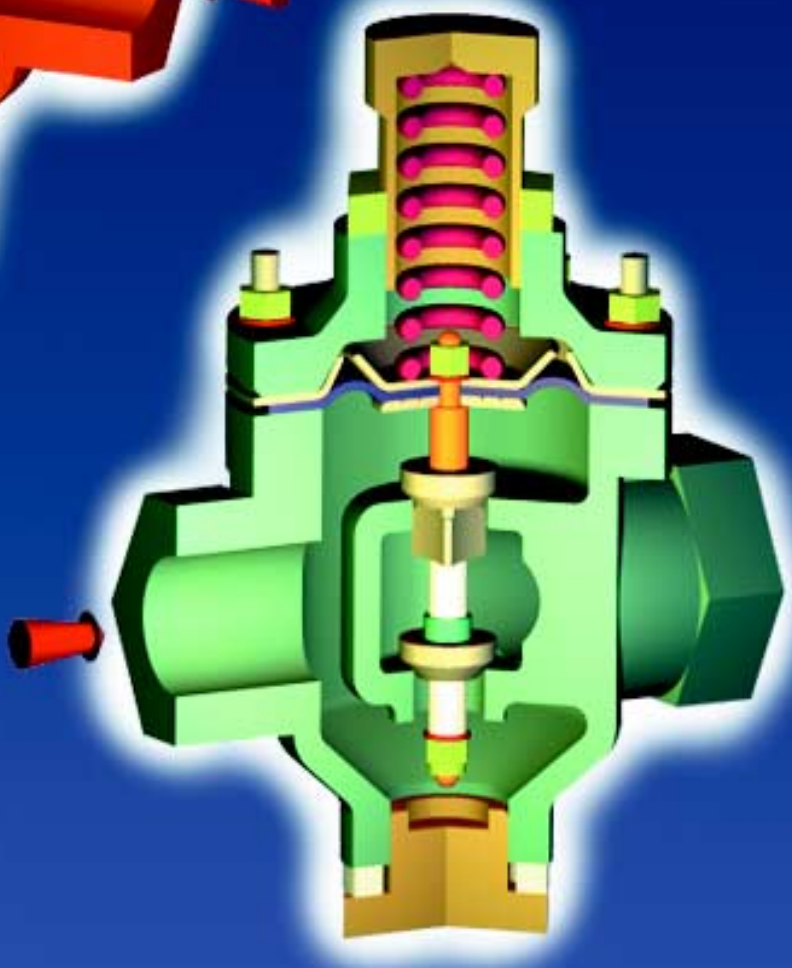
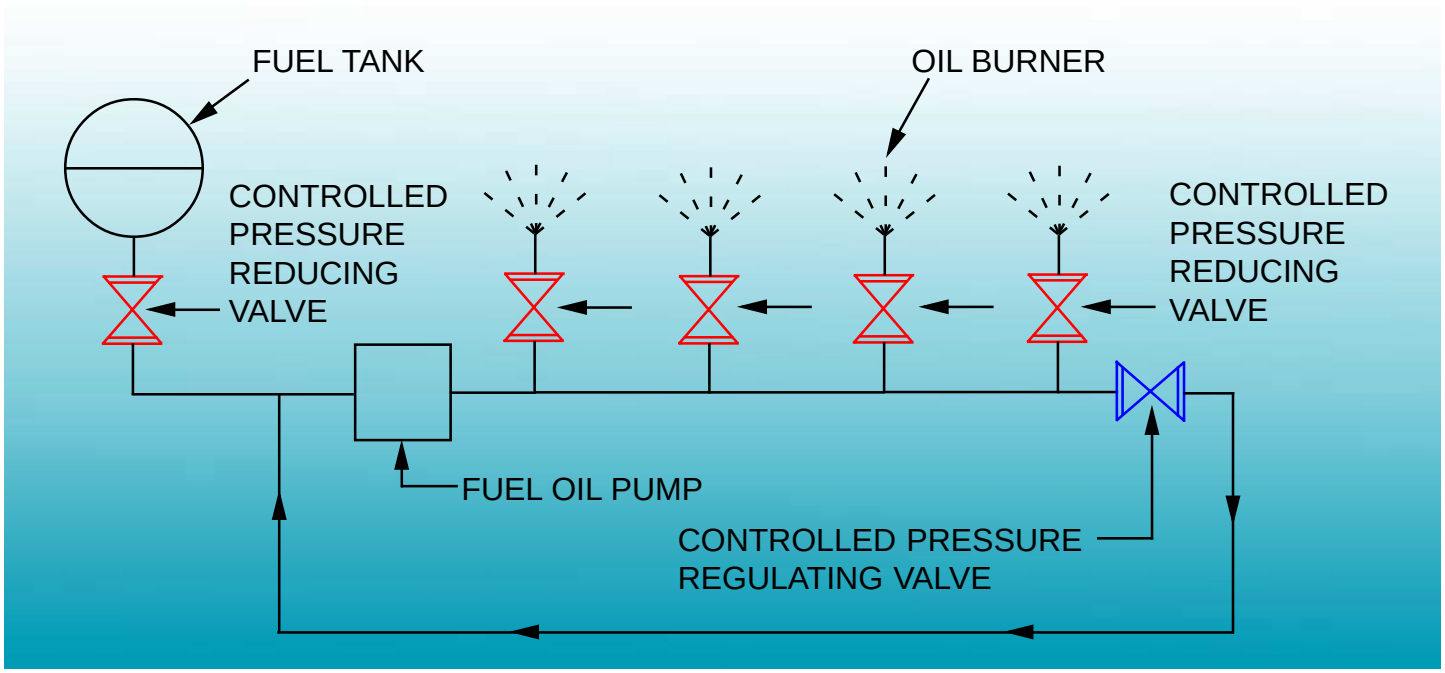
VELAN

‘ZWICKY VALVES’



CONTROLLED PRESSURE VALVES FOR FLUID SYSTEMS

ZWICKY CONTROLLED PRESSURE VALVES



These valves – of which there are two types (see opposite pages) – are designed to provide the means sensitivity and accuracy to control fuel oil pressures in oil burning systems.

Both types of valve perform this basic function.The one reacting to pressure on the outlet side of the valves (Reducing); the other being actuated by pressure on the inlet side of the valves (Regulating) .

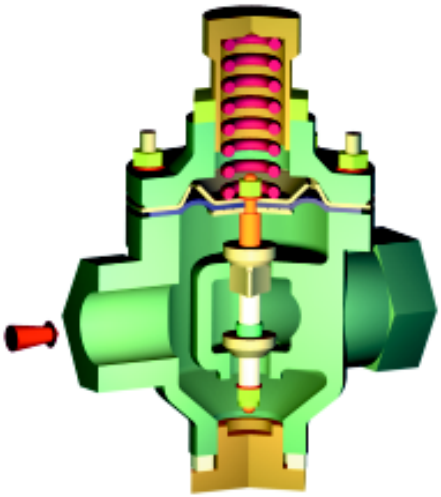
Obviously, their application is confined to oil systems – but, primarily, they were developed for use with oil-fired installations.

These valves are extremely sensitive to the forces of fluid pressure acting upon them, and instantly respond by compensating adjustment to variations from the datum pressure from which they are set.

Typical of the applications for which ZWICKY Controlled Pressure Valves have been developed is this gallery line feeding a number of oil burners.
The line is held at a constant pressure by means of a Controlled Pressure Regulating Valve at its downstream end. A Controlled Pressure Reducing Valve is located upstream of each burner in order that the pressure at which oil is fed to each burner remains constantly at that needed to ensure safe and efficient operation. The pressure in the gallery line would generally be above that at which the burners operate.
A Controlled Pressure Reducing Valve is also fitted at the outlet of the Storage Tank so that whatever the level of the oil in the tank, constant pressure is maintained to the suction side of the pump.
There are many applications for Controlled Pressure Regulating and Reducing Valves used separately or in conjunction.
The Regulating Valve, for example, may be used in a Pump By-Pass circuit to prevent the pressure downstream of the pump rising above the datum level.

Size		PSI	Part Number	
			Regulating	Reducing
3/4”	Low Flow	4-80	25321/1	25322/1
	STD	4-80	26314/1	26949/1
	Special	80-110	-	-
1”	STD	4-20	26315/1	25315/1
	STD	20-60	26315/2	25315/2
	HP	60-80	26316/2	-
	Special	85-110	-	-
1.1/2”	STD	4-20	25316/1	25320/1
	STD	20-60	25316/2	25320/2
	HP	60-80	25319/2	25317/2
	Special	85-110	-	-
2”	STD	4-20	25323/1	25324/1
	STD	20-60	25323/2	25324/2
	HP	60-80	25472/2	-
	Special	85-110	-	-

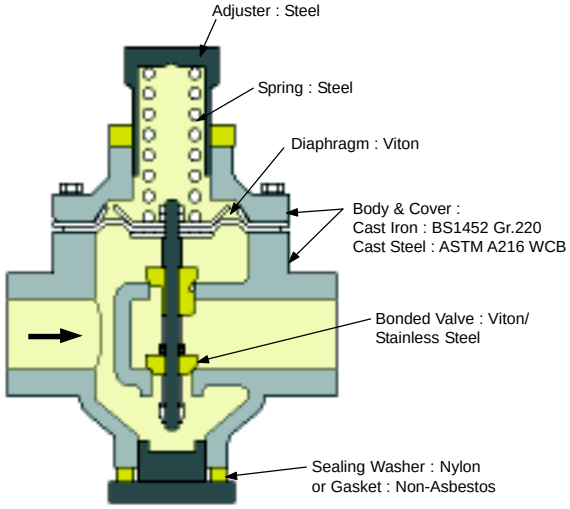
CONTROLLED PRESSURE REGULATING VALVES



The operation of this valve is in some respects similar to a safety valve. But it is designed sensitively to react to variations of pressure at a constant and predetermined level.

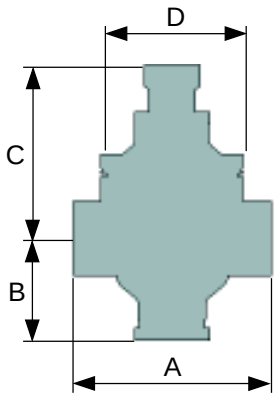
It remains closed while the fluid pressure upstream of the valve builds up to the predetermined datum level, beyond which any further increase in pressure will act upon the underside of the diaphragm and cause the valve to open. The valve will continue sensitively thus to regulate the pressure on the line upstream of it, opening and closing according to the pressure acting upon the diaphragm.

Material Specifications



Wetted Internal Components : Stainless Steel

Dimensions



SIZE	A	B	C	D
3/8 (10)	4.7/8 (124)	2.1/16 (52)	3.7/8 (98)	2.7/8 (73)
1/2 (15)	4.7/8 (124)	2.1/16 (52)	3.7/8 (98)	2.7/8 (73)
3/4 (20)	4 (102)	2.1/16 (52)	3.7/8 (98)	2.7/8 (73)
1 (25)	5.3/4 (146)	3.15/32 (88)	6.7/16 (164)	5.1/2 (140)
1.1/4 (32)	8.1/4 (210)	3.15/32 (88)	6.7/16 (164)	5.1/2 (140)
1.1/2 (40)	7.3/4 (197)	4.3/32 (104)	6.15/16 (176)	5.1/2 (140)
2 (50)	10.3/4 (273)	4.3/32 (104)	6.15/16 (176)	5.1/2 (140)
2 (50) FLANGED	8.1/2 (216)	4.3/32 (104)	6.15/16 (176)	5.1/2 (140)

2” Flange Option : 1. ANSI 125, 2. ANSI 150, 3. BS10 Table D, 4. BS10 Table E, 5. BS4504 PN6

Control Range

Standard Valves Upto and including
3/4” Valve : 4psi(0.3bar) to 80psi(5.5bar)
1” and above : 4psi(0.3bar) to 60psi(4bar)
This is obtained by a series of springs, therefore control pressure must be specified when ordering.

Spring Ranges Available

3/8” to 3/4” Std.
4-9, 5-25, 25-50, 20-35, 50-80psi.

1” to 2” Std.
4-9, 5-20, 20-35, 30-40, 35-50, 45-60psi.

1” to 2” High Pressure.
60-80psi only.

Flow Rate

0-3000g.p.h. Graphs giving typical flow characteristics as shown.

Standard Pipe Sizes

3/4”, 1” and 1.1/2” BSP Female.
2” Flanged.
Adaptors to male and female BSP connections from 3/8” to 2” can be supplied.

Test Pressure

150psi (10bar).

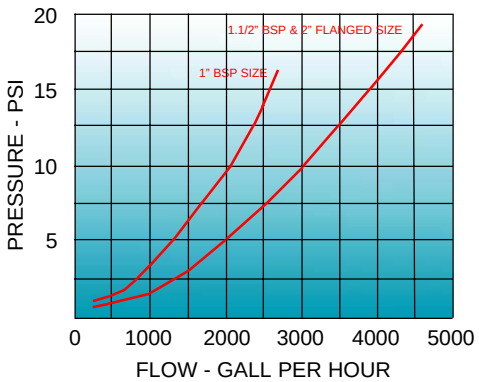
Working Pressure

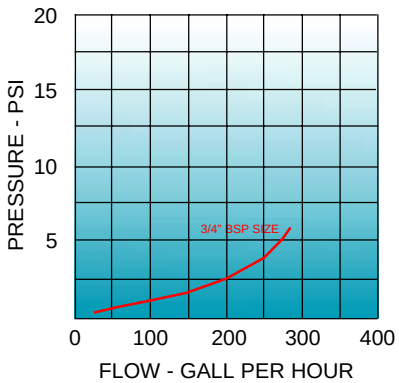
100psi (7bar).

Temperature

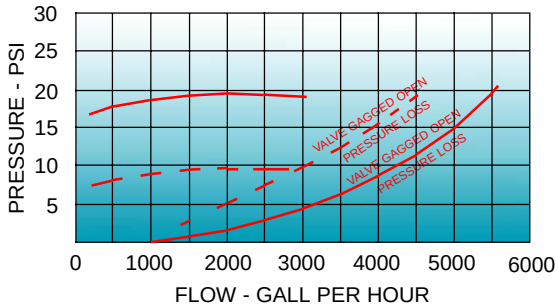
The maximum continuous Working Temperature of the standard range of valves is 170deg.C(388deg.F).

Low Flow extra-sensitive valves are available from stock (flow rate 2-20g.p.h.) Sizes 3/8”, 1/2” and 3/4” only.





Graph show example of Pressure Loss when Valves are fully open. Oil 1500secs. Redwood No.1



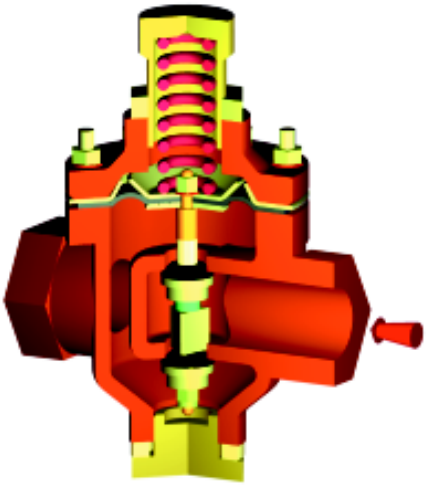
This graph represents test results taken from the operation of 1.1/2” and 2” valves. They reflect the extreme sensitivity of the valves in correcting fluctuation in pipeline pressure.

The “Valve Gagged Open” curves show that the pressure loss is negligible at the rates of flow for which the valves are designed.

Key

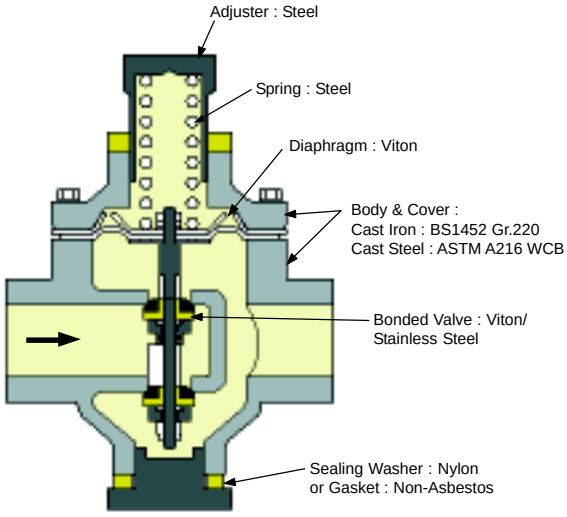
- - - - - - - Machine oil at 1500secs. Redwood No.1
——— Parraffin 32secs. Redwood No.1

CONTROLLED PRESSURE REDUCING VALVES



This valve controls the flow of oil through it, according to the pressure at its outlet side. Thus downstream of it there can be maintained a constant and predetermined fluid pressure regardless of the rate of flow, pressure or viscosity at which fuel enters the valve at its inlet side.
The valve is spring loaded open. After the flow of fuel oil begins the valve remains fully open until the fluid pressure downstream of the valve rises to the predetermined datum level at which it is to be stabilised. Any further increase of pressure at the outlet side of the valve immediately exerts a back pressure upon the underside of the diaphragm closing the balanced valve against its spring loading. Thus at the ruling rate of flow, the pressure at the outlet side of the valve is stabilised at the datum level pressure for which the valve is set. Any subsequent variations in the inlet pressure or rate of flow will cause similar and instantaneous compensating adjustments to the valve opening, always to maintain the outlet pressure at its datum level.

Material Specifications



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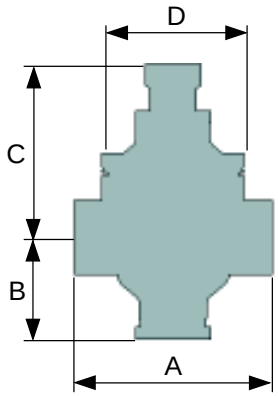

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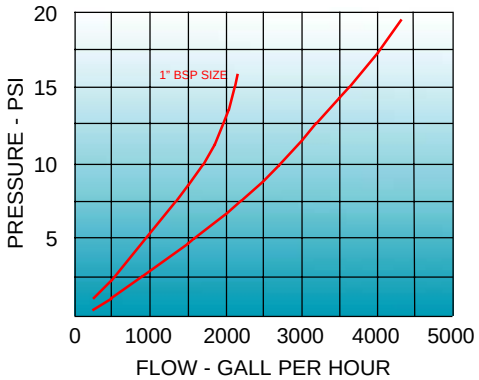

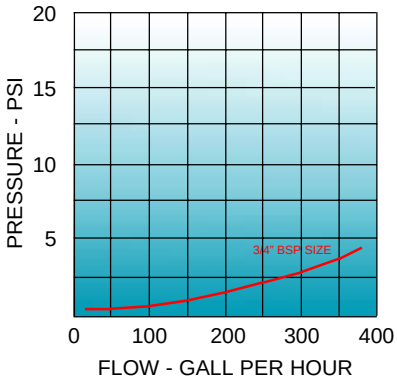

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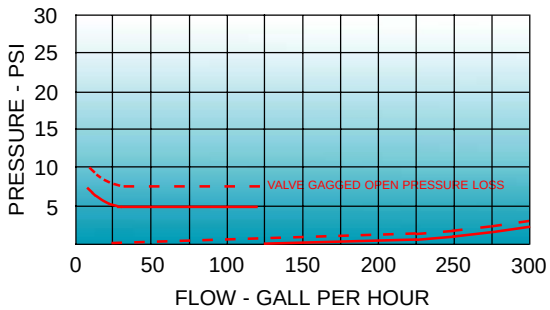

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Key

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——— Parraffin 32secs. Redwood No.1

SELECTING CONTROLLED PRESSURE VALVES

To select a suitable valve the following data is required :

1. **Maximum Temperature.**
2. **Minimum Inlet Pressure.**
3. **Maximum Outlet Pressure.**
4. **Pressure to be controlled, item 2 or 3.**
5. **Viscosity of fluid passing through the valve.**
6. **Maximum and minimum flow.**
7. **Type of fluid.**
8. **Test Pressure.**

Guide to Valve Selection

A. *Ensure*: that the requirements are within limitation laid down in Sales Pamphlet.

B. *Ascertain*: The type of valve required. The valves are two distinct types:-

1. Controlled pressure reducing valve:

Also known as Constant Pressure Valves or Downstream Control or Restrictor Valve. It maintains a constant OUTLET pressure irrespective of changes of the higher inlet pressure or of flow rate.

2. Controlled pressure regulating valve:

Also known as an Upstream Control Valve, or Regulating Valve or By-Pass Valve. It maintains a constant INLET pressure irrespective of changes of the lower uncontrolled outlet pressure and of flow rate. The maximum flow through this valve is generally equal to pump output and should not be confused with burner consumption.

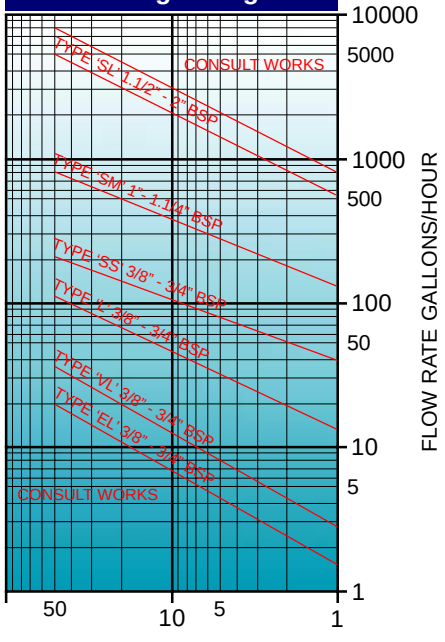
C: *Ascertain:* The required differential pressure by deducting maximum outlet pressure from minimum inlet pressure. In the case of the Reducing Valve this is the required control pressure deducted from the known inlet pressure. In the case of the Regulating Valve this is the back pressure felt at the valve outlet i.e. return line loss at maximum flow rate, plus any static head, deducted from the required control pressure.

D: *Viscosity:* The valve selection chart Graphs No. 1 & 2 are based on the use of a fluid having viscosity of 1500 secs. Redwood No 1. To compensate for varying viscosities the required differential pressure should be multiplied by one of the following factors BEFORE USING THE CHART. These factors are to be used for this purpose only.

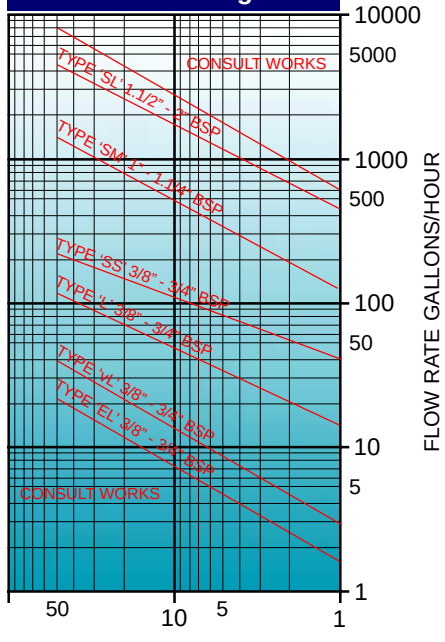
5000 sec.	**Red No.**	**1 x 0.6**
3000 sec.	**Red No.**	**1 x 0.8**
2000 sec.	**Red No.**	**1 x 0.9**
1500 sec.	**Red No.**	**1 x 1.0**
1000 sec.	**Red No.**	**1 x 1.1**
500 sec.	**Red No.**	**1 x 1.4**
250 sec.	**Red No.**	**1 x 1.7**
100 sec.	**Red No.**	**1 x 2.0**
35 sec.	**Red No.**	**1 x 2.5**

E: *Valve Size:* The equivalent differential pressure thus obtained can now be located on the bottom edge and the maximum flow rate along the right hand edge of the graphs. The intersection of the horizontal and vertical line of differential pressure and flow determines the size of valve required.

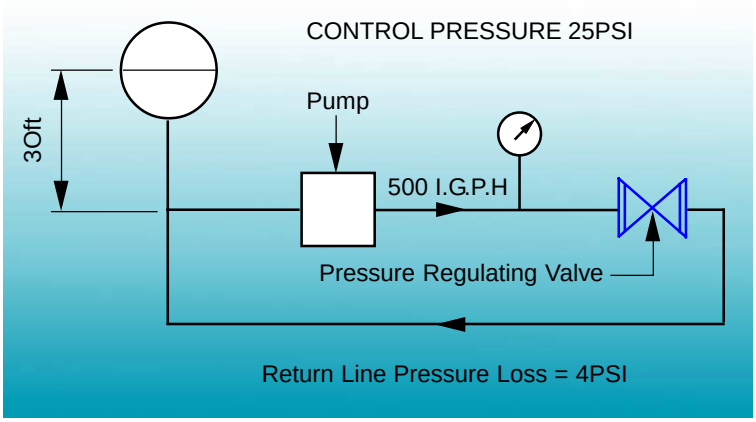
GRAPH No.1
Pressure regulating valve



GRAPH No.2
Pressure reducing valve



SELECTING CONTROLLED PRESSURE VALVES



Example

A Valve required to control the inlet (or upstream) pressure at 25 p.s.i. in a circulating system returning excess fuel to storage (or suction side of the pump). The static head in the storage tank is 30 ft. (13 p.s.i.) and the line loss down stream of the valve is 4 p.s.i. The maximum flow rate is 500 I.G.P.H. of fuel oil having viscosity of 2000 secs. Red No.1 at temperature of 100 deg.F when passing through valve. These requirements are within the limitation of the valves and the size of the valve can now be determined:-

Static head in tank - 30ft = 13 p.s.i.
Line loss valve to storage tank = 4 p.s.i.
Back pressure in valve = 17 p.s.i.

Differential pressure = Control pressure less back pressure in valve = 25 – 17 = 8 p.s.i.

Differential pressure correction due to viscosity = 8 x 0.9 = 7.2 p.s.i.

The intersection of 7.2 p.s.i. and 500 I.G.P.H. falls within the upper limit of the 1" or 1 1/4" size valve range and either size may be used.

F. For controlled pressure reducing valves to be used as break-head valves and other valve applications outside the specified range consult works for recommendations.

FOR ZWICKY VALVES CONTACT

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