

# Bailey

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## Assistance:

Our experienced and fully trained team of Technical Sales Engineers and distributors are available to give advice and assistance on the sizing and selection of the Bailey Direct Acting Series and any other associated products.

This service is available to you by calling your local distributor or our Bailey Technical Sales Department, who will be happy to help.

Details of our worldwide network of distributors and regional offices are available on our website.

## LOCAL DISTRIBUTOR

Simply photocopy and fax to us for more information on...

Please tick box where appropriate

G4 Pilot Operated Pressure Reducing Valves

700 Series Safety Relief Valves

Standard Safety Relief Valves

Associated Products

Birkett API/ASME Spring & Pilot SRV's

Amal Flame Arresters

Marston Bursting Discs & Explosion Vent Panels

Marvac Pressure/Vacuum Valves

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# Bailey



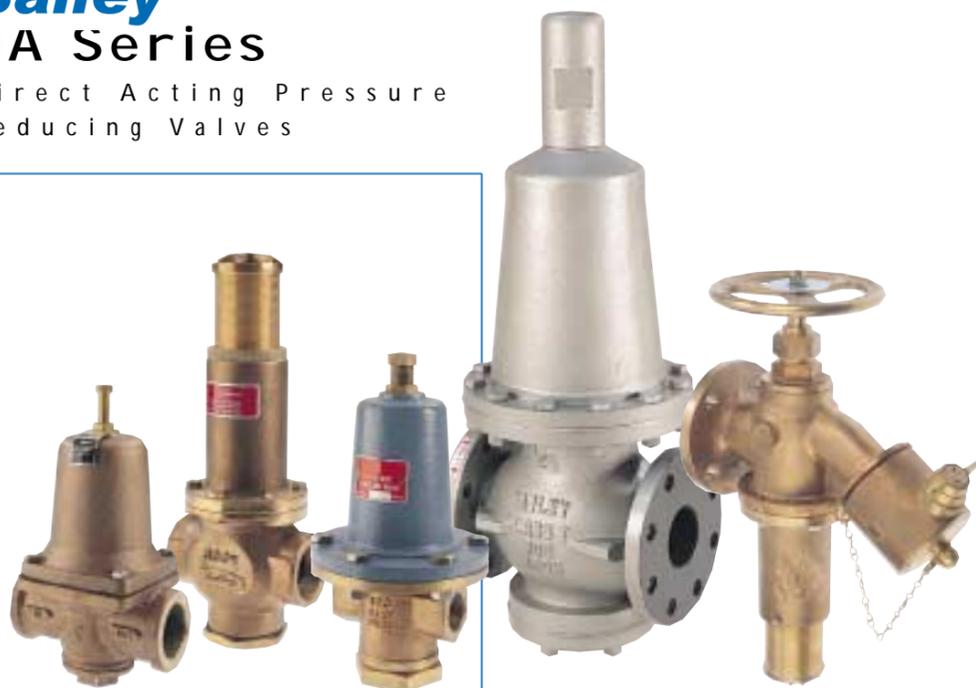
## DA Series

Direct Acting  
Pressure  
Reducing  
Valves



# Bailey DA Series

Direct Acting Pressure  
Reducing Valves



The Bailey DA Series of direct acting pressure reducing valves, offers comprehensive pressure regulation for key services, fire hose and pressure systems using steam, air, gases, water and process fluids.

Wherever demanding applications exist you will find Bailey DA pressure regulators, from industrial and commercial to domestic and fire fighting applications.

DA pressure reducing valves are used in the construction of hotels, high-rise buildings, hospitals, textile, paper and steel mills, rubber, food, drink, chemical and pharmaceutical processes, off-shore oil and gas platforms, floating production storage and off-loading (FPSO) vessels. In fact, anywhere boilers, compressors or pumps produce high-pressure service media for use on multiple low-pressure applications, Bailey DA pressure regulating valves have demonstrated proven reliability over many years, requiring minimal maintenance.

## THE LOGICAL CHOICE

Experience and focus on customer service make Bailey the logical choice of supplier for pressure reducing valves. A policy of continuous improvement ensures that Bailey can always supply the correct solution to meet customer needs, while also providing exceptional value, reliability and performance.

Bailey's design and selection service can help specify the most appropriate size and type of valve for any specific application, ensuring trouble free operation.

By choosing Bailey pressure reducing valves, you are selecting availability, quality, professional advice and proven performance, all delivered through an extensive worldwide network of distributors. Ex-stock availability of standard valves, ensures plant production time is maximised.

## Bailey DA Series

The complete solution  
with global support

## APPLICATIONS TABLE - DA SERIES

APPLICATION	MATERIAL	CONNECTIONS		VALVE TYPE
		TYPE	SIZE	
Water/Liquid	Bronze	Screwed	15 to 50mm	C10
	Bronze	Screwed/Flanged	15 to 50mm	Class T
	Cast Iron	Flanged	65 to 150mm	Class TLP
Air/Gas	Bronze	Screwed	15 to 50mm	C10
	Bronze	Screwed/Flanged	15 to 50mm	Class T
Steam	Bronze	Screwed/Flanged	15 to 50mm	470
Fire fighting hose pressure regulator	Bronze	Flanged	40 to 80mm	Class F
	Stainless Steel		50 to 65mm	
	Duplex	Screwed		
	6MO Titanium			

Accurate selection of DA Series depends on: Inlet/outlet pressure - capacity - material - temperature - fluid - connection required.

## CONTENTS

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## Class T Pressure Reducing Valve

The Class T balanced direct acting pressure regulator is designed for use on installations that have varying inlet pressures and capacities, and require positive shut-off under "no flow" conditions.

The standard valve is suitable for controlling air, gas, water and potable water. Alternative seals and diaphragms need to be fitted for oil duty.

A seawater compatible version is available for marine duty.

### OPERATION

The Class T pressure regulator is operated by a spring loaded piston and has a balanced main valve which ensures that the outlet dead-end pressure is unaffected by changes of inlet pressure.

The valve is opened by the load on the adjusting spring and closed by reduced pressure on the underside of the diaphragm. Under normal working conditions, the balance of these two forces gives the degree of valve opening for the required reduced pressure.

### FEATURES AND BENEFITS

- Water Research Council (WRC) Listed-for potable water service.
- Fully balanced piston - allows a constant outlet pressure to be maintained, irrespective of varying inlet pressure.
- Soft disc - for positive shut-off.
- Self actuation/regulation - requires no external power source.
- Simple design - enables the valve to be easily maintained and serviced, without removal from the line.
- Minimum variation between 'flow' and 'no-flow' pressure.
- Seawater version available.

### CE MARKING

The Class T has been certified to the requirements of the PED. Valve sizes below 32mm (1¼ inch), do not require, and hence, cannot be CE marked.

### TECHNICAL DATA

**Size:** 15, 20, 25, 32, 40, 50 mm  
(½, ¾, 1, 1¼, 1½, 2 inch)

**Connection:** Screwed BSP parallel, NPT.  
Flanged BS4504 PN25/40.  
BS 10 table 'H', ANSI 150.  
Others available on request.

**Temperature range:**  
Min: -20°C Max: air/water 100°C / oil 90°C.

**Maximum inlet pressure:** 40 Barg.

**Maximum outlet pressure:\*** 13.8 Barg.

**Minimum outlet pressure:\***

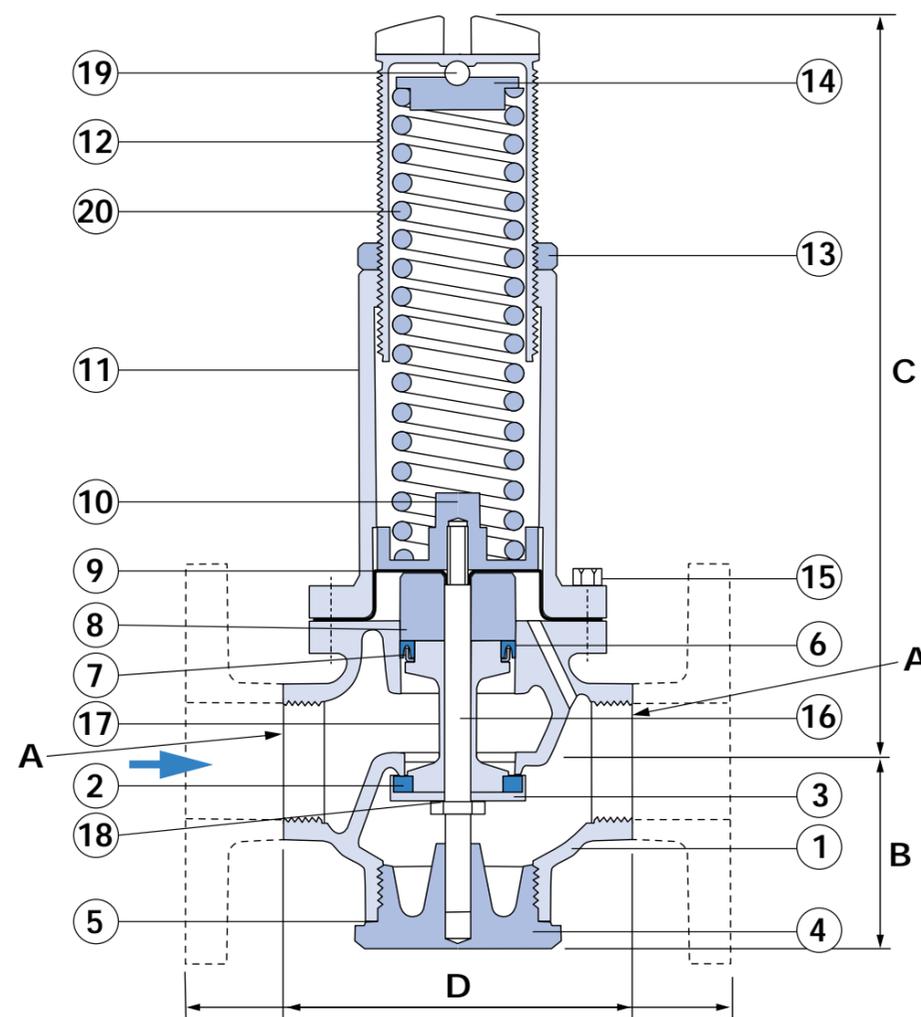
MIN. OUTLET	INLET PRESSURE RANGE
0.35 Barg	up to 6.9 Barg
5% of inlet	6.9 to 20.7 Barg
10% of inlet	above 20.7 Barg

**Material:** Bronze. WRC Listed.

\* Setting including rise at dead end (see page 20).

ITEM	PART	MATERIAL
1	Body	Bronze
2	Valve Disc*	Rubber/PTFE
3	Disc Holder	Brass
4	Bottom Plug	Bronze
5	Bottom Plug Joint	NAF
6	H. P. Seal	Rubber
7	H. P. Seal Ring	Brass
8	Distance Piece	Brass
9	Rolling Diaphragm	Rubber
10	Piston	Brass
11	Spring Chamber	Bronze
12	Adjusting Screw	Bronze
13	Adjusting Screw Ring	Brass
14	Spring Plate	Brass
15	Set Screws	Plt. Steel
16	Valve Stem	Bronze
17	Valve Stem Sleeve	Bronze
18	Valve Stem Joint	NAF
19	Adjusting Screw Ball	St. St.
20	Spring	Plt. Steel

\* Valve discs are normally rubber, however PTFE discs should be specified when the inlet pressure is above 17.2 Barg or the outlet pressure is above 8.2 Barg.



### DIMENSIONS

#### SCREWED

SIZE	DN15	DN20	DN25	DN32	DN40	DN50
<b>A BSP</b>	½"	¾"	1"	1¼"	1½"	2"
<b>B</b>	45	48	56	68	68	79
<b>C</b>	162	184	222	232	292	324
<b>D</b>	76	89	111	124	133	165
<b>Kg</b>	2	3	4	6	8	11

#### FLANGED

A	DN15	DN20	DN25	DN32	DN40	DN50
<b>B</b>	57	57	61	67	70	83
<b>C</b>	162	184	222	232	292	324
<b>D</b>	130	150	160	180	200	230
<b>Kg</b>	3	5	6.5	8.5	13	17

All dimensions in mm.

A full trouble shooting and maintenance leaflet is available for this valve.

## Class TLP Pressure Reducing Valve

The Class TLP balanced direct acting pressure regulator is designed for use on installations that have varying inlet pressures and capacities, and require positive shut-off under 'no flow' conditions.

The standard valve is best suited for controlling water.

A seawater compatible version is available for marine duty.

### OPERATION

The Class TLP pressure regulator is operated by a spring loaded piston and has a balanced main valve which ensures that the outlet dead-end pressure is unaffected by changes of inlet pressure.

The valve is opened by the load on the adjusting spring and closed by reduced pressure on the underside of the diaphragm. Under normal working conditions, the balance of these two forces gives the degree of valve opening for the required reduced pressure.

### TECHNICAL DATA

**Size:** 65, 80, 100, 125, 150 mm  
(2½, 3, 4, 5, 6 inch)

**Connection:** Flanged BS4504 PN16.  
BS 10 table 'F'.  
Others available on request.

**Temperature range:** -20 to 93°C

**Maximum inlet pressure:** 20.7 Barg

**Maximum outlet pressure:\*** 5.5 Barg

**Minimum outlet pressure:\***

MIN. OUTLET	INLET PRESSURE RANGE
0.35 Barg	up to 6.9 Barg
5% of inlet	6.9 to 20.7 Barg

**Material:** Cast Iron

\* Setting including rise at dead end (see page 20).

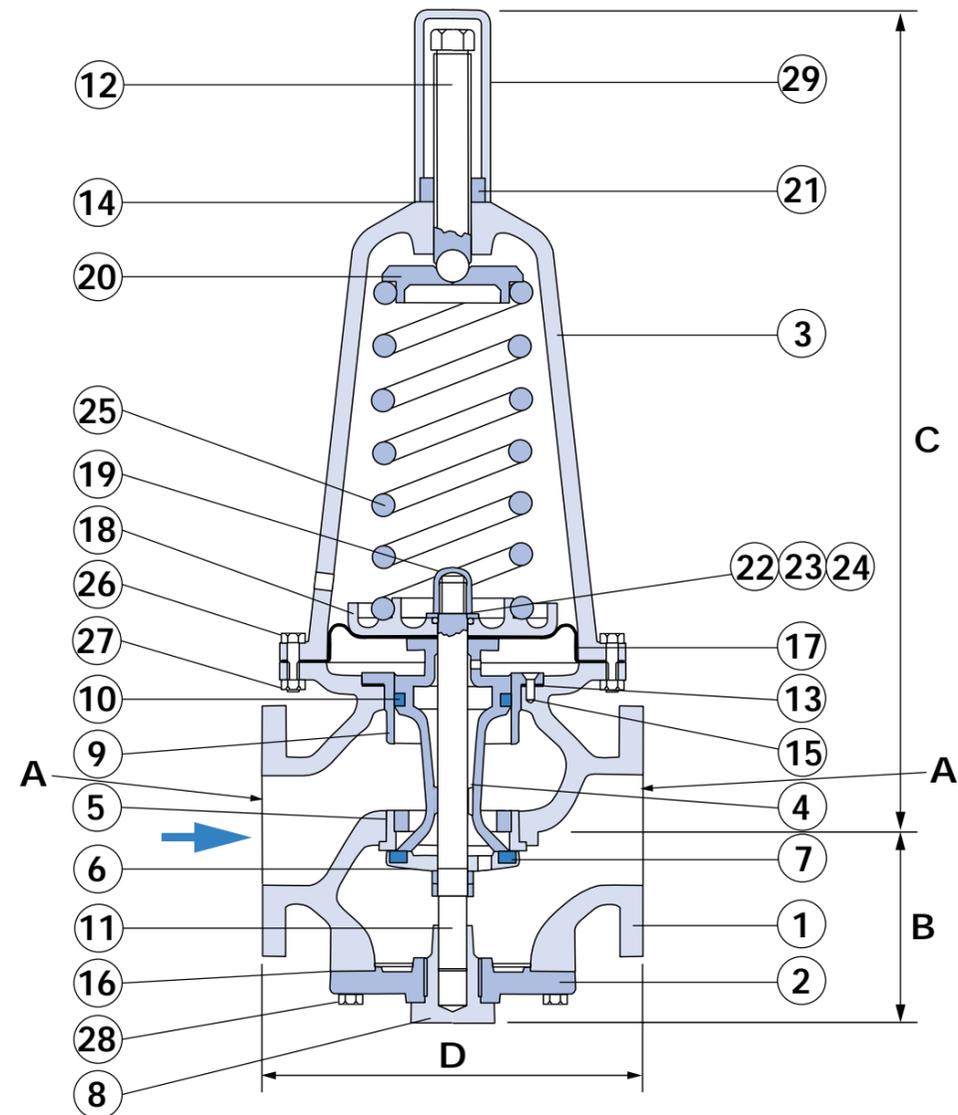
### FEATURES AND BENEFITS

- Fully balanced piston - allows a constant outlet pressure to be maintained, irrespective of varying inlet pressure.
- Soft disc - for positive shut-off.
- Self actuation/regulation - requires no external power source.
- Simple design - enables the valve to be easily maintained and serviced without removal from the line.
- Minimum variation between 'flow' and 'no-flow' pressure.
- Seawater version available.

### CE MARKING

The Class TLP has been certified to the requirements of the PED. For group 1 liquids, valve sizes below 100mm (4 inch), do not require, and hence, cannot be CE marked.

ITEM	PART	MATERIAL
1	Body	Cast Iron
2	Bottom Cover	Cast Iron
3	Spring Chamber	Cast Iron
4	Piston	Bronze
5	Valve Seat	Bronze
6	Disc Holder	Bronze
7	Valve Disc	Nitrile
8	Bottom Cover Bush	Bronze
9	Piston Liner	Bronze
10	Piston Seal	Nitrile
11	Spindle	Bronze
12	Adjusting Screw	Brass
13	Piston Liner Joint	NAF
14	Adjusting Screw Cap Joint	NAF
15	Piston Liner Screw	Brass
16	Bottom Cover Joint	NAF
17	Diaphragm	Nitrile
18	Bottom Spring Plate	Cast Iron
19	Spindle Nut	Brass
20	Top Spring Plate	Cast Iron
21	Adjusting Screw Locknut	Brass
22	Spindle Nut Washer	Rubber/Metal
23	'O' Ring	Nitrile
24	'O' Ring Plate	Brass
25	Spring	Plt. Steel
26	Spring Chamber Bolt	Plt. Steel
27	Spring Chamber Nut	Plt. Steel
28	Bottom Cover Bolt	Plt. Steel
29	Adjusting Screw Cap	Cast Iron



A full trouble shooting and maintenance leaflet is available for this valve.

### DIMENSIONS

	DN65	DN80	DN100	DN125	DN150
<b>A</b>					
<b>B</b>	137	155	178	229	251
<b>C</b>	562	638	740	870	883
<b>D</b>	254	286	343	406	419
<b>Kg</b>	55	79	111	177	202

All dimensions in mm.

## C10 Pressure Reducing Valve

The C10 balanced pressure reducing valve range is designed for use on water/air (gas) applications and for installations which have varying inlet pressures and capacities. It is particularly suitable where positive shut-off is required under 'no flow' conditions and where compact size and economy are essential.

### OPERATION

The C10 pressure regulator is operated by a spring loaded piston and has a balanced main valve which ensures that the outlet dead-end pressure is unaffected by changes of inlet pressure.

The valve is opened by the load on the adjusting spring and closed by reduced pressure on the underside of the diaphragm. Under normal working conditions, the balance of these two forces gives the degree of valve opening for the required reduced pressure.

### FEATURES AND BENEFITS

- Cast bronze body and stainless steel seat for extended life.
- Soft disc for positive shut-off.
- Integral strainer to maintain operability and increase reliability.
- Fully balanced piston - allows a constant outlet pressure to be maintained, irrespective of varying inlet pressure.
- Simple design - enables the valve to be easily maintained and serviced without removal from the line, using only an adjustable spanner and screwdriver.
- Self actuation/regulation - requires no external power source.
- Single adjustable spring - only one spring covers the entire outlet pressure range.

### CE MARKING

For liquid applications the C10 is in accordance with the PED and does not require to be CE marked.

### TECHNICAL DATA

**Size:** 15, 20, 25, 32, 40, 50 mm  
(1/2, 3/4, 1, 1 1/4, 1 1/2, 2 inch)

**Connection:** Screwed BSP parallel female

**Temperature range:** -18 to 82°C

**Maximum inlet pressure:** 27 Barg

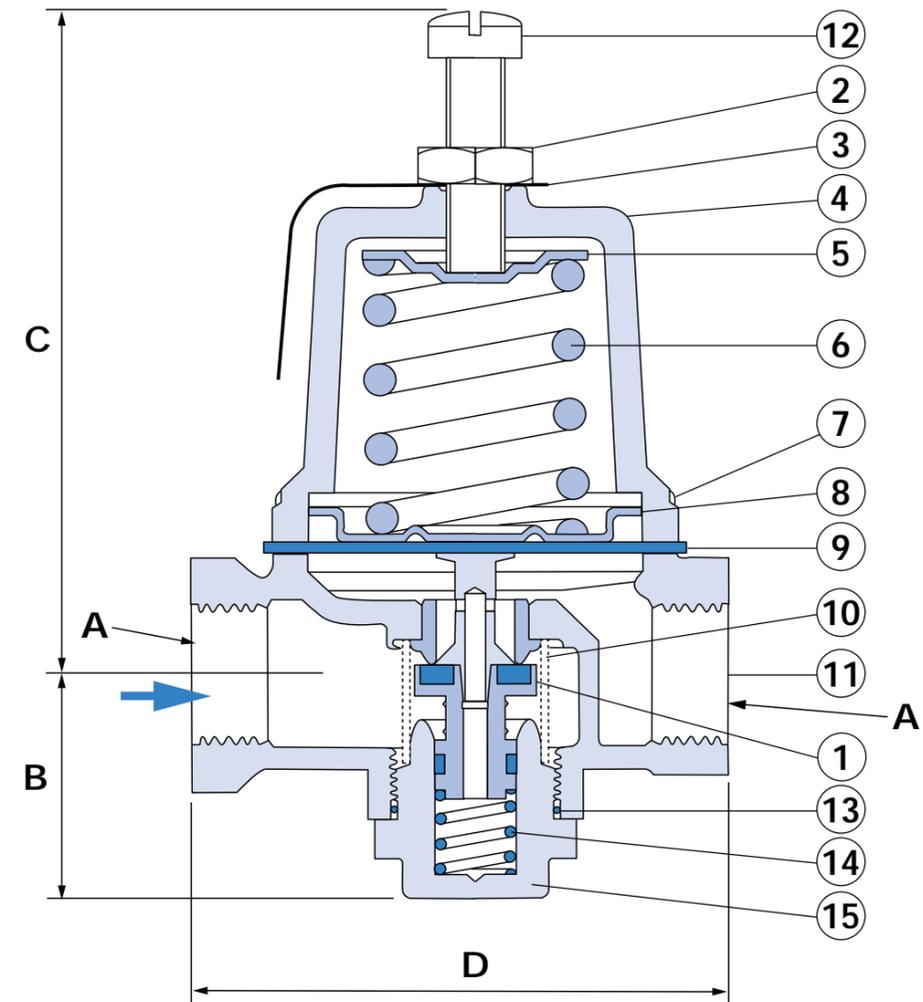
**Maximum outlet pressure:\*** 4.8 Barg

**Minimum outlet pressure:\*** 0.7 Barg  
Outlet pressure should not be less than 10% of the inlet pressure.

**Material:** Bronze.

\* Setting including rise at dead end (see page 20).

ITEM	PART	MATERIAL
1	Piston Subassembly including: - Pusher Post - Seat Disc - Piston - 'O'-Ring	Brass EPDM Brass EPDM
2	Nut	St. St.
3	Name Plate	Aluminium
4	Spring Chamber	Iron
5	Spring Plate	Steel/Iron
6	Spring	Steel
7	Screw	Brass/St. St.
8	Pressure Plate	Steel/Iron
9	Diaphragm	EPDM
10	Strainer	St. St.
11	Body Subassembly including: - Body - Seat Ring	Bronze St. St.
12	Adjusting Screw	Brass
13	'O'-Ring	EDPM
14	Piston Spring	St. St.
15	Bottom Plug	Brass



### DIMENSIONS

SIZE	DN15	DN20	DN25	DN32	DN40	DN50
<b>A BSP</b>	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
<b>B</b>	33.40	35.50	40.40	50.60	55.70	66.50
<b>C</b>	98.20	104.80	112.70	191.00	224.70	276.00
<b>D</b>	77.00	84.20	98.00	119.10	144.50	171.50
<b>Kg</b>	0.80	1.00	1.30	3.30	5.90	9.40

All dimensions in mm.

## 470 Pressure Reducing Valve

The 470 direct acting pressure reducing valve is best suited for use on steam and is designed to automatically maintain a reduced pressure on the downstream side of the valve.

A simple and reliable design has been adopted to allow for ease of maintenance.

### OPERATION

The steam enters at the inlet port (upstream), passing through the strainer screen and seat to the valve outlet (downstream). The amount of valve opening is controlled by the diaphragm.

The diaphragm moves in accordance with the forces exerted upon it by the main spring and the downstream pressure acting on the underside of the diaphragm, which opposes the main spring.

When the force exerted by the main spring is greater than that exerted by the downstream pressure, the valve is pushed off its seat by means of the push rod, thus allowing steam to flow from inlet to outlet. When the force exerted by the downstream pressure is equal or greater than that exerted by the main spring, the diaphragm will return to a horizontal position, and the valve spring, assisted by the steam pressure, will force the valve against the seat, thus cutting off the flow.

In actual operation, the valve will find a steady, open position in relation to the seat.

### FEATURES AND BENEFITS

- Spherical stainless steel valve - self cleaning.
- Renewable seats - gunmetal or stainless steel.
- Integral strainer to maintain operability and increase reliability.
- Simple design - enables the valve to be easily maintained and serviced without removal from the line.
- Self activation/regulation - requires no external power source.

### CE MARKING

The 470 has been certified to the requirements of the PED. Valve sizes below 32mm (1¼ inch), do not require, and hence, cannot be CE marked.

### TECHNICAL DATA

**Size:** 15, 20, 25, 32, 40, 50 mm  
(½, ¾, 1, 1¼, 1½, 2 inch)

**Connection:** Screwed BSP parallel female.  
Others available on request.

**Temperature range:** -20 to 230°C.

**Maximum inlet pressure:**  
Steam: 17.2 Barg.

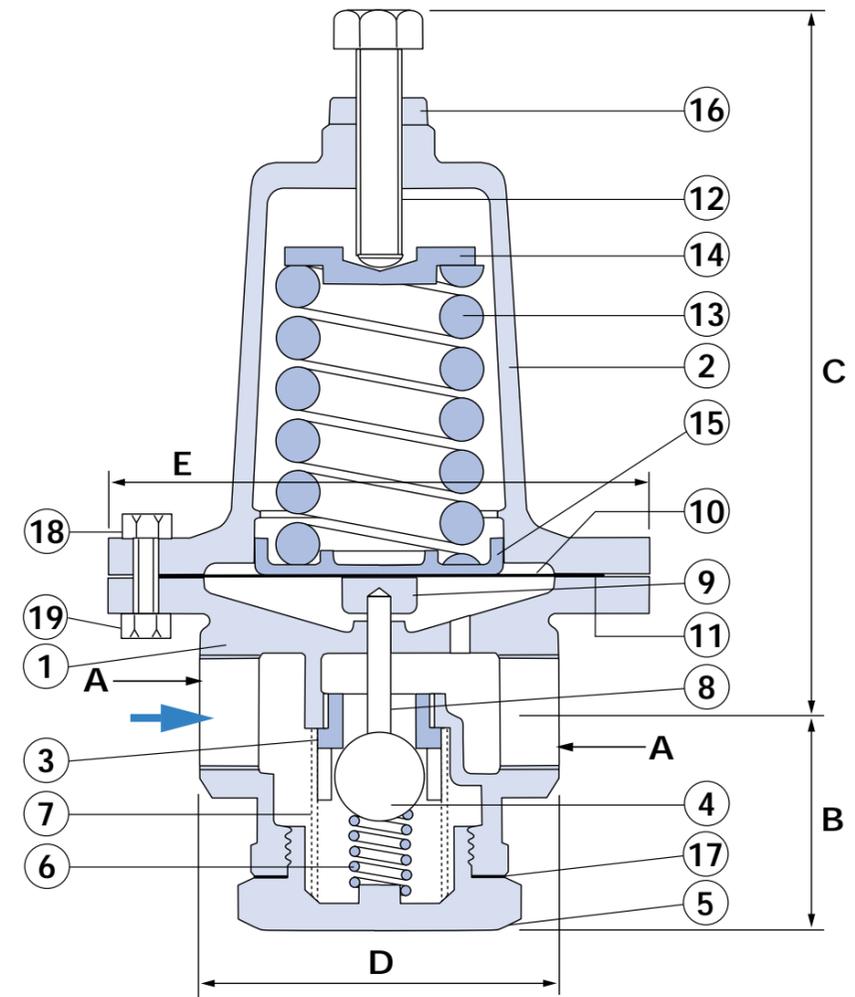
**Maximum outlet pressure:\***  
15/20mm: 10.3 Barg.  
Larger sizes: 8.5 Barg.

**Minimum outlet pressure:**  
0.7 Barg  
Outlet pressure should not be less than 10% of the inlet pressure.

**Material:** Bronze.

\* Setting including rise at dead end (see page 20).

ITEM	PART	MATERIAL
1	Body	Bronze
2	Cover	Brass
3	Seat	Bronze
4	Valve	St. St.
5	Cap	Bronze
6	Valve Spring	St. St.
7	Strainer	Brass
8	Pusher Rod	St. St.
9	Pusher Disc	Brass
10	Diaphragm	St. St.
11	Diaphragm Gasket	NAF
12	Adjusting Screw	Brass
13	Main Spring	Steel
14	Spring Plate	Brass
15	Guide Plate	Bronze
16	Lock Nut	Brass
17	Cap Gasket	NAF
18	Cover Bolt	Steel
19	Cover Nut	Steel



### DIMENSIONS

SIZE	DN15	DN20	DN25	DN32	DN40	DN50
<b>A BSP</b>	½"	¾"	1"	1¼"	1½"	2"
<b>B</b>	41	54	64	70	87	87
<b>C</b>	159	175	200	259	298	305
<b>D</b>	73	89	108	130	159	165
<b>E</b>	114	137	152	178	222	222
<b>Kg</b>	3.5	5	8	12	19	20

All dimensions in mm.

## Class F Hose Pressure Regulator

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.

### 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.

### 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.

### TECHNICAL DATA

**Size:** Valve size is always 1½"

#### Connections

<b>Inlet:</b>	Standard	Flanged 1½"
	Options	Screwed 2", 2½" BSP male or female. Flanged 2, 2½, 3"
	Available as	BS 4504 PN16/25 BS 10 Table 'H' ANSI 150/300
<b>Outlet:</b>	Standard	2½" BS336 Instantaneous female coupling.
	Options	Screwed 2½" BSP male. To suit internationally recommended adaptors.

**Inlet pressure range:** 4.8 to 20.7 Barg

**Outlet pressure range\*:** 4.1 to 8.3 Barg

#### Materials:

The standard construction is bronze with aluminium bronze trim, which is ideal for both fresh water and sea water.

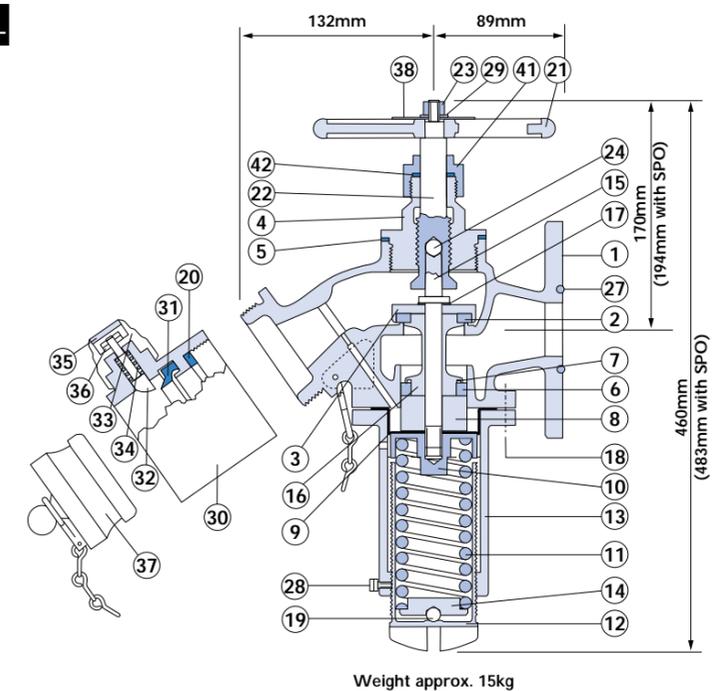
We do however regularly supply in:  
Stainless Steel, 6MO,  
Duplex, Titanium.

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

\* Setting including rise at dead end of 0.7 Barg (see page 20).

### 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

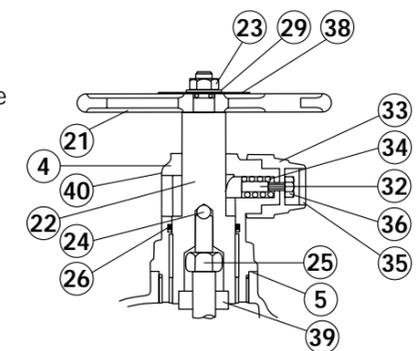


### OPTIONAL 'SPO' DEVICE

#### 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.



## AIR CAPACITY CHART (l/s) @ 15°C

Inlet Pressure		Barg *											
		2	5	10	15	20	25	30	35	40	41		
Flow Rate l/s		Psig											
		30	100	200	300	400	500	595					
Class T	1/2" 15mm	27	50	100	150	200	210	218					
	3/4" 20mm	53	100	200	300	400	437						
	1" 25mm	83	100	200	300	400	500	600	700	761			
	1 1/4" 32mm	161	200	300	400	500	600	700	800	900	1000	1100	1123
	1 1/2" 40mm	231	500	1000	1500	2000	2500	2736					
	2" 50mm	381	500	1000	1500	2000	2500	2736					
	C10	1/2" 15mm	4.9	10	20	30	40	50	60	67			
3/4" 20mm		8.2	10	20	30	40	50	60	70	80	90	100	111
1" 25mm		12.5	50	100	150	169							
1 1/4" 32mm		17.4	50	100	150	200	235						
1 1/2" 40mm		22.5	50	100	150	200	250	300	304				
2" 50mm		27.6	50	100	150	200	250	300	350	372			

\* Due to the difficulty of reading charts below 2 Barg, we recommend the use of our sizing programme. Alternatively please contact our Bailey Sales Engineers for assistance.

These capacity charts are based on a standard 'rise at dead end', see note 5.

## -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) Non-Critical Pressure Drop

If the outlet pressure (in gauge units) is less than 55% of the inlet pressure, the figures shown on the chart facing are correct. However if it is more than 55%, the valve will have a lower capacity. Corrections will need to be made as shown opposite, using the graph above.

### 2) Other Gases

If you wish to use the valve on other compatible gases, the chart opposite can be used, 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

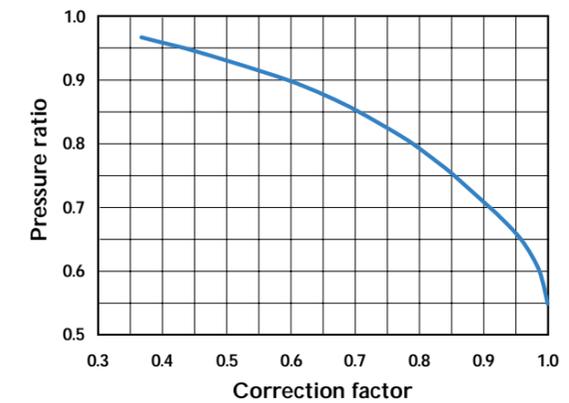
$$m^3/h = l/s \times 3.6$$

$$CFM = l/s \times 2.12$$

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

For a definition of rise at dead-end see Page 20. To calculate capacities at a different rise at dead end multiply chart capacity by the below figures.

VALVE TYPE	RISE AT DEAD END			
Class T	0.35 Barg	0.7 Barg	1 Barg	
	0.54	0.77	1.0	
C10	5%	10%	15%	20%
	0.25	0.5	0.75	1.0



**Example:** Use gauge units only.

Flowing outlet pressure 7 Barg

Flowing inlet pressure 10 Barg

$7 \div 10 =$  pressure ratio of 0.7 which equates to a correction factor of 0.91.

Therefore multiply the chart capacity by 0.91 (i.e. the valve will only pass 91% of the chart capacity).

**Example:**

Chart air capacity = 100 l/s

SG of gas = 0.8

Gas capacity of valve will be

$$100 \div \sqrt{0.8} = 111.8 \text{ l/s (gas)}$$

**Example:**

Chart air capacity = 100 l/s

Air temperature = 50°C (T = 323°K)

Actual Air capacity at temperature will be:

$$100 \div \sqrt{323/288} = 94.4 \text{ l/s (@ 50°C)}$$

**Example:**

Chart air capacity = l/s

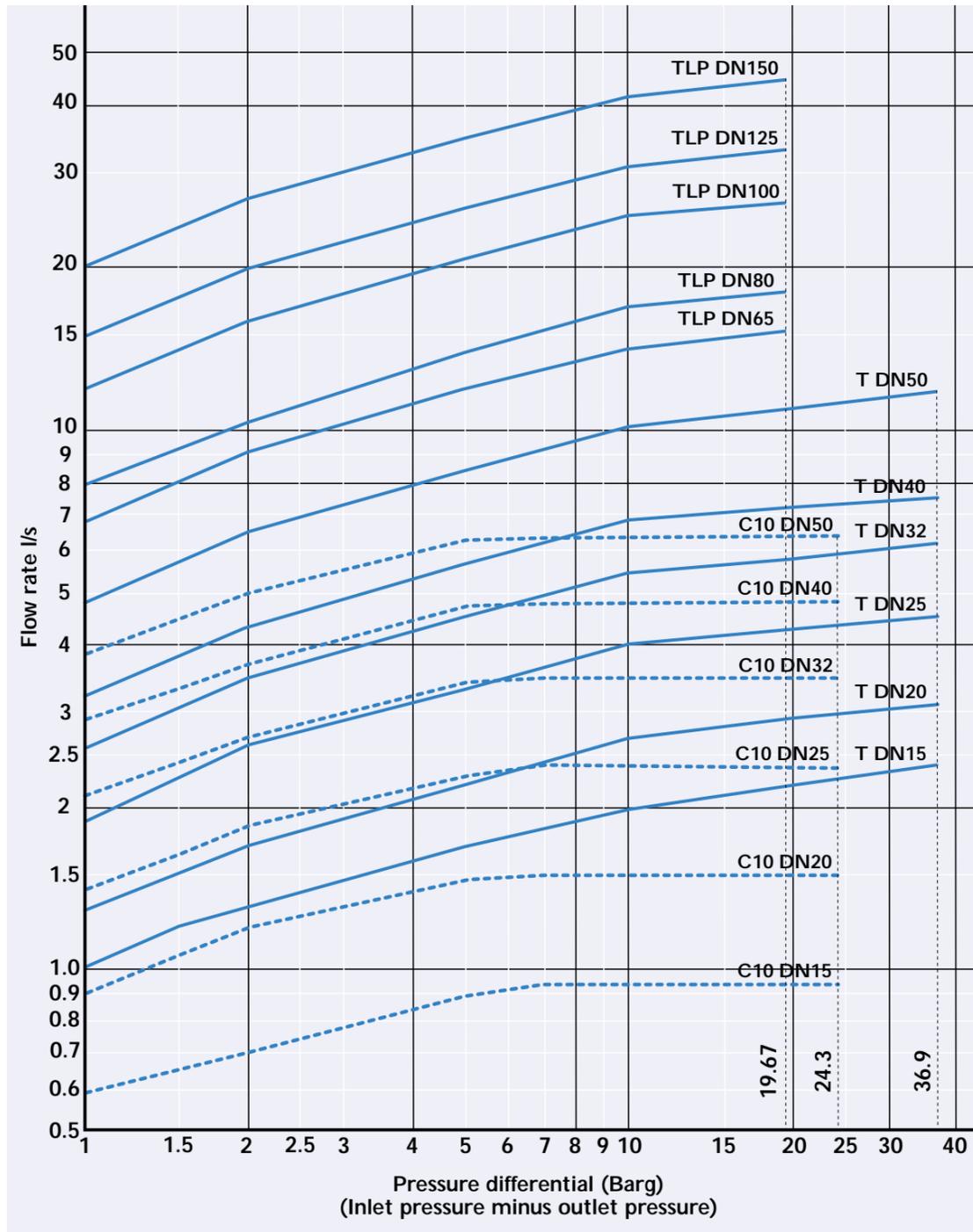
Valve type Class T

Required rise at dead end 0.35 Barg

Actual air capacity will become

$$1000 \times 0.54 = 540 \text{ l/s}$$

## WATER CAPACITY CHART (l/s)



The above capacity charts are based on a 1 Barg 'rise at dead end', see note 3.

## 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.)

### 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).

### 2) Useful Conversions

lgpm = l/s x 13.33  
 m<sup>3</sup>/min = l/s x 0.06

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

For a definition of rise at dead end see Page 20  
**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.

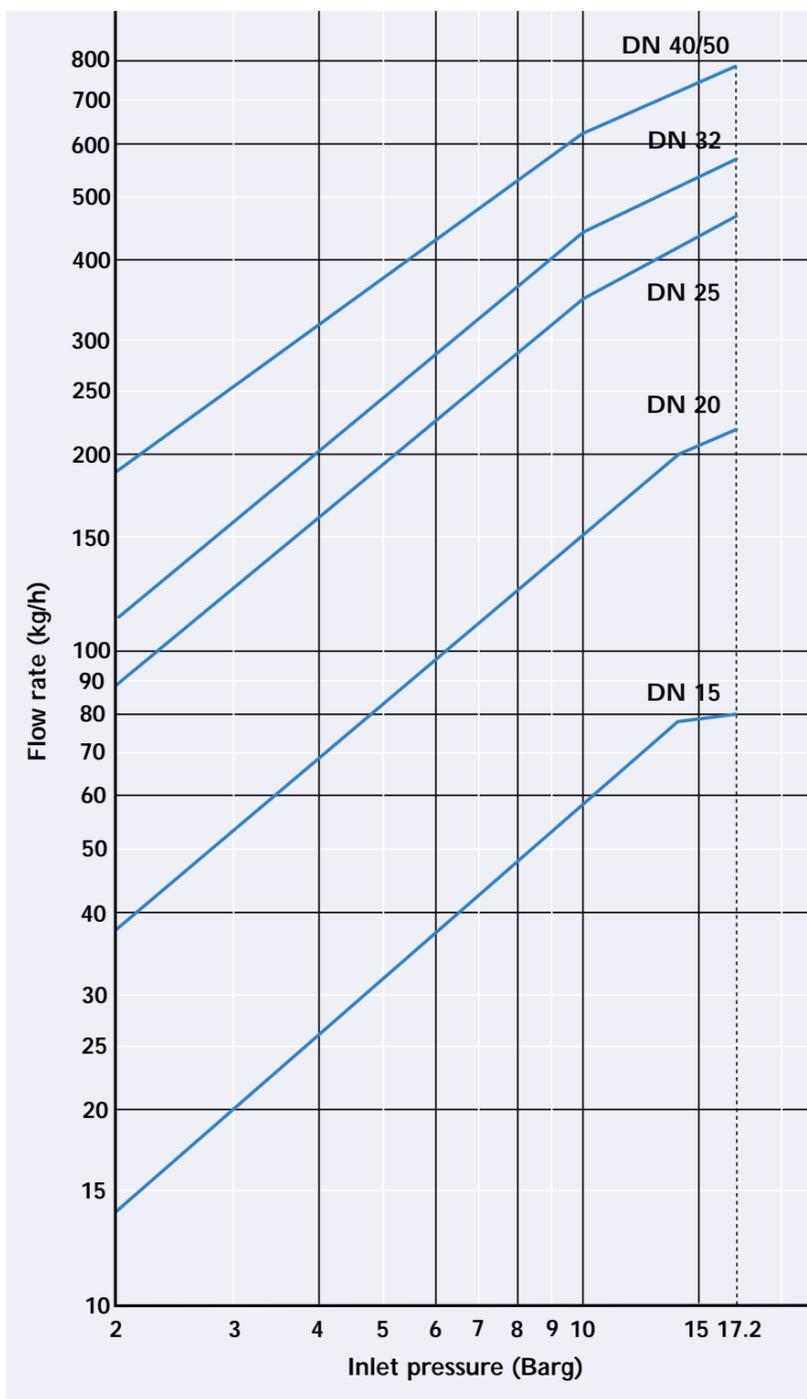
### Example:

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

TYPE & SIZE	RISE AT DEAD END		
	0.35 Barg	0.7 Barg	1.4 Barg
<b>T/TLP</b>			
1/2" to 4"	0.625	0.813	—
5" to 6"	—	0.770	1.230
<b>C10</b>			
1/2" to 1"	0.340	0.720	1.190
1 1/4" to 2"	0.260	0.680	1.290

Note. The capacity is unaffected by changes in temperature.

## 470 STEAM CAPACITY CHART (kg/h)



\* Due to the difficulty of reading charts below 2 Barg, we recommend the use of our sizing programme. Alternatively please contact our Bailey Sales Engineers for assistance.

The above capacity chart is based on a 'rise at dead end' of 10% (minimum 0.35 Barg), (see page 20).

## SIZING GUIDELINES FOR STEAM

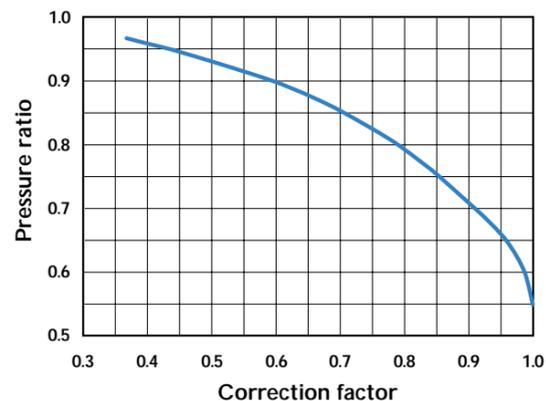
The capacity charts are for:

- 1) Sub-critical pressure drop.
- 2) Dry saturated steam.
- 3) Units kg/h.

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

### 1) Sub-Critical Pressure Drop

If the outlet pressure (in gauge units) is less than 55% of the inlet pressure, then the figures shown on the chart facing are correct. However if it is more than 55%, the valve will have a lower capacity. Corrections will need to be made as shown opposite, using the graph below.



### 2) Super Heated Steam

Most systems usually use saturated steam. However, if the steam temperature is greater than the saturated steam temperature the extra temperature will decrease the flow through the valve. Refer to office for details.

### 3) Useful Conversions

1b/hr = Kg/h x 2.2046.

**Example:** Use gauge units only.

Flowing outlet pressure 7 Barg

Flowing inlet pressure 10 Barg

$7 \div 10 =$  pressure ratio of 0.7 which equates to a correction factor of 0.91.

Therefore multiply the chart capacity by 0.91 (i.e. the valve will only pass 91% of the chart capacity).

## 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.

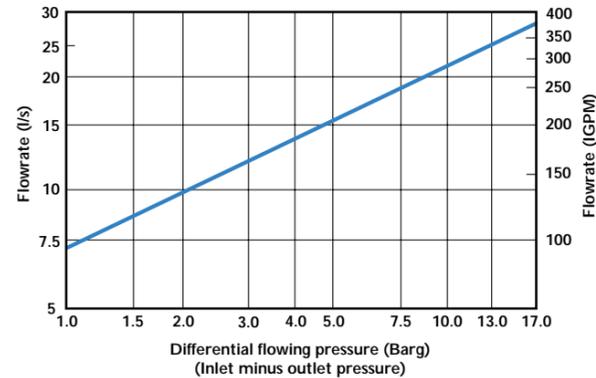
To size a valve in SPO mode please consult one of our Bailey Technical Sales Engineers, who will be pleased to assist.

### Note:

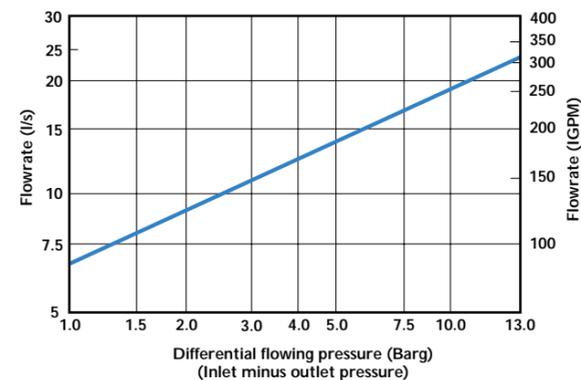
Regardless of connection size the valve size is 1 1/2", hence the capacity is always that of a 1 1/2" valve.

Rise at dead end (see page 20) will be 0.7 Barg.

**GRAPH 1**  
'Flowing' outlet pressure range: 3.4-4.8 Barg



**GRAPH 2**  
'Flowing' outlet pressure range: 4.8-7.6 Barg



## SPRING SELECTION TABLE

	DEAD END PRESSURE SETTING RANGE (Barg)	DEAD END PRESSURE SETTING RANGE (Psig)	COLOUR CODE
<b>CLASS T</b>	0.35 to 0.7	5 to 10	Dark Green
	0.7 to 1.4	10 to 20	Light Green
	1.4 to 2.8	20 to 40	Orange
	2.8 to 5.5	40 to 80	Brown
	5.5 to 8.3	80 to 120	Blue
	8.3 to 13.8	120 to 200	Red
<b>CLASS TLP</b>	0.35 to 2.1	5 to 30	Cream/Red
	2.1 to 5.5	30 to 80	Cream/Blue
<b>470</b>	0.7 to 3.5	10 to 50	Orange
	3.5 to 6.2	50 to 90	Purple
	3.5 to 10.3*	50 to 150*	Green
<b>C10</b>	0.7 to 4.8	10 to 70	Only 1 Spring
<b>CLASS F</b>	4.1 to 5.5	60 to 80	Brown
	5.5 to 8.3	80 to 120	Blue

\*Restricted on 1"-2" valves, see page 9.

## RISE AT DEAD END

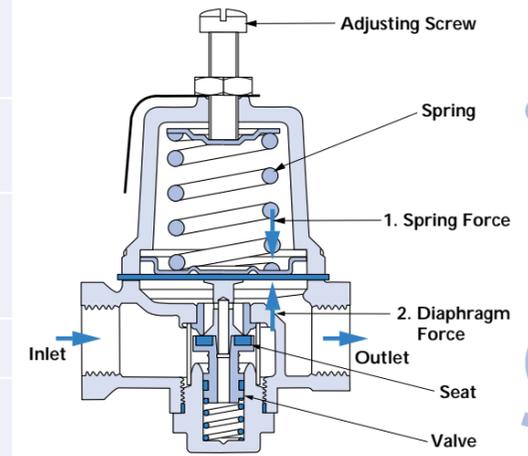
This is the amount of downstream pressure rise which occurs between the valve being fully open and closed.

All direct acting, spring loaded pressure reducing valves use two forces which open and close the valve and seat, thus regulating the flow through the valve.

- 1) The 'spring force' which tends to open the valve.
- 2) The 'diaphragm force' is created by the pressure in the outlet, acting on the underside of the diaphragm, opposing the spring force. This force tends to close the valve. When the valve is flowing at the correct pressure, the spring will have pushed the valve the correct distance away from the seat, allowing flow through the valve.

Once there is no demand from the system, the outlet pipe work will effectively be closed, i.e. the flow through the valve will come up against a dead end (nowhere to go). Under this condition the pressure will rise in the outlet, which in turn will increase the diaphragm force which opposes the spring force. This will tend to close the valve. When the diaphragm force is greater than the spring force, the valve will be fully closed.

The amount of rise in the outlet from the flowing pressure to the fully closed pressure is thus called "Rise at dead end".



## DEAD END SETTING

When commissioning the system and setting the valve, it is recommended practice to close off the outlet piping, i.e. dead end. It is important therefore to set the valve under this condition at the dead end pressure (flowing pressure plus the rise at dead end). **It is also important that when selecting the appropriate spring, the dead end pressure is used and not the flowing pressure.**

All sizing charts are based on the valve being fully open with a standard rise at dead end. However, alternative figures can be used, that reduce or increase the flow rate, dependent on the allowable rise. Please refer to the sizing examples.

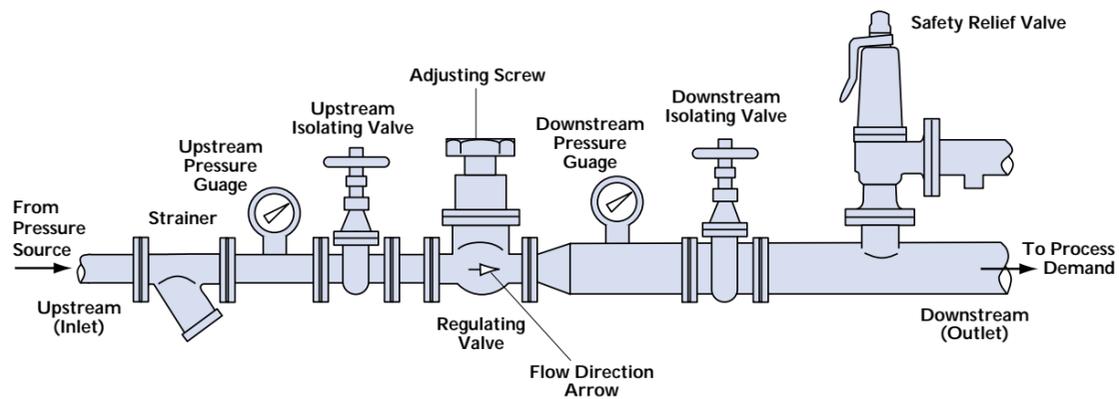
## INSTALLATION OF PRESSURE REGULATING VALVES

### 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. See page 20 for definitions.
- 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' (see page 20).

### 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 20.
- 1) Remove 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 to allow flow through the valve.
  - 6) If necessary, reset the pressure by turning the adjusting screw and then checking the new dead end setting.



## Bailey DA Series

Direct Acting Pressure Reducing Valves

