



# Christensen Irrigation (Singapore) Pte Ltd

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## Friction Loss Characteristics

### Type K Copper Water Tube

C=140

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

Sizes 1/2" through 3" Flow 1 through 600 GPM

Size	1/2"		5/8"		3/4"		1"		1 1/4"		1 1/2"		2"		2 1/2"		3"	
O.D.	0.625	1.91	0.750	1.40	0.875	1.47	1.125	1.88	1.375	2.125	1.625	2.125	2.625	2.125	2.625	3.125	3.125	3.125
I.D.	0.5270	1.81	0.652	1.30	0.745	1.37	0.995	1.74	1.245	1.95	1.481	1.959	2.435	1.959	2.435	2.907	2.907	2.907
Wall Thk	0.049	0.049	0.049	0.049	0.065	0.065	0.065	0.065	0.065	0.072	0.072	0.083	0.083	0.083	0.083	0.095	0.095	0.109
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	1.46	1.09	0.95	0.39	0.73	0.20	0.41	0.05	0.26	0.02	0.18	0.01	0.10	0.00				
2	2.93	3.94	1.91	1.40	1.47	0.73	0.82	0.18	0.52	0.06	0.37	0.03	0.21	0.01				
3	4.40	8.35	2.87	2.97	2.20	1.55	1.23	0.38	0.78	0.13	0.55	0.05	0.31	0.01	0.20	0.00		
4	5.87	14.23	3.83	5.05	2.94	2.64	1.64	0.65	1.05	0.22	0.74	0.09	0.42	0.02	0.27	0.01	0.19	0.00
5	7.34	21.51	4.79	7.64	3.67	3.99	2.06	0.98	1.31	0.33	0.93	0.14	0.53	0.04	0.34	0.01	0.24	0.01
6	8.81	30.15	5.75	10.70	4.41	5.60	2.47	1.37	1.57	0.46	1.11	0.20	0.63	0.05	0.41	0.02	0.28	0.01
7	10.28	40.11	6.71	14.24	5.14	7.44	2.88	1.82	1.84	0.61	1.30	0.26	0.74	0.07	0.48	0.02	0.33	0.01
8	11.75	51.37	7.67	18.24	5.88	9.53	3.29	2.33	2.10	0.78	1.48	0.34	0.85	0.09	0.55	0.03	0.38	0.01
9	13.22	63.89	8.63	22.68	6.61	11.86	3.70	2.90	2.36	0.97	1.67	0.42	0.95	0.11	0.61	0.04	0.43	0.02
10	14.69	77.66	9.59	27.57	7.35	14.41	4.12	3.53	2.63	1.18	1.86	0.51	1.06	0.13	0.68	0.05	0.48	0.02
11	16.15	92.65	10.55	32.89	8.08	17.19	4.53	4.21	2.89	1.41	2.04	0.61	1.16	0.16	0.75	0.05	0.53	0.02
12	17.62	108.85	11.51	38.64	8.82	20.20	4.94	4.94	3.15	1.66	2.23	0.71	1.27	0.18	0.82	0.06	0.57	0.03
14			13.43	51.41	10.29	26.87	5.76	6.57	3.68	2.21	2.60	0.95	1.48	0.24	0.95	0.08	0.67	0.04
16			15.35	65.83	11.76	34.41	6.59	8.42	4.21	2.83	2.97	1.22	1.70	0.31	1.10	0.11	0.77	0.05
18			17.27	81.88	13.23	42.80	7.41	10.47	4.73	3.52	3.34	1.51	1.91	0.39	1.23	0.13	0.86	0.06
20			19.19	99.53	14.70	52.02	8.24	12.73	5.26	4.28	3.72	1.84	2.11	0.47	1.37	0.16	0.96	0.07
22					16.17	62.06	9.06	15.18	5.79	5.10	4.09	2.19	2.33	0.56	1.51	0.20	1.06	0.08
24					17.64	72.92	9.89	17.84	6.31	5.99	4.46	2.58	2.55	0.66	1.65	0.23	1.15	0.10
26					19.11	84.57	10.71	20.69	6.84	6.95	4.83	2.99	2.76	0.77	1.78	0.27	1.25	0.11
28							11.53	23.73	7.37	7.98	5.20	3.43	2.97	0.88	1.92	0.30	1.35	0.13
30							12.36	26.97	7.89	9.06	5.58	3.89	3.18	1.00	2.06	0.35	1.44	0.15
35							14.42	35.88	9.21	12.06	6.51	5.18	3.72	1.33	2.40	0.46	1.68	0.19
40							16.48	45.95	10.52	15.44	7.44	6.63	4.25	1.70	2.75	0.59	1.93	0.25
45							18.54	57.15	11.84	19.20	8.37	8.25	4.78	2.12	3.00	0.73	2.17	0.31
50									13.16	23.34	9.30	10.03	5.31	2.57	3.44	0.89	2.41	0.38
55									14.47	27.85	10.23	11.97	5.84	3.07	3.78	1.06	2.65	0.45
60									15.79	32.71	11.16	14.06	6.37	3.60	4.12	1.25	2.89	0.53
65									17.10	37.94	12.09	16.31	6.91	4.18	4.47	1.45	3.13	0.61
70									18.42	43.52	13.02	18.70	7.44	4.80	4.81	1.66	3.37	0.70
75									19.74	49.46	13.95	21.25	7.97	5.45	5.16	1.89	3.62	0.80
80											14.88	23.95	8.50	6.14	5.50	2.13	3.86	0.90
85											15.81	26.80	9.03	6.87	5.84	2.38	4.10	1.01
90											16.74	29.79	9.56	7.64	6.19	2.65	4.34	1.12
95											17.67	32.93	10.09	8.44	6.53	2.93	4.58	1.24
100											18.60	36.21	10.63	9.28	6.88	3.22	4.82	1.36
110													11.69	11.08	7.56	3.84	5.31	1.62
120													12.75	13.01	8.25	4.52	5.79	1.91
130													13.82	15.09	8.94	5.24	6.27	2.21
140													14.88	17.31	9.63	6.01	6.75	2.54
150													15.94	19.67	10.32	6.83	7.24	2.88
160													17.01	22.17	11.00	7.69	7.72	3.25
170													18.07	24.81	11.69	8.61	8.20	3.64
180													19.13	27.58	12.38	9.57	8.69	4.04
190															13.07	10.58	9.17	4.47
200															13.76	11.63	9.65	4.91
225															15.48	14.47	10.86	6.11
250															17.20	17.58	12.07	7.43
275															18.92	20.98	13.27	8.86
300																	14.48	10.41
325																	15.69	12.07
350																	16.89	13.85
375																	18.10	15.73
400																	19.31	17.73
425																		
450																		
475																		
500																		
550																		

**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  $V = 408 \frac{Q}{d^2}$   
 Friction pressure loss values are computed from the equation:  $hf = 0.2083 \left( \frac{100}{c} \right)^{1.852} \left[ \frac{0.1852}{d^{4.866}} \right] \times 433$  for psi loss per 100' of pipe