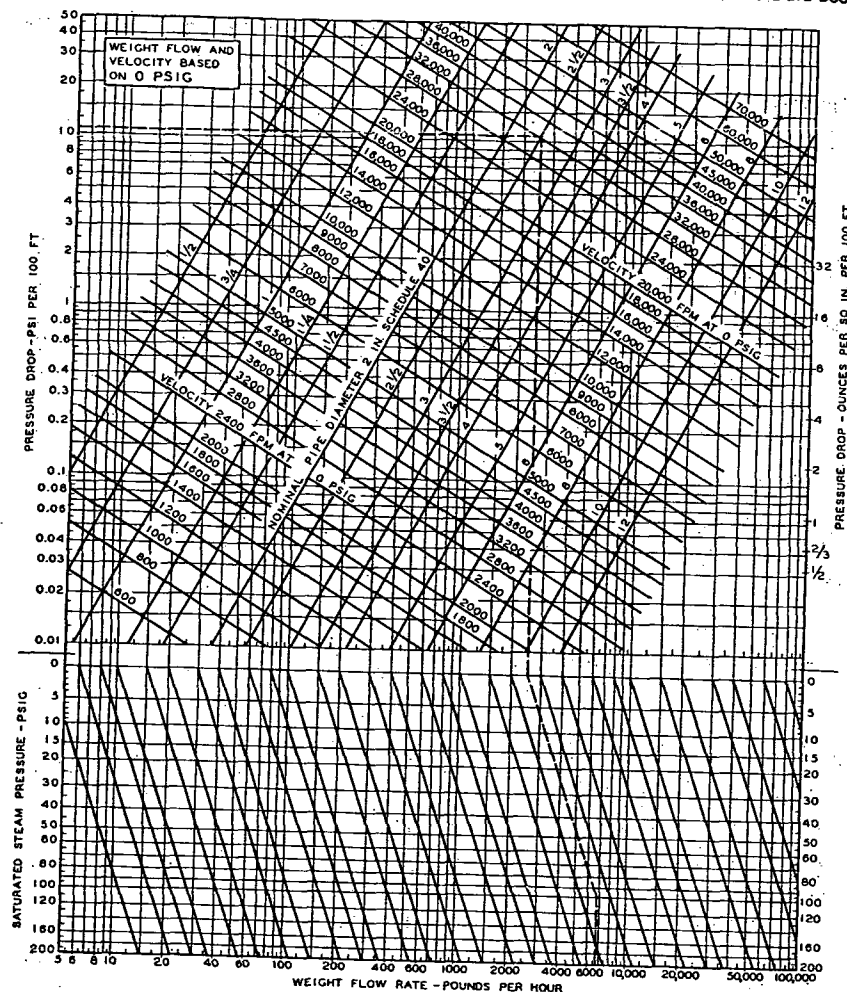




Based on Moody Friction Factor where flow of condensate does not inhibit the flow of steam.
 Fig. 22 Basic Chart for Weight-Flow Rate and Velocity of Steam in Schedule 40 Pipe
 Based on Saturation Pressure of 0 Psig
 (With Multiplier Charts for Obtaining Weight-Flow Rates and Velocities at All Saturation Pressures Between 0 and 200 Psig)

Steam Heating Systems

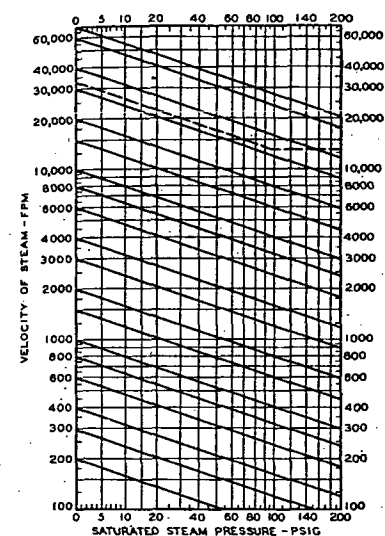


Fig. 22 (Continued).... Velocity Multiplier Chart

Example of Use of Basic and Velocity Multiplier Charts.

Given:

- Weight-Flow Rate = 6700 lb per hr.
- Initial Steam Pressure = 100 psig.
- Pressure Drop = 11 psi per 100 ft.

Find:

- Size of Schedule 40 pipe required.
- Velocity of steam in pipe.

Solution: The following steps are illustrated by the broken line on Fig. 22:

Step 1. Enter Fig. 22 at a weight-flow rate of 6700 lb per hr and move vertically to the horizontal line at 100 psig.

Step 2. Follow along inclined multiplier line (upward and to the left) to horizontal 0 psig line. The equivalent weight flow at 0 psig is about 2500 lb per hr.

Step 3. Follow the 2500 lb per hr line vertically until it intersects the horizontal line at 11 psi per 100 ft pressure drop. The nominal pipe size is 2½ in. The equivalent steam velocity at 0 psig is about 32,700 fpm.

Step 4. To find the steam velocity at 100 psig, locate the value of 32,700 fpm on the ordinate of the velocity multiplier chart at 0 psig.

Step 5. Move along the inclined multiplier line (downward and to the right) until it intersects the vertical 100 psig pressure line. The velocity as read from the right (or left) scale is about 13,000 fpm.

Note: The preceding Steps 1 to 5 would be rearranged or reversed if different data were given.

Table 5.... Weight Flow Rate of Steam in Schedule 40 Pipe* at Initial Saturation Pressures of 3.5 and 12 Psig.^{b,c}
 (Weight Flow Rate Expressed in Pounds per Hour)

Nom. Pipe Size Inches	Pressure Drop—Psi Per 100 Ft in Length											
	½ Psi (1 oz)		¾ Psi (2 oz)		1½ Psi (4 oz)		2½ Psi (8 oz)		3½ Psi (12 oz)		1 Psi	
	Sat. press. psig	Sat. press. psig	Sat. press. psig	Sat. press. psig	Sat. press. psig	Sat. press. psig	Sat. press. psig	Sat. press. psig	Sat. press. psig	Sat. press. psig	Sat. press. psig	Sat. press. psig
	3.5	12	3.5	12	3.5	12	3.5	12	3.5	12	3.5	12
¾	9	11	14	16	20	24	29	35	36	43	42	50
1	17	21	26	31	37	46	54	66	68	82	81	95
1¼	26	32	40	48	58	72	86	104	108	130	128	150
1½	36	45	55	66	78	96	116	140	146	176	172	204
2	48	60	74	90	108	132	160	192	200	240	234	280
2½	62	78	96	116	140	172	210	252	264	312	302	360
3	78	98	120	144	176	216	264	316	330	396	382	460
3½	96	120	144	176	216	264	316	376	396	480	462	560
4	116	144	176	216	264	316	376	440	464	560	538	650
5	140	176	216	264	316	376	440	520	544	650	624	760
6	168	210	252	300	360	432	516	600	624	740	710	860
8	216	270	324	390	468	560	660	760	792	930	894	1080
10	270	336	408	492	590	700	816	936	972	1140	1098	1320
12	336	414	504	600	720	850	990	1120	1164	1360	1308	1560

* Based on Moody Friction Factor, where flow of condensate does not inhibit the flow of steam.

^b The weight-flow rates at 3.5 psig can be used to cover sat. press. from 1 to 6 psig, and the rates at 12 psig can be used to cover sat. press. from 6 to 16 psig with an error not exceeding 8 percent.

^c The steam velocities corresponding to the weight-flow rates given in this table can be found from the basic chart and velocity multiplier chart, Fig. 22.