

Tabella delle perdite di carico nelle tubazioni

Pipes charge losses schedule

Portata Capacity			H <sub>j</sub> = m v = m/sec	Diametro nominale (DN = mm)										Nominal diameter (DN=mm)							
l/sec	l/min	mc/h		15	20	25	32	40	50	65	80	100	125	150	175	200	250	300	350	400	
0.16	10	0.6	H <sub>j</sub> v	11.8 0.93	2.82 0.53	1 0.35	0.25 0.21														
0.33	20	1.2	H <sub>j</sub> v	43.1 1.83	10.4 1.05	3.72 0.7	0.95 0.42	0.31 0.26													
0.5	30	1.5	H <sub>j</sub> v	92 2.73	22.3 1.56	8 1.05	2.09 0.62	0.66 0.4													
0.66	40	1.8	H <sub>j</sub> v		38.2 2.1	13.8 1.4	2.65 0.83	1.15 0.53	0.4 0.35												
1	60	3.6	H <sub>j</sub> v		82 3.1	30 2.1	8 1.25	2.48 0.79	0.86 0.52												
1.3	80	4.8	H <sub>j</sub> v		141 4.15	51.5 2.77	13.9 1.66	4.3 1.05	1.46 0.68												
1.6	100	6	H <sub>j</sub> v			79 3.45	21.4 2.08	6.6 1.31	2.22 0.86	0.56 0.5											
2.08	125	7.5	H <sub>j</sub> v			120 4.3	33 2.6	10 1.63	3.4 1.07	0.86 0.63											
2.5	150	9	H <sub>j</sub> v				47 3.12	14.2 1.96	4.74 1.27	1.21 0.74	0.43 0.49										
2.9	175	10.5	H <sub>j</sub> v				63 3.64	19 2.28	6.3 1.48	1.63 0.87	0.57 0.58										
3.3	200	12	H <sub>j</sub> v				82 4.2	24.5 2.6	8.1 1.68	2.1 1	0.74 0.65										
4.1	250	15	H <sub>j</sub> v				126 5.2	37.5 3.24	12.3 2.1	3.2 1.25	1.12 0.83	0.36 0.53									
5	300	18	H <sub>j</sub> v				53 3.9	17.3 2.51	4.5 1.5	1.58 1.3	0.51 0.98										
6.6	400	24	H <sub>j</sub> v				92 5.2	29.5 2.32	7.8 1.97	2.7 1.5	0.89 0.84										
8.3	500	30	H <sub>j</sub> v				140 6.45	44.8 4.10	12 2.46	4.13 1.6	1.36 1.06	0.48 0.7									
10	600	36	H <sub>j</sub> v					63 5	17 2.95	5.8 1.95	1.93 1.26	0.68 0.84									
18	800	48	H <sub>j</sub> v					108 6.5	29 3.9	10 2.5	3.35 1.68	1.15 1.11	0.43 0.75								
16.6	1000	60	H <sub>j</sub> v						44.5 4.9	15.2 3.2	5.14 2.1	1.75 1.38	0.66 0.94								
20.8	1250	75	H <sub>j</sub> v						68 6.1	23 4	7.9 2.63	2.7 1.73	1 1.18	0.48 0.88							
25	1500	90	H <sub>j</sub> v						96 7.3	32.6 4.8	11.2 3.15	3.75 2.06	1.4 1.40	0.70 1.06							
29.1	1750	105	H <sub>j</sub> v						129 8.5	43.5 5.6	15 3.68	5.05 2.4	1.9 1.65	0.95 1.23	0.45 0.94						
33.3	2000	120	H <sub>j</sub> v						56 6.4	19.4 4.2	6.5 2.74	2.43 1.9	1.20 1.4	0.58 1.07							
41.6	2500	150	H <sub>j</sub> v						85 7.9	30 5.24	10 3.41	3.75 2.35	1.80 1.75	0.90 1.33							
50	3000	180	H <sub>j</sub> v						120 9.5	42 6.3	14 4.1	5.3 2.82	2.55 2	1.25 1.6							
66.6	4000	240	H <sub>j</sub> v						120 9.95	42 6.37	13.8 4.08	5.3 2.83	2.53 2.08	1.25 1.59	0.35 1.02	0.15 0.71					
83.3	5000	300	H <sub>j</sub> v						124.9 10.62	41.3 6.79	16.74 4.72	7.81 3.47	4.03 2.65	1.34 1.70	0.54 1.18	0.25 0.87	0.13 0.66				
166.6	10000	600	H <sub>j</sub> v							161 13.59	65 9.44	30.2 6.93	15.6 5.31	5.16 3.4	2.09 2.36	0.97 1.73	0.5 1.33				
333.3	20000	1200	H <sub>j</sub> v												20.1 6.79	8.13 4.72	3.8 3.47	1.95 2.65			
500	30000	1800	H <sub>j</sub> v													18.07 7.7	8.39 5.2	4.32 4.0			
833.3	50000	3000	H <sub>j</sub> v														49.5 11.8	23 8.67	11.8 6.63		
1250	75000	4500	H <sub>j</sub> v															110.5 17.7	51.3 13	26.4 9.9	
1666.6	100000	6000	H <sub>j</sub> v																	90.6 17.33	46.6 13.27

I valori delle perdite di carico in tabella sono relativi a tubi in ghisa. Nei tubi in acciaio laminato sono 0.8 volte quelli indicati. Per tubi vecchi incrostati le perdite di carico possono aumentare fino a 1.7 volte i valori in tabella.

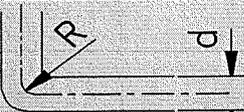
Charge losses valves are related to cast-iron tubes are 0.8 times those indicated for old encrusted tubes charge losses man increase until 1.7 times schedule ones

H<sub>j</sub> = perdita di carico per ogni 100 metri tubazione  
charge losses for each 100 meters of piping

v = velocità dell'acqua in m/sec  
flow velocity m/sec

**Tabella delle perdite di carico nelle curve, saracinesche e valvole**

**Pressure drop in curves, gates and valves schedule**

Velocità dell'acqua in m/s water speed in m/s	Curve ad angolo vivo Allive angle curves					Curve normali Normal curves					Saracinesche normali normal gates	Valvole di fondo Foot valves	Valvole di ritegno not return valves	Perdite di energia all'uscita dei tubi di scorio V <sub>2</sub> : 2g output hydraulic loss of the discharge tubes
														
	$\alpha = 30^\circ$	$\alpha = 40^\circ$	$\alpha = 60^\circ$	$\alpha = 80^\circ$	$\alpha = 90^\circ$	$\frac{d}{R} = 0.4$	$\frac{d}{R} = 0.6$	$\frac{d}{R} = 0.8$	$\frac{d}{R} = 1$	$\frac{d}{R} = 1.5$				
0.10	0.03	0.04	0.05	0.07	0.08	0.07	0.08	0.01	0.0155	0.027	0.03	30	30	0.05
0.15	0.06	0.73	0.1	0.14	0.17	0.016	0.019	0.024	0.033	0.06	0.033	31	31	0.12
0.2	0.11	0.13	0.18	0.26	0.31	0.028	0.033	0.04	0.058	0.11	0.058	31	31	0.21
0.25	0.17	0.21	0.28	0.4	0.48	0.044	0.052	0.063	0.091	0.17	0.09	31	31	0.32
0.3	0.25	0.3	0.41	0.6	0.7	0.063	0.074	0.09	0.13	0.25	0.13	31	31	0.46
0.35	0.33	0.4	0.54	0.8	0.93	0.085	0.10	0.12	0.18	0.33	0.18	31	31	0.62
0.4	0.43	0.52	0.71	1.0	1.2	0.11	0.13	0.16	0.23	0.43	0.23	32	31	0.82
0.5	0.67	0.81	1.1	1.6	1.9	0.18	0.21	0.26	0.37	0.67	0.37	33	32	1.27
0.6	0.97	1.2	1.6	2.3	2.8	0.25	0.29	0.36	0.52	0.97	0.52	34	32	1.84
0.7	1.35	1.65	2.2	3.2	3.9	0.34	0.40	0.48	0.70	1.35	0.7	35	32	2.5
0.8	1.7	2.1	2.8	4.0	4.8	0.45	0.53	0.64	0.93	1.7	0.95	36	33	3.3
0.9	2.2	2.7	6	5.2	6.2	0.57	0.67	0.82	1.18	2.2	1.2	37	34	4.2
1.0	2.7	3.3	4.5	6.4	7.6	0.7	0.82	1.0	1.45	2.7	1.45	38	35	5.1
1.5	6.0	7.3	10.0	14.0	17.0	1.6	1.9	2.3	3.3	6.0	3.3	47	40	11.5
2.0	11.0	14.0	18.0	26.0	31.0	2.8	3.3	4.0	5.8	11.0	5.8	61	48	20.4
2.5	17.0	21.0	28.0	40.0	48.0	4.4	5.2	6.3	9.1	17.0	9.1	78	58	32.0
3.0	25.0	30.0	41.0	60.0	70.0	6.3	7.4	9.0	13.0	25.0	13.0	100	71	46.0
3.5	33.0	40.0	55.0	78.0	93.0	8.5	10.0	12.0	18.0	33.0	18.0	123	85	62.0
4.0	43.0	52.0	70.0	100.0	120.0	11.0	13.0	16.0	23.0	42.0	23.0	150	100	82.0
4.5	55.0	67.0	90.0	130.0	160.0	14.0	21.0	26.0	37.0	55.0	37.0	190	120	103.0
5.0	67.0	82.0	110.0	160.0	190.0	18.0	29.0	36.0	52.0	67.0	52.0	220	140	127.0

La perdita di carico nelle curve è soltanto quella dovuta alla contrazione dei filletti liquidi per cambiamento di direzione (lo sviluppo delle curve deve essere quindi compreso nella lunghezza della tubazione), mentre la perdita di carico nelle valvole a saracinesche è stata determinata in base a prove tecniche. La perdita di carico per saracinesche e curve normali è pari a quella di 5 metri di tubazione diritta mentre per valvole di ritegno a clapet a 15 metri. I valori indicati si intendono per tubazione internamente liscia. In caso di tubazione incrostanta occorrerà considerare i corrispondenti aumenti.

The pressure drop in curves is only the one due to the contraction of the liquid thin thread for directional change (the development of the curves must be included in the length of the piping), while the pressure drop in the valves and gates is been determined on the basis of technical testes. The pressure drop for gates and normal curves is equal to 5 metres of straigh piping, while for not return clapet valve is to 15 metres. The values indicated are intended for piping internally smooth. In case of overlaid piping, will need to consider the corresponding increase.