TABLE 1.—ORIFICE RELIEVING CAPACITIES, POUNDS PER SQUARE INCH

Outlet pres., psig	Pressure-reducing valve inlet pressure, psig															
	400	350	300	250	200	175	150	125	100	85	75	60	50	40	30	25
250	21000	17100	10800	----	----	----	----	----	----	----	----	----	----	----	----	----
200	21350	18250	15350	10900	----	----	----	----	----	----	----	----	----	----	----	----
175	21350	18250	16000	12600	7250	----	----	----	----	----	----	----	----	----	----	----
150	21350	18250	16200	13400	9540	6750	----	----	----	----	----	----	----	----	----	----
125	21350	18250	16200	13600	10800	8780	6220	----	----	----	----	----	----	----	----	----
110	21350	18250	16200	13600	11000	9460	7420	4550	----	----	----	----	----	----	----	----
100	21350	18250	16200	13600	11000	9760	7970	5630	----	----	----	----	----	----	----	----
85	21350	18250	16200	13600	11000	9760	8480	6640	4070	----	----	----	----	----	----	----
75	21350	18250	16200	13600	11000	9760	8480	7050	4980	3150	----	----	----	----	----	----
60	21350	18250	16200	13600	11000	9760	8480	7200	5750	4540	3520	----	----	----	----	----
50	21350	18250	16200	13600	11000	9760	8480	7200	5920	5000	4230	2680	----	----	----	----
40	21350	18250	16200	13600	11000	9760	8480	7200	5920	5140	4630	3480	2470	----	----	----
30	21350	18250	16200	13600	11000	9760	8480	7200	5920	5140	4630	3860	3140	2210	----	----
25	21350	18250	16200	13600	11000	9760	8480	7200	5920	5140	4630	3860	3340	2580	1485	----
15	21350	18250	16200	13600	11000	9760	8480	7200	5920	5140	4630	3860	3340	2830	2320	1800
10	21350	18250	16200	13600	11000	9760	8480	7200	5920	5140	4630	3860	3340	2830	2320	2060
5	21350	18250	16200	13600	11000	9760	8480	7200	5920	5140	4630	3860	3340	2830	2320	2060

NOTE: The following formulas shall be used in connection with this table to calculate the required relieving capacity of safety valves installed on the low-pressure side of pressure-reducing valves. Use the formula that requires the larger relieving capacity.

$$W = \frac{1}{3} AC \text{ or } W = \frac{1}{2} A^1 C$$

where: W = required safety valve relieving capacity.
A = internal area of the pipe size of the pressure-reducing valve (use pipe areas of Table 2).
A^1 = Internal area of the pipe size of the by-pass line around the pressure-reducing valve.
C = orifice relieving capacity, pounds of steam per hour per square inch, for the given inlet and outlet pressures of the pressure-reducing valve (from this Table).

TABLE 2.—INTERNAL PIPE AREA

Nominal pipe size, inches	STANDARD		
	Actual internal diameter, inches	Approx. internal diameter, inches	Approx. internal area, square inches
⅜	0.675	0.49	0.19
½	0.840	0.62	0.30
¾	1.050	0.82	0.53
1	1.315	1.05	0.86
1¼	1.660	1.38	1.50
1½	1.900	1.61	2.04
2	2.375	2.07	3.36
2½	2.875	2.47	4.78
3	3.5	3.07	7.39
3½	4.0	3.55	9.89
4	4.5	4.03	12.73
5	5.563	5.05	19.99
6	6.625	6.07	28.89
8	8.625	8.07	51.15
10	10.750	10.19	81.55
12	12.750	12.09	114.80

Note: In applying these rules, the area of the pipe is always based upon standard weight pipe and the inlet size of the pressure-reducing valve.

(a) The following formula shall be used to determine the steam flow rate through the bypass when pressure reducing valves are arranged with a valved bypass which also acts as a potential steam source hazard in case the bypass is left open.

RVC = ½ × OC × BPA.

Where RVC = relief valve capacity, lbs. of steam per hour.

OC = orifice capacity, lbs. of steam per hour per square inch. (See Table 1.)

BPA = bypass pipe area, sq. inch. (See Table 2.)

(b) The larger of the relief valve capacities calculated by the formulas in subsections Ind 41.12 (1) and (1) (a) shall be used for selecting the relief valve for the vessel.

Note: Example. Suppose a high pressure boiler operating at 125 psi distributes steam to a series of 40 psi ASME constructed retorts through a 1½ inch size pressure reducing valve provided with a glove-valved 1 inch bypass. Determine the proper ASME relief valve protection for the retorts. Utilizing data in tables and the first of the 2 formulas above:

W = ⅓ × 7200 × 2.04 = 4896 lbs. steam per hour.

Checking the bypass steam flow according to the second formula gives:

W = ½ × 7200 × 0.86 = 3100 lbs. steam per hour.

The potential steam flow through the pressure reducing valve is 4896 lbs. per hour rated capacity or

4896 × 1000 or 4,896,000 BTU per hour.

History: Cr. Register, April, 1961, No. 64, eff. 5–1–61; am. Register, January, 1966, No. 121, eff. 2–1–66; r. and recr. (1) and Table 1, Register, February, 1971, No. 182, eff. 3–1–71; r. (1) second "Note" following Table 2 including referenced formulas that follow this note and cr. (1) (a) and (b), Register, May, 1971, No. 185, eff. 6–1–71.

Ind 41.13 Maintenance. (1) All boilers shall be installed and maintained in such a manner as to prevent excessive corrosion and deterioration.

(2) The inspector shall note conditions during internal inspection,