Bailey

CLASS F Hose Pressure Regulator

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The Class F Hose Pressure Regulator combines the features of a fire hydrant valve and a direct acting water pressure regulator, to give a single unit which protects the fire crew from excess pressure in the fire hose which could cause difficulties in handling the hose. High pressure fire systems are to be found in high rise buildings, oil, gas and chemical facilities.

OPERATION

The Class F hose pressure regulator incorporates a spring loaded “balanced” pressure reducing valve combined with a hydrant stop valve. The stop valve element is operated in exactly the same way as a conventional hydrant stop valve (clockwise rotation to close, anti-clockwise rotation to open).
The reducing valve element is opened by the load applied to the pressure adjusting spring and closed by the reduced pressure acting upon the underside of the diaphragm. Under working conditions the balance of these two forces determines the degree of valve opening required to maintain a steady outlet pressure.
Accurate pressure control is achieved by a venturi section in the outlet flow area, which ensures that there is a minimal rise in outlet pressure between the fully open and fully closed positions.
Under conditions of varying flow rates, the close control of the Class F ensures a uniform fire fighting pressure is maintained at any hydrant in a fire protection system.

TECHNICAL SPECIFICATION

Size		Valve size is always 1-1/2"
Connections		
Inlet	Standard	Flanged 1-1/2"
	Options	Screwed 2", 2-1/2" BSP male or female. Flanged 2, 2-1/2, 3"
	Available as	BS 4504 PN16/25 BS 10 Table ‘H’ ANSI 150/300
Outlet	Standard	2-1/2" BS336 Instantaneous female coupling.
	Options	Screwed 2-1/2" BSP male. To suit internationally recommended adaptors.

Materials

The standard construction is bronze with aluminium bronze trim, which is ideal for both fresh water and sea water. We do however regularly supply in:

Stainless Steel, 6MO,
Duplex, Titanium.

Our Technical Department will be pleased to advise on other required materials.

Inlet Pressure Range	4.8 to 20.7 Barg
Outlet Pressure Range*	4.1 to 8.3 Barg

* Setting including rise at dead end of 0.7 Barg.

CLASS F

FEATURES AND BENEFITS

- Designed to meet the needs of modern fire protection technology.
- Maintains a uniform fire fighting pressure at every hydrant in a fire protection system, irrespective of location.
- Accurate pressure control is maintained despite varying flow levels and inlet pressures.
- Greatly reduces installation costs by completely eliminating expensive relief piping systems.
- Individual floor level pressure requirements met by quick and easy in-situ regulator adjustment.
- Sea-water resistant trim incorporated as standard.
- Available in a wide variety of material options, to suit particular applications.

CE MARKING

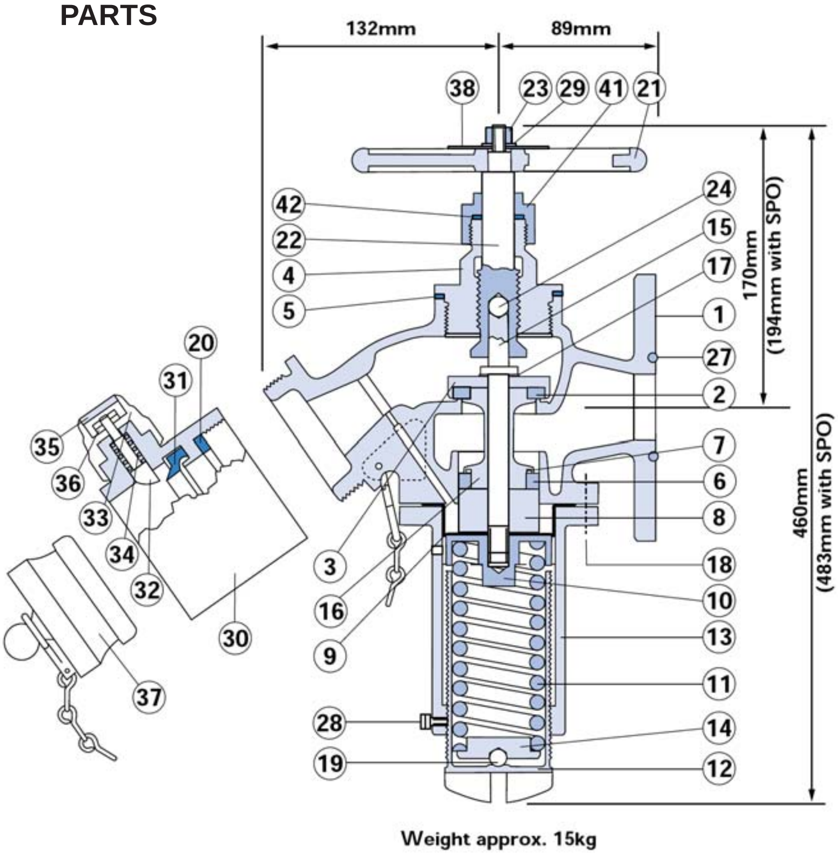
The Class F is not required to be PED certified on water applications, hence cannot be CE marked.

APPLICATIONS

The Class F hose pressure regulator is suitable for:

- Fire mains systems in high rise buildings.
- High pressure systems on oil rig platforms and in oil refineries and chemical plants.
- Hand held hoses and fixed monitors, where individual pressure requirements vary.
- Applications with high pressure drops caused by the length of water mains.
- Applications with low pressure condition produced by pump characteristics.
- Floating production, storage and off-loading (FPSO) vessels.

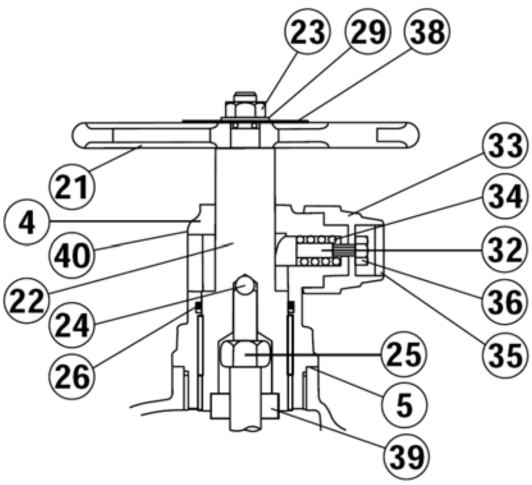
PARTS



ITEM	PART	MATERIAL
1	Body	Bronze
2	Valve Disc	Nitrile
3	Disc Holder	Bronze
4	Bonnet	Bronze
5	Bonnet Joint	NAF
6	High Pressure Seal	Rubber
7	H.P. Seal Ring	Bronze
8	Distance Piece	Bronze
9	Diaphragm	Nitrile
10	Piston	Bronze
11	Spring Plt.	Steel
12	Adjusting Screw	Bronze
13	Spring Chamber	Bronze
14	Adjusting Screw Plate	Bronze
15	Valve Stem	Bronze
16	Valve Stem Sleeve	Bronze
17	Valve Stem Joint	NAF
18	Set Screws	St. St.
19	Adjusting Screw Ball	St. St.
20	Washer	Rubber
21	Handwheel	Bronze
22	Handwheel Stem	Bronze
23	Handwheel Nut	Brass
24	Handwheel Stem Ball	St. St.
25	Valve Stem Nut	Brass
26	Handwheel Stem 'O' Ring	Rubber
27	Body 'O' Ring	Nitrile
28	Lock Screw	St. St.
29	Handwheel Washer	Brass
30	Adaptor Body	Bronze
31	Coupling Washer	Neoprene
32	Coupling Bolt	Bronze
33	Quick Release Cap	Bronze
34	Coupling Spring Phosphur	Bronze
35	Screwed Cap	Brass
36	Philidas Nut	Bronze
37	Cap and Chain	Bronze
38	Nameplate	Aluminium
39	Retaining Nut	Bronze
40	Position Indicator	Aluminium
41	Gland	Bronze
42	Gland 'O' Ring	Nitrile

SPRING SELECTION

DEAD END PRESSURE SETTING RANGE (Barg)	DEAD END PRESSURE SETTING RANGE (Psig)	COLOUR CODE
4.1 to 5.5	60 to 80	Brown
5.5 to 8.3	80 to 120	Blue



OPTIONAL 'SPO' DEVICE

Class F with set pressure override device

An optional feature of the valve is a set pressure override device (or SPO) which, when actuated, allows full opening of the valve without regulating the downstream pressure, thereby bringing it very close to the available inlet pressure. The SPO can be used for manifolding applications where the valve has to supply a combination of units e.g. water cannons, hand held hoses or foam making equipment.

SIZING GUIDELINES FOR AIR AND GAS DUTIES

The capacity sizing charts are for:

1) Critical pressure drop sizing.
2) Air.
3) Temperature of 15°C.
4) Units l/s.
5) Standard rise at dead end setting.

The following instructions will assist when the actual service conditions differ from the above criteria.

1) **Critical Pressure Drop**

The air capacity charts are based on critical pressure drop sizing. To achieve these flows, it is critical that the correct pipe sizes are used.

2) **Other Gases**

If you wish to use the valve on other compatible gases, the chart opposite can be used, l however the capacity will change depending on the specific gravity of the flowing gas. Divide the valve air capacity by $\sqrt{SG}$ to give the gas capacity (SG = specific gravity, relative to air = 1)

3) **Other Temperatures**

If the flowing temperature is not 15°C the chart capacity will need to be divided by $\sqrt{(T/288)}$
where: T= flowing temperature °C + 273°K

4) **Useful Conversions**

m^3/h = l/s x 3.6
CFM = l/s x 2.12

5) **Non-Standard Rise at Dead End**

For a definition of rise at dead-end. To calculate capacities at a different rise at dead end multiply chart capacity by the below figures.

Example:

Chart air capacity = 100 l/s
SG of gas = 0.8
Gas capacity of valve will be
$100 \div \sqrt{0.8}$ = 111.8 l/s (gas)

Example:

Chart air capacity = 100 l/s
Air temperature = 50°C (T = 323°K)
Actual Air capacity at temperature will be:
$100 \div \sqrt{323/288}$ = 94.4 l/s (@ 50°C)

Example:

Chart air capacity = l/s
Valve type Class T
Required rise at dead end 0.35 Barg
Actual air capacity will become
1000 x 0.54 = 540 l/s

SIZING GUIDELINES FOR WATER AND OTHER LIQUIDS

The capacity sizing charts are for:

1) Water.
2) Units l/s.
3) Standard rise at dead end setting.

The following instructions will assist when the actual service conditions differ from the above criteria.

1) **Other Liquids**

If you wish to use the valve on other compatible liquids, the sizing chart opposite can be used.
However, the valve capacity will change depending on the specific gravity of the flowing liquid. Divide the valve water capacity by $\sqrt{SG}$ to give the liquid capacity.
(SG = specific gravity, relative to water =1.)

2) **Useful Conversions**

Igpm = l/s x 13.33
m^3/min = l/s x 0.06

3) **Non-Standard Rise at Dead End**

For a definition of rise at dead end.

Standard rise at dead end is 1 barg.

To determine the capacity at a different rise at dead end, multiply the water capacity by the following factors.
Note. The capacity is unaffected by changes in temperature.

Example:

Chart water capacity = 2 l/s
SG of liquid = 0.8
Liquid capacity of valve will be
$2 \div \sqrt{0.8}$ = 2.24 l/s (liquid).

Example:

Chart water capacity = 2 l/s
Valve Type C10
Size 1”
Required rise at dead end 1.4 barg
actual water capacity will become
2 x 1.190 = 2.38 l/s

CLASS F HOSE PRESSURE REGULATOR SIZING

To determine the flow rate through the valve, it is necessary to know the available inlet 'flowing' pressure and the required outlet 'flowing' pressure.

Firstly you need to work out the differential 'flowing' pressure (i.e. inlet minus outlet pressures).

Secondly, based on the required outlet flowing pressure, refer to either graph 1 or 2, which are only valid for the appropriate 'flowing' outlet pressure range.

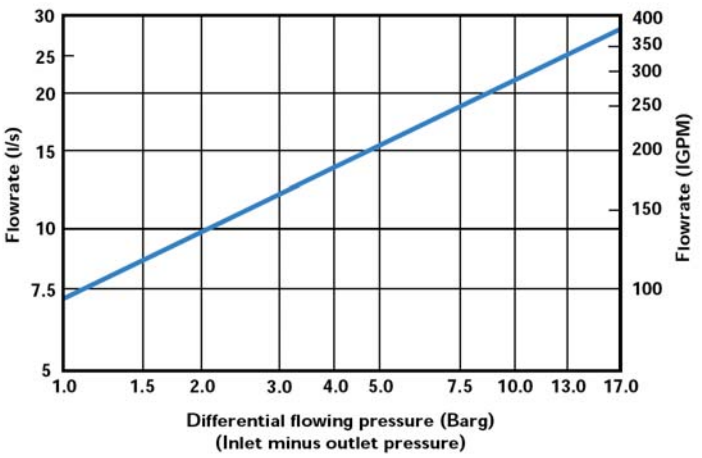
Thirdly, from the differential 'flowing' pressure read the corresponding flow rate. e.g. Inlet 'flowing' pressure = 7 Barg, outlet 'flowing' pressure = 4 Barg.

Therefore:
1) Differential 'flowing' pressure = 7 - 4 = 3 Barg.
2) As outlet 'flowing' pressure is 4 Barg, use graph 1 (3.4 - 4.8 Barg).
3) A differential 'flowing' pressure of 3 Barg corresponds to an approximate flow rate of 12.5 l/s.

To size a valve in SPO mode please consult one of our Bailey Technical Sales Engineers, who will be pleased to assist.

GRAPH 1

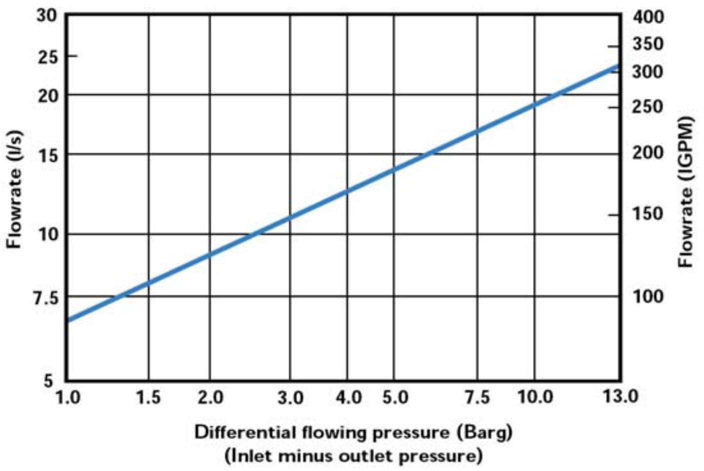
'Flowing' outlet pressure range: 3.4-4.8 Barg



Note:
Regardless of connection size the valve size is 1-1/2", hence the capacity is always that of a 1-1/2" valve. Rise at dead end will be 0.7 Barg.

GRAPH 2

'Flowing' outlet pressure range: 4.8-7.6 Barg



INSTALLATION OF PRESSURE REGULATING VALVES

Installation

1) Mount the valve with the spring centre line vertical and with the adjusting screw uppermost.
2) Ensure the valve and pipework is adequately supported and that the pipe does not impose strain onto the valve.
3) Provide adequate headroom or adjustment and space underneath to remove the bottom cover or plug, to give access for dismantling.
4) It is recommended to fit pressure gauges downstream of the valve.
5) Isolating valves and line strainers are advisable.
6) The downstream (outlet) system should be protected by a correctly sized safety relief valve, set at a pressure not less than 1 barg or 15% (whichever is the greater) above the dead end setting of the regulator.
7) Flush the pipework to ensure that it is clear of dirt and debris.
8) For valves on air, gas and steam. The outlet piping should be expanded to accommodate the increased volume.
9) Ensure correct orientation of the valve, with respect to the direction of flow. Each valve is marked with a flow direction arrow.
10) Ensure that the correct spring is fitted for the required downstream (outlet) pressure, including the 'rise at dead end'

Setting

All direct acting regulating valves should be set against a 'Dead end', allowing for a 'rise at dead end'. For definitions of these terms please refer to Page 90.
1) Remove all the load from the spring by unscrewing the adjusting screw (see item 12 on individual valve drawings).
2) Provide a downstream (outlet) 'Dead end' complete with pressure gauge, by closing a suitable isolating valve.
3) Admit upstream (inlet) pressure.
4) Commence adding load to the spring by screwing the adjusting screw (item 12). Stop when the required downstream (outlet) dead end setting pressure has been achieved.
5) Open the downstream isolating valve slowly to allow flow through the valve. On steam applications
it is important that the down stream system is allowed to clear any condensate and to warm through gradually.
6) If necessary, reset the pressure by turning the adjusting screw and then checking the new dead end setting.