

Table of head losses

Miscellaneous

Head losses in ordinary water pipes

Upper figures indicate the velocity of water in m/sec.

Lower figures indicate head loss in metres per 100 metres of straight pipes.

m ³ /h	Litres/min.	Litres/sec.	Head losses in ordinary water pipes											
			Nominal pipe diameter in inches and internal diameter in [mm]											
			½"	¾"	1"	1¼"	1½"	2"	2½"	3"	3½"	4"	5"	6"
0.6	10	0.16	0.855 9.910	0.470 2.407	0.292 0.784									
0.9	15	0.25	1.282 20.11	0.705 4.862	0.438 1.570	0.249 0.416								
1.2	20	0.33	1.710 33.53	0.940 8.035	0.584 2.588	0.331 0.677	0.249 0.346							
1.5	25	0.42	2.138 49.93	1.174 11.91	0.730 3.834	0.415 1.004	0.312 0.510							
1.8	30	0.50	2.565 69.34	1.409 16.50	0.876 5.277	0.498 1.379	0.374 0.700	0.231 0.223						
2.1	35	0.58	2.993 91.54	1.644 21.75	1.022 6.949	0.581 1.811	0.436 0.914	0.269 0.291						
2.4	40	0.67	3.421 76.49	1.879 27.66	1.168 8.820	0.664 2.290	0.499 1.160	0.308 0.368						
3.0	50	0.83	3.849 41.40	1.460 13.14	0.830 3.403	0.623 1.719	0.385 0.544	0.229 0.159						
3.6	60	1.00	4.271 57.74	1.751 18.28	0.996 4.718	0.748 2.375	0.462 0.751	0.275 0.218						
4.2	70	1.12	4.700 76.49	2.043 24.18	1.162 6.231	0.873 3.132	0.539 0.988	0.321 0.287	0.231 0.131					
4.8	80	1.33	5.128 30.87	2.335 7.940	1.328 3.988	0.997 1.254	0.616 0.363	0.367 0.164	0.263 0.164					
5.4	90	1.50	5.557 38.30	2.627 9.828	1.494 4.927	1.122 1.551	0.693 0.449	0.413 0.203	0.269 0.203					
6.0	100	1.67	5.986 46.49	2.919 46.49	1.660 11.90	1.247 5.972	0.770 1.875	0.459 0.542	0.329 0.244	0.248 0.124				
7.5	125	2.08	6.415 70.41	3.649 17.93	2.075 8.967	1.558 2.802	0.962 0.809	0.574 0.365	0.412 0.185	0.310 0.101	0.241 0.101			
9.0	150	2.50	6.844 25.11	4.900 12.53	2.870 3.903	1.154 1.124	0.668 0.506	0.494 0.256	0.372 0.140	0.289 0.140				
10.5	175	2.92	7.273 33.32	5.204 16.66	2.182 5.179	1.347 1.488	0.803 0.670	0.576 0.338	0.434 0.184	0.337 0.184				
12	200	3.33	7.702 42.75	5.532 21.36	2.493 6.624	1.539 1.901	0.918 0.855	0.659 0.431	0.496 0.234	0.385 0.084	0.251 0.084			
15	250	4.17	8.131 64.86	6.149 32.32	3.117 10.03	1.924 2.860	1.147 1.282	0.823 0.646	0.620 0.350	0.481 0.126	0.314 0.126			
18	300	5.00	8.560 45.52	7.740 14.04	2.309 4.009	1.377 1.792	0.988 0.903	0.744 0.488	0.577 0.175	0.377 0.074	0.263 0.074			
24	400	6.67	9.987 78.17	8.269 24.04	3.078 6.828	1.836 3.053	1.317 1.530	0.992 0.829	0.770 0.294	0.502 0.124	0.351 0.124			
30	500	8.33	10.416 36.71	8.816 10.40	3.848 4.622	2.295 2.315	1.647 1.254	1.240 1.045	0.962 0.753	0.628 0.526	0.439 0.187			
36	600	10.0	10.845 51.84	9.618 14.62	2.753 6.505	1.976 3.261	1.488 1.757	1.155 1.023	0.753 0.623	0.526 0.260				
42	700	11.7	11.274 19.52	10.212 8.693	2.306 4.356	1.736 2.345	1.347 0.831	0.879 0.614						
48	800	13.3	11.703 37.00	9.671 11.18	2.309 25.20	1.377 11.18	0.988 5.582	0.744 3.009	0.577 1.066	0.377 0.445	0.263 0.187			
54	900	15.0	12.132 31.51	10.012 13.97	2.964 6.983	2.232 3.762	1.732 1.328	1.732 1.328	1.130 1.055					
60	1000	16.7	12.561 38.43	10.441 17.06	3.294 8.521	2.480 4.595	1.925 1.616	1.256 1.674	0.877 0.674					
75	1250	20.8	13.090 26.10	10.870 13.00	4.117 7.010	3.100 2.458	2.406 1.097	1.570 1.027						
90	1500	25.0	13.519 36.97	11.309 18.42	4.941 9.892	3.720 9.468	2.887 2.468	1.883 1.444	1.316 1.044					
105	1750	29.2	14.048 24.76	11.738 13.30	4.340 4.665	3.368 4.165	2.197 1.934							
120	2000	33.3	14.477 31.94	12.167 17.16	4.960 31.94	3.850 5.995	2.511 2.496							
150	2500	41.7	15.006 26.26	12.696 26.26	4.812 9.216	3.139 9.216	2.193 3.807							
180	3000	50.0	15.835 13.05	13.565 13.05	3.767 5.023	2.632 3.509	1.879 2.193							
240	4000	66.7	16.664 22.72	14.394 22.72	3.767 5.023	2.632 8.926	2.193 8.926							
300	5000	83.3	17.493 14.42	15.223 14.42	4.386 14.42									

90° bends, slide valves
T-pieces, non-return valves

1.0
4.0

1.0
4.0

1.1
4.0

1.2
5.0

1.3
5.0

1.4
5.0

1.5
6.0

1.6
6.0

1.6
6.0

1.7
7.0

2.0
8.0

2.5
9.0

The head loss in bends, slide valves, T-pieces and non-return valves is equivalent to the metres of straight pipes stated in the last two lines of the table. To find the head loss in foot valves multiply the loss in T-pieces by two.

Table of head losses

Miscellaneous

Head losses in plastic pipes

Upper figures indicate the velocity of water in m/sec.

Lower figures indicate head loss in metres per 100 metres of straight pipes.

m ³ /h	Litres/min.	Litres/sec.	PELM/PEH PN 10														
			PELM						PEH								
			25 20.4	32 26.2	40 32.6	50 40.8	63 51.4	75 61.4	90 73.6	110 90.0	125 102.2	140 114.6	160 130.8	180 147.2			
0.6	10	0.16	0.49 1.8	0.30 0.66	0.19 0.27	0.12 0.085											
0.9	15	0.25	0.76 4.0	0.46 1.14	0.3 0.6	0.19 0.18	0.12 0.63										
1.2	20	0.33	1.0 6.4	0.61 2.2	0.39 0.9	0.25 0.28	0.16 0.11										
1.5	25	0.42	1.3 10.0	0.78 3.5	0.5 1.4	0.32 0.43	0.2 0.17	0.14 0.074									
1.8	30	0.50	1.53 13.0	0.93 4.6	0.6 1.9	0.38 0.57	0.24 0.22	0.17 0.092									
2.1	35	0.58	1.77 16.0	1.08 6.0	0.69 2.0	0.44 0.70	0.28 0.27	0.2 0.12									
2.4	40	0.67	2.05 22.0	1.24 7.5	0.80 3.3	0.51 0.93	0.32 0.35	0.23 0.16	0.16								
3.0	50	0.83	2.54 37.0	1.54 11.0	0.99 4.8	0.63 1.40	0.4 0.50	0.28 0.22	0.2	0.09							
3.6	60	1.00	3.06 43.0	1.85 15.0	1.2 6.5	0.76 1.90	0.48 0.70	0.34 0.32	0.24 0.13	0.16 0.050							
4.2	70	1.12	3.43 50.0	2.08 18.0	1.34 8.0	0.86 2.50	0.54 0.83	0.38 0.38	0.26 0.17	0.18 0.068							
4.8	80	1.33		2.47 25.0	1.59 10.5	1.02 3.00	0.64 1.20	0.45 0.50	0.31 0.22	0.2 0.084							
5.4	90	1.50		2.78 30.0	1.8 12.0	1.15 3.50	0.72 1.30	0.51 0.57	0.35 0.26	0.24 0.092	0.18 0.05						
6.0	100	1.67		3.1 39.0	2.0 16.0	1.28 4.6	0.8 1.80	0.56 0.73	0.39 0.30	0.26 0.12	0.2 0.07						
7.5	125	2.08		3.86 50.0	2.49 24.0	1.59 6.6	1.00 2.50	0.70 1.10	0.49 0.50	0.33 0.18	0.25 0.10	0.20 0.055					
9.0	150	2.50			3.00 33.0	1.91 8.6	1.20 3.5	0.84 1.40	0.59 0.63	0.39 0.24	0.30 0.13	0.24 0.075					
10.5	175	2.92			3.5 38.0	2.23 11.0	1.41 4.3	0.99 1.80	0.69 0.78	0.46 0.30	0.36 0.18	0.28 0.09					
12	200	3.33			3.99 50.0	2.55 14.0	1.60 5.5	1.12 2.40	0.78 1.0	0.52 0.40	0.41 0.22	0.32 0.12	0.25 0.065				
15	250	4.17				3.19 21.0	2.01 8.0	1.41 3.70	0.98 1.50	0.66 0.57	0.51 0.34	0.40 0.18	0.31 0.105	0.25 0.06			
18	300	5.00				3.82 28.0	2.41 10.5	1.69 4.60	1.18 1.95	0.78 0.77	0.61 0.45	0.48 0.25	0.37 0.13	0.29 0.085			
24	400	6.67					3.21 19.0	2.25 8.0	1.57 3.60	1.05 1.40	0.81 0.78	0.65 0.44	0.50 0.23	0.39 0.15			
30	500	8.33					4.01 28.0	2.81 11.5	1.96 5.0	1.31 2.0	1.02 1.20	0.81 0.63	0.62 0.33	0.49 0.21			
36	600	10.0					4.82 37.0	3.38 15.0	2.35 6.6	1.57 2.60	1.22 1.50	0.97 0.82	0.74 0.45	0.59 0.28			
42	700	11.7					5.64 47.0	3.95 24.0	2.75 8.0	1.84 3.50	1.43 1.90	1.13 1.10	0.87 0.60	0.69 0.40			
48	800	13.3						4.49 26.0	3.13 11.0	2.09 4.5	1.62 2.60	1.29 1.40	0.99 0.81	0.78 0.48			
54	900	15.0						5.07 33.0	3.53 13.5	2.36 5.5	1.83 3.20	1.45 1.70	1.12 0.95	0.80 0.58			
60	1000	16.7						5.64 40.0	3.93 16.0	2.63 6.7	2.04 3.90	1.62 2.2	1.24 1.2	0.96 0.75			
75	1250	20.8							4.89 25.0	3.27 9.0	2.54 5.0	2.02 3.0	1.55 1.6	1.22 1.05	1.22 0.95		
90	1500	25.0							5.88 33.0	3.93 13.0	3.05 8.0	2.42 4.1	1.86 2.3	1.47 1.40			
105	1750	29.2							6.86 44.0	4.59 17.5	3.56 9.7	2.83 5.7	2.17 3.2	1.72 1.9			
120	2000	33.3								5.23 23.0	4.06 13.0	3.23 7.0	2.48 4.0	1.96 2.4			
150	2500	41.7								6.55 34.0	5.08 18.0	4.04 10.5	3.10 6.0	2.45 3.5			
180	3000	50.0								7.86 45.0	6.1 27.0	4.85 14.0	3.72 7.6	2.94 4.4			
240	4000	66.7									8.13 43.0	6.47 24.0	4.96 13.0	3.92 7.5			
300	5000	83.3										8.08 33.0	6.2 18.0	4.89 11.0			

The table is based on a nomogram.

Roughness: K = 0.01 mm.

Water temperature: t = 10°C.