STEAM - Flow Table

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Table A - Based upon inlet pressure 10 times higher than drop through valve (valve pressure drop is 10% of inlet pressure)

FLOW IN POUNDS OF STEAM PER HOUR	PRESSURE DROP IN POUNDS PER SQUARE INCH THRU { V - FULL PORT MAGNATROL OR GLOBE VALVE; PIPE - PER LENGTH AS INDICATED																											
	3/8"			1/2"			3/4"			1"			1-1/4"			1-1/2"			2"			2-1/2"			3"		
	V	PIPE		V	PIPE		V	PIPE		V	PIPE		V	PIPE		V	PIPE		V	PIPE		V	PIPE		V	PIPE	
		12.5'	25'		12.5'	25'		12.5'	25'		25'	50'		25'	50'		25'	50'		50'	100'		50'	100'		50'	100'
12	.19	.44	1.1																								
18	.39	.68	1.7	.17	.29	.75																					
25	.64	.96	2.6	.29	.44	1.1																					
35	1.1	1.4	3.8	.54	.65	1.7	.15	.26	.61																		
50	1.7	2.0	5.7	.92	.96	2.6	.29	.41	.97																		
75	2.9	3.1	8.7	1.6	1.5	4.1	.56	.61	1.6	.21	.45	1.2															
100	4.0	4.2	12	2.3	2.0	5.7	.87	.85	2.3	.35	.67	1.7	.18	.27	.64												
150	5.7	6.1	18	3.8	3.1	8.7	1.5	1.3	3.6	.67	1.1	2.8	.35	.46	1.2	.21	.26	.60									
200	8.8	9.0	24	5.3	4.2	12	2.3	2.2	5.0	1.0	1.5	4.0	.56	.67	1.7	.35	.37	.93	.13	.29	.70						
300	14	14	37	8.3	6.5	18	3.7	2.8	7.6	1.7	2.4	6.4	1.0	1.1	2.8	.67	.64	1.6	.27	.53	1.2	.14	.22	.46			
400	19	18	50	11	8.8	24	5.1	3.8	10	2.6	3.2	8.9	1.5	1.5	4.0	1.0	.91	2.3	.44	.74	2.0	.24	.34	.77	.12	.13	.27
600	29	39	97	18	14	37	8.0	5.7	16	4.2	5.0	14	2.6	2.4	6.4	1.7	1.5	3.6	.81	1.3	3.4	.48	.59	1.4	.25	.25	.55
800	–	–	–	24	18	50	11	7.8	21	5.8	6.7	20	3.6	3.2	8.8	2.6	2.0	5.4	1.2	1.9	4.9	.74	.88	2.2	.40	.39	.89
1,000	–	–	–	–	–	–	14	9.8	27	7.4	8.5	24	4.7	4.1	11	3.4	2.6	6.9	1.6	2.5	6.4	1.0	1.2	3.0	.57	.54	1.3
1,500	–	–	–	–	–	–	22	15	41	12	13	36	7.4	6.3	17	5.4	4.0	11	3.0	3.9	10	1.7	1.9	5.0	1.0	.91	2.3
2,000	–	–	–	–	–	–	–	–	–	16	18	48	10	8.5	23	7.4	5.5	15	4.0	5.3	18	2.6	2.7	7.6	1.5	1.3	3.4
3,000	–	–	–	–	–	–	–	–	–	24	27	74	16	13	36	12	8.0	23	6.3	8.2	23	4.2	4.3	11	2.2	2.1	5.7
4,000	–	–	–	–	–	–	–	–	–	–	–	–	22	18	48	16	11	32	8.4	11	30	5.8	5.8	16	3.7	3.0	8.0
6,000	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	24	18	47	13	17	47	9.1	9.2	25	5.9	4.7	13
8,000	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	18	23	63	12	12	33	8.0	6.5	18
10,000	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	23	29	87	16	15	42	11	8.2	23
15,000	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	24	23	64	16	13	35
20,000	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	22	17	47

PROBLEM: Steam is required at the rate of 700 pounds per hour. Boiler pressure is 15 PSI. Drop should not exceed 3 PSI. Branch layout to heat exchanger calls for one Magnatrol Valve, 25 feet of pipe, various fittings with a combined resistance equal to 10 feet of pipe.

SOLUTION: Pressure drop represents 20% of the inlet pressure. Less than half of this drop goes to valve; therefore table (A) should be used. The rate of 700 pounds is not shown, but will be taken as half-way between 600 and 800 pounds. The equivalent length of 35 feet of pipe and fittings together also is not shown, but can be taken as half-way between 25 and 50. Reading along the 600 and 800 pound lines, the 1-1/2 inch valve shows 1.7 plus 2.6 divided by 2 equals 2.2 pounds drop for the 700 pound flow rate; for the pipe the figures 1.5, 3.6, 2.0 and 5.4 are added and divided by 4, equaling 3.1 as the mid-point drop. 2.2 plus 3.1 equals 5.3 as the drop in PSI, which is too high. Repeating with the 2 inch size, the valve comes to 1.0 pounds drop, the piping for 50 feet would come to 1.6 pounds, or less than 1.0 pounds for 35 feet; a total indicated pressure drop of slightly less than 2 PSI.

The solutions given for the air flow are also applicable to steam flow tables.