

Viscosity Friction Losses

GPM	Nom. Pipe Size	Kinematic Viscosity- Seconds Saybolt Standard Universal													
		Water	100	200	300	400	500	600	800	1000	1500	2000	3000	5000	10,000
3	1/3	10.0	25.7	54.4	83	108	135	162	218	273	411	545	820	1350	
	3/4	2.50	8.5	17.5	26.7	35.5	44	53	71	88	131	176	265	440	880
	1	0.77	3.2	6.6	10.2	13.4	16.6	20.0	26.6	34	50	67	100	167	
5	3/4	6.32	14.1	29.3	44	59	74	86	117	147	219	293	440	740	1470
	1 1/4	1.93	5.3	11.0	16.8	22.4	28	33	44	56	83	111	167		
	1 1/2	0.51	1.8	3.7	5.5	7.6	9.5	11.1	14.8	18.5	28	37	56	94	187
10	1	6.85	11.2	22.4	33.5	45	56	66	89	112	165	223			
	1 1/4	1.77	3.6	7.5	11.2	14.9	19.1	22.4	30	37	55	74	112	190	
	1 1/2	0.83	1.9	4.2	6.0	8.1	10.2	12.3	16.5	20.3	31	41	62	102	207
15	1	14.6	26	34	50	67	85	104	137	172					
	1 1/4	3.72	6.4	11.3	16.9	22.4	29	34	45	57	64	112	167		
	1 1/2	1.73	2.8	6.2	9.2	12.4	15.3	18.4	25	30	46	61	92	152	
20	1	25.1	46	46	67	90	111	133	180	220					
	1 1/2	2.94	5.3	8.1	12.2	16.2	20.3	25	33	40	61	81	122	203	
	2	0.87	1.5	3.0	4.4	6.0	7.4	9.0	11.9	14.8	22.4	30	45	74	147
30	1 1/2	6.26	11.6	12.2	16.2	24.3	30	37	50	61	91	122	182		
	2	1.82	3.2	4.4	6.7	9.0	11.1	13.2	17.8	22.2	33	45	67	178	222
	2 1/2	0.75	1.4	2.2	3.2	4.4	5.5	6.5	8.8	10.9	16.6	22.0	33	55	110
40	1 1/2	10.5	19.6	20.8	24	32	40	50	65	81	121	162	243	400	810
	2	3.10	5.8	5.8	9.0	11.8	14.8	17.7	24	30	44	59	89	146	
	2 1/2	1.28	2.5	3.0	4.4	5.8	7.4	8.8	11.8	14.6	22.2	29	44	73	145
60	2	6.59	11.5	13.4	13.4	17.8	22.2	27	36	45	67	89	134	220	
	2 1/2	2.72	5.1	5.5	6.5	8.8	10.9	13.1	17.8	22.0	34	44	66	109	220
	3	0.92	1.8	1.8	2.8	3.7	4.6	5.6	7.3	9.2	13.8	18.5	27	46	92
80	2 1/2	4.66	8.3	9.7	9.7	11.8	14.6	17.6	24	29	44	58	87	145	
	3	1.57	3.0	3.2	3.7	4.8	6.2	7.3	9.7	12.2	18.3	24	37	61	122
	4	0.41	0.83	0.83	1.2	1.7	2.1	2.5	3.3	4.2	6.2	8.3	12.5	20.6	41
100	2 1/2	7.11	12.2	14.1	14.8	14.8	18.5	22	29	36	55	73	109	183	
	3	2.39	4.4	5.1	5.1	6.2	7.6	9.1	12.1	15.2	23	31	45	77	150
	4	0.62	1.2	1.3	1.5	2.1	2.5	3.1	4.1	5.1	7.8	10.4	15.5	26	51
125	3	3.62	6.5	7.8	8.1	8.1	9.7	11.5	15.3	19.4	29	39	58	97	193
	4	0.94	1.8	2.1	2.1	2.6	3.2	3.9	5.2	6.4	9.8	12.7	19.3	32	65
	6	0.12	0.25	0.28	0.39	0.52	0.63	0.78	1.0	1.3	1.9	2.6	3.9	6.4	13.0
150	3	5.14	9.2	10.4	11.5	11.5	11.5	13.7	18.4	23	35	46	69	115	230
	4	1.32	2.4	2.9	2.9	3.1	3.9	4.6	6.2	7.8	11.5	15.4	23	39	78
	6	0.15	0.34	0.39	0.46	0.62	0.77	0.9	1.2	1.5	2.3	3.0	4.6	7.6	15.2
175	3	6.9	11.7	13.8	15.8	15.8	15.8	15.9	21.4	27	40	53	80	133	
	4	1.76	3.2	4.0	4.0	4.0	4.6	5.4	7.4	9.2	13.7	18.2	28	46	92
	6	0.23	0.44	0.52	0.54	0.7	0.9	1.1	1.4	1.8	2.6	3.5	5.3	8.8	17.8
200	3	8.9	15.0	17.8	20.3	20.3	20.3	20.3	25	31	46	61	91	152	
	4	2.27	4.2	5.1	5.1	5.1	5.1	6.2	8.3	10.4	15.5	20.6	31	51	103
	6	0.30	0.58	0.69	0.69	0.81	1.0	1.2	1.6	2.0	3.0	3.9	6.2	9.9	20.1
250	4	3.46	6.0	7.4	8.0	8.0	8.0	10.2	12.9	19.4	26	39	64	130	
	6	0.45	0.83	0.99	1.0	1.0	1.2	1.5	2.1	2.5	3.7	5.1	7.6	12.5	
	8	0.12	0.21	0.28	0.28	0.35	0.42	0.51	0.67	0.83	1.2	1.7	2.5	4.2	8.3
300	4	4.89	8.5	9.9	11.6	11.6	11.6	11.6	12.4	15.5	23	31	46	77	155
	6	0.64	1.2	1.4	1.5	1.5	1.5	1.8	2.5	3.0	4.6	6.0	9.1	15.0	30
	8	0.16	0.30	0.39	0.39	0.42	0.51	0.61	0.82	1.0	1.5	2.0	3.0	5.1	9.9
400	6	1.09	1.9	2.3	2.5	2.8	2.8	2.8	3.2	3.9	6.0	8.1	12.1	20.1	
	8	0.28	0.53	0.62	0.67	0.67	0.67	0.81	1.1	1.3	2.0	2.8	4.1	6.7	13.5
	10	0.09	0.18	0.21	0.23	0.23	0.28	0.32	0.43	0.53	0.81	1.1	1.6	2.8	5.3
600	6	2.34	4.2	5.1	5.3	5.5	6.0	6.2	6.2	6.2	9.0	12.0	18.5		
	8	0.60	1.1	1.3	1.4	1.5	1.5	1.5	1.7	2.0	3.0	3.9	6.2	9.9	20
	10	0.19	0.37	0.42	0.46	0.51	0.51	0.51	0.65	0.81	1.2	1.6	2.4	4.2	8.1
800	6	4.03	6.5	8.1	8.5	9.2	9.7	11.1	11.1	11.1	12.0	16.0			
	8	1.02	1.8	2.2	2.3	2.5	2.8	2.8	2.8	2.8	3.9	5.3	6.2	13.4	
	10	0.33	0.50	0.69	0.78	0.88	0.92	0.92	0.92	1.1	1.6	2.1	3.2	5.3	10.9
1000	8	1.56	2.5	3.2	3.5	3.7	4.2	4.4	4.4	4.4	5.1	6.7	10.2	16.6	
	10	0.50	0.89	1.0	1.2	1.3	1.4	1.4	1.4	1.4	2.0	2.8	4.0	6.7	13.4
	12	0.21	0.39	0.6	0.51	0.55	0.58	0.58	0.58	0.87	1.0	1.3	2.0	3.5	6.7

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