750			9.231	4.140													750
800			9.847	4.665													800

RECOMMENDED OPERATING CONDITIONS SHOWN ABOVE HEAVY LINES IN CHART

WATER HAMMER (shock waves) in pipe systems can result from sudden changes in flow, such as pumps starting and stopping, automatic control valves opening and closing, exhausting air from the system, or other flow restricting action. When a sudden change in flow occurs, the velocity energy of the flowing water is suddenly changed to pressure at that location. This excess pressure is called SURGE PRESSURE and is greater with larger changes in velocity. To help minimize SURGE PRESSURES, the maximum velocity of the water in the pipe line should be limited.

USE CAUTION IF VELOCITIES EXCEED 5 FEET PER SECOND, ESPECIALLY SUCTION VELOCITIES.

VELOCITIES SHOULD NOT EXCEED 8 FEET PER SECOND IN COLD WATER SYSTEMS.

Velocity calculated using the formula...

$$V = \frac{0.4085 \times Q}{D^2}$$

V = flow velocity in feet per second
Q = flow rate in gallons per minute
D = inside diameter of pipe in inches

Head loss calculated using Hazen-Williams formula with C=150...

$$F = \frac{0.2083 (100/C)^{1.852} \times Q^{1.852}}{D^{4.8655}}$$

F = friction head loss in feet of water per 100 feet of pipe
C = coefficient for roughness of the interior pipe surface
Q = flow rate in gallons per minute
D = inside diameter of pipe in inches

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