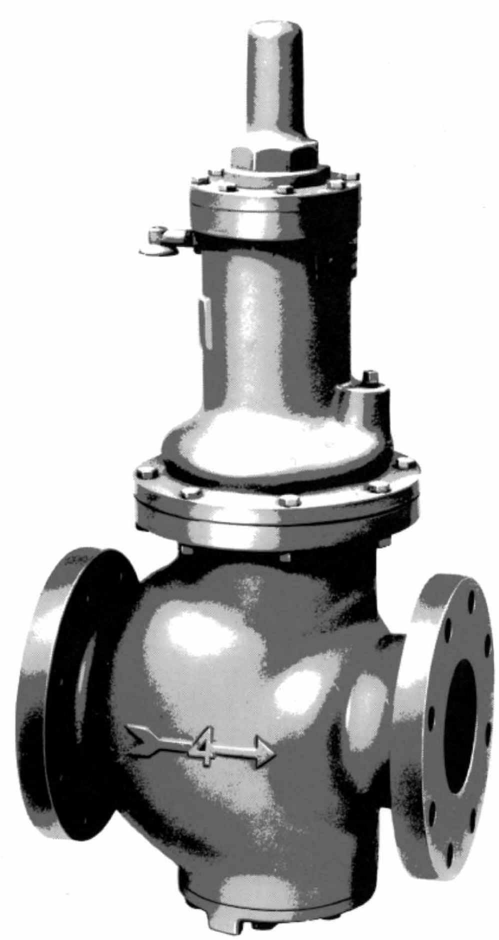
RDS-1452
Rev.1

Equimeter INCORPORATED
A BTR Metering Systems Company

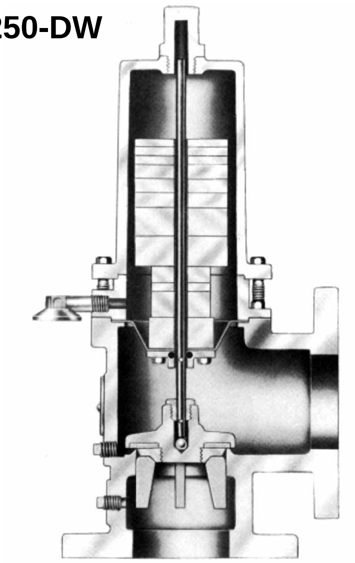
Relief Valve Sizing

Models 257S, 250-DW, and 250-S

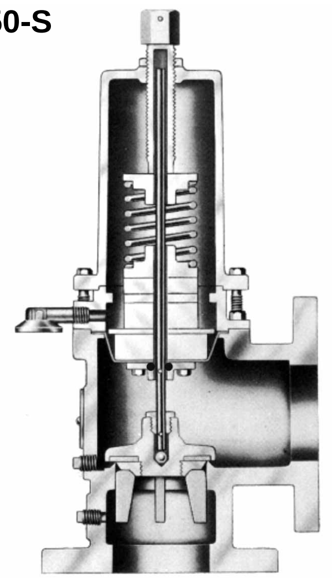
Model 257S



Model 250-DW



Model 250-S



Sizing Equimeter Model 257S, 250-DW, and 250-S relief valves is the subject of this bulletin. The method used is unique because it includes the effect of stack piping. Taking into account stack sizing makes more accurate sizing possible.

The basics of relief valve sizing are discussed on pages 2 and 3. Terms are defined and four typical installations are shown.

Page 4 is a nomogram that allows for stack piping. Page 5 gives instructions for using the nomogram, including figuring the equivalent length of stack piping. Page 5 also explains using the nomograms on pages 4 and 6 to get the maximum capacity of an installation.

The page 6 nomogram gives the required K factors of an installation and how to use it to size the relief valve.

The tables on page 7 give the K factors for the various models along with other basic data. Also on page 7 is information for determining set-point for models 250-DW and 250-S.

Pages 8 and 9 provide information for determining set-point for the 257S. Pages 10 and 11 cover the adjustment ranges for the various models along with dimensions and weights.

Equimeter INCORPORATED
A BTR Metering Systems Company

Taking the Measure of Tomorrow

Models 257-S, 250-DW, and 250S Relief Valve Sizing

Relief valve sizing begins with adequate data to clearly specify requirements. Figures 1 through 4 show some typical installations to illustrate what is involved. In general, the data required are the (1) maximum safe limit, (2) required relief capacity, (3) maximum blowing pressure, and (4) initial relief pressure. These are explained in the following sections. Branch Piping and Stack Piping are also covered.

Maximum Safe Limit

Relief valves protect against accidental overpressuring. Accordingly, in Figures 1 through 4, the relief valve must prevent the system pressure P_B from rising too high if a regulator failure creates an excessive flow of gas into the system. The maximum safe limit establishes a dividing line between what is and is not too high.

By releasing the excess gas to atmosphere, the relief valve prevents P_B from exceeding the maximum safe limit. The entire system must be safe at any pressure up to the limit. Pressures above are forbidden. Needless to say, it is most important to establish this limit carefully.

For applications on which it applies, attention is directed to Section 192.201 of the DOT code. One group of conditions that establishes the maximum safe limit is specified in 192.201, subsections (i), (ii), and (iii), as the maximum allowable operating pressure (MAOP) plus 10%, 6 psi or 50% respectively (carefully read 192.201 before using any of these values).

Required Relief Capacity

In general, a relief valve is sized to discharge a certain amount of gas into the atmosphere. This amount is called the required relief capacity and is specified in SCFH.

For full capacity relief, it is the SCFH that would flow into the system upon worst failure. The worst failure occurs when the regulator fails the widest open possible with inlet pressure (P_A in Figures 1 through 4) at maximum.

A vitally important step in relief sizing is to establish this required relief capacity. It must be accurate. If too small, a likely result could be a relief valve that is too small and thus provides inadequate protection.

Maximum Blowing Pressure

The maximum blowing pressure is the P_I at which the required relief capacity is reached.

Referring to Figures 1 through 4, note that P_I is the pressure at the relief valve inlet and not the system pressure P_B. They are the same as long as the relief valve is closed. However, when it opens and gas begins to flow, pressure loss begins to occur in the branch piping. The greater the relief flow, the greater the loss. And the greater the loss, the more P_B will exceed P_I.

Therefore, when sizing, it is important to take this branch piping pressure loss into account. Failure to do so could result in a relief valve that is too small. P_I will be less than P_B by the amount of pressure loss in the branch piping when flow reaches the required relief capacity, and it is the smaller of the two (P_I) that is the maximum blowing pressure for sizing the relief valve. When sizing is correct, the system pressure P_B will not exceed the maximum safe limit when P_I reaches the maximum blowing pressure.

Initial Relief Pressure – Set-Point

The initial relief pressure is the set-point for the relief valve. This is the pressure at which it begins to open. At lower pressures it is closed, and as pressure goes higher it opens. Also, the more the pressure increases above this, the farther the relief valve opens until wide open.

In general, the set-point is the pressure for which a relief valve is adjusted. Data covering the various adjustment ranges for the 257S, 250-DW, and 250-S are given on pages 7, 10, and 11.

The difference between the initial relief pressure and maximum blowing pressure is often called "build-up." It is the increase in P_I needed to reach the required relief capacity. In general, self-operated types of relief valves have more build-up than pilot operated types.

Another term sometimes used is "blow down." It is usually defined as the decrease in pressure below set-point to reach tight shutoff. The pressure at which a closing relief valve closes tight is generally somewhat less than the pressure at which in opening, gas begins to flow. At first glance, it would seem that the two should coincide. However, they actually do not because when the direction of movement of the valve is reversed, there is a slight shift in certain characteristics. This shift for the shutoff point is called "blow down."

Typical Relief Valve Installations

The simple and compact design of the Model 257S, 250-DW, and 250-S makes them easy relief valves to install. The sketch below shows typical arrangements.

The relief valve will work to maintain a safe pressure for which it is adjusted at that point in the downstream system where the relief valve is connected to the downstream piping.

The piping relief valve shall be downstream from the regulator and should be located in as a straight a run of pipe as possible. Where outlet piping increases in size near the regulator, it is preferable to connect into the larger diameter portion. The connection itself must be smooth and clean, free of rough edges, welding icicles, etc.

Figure 1

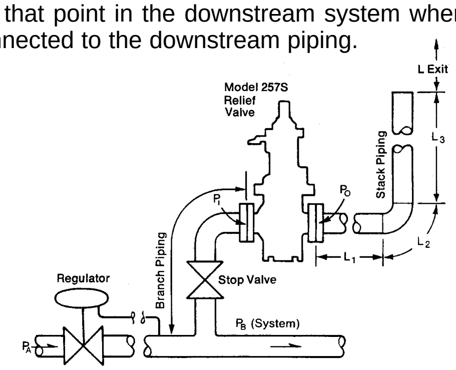
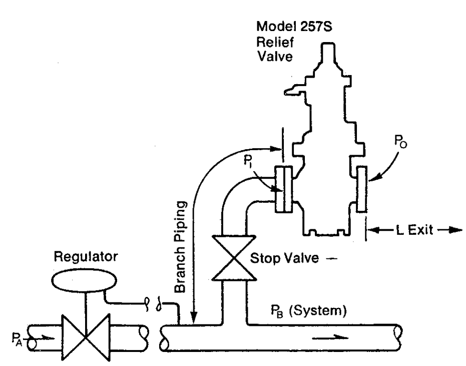


Figure 2



Branch Piping

Relief valve branch piping is the piping between the system and the relief valve inlet as shown in Figures 1 through 4. It must be adequately engineered into the overall relief valve installation. Pressure loss must be checked to avoid any excess that would restrict relief capacity below requirements.

As previously noted, when there is a maximum emergency and flow reaches the required relief capacity, the pressure at the relief valve inlet (P_I) will be less than the system pressure (P_B) by the amount of pressure loss in the branch piping. The branch piping should be as short and direct as possible, with pipe size as large as practical, in order to minimize the pressure loss.

Note the stop valve in Figures 1 through 4. This is an accepted practice in the gas industry in keeping with DOT 192.199(c) and 192.739. Note also, however, the need for adequate protection against unauthorized closure per DOT 192.199(h). Normally, this stop valve must remain fully open. If only partly open, there is only partial relief protection. If closed, there is no protection – relief capacity is zero. Therefore, it is vitally important that stop valves of this kind be adequately locked wide open.

Stack Piping

Stack piping affects the pressure at the relief valve outlet (P_O in Figures 1 through 4) and thus the relief capacity. The more pipe and elbows used, the greater the restriction and the lower the capacity.

Even when no stack piping is used there can be restriction from the exit effect of the relief valve outlet open end (L_{EXIT} in Figures 2 and 4).

Therefore, this should be included in relief valve sizing and that is the purpose of the nomogram on page 4 (Figure 5). It makes the allowance in relief capacity necessitated by the stack piping and thus improves sizing accuracy.

Note 192.199(c) in the DOT code which specifies that stack piping be "designed to prevent accumulation of water, ice or snow, located where gas can be discharged into the atmosphere without undue hazard." The last item can be a most serious consideration, particularly around congested areas. Even a small relief valve can release an enormous amount of gas into the atmosphere if the maximum blowing pressure is high enough. Possible hazard resulting from the gas discharged into the atmosphere by a relief valve must be carefully considered.

Summary

It is important to clearly distinguish between the various pressures involved. Referring to Figures 1 through 4, note how they are related:

1. First of all there is the NORMAL SYSTEM PRESSURE. With the regulator operating correctly, P_B is normal and the relief valve is closed. Since there is no relief flow, P_I is the same as P_B. The pressure of both is the NORMAL SYSTEM PRESSURE.

2. Secondly, there is the relief valve set-point, the INITIAL RELIEF PRESSURE. If a regulator failure causes excess gas to flow into the system, P_B will begin to rise above normal. When it reaches the INITIAL RELIEF PRESSURE the relief valve will begin to open.

3. Thirdly, there is the MAXIMUM BLOWING PRESSURE. This is reached when the relief valve is exiting all of the excess gas to atmosphere and there is no further rise in P_B. Remember that at this point the MAXIMUM BLOWING PRESSURE is P_I, the pressure at the relief valve inlet, not the system pressure P_B. P_I will be less than P_B by the amount of pressure loss in the branch piping.

4. Fourthly, there is the MAXIMUM SAFE LIMIT. This is the limit for P_B. When P_I (in 3 above) reaches the MAXIMUM BLOWING PRESSURE, the system pressure P_B must not exceed the MAXIMUM SAFE LIMIT.

5. FULL CAPACITY RELIEF in general means the relief valve is large enough to handle worst regulator failure. This occurs when the regulator fails in the widest open position possible with its inlet pressure P_A at maximum. Under these conditions, the relief valve must prevent P_B from exceeding the MAXIMUM SAFE LIMIT.

In addition to the DOT code references already cited, attention is also directed to other relief valve related information in sections 192.169, 192.195, 192.197, 192.199, 192.201, 192.203, 192.731, 192.739 and 192.743.

Caution: The relief valve set pressure has been reduced to prevent valve damage during shipment and storage. The 250-DW should be installed, and the 257S and 250-S adjustment screw should be adjusted, so the double stop nut contacts the top cap just prior to pressurization. Turn gas on slowly. If a stop valve is used, it should be opened first and should remain open after setting. Do not overload the diaphragm and/or valve with a sudden surge of inlet pressure. Monitor the inlet pressure during start-up to prevent the relief valve from opening. **Refer to Equimeter Bulletin R-1450 for more detailed start-up procedures**.

Figure 3

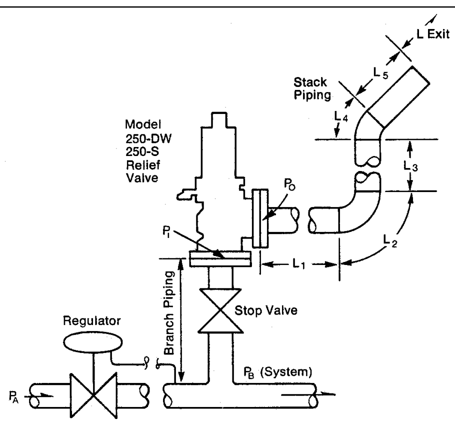
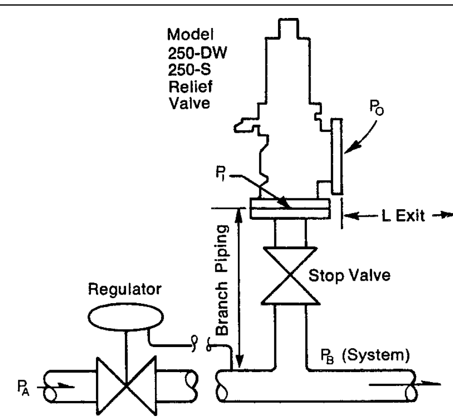


Figure 4



Caution: It is the user's responsibility to assure that all relief valve stacks and/or vent lines exhaust to a non-hazardous location away from any potential sources of ignition. **Refer to Equimeter Bulletins R-1450 and RM-1399 for more detailed information**.

TOC

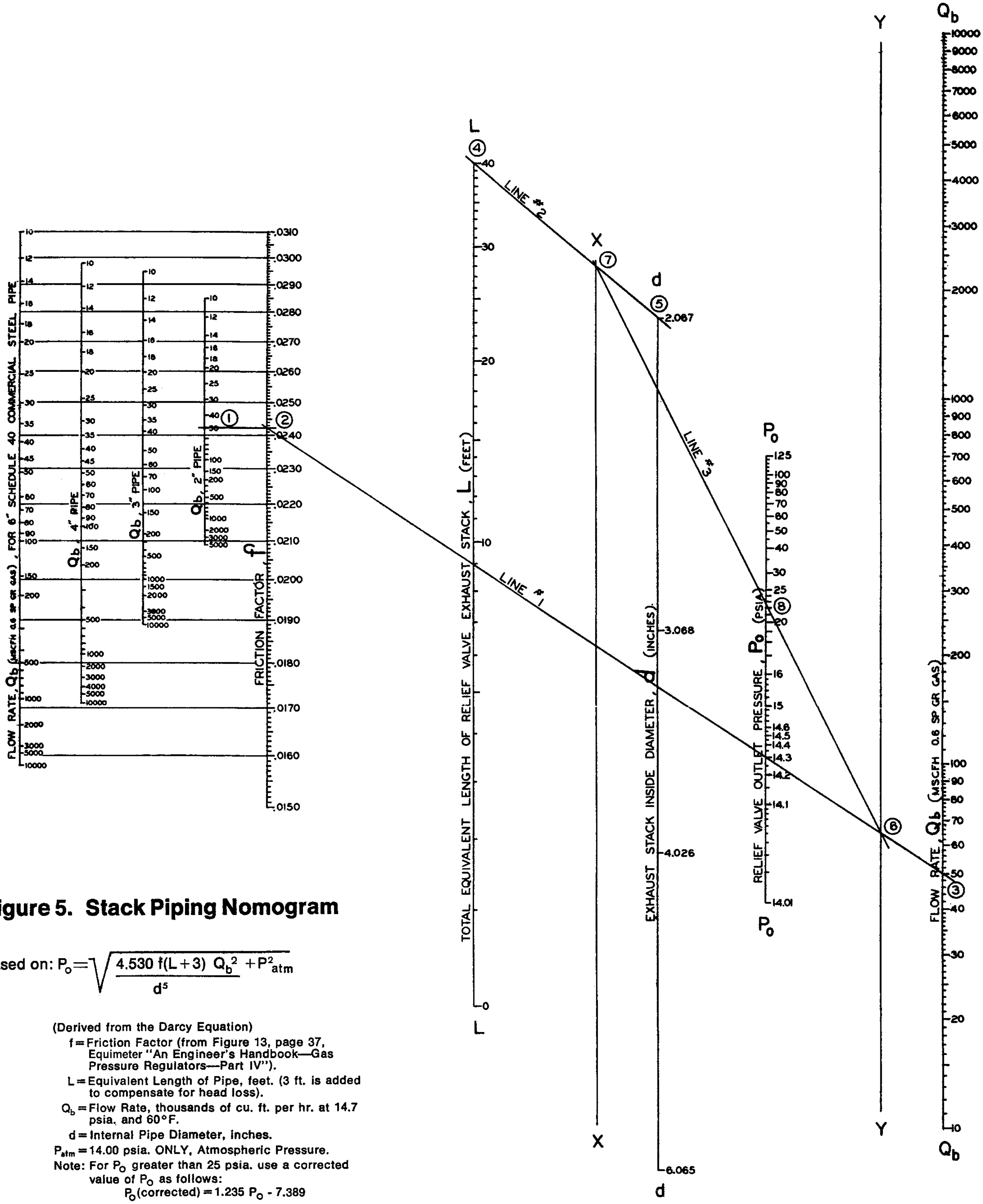


Figure 5. Stack Piping Nomogram

Based on: $P_o = \sqrt{\dfrac{4.530\, f(L+3)\; Q_b^2}{d^5} + P^2_{atm}}$

(Derived from the Darcy Equation)

f = Friction Factor (from Figure 13, page 37, Equimeter "An Engineer's Handbook—Gas Pressure Regulators—Part IV").

L = Equivalent Length of Pipe, feet. (3 ft. is added to compensate for head loss).

Q_b = Flow Rate, thousands of cu. ft. per hr. at 14.7 psia. and 60°F.

d = Internal Pipe Diameter, inches.

P_{atm} = 14.00 psia. ONLY, Atmospheric Pressure.

Note: For P_o greater than 25 psia. use a corrected value of P_o as follows:

$P_o(\text{corrected}) = 1.235\, P_o - 7.389$

Sizing a Relief Valve

Before using nomograms Figures 5 and 6 to size a relief valve, it is necessary to establish (1) the maximum safe limit, then – on the basis of it – establish (2) the required relief capacity and (3) the maximum blowing pressure.

To get the maximum blowing pressure, it is necessary to know the pressure loss in the branch piping, which varies depending on its pipe size as well as the required relief capacity. Furthermore, this pipe size is often also used for the relief valve itself and the stack piping.

An additional preliminary step then is to establish this pipe size. One way to do it is to simply make an "engineered guess." Another way is to roughly calculate for the pipe size having the lowest practical pressure loss (note... maximum blowing pressure = maximum safe limit – branch piping pressure loss). Whichever way it is done, work fully through nomograms Figures 5 and 6. The result will show if the pipe size is satisfactory overall or if another should be tried.

After the relief valve size and model have been established by means of Figures 5 and 6, use the information on pages 7, 8, and 9 to get the set-point (initial relief pressure).

Instructions for using Figure 5 follow. Instructions for Figure 6 are provided with it. An example is included in these instructions. Using Figure 1 on page 2 for the example, the initial conditions are a required relief capacity of 49,700 SCFH, a maximum blowing pressure of 15 psig and 2" sch. 40 for the stack piping.

Instructions for Figure 5

To get the value of P_O:

1. Locate the REQUIRED RELIEF CAPACITY on the Flow Rate Q_b scale for the stack pipe used. This is point①.
   Example: Vent pipe is 2" sch. 40 and REQUIRED RELIEF CAPACITY is 49,700 SCFH.

2. Move straight across from①to locate point②on the f scale.
   Example: ②gives a friction factor of .0242.

3. Locate the REQUIRED RELIEF CAPACITY on the opposite Flow Rate Q_b scale. This is point③.
   Example: REQUIRED RELIEF CAPACITY is 49,700 SCFH.

4. Draw line #1 from②to③and locate point⑥on the Y scale.

5. Locate the TOTAL EQUIVALENT LENGTH of stack piping on the L scale. This is point④. Follow the explanation below to get L.
   Example: L, the TOTAL EQUIVALENT LENGTH, is 40 ft. based on the following make up for Figure 1: L_1 is 20 ft., L_3 is 8 ft., and from Table A, L_2 is 5 ft. and L_{EXIT} is 7 ft. L is the sum of these or 40 ft.

6. Locate the STACK I.D. on the d scale. This is point⑤.
   Example: Referring to Table B, the I.D. of 2" sch. 40 pipe is 2.067 in.

7. Draw line #2 from④to⑤and locate point⑦on the X scale.

8. Draw line #3 from⑥to⑦and locate⑧on the P_o scale. This is the value of P_O.
   Example: P_O is 22.5 psia (absolute pressure). Rounded to the next highest whole number it is 23 psia. Using this for point 1 on Figure 6, turn to page 6 and follow the instructions to get the size and model relief valve to use.

Stack Piping – Total Equivalent Feet

Scale L on Figure 5 is for the total equivalent feet of stack piping. L consists of three parts; pipe, elbows, and the open end.

For the pipe, use the total length of straight pipe in feet. In Figure 1 it is $L_1 + L_3$. In Figure 3 it is $L_1 + L_3 + L_5$. In Figures 2 and 4 it is zero.

For the elbows and open end, take the appropriate values from Table A. For example: if the stack piping in Figure 1 is 2" size, L_2 is 5 ft. and L_{EXIT} is 7 ft. In Figure 3, if 6" pipe size, L_2 is 10 ft., L_4 is 8 ft. and L_{EXIT} is 21 ft.

For Figure 1, $L = L_1 + L_2 + L_3 + L_{EXIT}$. For Figures 2 and 4, $L = L_{EXIT}$ only. For Figure 3, $L = L_1 + L_2 + L_3 + L_4 + L_5 + L_{EXIT}$.

Table B gives the actual I.D. (inside diameter) of sch. 40 pipe. This is needed for the d scale on Figure 5.

Maximum Relief Valve Capacity

Figures 5 and 6 can be used to find maximum relief valve capacity. The starting data needed are (1) the relief valve K factor from Page 7, (2) maximum blowing pressure P_I, (3) stack equivalent length L from Table A, and (4) stack size and inside diameter d from Table B.

Unfortunately the answer cannot be taken directly from the nomograms. Instead, Figure 6 must be worked against Figure 5 until their P_o values match.

Assume a value for P_O and use it in Figure 6, along with K and P_I, to find Q point 2. Next, apply this Q to points 1 and 3 of Figure 5, along with L and d, to find P_O point 8. Continue trying different values for P_O in Figure 5 until it matches P_O in Figure 6. The Q that matches them is the maximum capacity for the relief valve in that particular installation.

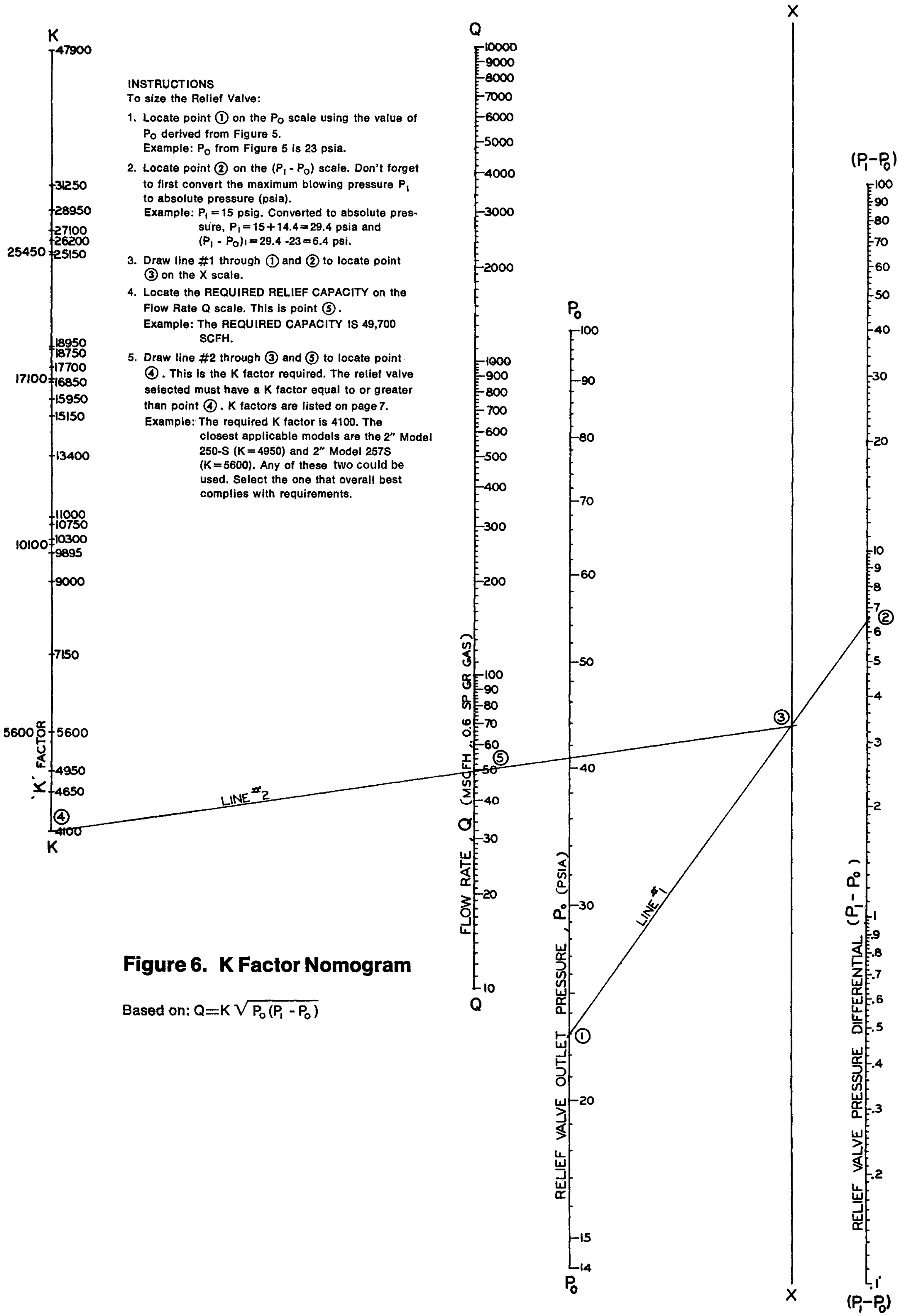
CAUTION: *Do not use Figure 6 by itself as it will lead to erroneous capacities. Always check the Q from Figure 6 with the Q from Figure 5 until P_O on Figures 5 and 6 match.*

Table A. Equivalent Feet of Pipe

Pipe Size	90° Elbow Std.	90° Elbow Long Radius	45° Elbow	Open End (L_{EXIT})
2"	5 ft.	4 ft.	3 ft.	7 ft.
3"	7 ft.	5 ft.	4 ft.	10 ft.
4"	10 ft.	7 ft.	5 ft.	14 ft.
6"	15 ft.	10 ft.	8 ft.	21 ft.

Table B.

Pipe Size	d (Inside Diameter) Inches
2" sch. 40	2.067
3" sch. 40	3.068
4" sch. 40	4.026
6" sch. 40	6.065



INSTRUCTIONS

To size the Relief Valve:

1. Locate point ① on the P_o scale using the value of P_o derived from Figure 5.
   Example: P_o from Figure 5 is 23 psia.
2. Locate point ② on the $(P_1 - P_o)$ scale. Don't forget to first convert the maximum blowing pressure P_1 to absolute pressure (psia).
   Example: $P_1 = 15$ psig. Converted to absolute pressure, $P_1 = 15 + 14.4 = 29.4$ psia and $(P_1 - P_o)_1 = 29.4 - 23 = 6.4$ psi.
3. Draw line #1 through ① and ② to locate point ③ on the X scale.
4. Locate the REQUIRED RELIEF CAPACITY on the Flow Rate Q scale. This is point ⑤.
   Example: The REQUIRED CAPACITY IS 49,700 SCFH.
5. Draw line #2 through ③ and ⑤ to locate point ④. This is the K factor required. The relief valve selected must have a K factor equal to or greater than point ④. K factors are listed on page 7.
   Example: The required K factor is 4100. The closest applicable models are the 2" Model 250-S (K=4950) and 2" Model 257S (K=5600). Any of these two could be used. Select the one that overall best complies with requirements.

Figure 6. K Factor Nomogram

Based on: $Q = K\sqrt{P_o(P_1 - P_o)}$

Model 257S Spring Type with Roll-Out Diaphragm

Pipe Size	Adjustment Range (Initial Relief Pressure)	K Factor	Valve Travel
2"	2 psig to 100 psig	5,600	$^3/_4$"
3"		10,100	$1^1/_4$"
4"		17,100	1"

Model 250-DW Weight Type

Pipe Size	Adjustment Range (Initial Relief Pressure)	K Factor	Valve Size
2"	8 ozs. (14" N.C.) to 6 psig	4,650	$1\,^3/_4$"
3"	11 ozs. (14" N.C.) to 3 psig 8 ozs. (14" N.C.) to $2^1/_4$ psig	10,750 13,400	$2\,^1/_2$" 3 "
4"	12 ozs. (14" N.C.) to $4^1/_2$ psig 8 ozs. (14" N.C.) to 2 psig	15,950 26,200	3 " 4 "

Model 250-S Spring Type

Pipe Size	Adjustment Range (Initial Relief Pressure)	K Factor	Valve Size
2"	2 psig to 40 psig	4,950	$1\,^3/_4$"
3"	1 psig to 30 psig	10,300	3 "
4"	15 psig to 30 psig 1 psig to 16 psig	11,000 16,850	3 " 4 "

Relief Valve Set-Point – Models 250-DW and 250-S

P_I is the pressure at the inlet of the relief valve. When P_I reaches set-point (initial relief pressure), the relief valve begins to open. When P_I reaches the maximum blowing pressure, the relief valve is full open or at least far enough open to flow the required relief capacity.

For the relief valve to be full open when P_I reaches the maximum blowing pressure, the set-point should be the following or lower:

1. **Model 250-DW:**
   a. When the maximum blowing pressure is 40 oz. ($2^1/_2$ psig) and higher;

      $$\text{Set-point} = \frac{\text{maximum blowing pressure}}{1.10}$$

      (note... at set-points of $2^1/_2$ psig and above, relief valve is full open at set-point + 10%)

   b. When maximum blowing pressure is less than 40 oz.;
      Set-point = maximum blowing pressure - 4 oz.

2. **Model 250-S:**
   a. When maximum blowing pressure is 10 psig and higher;

      $$\text{Set-point} = \frac{\text{maximum blowing pressure}}{1.25}$$

      (note... at set-points of 10 psig and above, relief valve is full open at set-point + 25%).

   b. When maximum blowing pressure is less than 10 psig;
      Set-point = maximum blowing pressure – 2 psi.

The foregoing is quite satisfactory for most applications. Note however that the set-points obtained are usually below their actual maximum values. The reason for this is that relief valves usually have excess capacity. The required K factor (point 4 on Figure 6) rarely exactly matches a relief valve maximum K factor. Hence, most relief valves have more capacity than is needed and therefore reach the required relief capacity before they are wide open. As a result their set-points can actually be higher depending on the amount of excess capacity.

Unfortunately, it is not easy to set up a method for determining how much higher. Therefore, please contact Equimeter whenever the set-point needed is higher than what is obtained by the foregoing method. Engineering will provide the information.

Relief Valve Set-Point – Model 257S

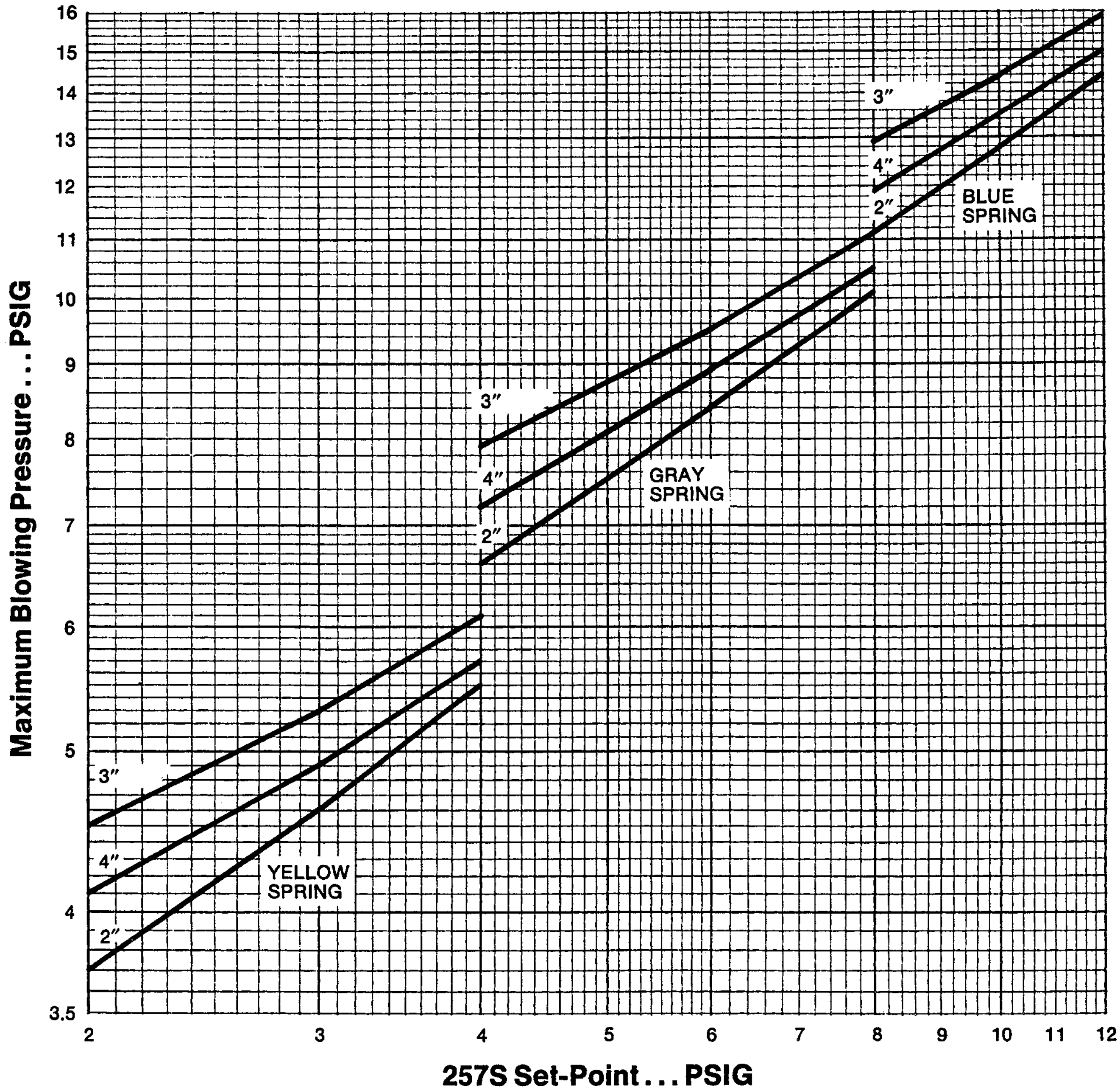
P_I is the pressure at the inlet of the relief valve. When P_I reaches set-point (initial relief pressure), the relief valve begins to open. When P_I reaches the maximum blowing pressure, the relief valve is full open or at least far enough open to flow the required relief capacity.

For the relief valve to be full open when P_I reaches the maximum blowing pressure, the set-point should be the following or lower:

Model 257S:
Use the curves on these two pages (Figure 7).

First find the maximum blowing pressure on the vertical scale. Then follow it horizontally across to the curve for the spring and pipe size used. From the intersection go vertically down to the horizontal "257S set-point" scale. Set-point should be this value or lower for the relief valve to be wide open when P_I reaches the maximum blowing pressure.

Figure 7 **Model 257S . . . . Set Point vs.**



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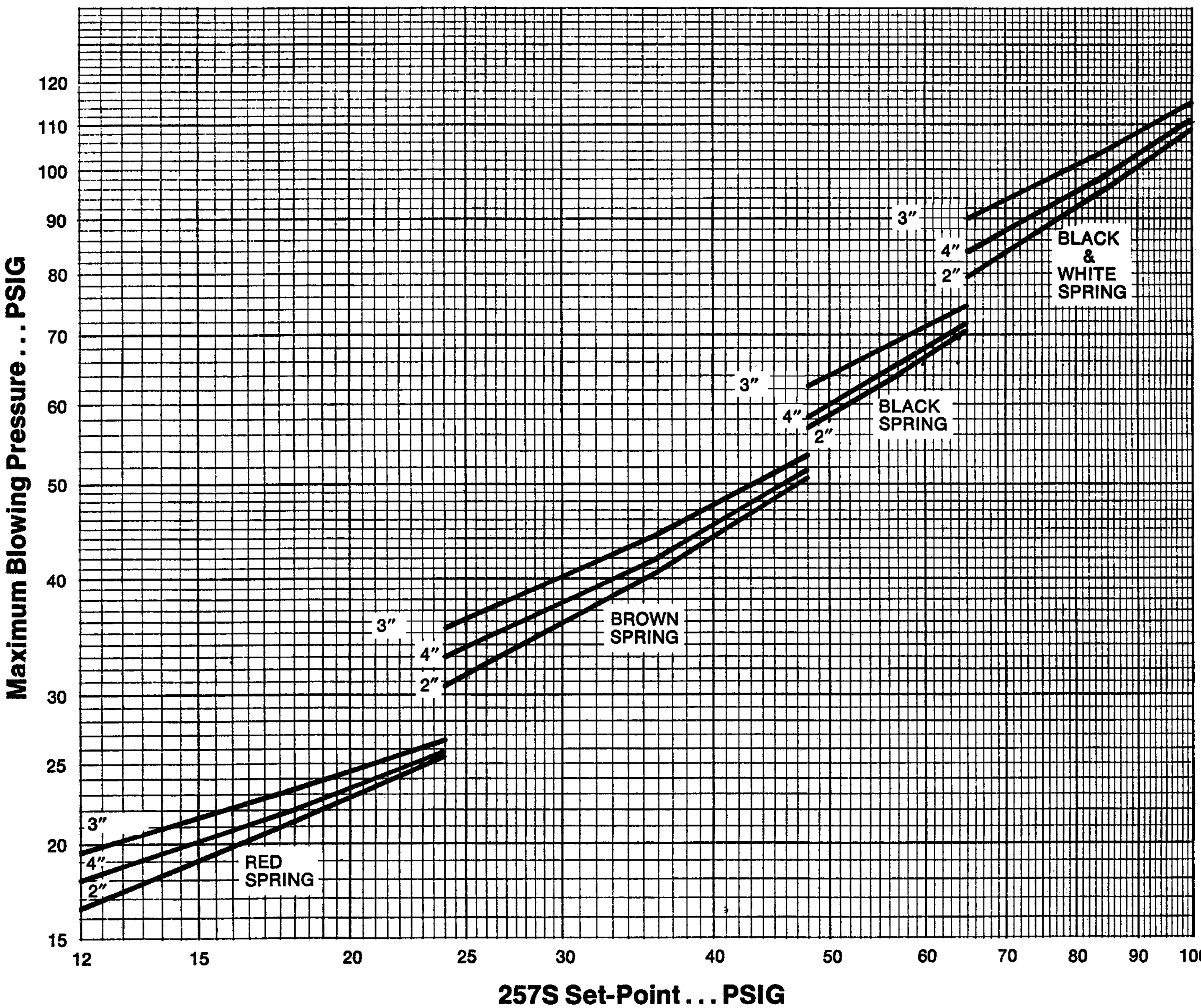
Note there are three curves for each spring. The bottom curve is for the 2" Model 257S, the middle one is for the 4" size, and the top one is for the 3" size. Be sure to intersect the correct curve.

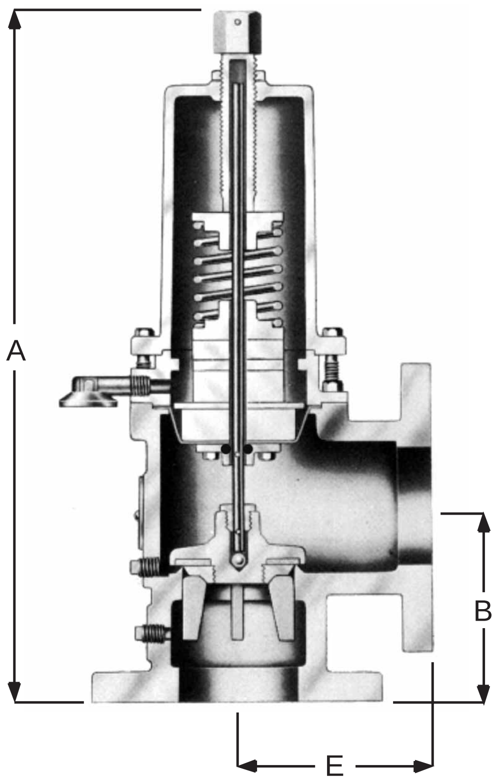
This method of determining set-point is quite satisfactory for most applications. Note however that the set-points derived are usually below their actual maximum values. The reason for this is that relief valves usually have excess capacity. The required K factor (point 4 on Figure 6) rarely exactly matches a relief valve maximum K factor. Hence, most relief valves have more capacity than is needed and therefore reach the required relief capacity before they are wide open. As a result, their set-points can actually be higher, depending on the amount of excess capacity.

Unfortunately, it is not easy to set up a method for determining how much higher. Therefore, please contact Equimeter whenever the set-point needed is higher than what is obtained by the foregoing method. Engineering will provide the information.

Maximum Blowing Pressure at Full Open



Model 250-S

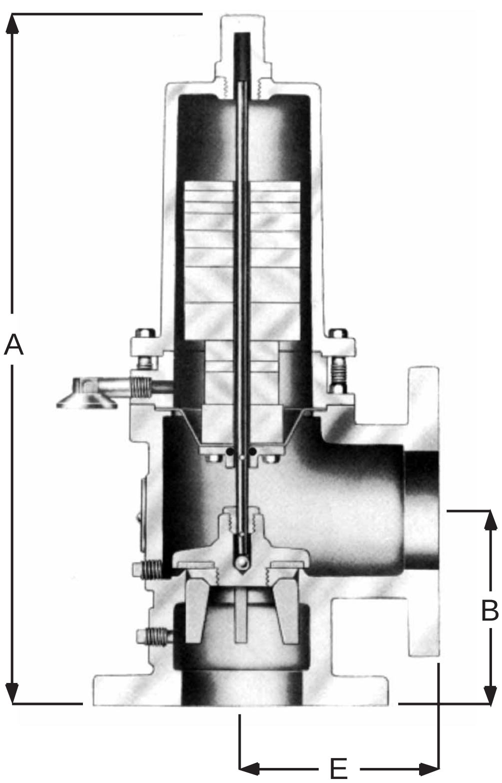


DIMENSIONS

SIZE	A	B	E	WEIGHT LBS.
2" NPT	19 1/2"	3 1/4"	3 1/4"	30
2" Flgd.		4 1/4"	4 1/4"	40
3"	20 3/4"	5 "	5 "	65
4"	22 1/4"	6 "	6 "	110

COLOR OF SPRING	Initial Relief Pressures, psi			
	2"	3"	4"	
	1 3/4" dia.	3" dia.	4" dia.	3" dia.
Aluminum	2 – 10	1 – 4	1.00 – 2.25	
Green	10 – 16	4 – 6	2.25 – 3.50	
Yellow	16 – 26	6 – 10	3.50 – 5.50	
Gray	26 – 40	10 – 15	5.50 – 7.50	
Blue		15 – 30	7.50 –16.00	15 – 30
Red		30 – 50	16.00 – 25.00	

Model 250-DW

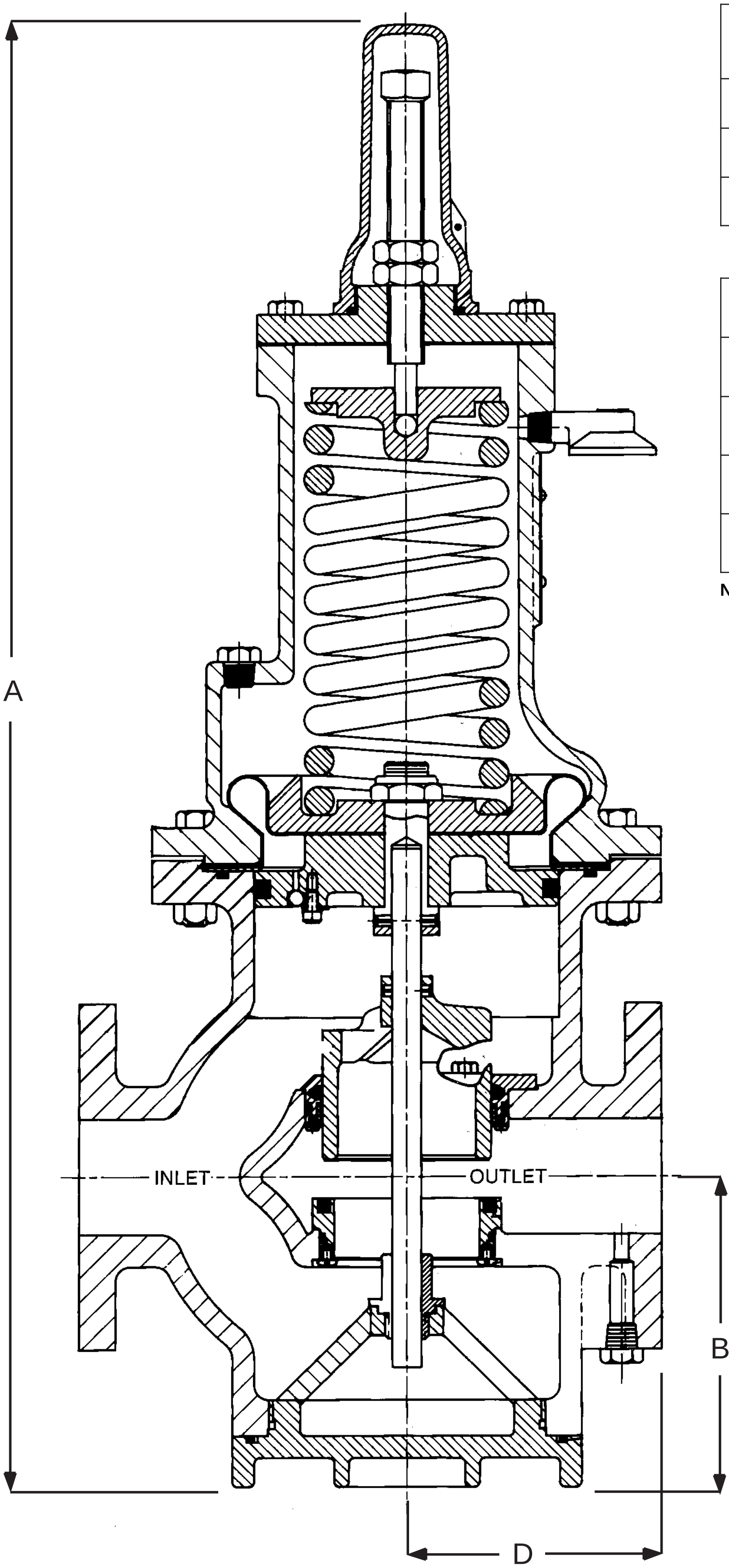


Size	Valve Diameter	Initial Relief Pressures	Minimum Relief Pressure Without Weights	Weights		Maximum Number of Weights
				Size	Will Increase Relief Pressure	
2"	1 3/4"	8 ozs. to 6 psi	15 ounces (8 ozs.– special)	3" × 1" 3" × 1/2" 3" × 1/4"	12.00 ounces 6.00 ounces 3.00 ounces	7–1"
3"	3 "	8 ozs. to 36 ozs.	8 ounces	3" × 1" 3" × 1/2" 3" × 1/4"	4.00 ounces 2.00 ounces 1.00 ounce	7–1"
	2 1/2"	11 ozs. to 50 ozs.	11 ounces	3" × 1" 3" × 1/2" 3" × 1/4"	6.00 ounces 3.00 ounces 1.50 ounces	7–1"
4"	4 "	8 ozs. to 32 ozs.	8 ounces	3" × 1/2" 3" × 1/4"	1.00 ounce 0.50 ounce	Use these weights first, immediately above diaphragm
				3 3/4" × 1 " 3 3/4" × 1/2" 3 3/4" × 1/4"	4.00 ounces 2.00 ounces 1.00 ounce	6 –1" × 3 3/4"
	3 "	12 ozs. to 55 ozs.	12 ounces	3" × 1/2" 3" × 1/4"	1.00 ounce	Use these weights first, immediately above diaphragm
				3 3/4" × 1 " 3 3/4" × 1/2" 3 3/4" × 1/4"	7.00 ounces 3.50 ounces 1.75 ounces	6 –1" × 3 3/4"

DIMENSIONS

SIZE	A	B	E	WEIGHT LBS.
2" NPT	16 3/4"	3 1/4"	3 1/4"	30
2" Flgd.		4 1/4"	4 1/4"	40
3"	18 1/4"	5 "	5 "	65
4"	20 "	6 "	6 "	110

Model 257S



DIMENSIONS

Size	A	B	D	WEIGHT LBS.
2"	$24^1/_4$"	$5^3/_8$"	10"	95
3"	$24^3/_4$"	$5^3/_8$"	$11^3/_4$"	105
4"	$26^1/_2$"	$5^7/_8$"	$12^1/_2$"	125

Initial Relief Pressures	Color of Spring	Part Numbers
2 to 4 psi 4 to 8 psi	Yellow Gray	091-00-021-05 091-00-021-04
8 to 12 psi 12 to 24 psi	Blue Red	091-00-021-03 091-00-021-02
24 to 48 psi 48 to 65 psi	Brown Black	091-00-021-01 091-00-021-00
65 to 100 psi	Black with a White inner spring	091-00-021-00 091-00-021-08

NOTE: Do not exceed maximum pressure of each spring.