Bailey

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 Standard 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
- ☐ Direct Acting Pressure Reducing Valves
- ☐ 700 Series 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

Fax back to us on

Please complete the following

Name:

Position:

Company:

Address:

Post Code:

Tel No:

Fax No:

Email:

BAST0702

Registered Office: Sharp Street, Worsley, Manchester M28 3NA, UK.

Bailey

Standard Series

Safety Relief Valves

Bailey
Standard Series
Safety Relief Valves

The Bailey Standard Series of Safety Relief Valves offers a broad spectrum of protection against over-pressure for vital services such as steam, air, gases, water and process fluids.

Global legislation covering all pressure equipment and systems requires regular inspection of plant, pipework and safety provisions. Bailey Safety Relief Valves have demonstrated proven reliability over many years and require minimal maintenance.

Should a valve change-out be required at short notice, ex-stock availability of most Standard valves ensures minimal plant downtime and maximum protection.

THE LOGICAL CHOICE

Experience and focus on customer services make Bailey the logical choice of supplier for safety valves to protect pipework, boilers and vessels - across a wide range of applications.

A policy of continuous improvement assures that Bailey valves will always meet current legislative requirements and of course provide exceptional reliability and performance. Bailey's design service can help to specify the most appropriate size and type of valve for any specific application, with the ability to include special modifications where necessary.

By choosing Bailey, availability, quality, professional advice and proven performance are assured - all delivered through an extensive world-wide network of distributors.

Bailey
Standard Series
Dependable solutions with reliable global support

APPLICATIONS TABLE - STANDARD SERIES

Application	Medium	Standard Series Safety Relief Valve
Boilers, pressure vessels, and pipelines	Steam, Air, Gases and Hot Water	Pop-Type
Pipelines and thermal expansion Low capacity requirement	Water, Liquid, Air Gases and Steam	1640B 300
Bypass and pump relief	Water, Liquid	480/485
Process, pipeline, pump and vessel protection	Process/Corrosive Liquids	490 Stainless Steel
Blowers, bulk transfer, tank duty, road/rail transfers	Air	616D

The selection of Standard Series member for each application depends on: Pressure - capacity - material - connection required.

CONTENTS

Contents

Definitions

DEFINITIONS

Safety Valve

A valve which automatically discharges gases and vapours so as to prevent a predetermined safe pressure being exceeded. It is characterised by a rapid full opening action and used for steam, gases or vapour service.

Relief Valve

A valve which automatically discharges fluid, (usually liquid), when a predetermined upstream pressure is exceeded. The term is commonly used for pressure relieving valves in which the lift is proportional to the increase in pressure above the set pressure.

Safety Relief Valve

A valve which will automatically discharge gases, vapours or liquids, so as to prevent a predetermined safe pressure being exceeded. It is characterised by a rapid opening action.

Accumulation

The pressure increase over a maximum safe working pressure of the vessel or system when the safety relief valve is discharging at its rated capacity is called accumulation. The term refers to the vessel or system to be protected and not to the valve. Accumulation is the same as over-pressure when the valve is set at the design pressure of the vessel.

Set Pressure

The pressure measured at the valve inlet at which a safety relief valve should commence to lift under service conditions.

Overpressure

The pressure increase above set pressure at the valve inlet at which the discharge capacity is attained. Usually expressed as a percentage of set pressure.

Re-Seat Pressure

The pressure measured at the valve inlet at which the safety relief valve closes.

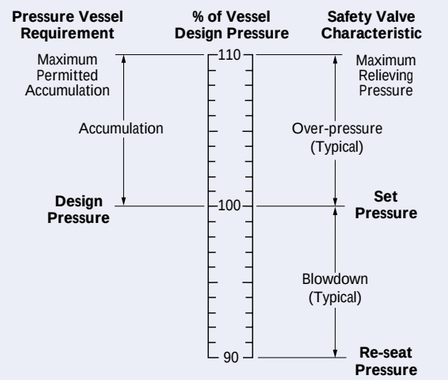
Blow-Down

The difference between the set pressure and the re-seating pressure expressed as a percentage of the set pressure or as a pressure difference.

Simmer

The pressure zone between the valve set pressure and the popping pressure. In this pressure zone the valve is only slightly open, and therefore discharging a small percentage of its rated capacity.

PRESSURE TERM RELATIONSHIP



Note: System operating pressure must always be less than re-seat pressure.

DEFINITIONS

Popping Pressure

The pressure at which the valve disc rapidly moves from a slightly open (simmer) position to a practically full open position.

Superimposed Back Pressure

Pressure higher than atmosphere in the safety valve outlet. This may result from discharge into the common disposal system of other safety valves or devices or as a result of a specific design requirement. Back pressure can be either constant or variable depending on the operating conditions.

Built Up Back Pressure

The pressure existing at the outlet of a safety valve caused by flow through the valve into the disposal system.

Differential Set Pressure

This is the difference between the set pressure and the constant superimposed back pressure. It is applicable only when a conventional type safety relief valve is used to discharge against constant superimposed back pressure. (It is the pressure at which the safety valve is set at on the test bench without back pressure.)

Cold Differential Set Pressure

The pressure at which a safety relief valve intended for high temperature service is set on a test rig using a test fluid at ambient temperature. The cold differential test pressure will be higher than the set pressure, in order to compensate for the effect of elevated temperature on the valve.

Valve Lift

The actual travel of the valve disc away from the seat when the valve is relieving.

Discharge Capacity

Actual rate of discharge which can be expressed in mass flow or volumetric terms.

Equivalent Capacity

Calculated in mass or volumetric flow rate of the valve of a given test fluid. The fluids commonly used for test purposes are steam, air and water.

BS 6759 TOLERANCES FOR STANDARD SERIES SAFETY RELIEF VALVES

PART	% Overpressure	% Blowdown	Medium
Part 1	10%	0.3 Barg or 15%*	Steam
Part 2	10%	0.3 Barg or 10%*	Compressed Air and Inert Gases
Part 3	10%	15%	Gases
Part 3	10%	0.6 Barg or 20%*	Liquids

**Whichever is the greater.*

Definitions

Pop-Type Bronze Safety Valve

DESIGN

The pop-type safety valve is designed to give high discharge capacity for a valve of the minimum size for the given duty. Its simple design reduces both the initial cost and the maintenance cost. Good reseating characteristics and adjustable blowdown control ensures stable performance. The body material and trim is cast bronze ranging from DN15 to DN65 in size.

FEATURES AND BENEFITS

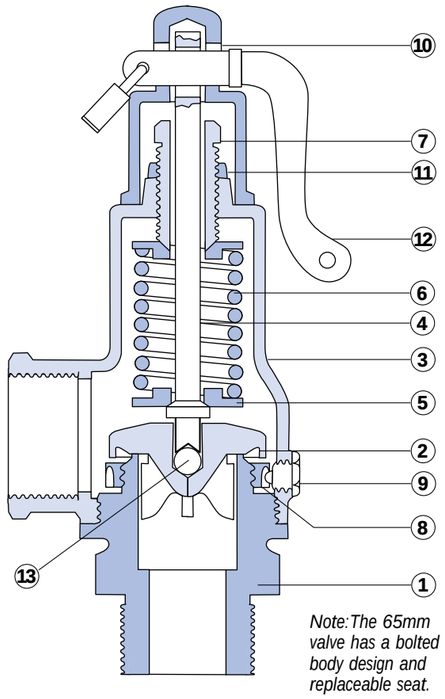
- Certified to BS6759 parts 1, 2 and 3 SAFED/AOTC.
- High lift, high flow capability.
- Positive shut-off achievable with precision lapping of sealing surfaces.
- Simple design for reducing maintenance costs.
- Screwed or flanged connections.
- Cap option: either pressure tight dome or open lever.

CE MARKING

This range of Safety Valves has been certified to the requirements of the PED. Set pressures below 0.5 Barg do not require certification hence they cannot be CE marked.

FIGURE NUMBERING SYSTEM

SIZE (mm)	MAX PRESSURE	CONNECTIONS	CAP	FIGURE No.
15 to 50	24 Barg	Screwed Male x Female	Dome	3373
			Lever	3376 1643
15 to 50	24 Barg	Flanged Inlet x Outlet	Dome	3383
			Lever	3386
65	18 Barg	Screwed Male x Female	Dome	3373A
			Lever	3376A



Note: The 65mm valve has a bolted body design and replaceable seat.

ITEM	PART	MATERIAL
1	Seat	Bronze
2	Valve Disc	Bronze
3	Body	Bronze
4	Spindle	Brass
5	Spring End Plate	Brass
6	Spring	C. S.
7	Adjusting Screw	Brass
8	Blowdown Ring	Bronze
9	Setting Screw	Brass
10	Dome	Nylon
11	Lock Nut	Brass
12	Lever	Bronze
13	Ball	St. St.

1640B Bronze Relief Valve

DESIGN

The 1640B bronze relief valve is an inexpensive valve suitable for relieving excess pressures of water, oil, air, gases, or steam where high discharge rates are not required. Typically for pipeline and thermal relief applications.

The body and trim material is bronze ranging from DN15 to DN100 in size.

FEATURES AND BENEFITS

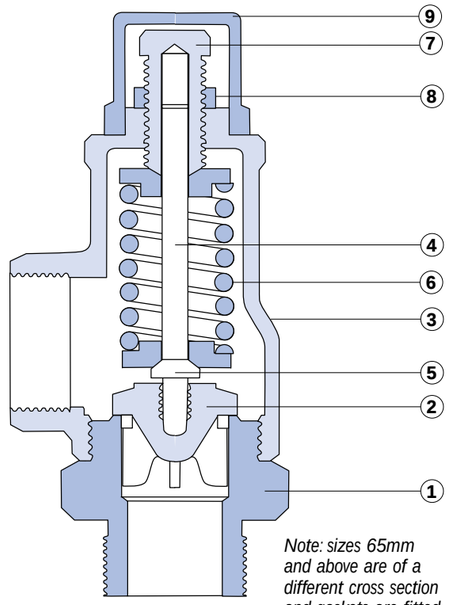
- Precision finish metal to metal seating surfaces.
- Screwed dome ensuring pressure tightness during discharge.
- Simple design for the reduction of maintenance costs.

CE MARKING

This range of Safety Valves has been certified to the requirements of the PED. Set pressures below 0.5 Barg do not require certification hence they cannot be CE marked.

FIGURE NUMBERING SYSTEM

SIZE(mm)	MAX PRESSURE	FIGURE No.
15 to 50	24 barg	1640B
65 to 100	10.3 barg	1640B



Note: sizes 65mm and above are of a different cross section and gaskets are fitted to domed versions.

ITEM	PART	MATERIAL
1	Seat	Brass
2	Valve Disc	Bronze
3	Body	Bronze
4	Spindle	Brass
5	Spring End Plate	Brass
6	Spring	C. S.
7	Adjusting Screw	Brass
8	Lock Nut	Brass
9	Leak Proof Dome	Brass

300 Series

300 Series Bronze Relief Valves

DESIGN

The 300 Series spring loaded range of inexpensive relief valves are suitable for relieving excess pressures of water, oil, air, gases or steam where high discharge rates are not required. Typically for pipeline and thermal relief applications. The body and trim material is cast bronze. Ranging from DN15 to DN100 in size.

FEATURES AND BENEFITS

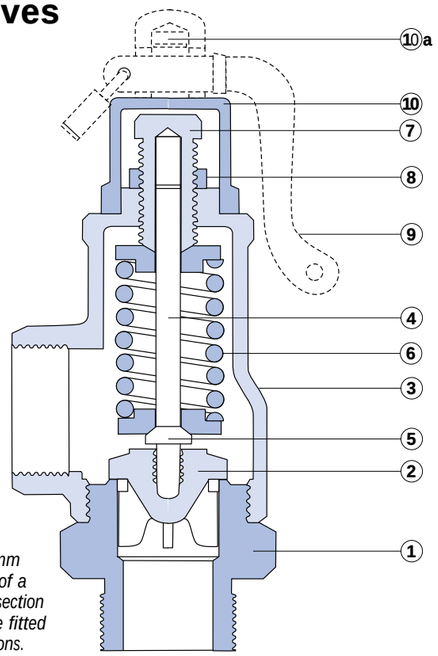
- Precision lapped metal to metal seating surfaces.
- Screwed or flanged connections.
- Cap option: either pressure tight dome or open lever.
- Simple design for the reduction of maintenance costs.

CE MARKING

This range of Safety Valves has been certified to the requirements of the PED. Set pressures below 0.5 Barg do not require certification hence they cannot be CE marked.

FIGURE NUMBERING SYSTEM

SIZE (mm)	MAX PRESSURE	CONNECTIONS	CAP	FIGURE No.
15 to 50	24 Barg	Screwed Male x Female	Dome	323
			Lever	326
		Flanged Inlet x Outlet	Dome	333
			Lever	336
65 to 100	10.3 Barg	Screwed Male x Female	Dome	323A
			Lever	326A
		Flanged Inlet x Outlet	Dome	333A
			Lever	336A



Note: sizes 65mm and above are of a different cross section and gaskets are fitted to domed versions.

ITEM	PART	MATERIAL
1	Seat	Brass
2	Valve Disc	Bronze
3	Body	Bronze
4	Spindle	Brass
5	Spring End Plate	Brass
6	Spring	C. S.
7	Adjusting Screw	Brass
8	Lock Nut	Brass
9	Lever	Bronze
10a	Lever Dome	Nylon
10	Leak Proof Dome	Brass

480/490 Series

480/490 Series Bronze/Stainless Relief Valves

DESIGN

This spring operated liquid relief valve has a cartridge type assembly which can be withdrawn from the body without disturbing the spring setting and hence relieving pressure. This allows the seating surfaces to be cleaned without the need to reset the valve. The 480 is a bronze relief valve, the 485 is also bronze with a renewable stainless steel seat and disc, while the 490 is all stainless steel.

Typically for use on positive displacement pumps, for relief or bypass duties. The spring cartridge assembly can be supplied separately for use as an integral pump bypass relief valve.

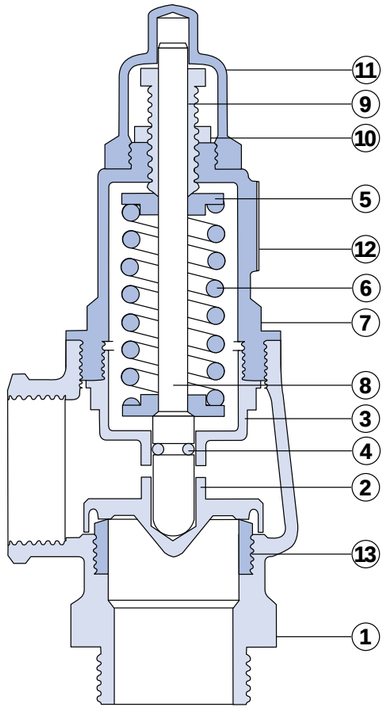
For low temperature duties the spindle is fitted with an 'O' ring to protect the spring particularly on corrosive duties.

FEATURES AND BENEFITS

- Certified to BS6759 Part 3 by SAFED/AOTC.
- Top guided valve disc.
- Precision lapped valve disc.
- Opening and closing pressures closer than conventional valves.
- Self contained spring chamber.
- Spring isolated from liquid flow and calibrated to suit working pressure.
- Screwed connections available as male or female in BSP or NPT.
- Particularly suited to pump by-pass duty.

CE MARKING

This range of Safety Valves has been certified to the requirements of the PED. Set pressures below 0.5 Barg do not require certification hence they cannot be CE marked.



ITEM	PART	MATERIAL 480	MATERIAL 490
1	Body	Bronze	St. St.
2	Valve Disc	Bronze*	St. St.
3	Guide	Bronze	St. St.
4	'O' Ring	Nitrile	Viton
5	Spring Plate	Brass	St. St.
6	Spring	C. S.	St. St.
7	Cover	Bronze	St. St.
8	Spindle	Bronze	St. St.
9	Adjusting Screw	Brass	St. St.
10	Locknut	Brass	St. St.
11	Dome	Bronze	St. St.
12	Nameplate	Aluminium	Aluminium
13	Renewable Seat	Bronze*	St. St.

*Materials for Fig 485 are the same as Fig 480 except items 2 & 13 which are Stainless Steel.

FIGURE NUMBERING SYSTEM

FIGURE No.	BODY MATERIAL	TRIM MATERIAL	MAX. PRESSURE	MAX.TEMPERATURE With 'O' ring	MAX.TEMPERATURE No 'O' ring
480	Bronze	Bronze	24 Barg	120ºC	224ºC
485	Bronze	Stainless Steel	24 Barg	120ºC	224ºC
490	Stainless Steel	Stainless Steel	24 Barg	200ºC	260ºC

Note that the 80mm valve is limited to 10 barg.

Type 616D Air Blower Safety Valve

DESIGN

The type 616D is a spring operated high capacity safety valve for low-pressure air applications. It is designed to deliver precise relieving and re-seating pressures while the protected open discharge gives downward flow. The non-stick seating surfaces give positive shut-off and freedom from sticking, whilst the mixture of aluminium and gunmetal make it light but very robust. Typically used on blowers or bulk transfer road/rail transport vehicles.

It is specially designed to give overpressure protection of positive displacement air blowers and associated tanks or pressure vessels.

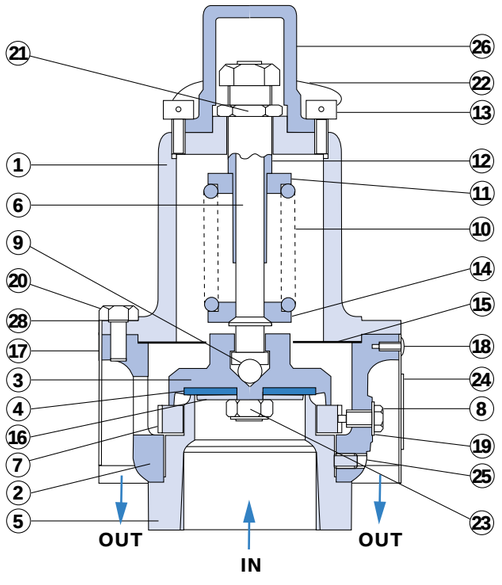
The body material is aluminium ranging from DN40 to DN50 in size, and has an open discharge which is protected by a steel cowl.

FEATURES AND BENEFITS

- Fully conforms to BS6759 Part 2 and ISO4126.
- Engineered to give the highest possible discharge capacity efficiency.
- Precise relieving and re-seating pressures.
- Non-stick seating surfaces for positive shut-off.
- Lightweight aluminium bonnet and body.
- Resilient seal on bronze seat.
- Stainless steel spring.
- BSP female inlet 1½" and 2".
- Protected open discharge.

CE MARKING

This range of Safety Valves has been certified to the requirements of the PED. Set pressures below 0.5 Barg do not require certification hence they cannot be CE marked.



ITEM	PART	MATERIAL
1	Cover	Aluminium
2	Body	Aluminium
3	Disc Holder	Aluminium
4	Disc	PTFE
5	Seat	Bronze
6	Spindle	St. St.
7	Blow Down Ring	Bronze
8	Setting Screw	Ni. pl. Steel
9	Spindle Ball	St. St.
10	Spring	St. St.
11	Upper Spring Cap	Mild Steel
12	Adjusting Screw	Brass
13	Cap Screw	St. St.
14	Bottom Spring Cap	Mild Steel
15	Dust Shield	Aluminium
16	Disc Support	Zi. pl. Steel
17	Cowl	Zi. pl. Steel
18	Self Tapping Screw	Zi. pl. Steel
19	Shakeproof Washer	St. St.
20	Set Screw	St. St.
21	Locknut	Brass
22	Wire and Lead Seal	Lead & St. St.
23	Self Locking Nut	Brass
24	Nameplate	Aluminium
25	Grub Screw	Steel
26	Locking Dome	Nylon
28	Starwasher	St. St.

INSTALLATION

Safety Relief Valves should always be installed in an upright position with their spring chamber vertical. All packing materials should be removed from the valve connections prior to installation.

Pressure Vessels

When fitting a Safety Relief Valve onto pressure vessels, the inlet connection pipe should be as short as possible and the bore should be at least equivalent to the nominal bore size of the valve.

The pressure drop between the vessel and the valve should be no more than 3% at rated capacity.

A pressure-tight dome should be specified when:

1) A backpressure must be contained within the relieving system.

2) A head of liquid is built up within the valve body and consequently needs to be contained.

3) The relieving medium is toxic, corrosive or environmentally unfriendly.

Pipelines

When fitting a Safety Relief Valve into a pipeline, the inlet connecting pipe leading from the main pipeline to the Safety Relief Valve should be as short as possible, so that the inlet pressure drop is no more than 3% of rated capacity.

In addition, it is advised that the Safety Relief Valve is placed a sufficient distance downstream of the pressure source. This will protect the valve from the adverse effects of pressure pulsations.

Discharge pipelines

These should be equal to or larger than the valve outlet, with adequate supports, minimum number of bends and overall length. The maximum build up of backpressure should not exceed 10% of the set pressure. Steam service lines should be adequately drained. Alignment of the discharge or drain should present no risk to persons or property. Protection from collection of rainwater or condensation is advisable.

System Cleansing

It is essential that new installations are fully flushed and all debris removed prior to installing the valve since serious damage can be caused to valve seats, resulting in subsequent leakage.

Pressure Adjustment

Every valve is fitted with a suitable spring and tested before leaving the factory. Valves can be preset on request but to alter the set pressure, the adjusting screw, when viewed from the top, should be screwed downwards in a clockwise direction to increase the set pressure and upwards in an anti-clockwise direction to decrease it. Set pressure adjustment must be carried out by experienced and approved personnel. Any change in set pressures must be within the range of the existing spring, if it exceeds the range a new spring will be required. The valve cap lead seal must be re-made after any adjustment to the set pressure.

Blow-down Adjustment (POP Valves Only)

The blow-down ring (part no.8) is set before the valve leaves the factory and normally no further adjustment will be necessary. However, if the reseating pressure has to be altered in service, the blow-down ring should be screwed clockwise to raise the pressure and anti-clockwise to lower it. When re-inserting the setting screw (part no 9). It should always be placed to engage a slot in the blow-down ring. For recommended settings, please contact our technical sales office who will be pleased to help.

INSTALLATION OF 616D

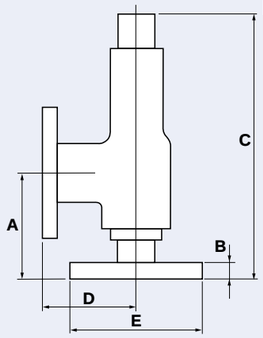
Mount the valve in a vertical position whenever possible. (It may be mounted at any angle up to 45° without detriment.) Ensure that the valve discharge is unobstructed and does not create a hazard to persons or property.

The branch leading to the valve must be the same nominal bore as the valve (or larger) and bushed down at the valve entry. The length must be kept as short as possible.

Due to the adverse effect of pressure pulsations from the usual Rootes-type machine, the valve should not be mounted within 1.25m of the blower outlet. However, no valve or other obstruction must intervene between the blower and the safety valve.

Dimensions

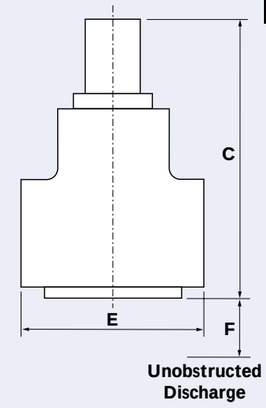
Flanged x Flanged



Valve Type	Valve size	Inlet & Outlet (BSP)	A	B	'C' Dome	'C' Lever	D	E	Weight (kg)*
Pop Type	DN20	¾"	62	10	168	194	62	102	2
	DN25	1"	75	10	197	222	73	121	3
	DN32	1¼"	83	11	208	235	81	133	4.5
	DN40	1½"	89	13	221	248	89	140	6
	DN50	2"	109	16	273	305	108	165	10
300 Series	DN20	¾"	75	10	169	194	62	102	2
	DN25	1"	75	10	197	223	73	121	3
	DN32	1¼"	83	13	209	237	83	133	4.5
	DN40	1½"	89	13	236	263	89	140	6
	DN50	2"	106	16	275	309	109	165	9
	DN65	2½"	114	16	295	337	114	184	11
	DN80	3"	121	16	321	362	121	203	15
	DN100	4"	140	19	395	445	152	229	20

**Approximate weights based flanged products.*
All dimensions are in mm.

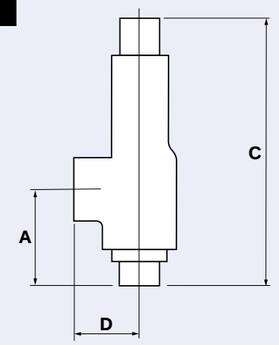
Female



Valve Type	Valve size	Inlet (BSP)	C	E	F	Weight (kg)
616D	DN40	1½"	194	102	10	1.8
	DN50	2"	205	127	13	2.0

All dimensions are in mm.

Male x Female



Valve Type	Valve size	Inlet & Outlet (BSP)	A	'C' Dome	'C' Lever	D	Weight (kg)*
Pop Type	DN15	½"	49	137	154	33	1
	DN20	¾"	57	147	172	40	1
	DN25	1"	64	186	212	48	2
	DN32	1¼"	78	195	222	57	3
	DN40	1½"	83	207	235	65	3
	DN50	2"	105	262	293	79	6
	DN65	2½"	106	322	360	106	9
1640B	DN15	½"	48	122	—	26	0.5
	DN20	¾"	55	140	—	36	1
	DN25	1"	65	163	—	39	1.5
	DN32	1¼"	75	173	—	48	2
	DN40	1½"	81	200	—	50	3
	DN50	2"	94	222	—	59	4
	DN65	2½"	118	298	—	76	10
	DN80	3"	133	333	—	83	13
	DN100	4"	152	408	—	95	16
300 Series	DN15	½"	48	122	140	26	0.5
	DN20	¾"	55	140	166	36	1
	DN25	1"	65	163	190	39	1.5
	DN32	1¼"	75	173	200	48	2
	DN40	1½"	81	200	229	50	3
	DN50	2"	94	222	255	59	4
	DN65	2½"	118	298	340	76	10
	DN80	3"	133	333	375	83	13
	DN100	4"	152	408	457	95	16
480/ 490	DN20	¾"	49	176	—	41	1
	DN25	1"	64	198	—	45	2
	DN40	1½"	73	237	—	56	3
	DN50	2"	91	270	—	64	5
	DN80	3"	111	390	—	86	13

Air Capacity

AIR CAPACITY CHART (*l/s*) @ 10% OVERPRESSURE AND 15°C

Set Pressure (Barg)	Valve Type Pop-Type (BS6759 part 2)							Valve Type 1640B								
	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
1.0	8.60	19.40	34.52	53.85	77.61	138	216	4.37	9.88	17.56	27.41	39.50	70.24	110	158	281
1.5	10.81	24.45	43.50	67.87	97.81	174	272	5.50	12.45	22.14	34.54	49.78	88.52	138	199	354
2.0	13.04	29.50	52.48	81.88	118	210	328	6.64	15.02	26.71	41.67	60.06	107	167	240	427
3.0	17.51	39.60	70.44	110	158	282	440	8.91	20.15	35.85	55.94	80.62	143	224	322	573
4.0	21.97	49.70	88.41	138	199	353	552	11.18	25.29	45.00	70.20	101	180	281	405	720
5.0	26.43	59.79	106	166	239	425	664	13.45	30.43	54.14	84.47	122	216	338	487	866
6.0	30.90	69.89	124	194	280	497	777	15.73	35.57	63.28	98.73	142	253	395	569	1012
7.0	35.36	79.99	142	222	320	569	889	18.00	40.71	72.43	113	163	290	452	651	1158
8.0	39.83	90.09	160	250	360	641	1001	20.27	45.85	81.57	127	183	326	510	734	1304
9.0	44.29	100	178	278	401	713	1113	22.54	50.99	90.71	142	204	363	567	816	1450
10.0	48.76	110	196	306	441	784	1225	24.82	56.13	99.85	156	225	399	624	898	1597
12.0	57.68	130	232	362	522	928	1450	29.36	66.41	118	184	266	472	—	—	—
12.5	59.92	136	241	376	542	964	1506	30.50	68.98	123	191	276	491	—	—	—
14.0	66.61	151	268	418	603	1072	1674	33.90	76.69	136	213	307	545	—	—	—
16.0	73.54	171	304	474	683	1215	1899	38.45	86.97	155	241	348	619	—	—	—
18.0	84.47	191	340	530	764	1359	2123	42.99	97.25	173	270	389	692	—	—	—
20.0	93.40	211	376	586	845	1503	—	47.54	108	191	298	430	765	—	—	—
22.0	102	231	412	642	926	1646	—	52.08	118	210	327	471	838	—	—	—
24.0	111	252	448	698	1007	1790	—	56.63	128	228	355	512	911	—	—	—

Useful Conversions

Nm^3/hr = 1/sec x 3.60

SCFM = 1/sec x 2.12

Other Gases

If you wish to use the valve on other compatible gases, the sizing details above can be used. The valve capacity will however change depending on the specific gravity of the flowing gas. Multiply the valve air capacity by $1/\sqrt{SG}$ to give the gas capacity.

SG = specific gravity

(relative to air = 1)

AIR CAPACITY CHART (*l/s*) @ 10% OVERPRESSURE AND 15°C

Set Pressure (Barg)	Valve Type 300 Series								
	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
1.0	4.37	9.88	17.56	27.41	39.50	70.24	110	158	281
1.5	5.50	12.45	22.14	34.54	49.78	88.52	138	199	354
2.0	6.64	15.02	26.71	41.67	60.06	107	167	240	427
3.0	8.91	20.15	35.85	55.94	80.62	143	224	322	573
4.0	11.18	25.29	45.00	70.20	101	180	281	405	720
5.0	13.45	30.43	54.14	84.47	122	216	338	487	866
6.0	15.73	35.57	63.28	98.73	142	253	395	569	1012
7.0	18.00	40.71	72.43	113	163	290	452	651	1158
8.0	20.27	45.85	81.57	127	183	326	510	734	1304
9.0	22.54	50.99	90.71	142	204	363	567	816	1450
10.0	24.82	56.13	99.85	156	225	399	624	898	1597
12.0	29.36	66.41	118	184	266	472	—	—	—
12.5	30.50	68.98	123	191	276	491	—	—	—
14.0	33.90	76.69	136	213	307	545	—	—	—
16.0	38.45	86.97	155	241	348	619	—	—	—
18.0	42.99	97.25	173	270	389	692	—	—	—
20.0	47.54	108	191	298	430	765	—	—	—
22.0	52.08	118	210	327	471	838	—	—	—
24.0	56.63	128	228	355	512	911	—	—	—

VALVE TYPE 616D

AIR CAPACITY CHART (*l/s*) @ 0.07 Barg or10% OVERPRESSURE AND 15°C

Valve Size	Set Pressure Barg											
	0.2	0.35	0.5	0.65	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.5
DN40	64.2	75.7	87.9	101	116	137	160	186	212	241	271	340
DN50	115	132	150	169	191	222	252	286	322	359	398	490

Steam Capacity

STEAM CAPACITY CHART (kg/h) @ 10% OVERPRESSURE

Set Pressure (Barg)	Saturated Steam Temp. °C	Valve Type Pop-Type (BS6759 part 1)						
		DN15	DN20	DN25	DN32	DN40	DN50	DN65
1.0	**120**	21.39	48.38	86.07	134	194	344	538
1.5	**127**	28.37	64.17	114	178	257	456	713
2.0	**134**	35.50	80.30	143	223	321	571	892
3.0	**144**	47.65	108	192	299	431	767	1198
4.0	**152**	59.81	135	241	375	541	962	1503
5.0	**159**	71.96	163	290	452	651	1158	1808
6.0	**165**	84.11	190	338	528	761	1353	2114
7.0	**170**	96.26	218	387	604	871	1549	2420
8.0	**175**	108	245	436	681	981	1744	2725
9.0	**180**	121	273	485	757	1091	1940	3030
10.0	**184**	133	300	534	833	1201	2135	3336
12.0	**192**	157	355	632	986	1421	2526	3947
12.5	**193**	163	369	656	1024	1476	2624	4099
14.0	**198**	181	410	730	1138	1641	2917	4558
16.0	**204**	206	465	827	1291	1860	3308	5168
18.0	**210**	230	520	925	1443	2080	3699	5779
20.0	**215**	254	575	1023	1596	2300	4090	—
22.0	**220**	279	630	1121	1749	2520	4481	—
24.0	**224**	303	685	1219	1901	2740	4872	—

Useful Conversions
lbs/h = kg/h x 2.2046

Other Temperatures
The above tables are based on saturated steam, at the temperatures shown.
For steam systems operating at higher temperatures, the above capacities will need to be derated by using the super heat correction factor.
If you do not already have these figures, please consult the Bailey sales office.

STEAM CAPACITY CHART (kg/h) @ 10% OVERPRESSURE

Set Pressure (Barg)	Valve Type 1640B									Valve Type 300 Series								
	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
1.0	11.89	26.88	47.82	74.61	108	191	299	430	765	11.89	26.88	47.82	74.61	108	191	299	430	765
1.5	14.98	33.88	60.27	94.03	136	241	376	542	964	14.98	33.88	60.27	94.03	136	241	376	542	964
2.0	18.07	40.87	72.71	113	163	291	454	654	1163	18.07	40.87	72.71	113	163	291	454	654	1163
3.0	24.26	54.86	97.60	152	219	390	610	878	1561	24.26	54.86	97.60	152	219	390	610	878	1561
4.0	30.44	68.85	123	191	275	490	765	1102	1959	30.44	68.85	123	191	275	490	765	1102	1959
5.0	36.63	82.84	147	230	331	589	921	1325	2357	36.63	82.84	147	230	331	589	921	1325	2357
6.0	42.81	96.83	172	269	387	689	1076	1549	2754	42.81	96.83	172	269	387	689	1076	1549	2754
7.0	49.00	111	197	308	443	788	1231	1773	3152	49.00	111	197	308	443	788	1231	1773	3152
8.0	55.18	125	222	346	499	888	1387	1997	3550	55.18	125	222	346	499	888	1387	1997	3550
9.0	61.37	139	247	385	555	987	1542	2221	3948	61.37	139	247	385	555	987	1542	2221	3948
10.0	67.55	153	272	424	611	1087	1698	2445	4346	67.55	153	272	424	611	1087	1698	2445	4346
12.0	79.92	181	322	502	723	1286	—	—	—	79.92	181	322	502	723	1286	—	—	—
12.5	83.01	188	334	521	751	1335	—	—	—	83.01	188	334	521	751	1335	—	—	—
14.0	92.29	209	371	579	835	1485	—	—	—	92.29	209	371	579	835	1485	—	—	—
16.0	106	237	421	657	947	1684	—	—	—	106	237	421	657	947	1684	—	—	—
18.0	117	265	471	735	1059	1883	—	—	—	117	265	471	735	1059	1883	—	—	—
20.0	129	293	521	812	1171	2082	—	—	—	129	293	521	812	1171	2082	—	—	—
22.0	142	321	570	890	1283	2281	—	—	—	142	321	570	890	1283	2281	—	—	—
24.0	154	349	620	968	1395	2480	—	—	—	154	349	620	968	1395	2480	—	—	—

Steam Capacity

Water Capacity

WATER CAPACITY CHART (l/m) @ 10% OVERPRESSURE

Set Pressure (Barg)	Valve Type 1640B (BS6759 part 3)								
	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
1.0	6.17	13.95	24.82	38.72	55.80	99.22	155	223	397
1.5	7.55	17.09	30.39	47.42	68.34	122	190	273	486
2.0	8.72	19.73	35.10	54.76	78.91	141	219	316	561
3.0	10.68	24.16	42.98	67.06	96.60	172	268	387	687
4.0	12.33	27.90	49.63	77.44	112	198	310	446	794
5.0	13.79	31.19	55.49	86.58	125	222	347	499	887
6.0	15.11	34.17	60.79	94.84	137	243	380	547	972
7.0	16.32	36.91	65.66	102	148	263	410	591	1050
8.0	17.44	39.46	70.19	110	158	281	438	631	1122
9.0	18.50	41.85	74.45	116	167	298	465	670	1190
10.0	19.50	44.11	78.48	122	176	314	490	706	1255
12.0	21.36	48.32	85.97	134	193	344	—	—	—
12.5	21.81	49.32	87.74	137	197	351	—	—	—
14.0	23.08	52.20	92.86	145	209	371	—	—	—
16.0	24.67	55.80	99.27	155	223	397	—	—	—
18.0	26.17	59.19	109	164	237	421	—	—	—
20.0	27.58	62.39	111	173	250	444	—	—	—
22.0	28.93	65.43	116	182	262	465	—	—	—
24.0	30.21	68.34	122	190	273	486	—	—	—

Useful Conversions

lgpm = 1/min x 0.22

m^3/min = 1/min x 0.001

Other Liquids

If you wish to use the valve on other compatible liquids, the sizing details above can be used. The valve capacity will however change depending on the specific gravity of the flowing liquid. Multiply the valve water capacity by $1/\sqrt{SG}$ to give the liquid capacity.

SG = specific gravity

(relative to water = 1)

WATER CAPACITY CHART (l/m) @ 10% OVERPRESSURE

Set Pressure (Barg)	Valve Type 300 Series (BS6759 part 3)									Valve Type 480/490 Series (BS6759 part 3)				
	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100	DN20	DN25	DN40	DN50	DN80
1.0	6.17	13.95	24.82	38.72	55.80	99.22	155	223	397	27.90	49.63	112	198	446
1.5	7.55	17.09	30.39	47.42	68.34	122	190	273	486	34.17	60.78	137	243	547
2.0	8.72	19.73	35.10	54.76	78.91	140	219	316	561	39.46	70.19	158	281	631
3.0	10.68	24.16	42.98	67.06	96.60	172	268	387	687	48.32	85.97	193	344	773
4.0	12.33	27.90	49.63	77.44	112	198	310	446	794	55.80	99.27	223	397	893
5.0	13.79	31.19	55.49	86.58	125	222	347	499	887	62.39	111	250	444	998
6.0	15.11	34.17	60.79	94.84	137	243	380	547	972	48.34	122	273	486	1093
7.0	16.32	36.91	65.66	102	148	263	410	591	1050	73.82	131	295	525	1181
8.0	17.44	39.46	70.19	110	158	281	438	631	1122	78.91	140	316	561	1263
9.0	18.50	41.85	74.45	116	167	298	465	670	1190	83.70	149	334	595	1339
10.0	19.50	44.11	78.48	122	177	314	490	706	1255	88.23	157	353	628	1412
12.0	21.36	48.32	85.97	134	193	344	—	—	—	96.65	172	387	687	—
12.5	21.81	49.32	87.74	137	197	351	—	—	—	98.64	176	395	702	—
14.0	23.08	52.20	92.86	145	209	371	—	—	—	104	186	418	742	—
16.0	24.67	55.80	99.27	155	223	397	—	—	—	112	199	446	794	—
18.0	26.17	59.19	109	164	237	421	—	—	—	118	211	473	842	—
20.0	27.58	62.39	111	173	250	444	—	—	—	125	222	499	887	—
22.0	28.93	65.43	116	182	262	465	—	—	—	131	233	523	931	—
24.0	30.21	68.34	122	190	273	486	—	—	—	137	243	547	972	—

Water Capacity

Springs

STANDARD SERIES SPRING SELECTION CHARTS

The valves are fitted with a suitable spring. Every valve is tested thoroughly for efficient operation before leaving our factory. Ensure the set pressure is within the range of the existing spring. If not, select and fit the correct spring from the tables below. All our springs are low stressed and painted to prevent corrosion.

1640B Spring Range and Selection

Barg	Psig	½" - 2"	2½"	3"	4"
0.173 - 0.52	2.5 - 7.5	Red	Red	Red	Yellow
0.52 - 0.86	7.5 - 12.5	Yellow	Blue	Yellow	Blue
0.86 - 1.38	12.5 - 20.0	Blue	Orange	Blue	Orange
1.38 - 2.59	20.0 - 37.5	Orange	Purple	Orange	Purple
2.59 - 4.31	37.5 - 62.5	Purple	Green/Blue	Purple	Green
4.31 - 6.03	62.5 - 87.5	Green/Blue	Green	Green/Blue	White
6.03 - 8.62	87.5 - 125.0	Green	White	Green	Red/Yellow
8.62 - 12.00	125.0 - 175.0	White	Red/Green	White	Red/Green
12.00 - 15.52	175.0 - 225.0	Red/Yellow			
15.52 - 18.97	225.0 - 275.0	Red/Green			
18.97 - 22.41	275.0 - 325.0	Red/Orange			
22.41 - 24.0	325.0 - 375.0	Yellow/Blue			

(Maximum pressure 2½" - 4" 10 Barg [147 Psig])

Pop-Type Spring Range and Selection

Springs listed below comply with the requirements of BS6759: Part 1

Barg	Psig	Colour Code
0.35 - 0.52	5.0 - 7.5	Red
0.52 - 0.86	7.5 - 12.5	Yellow
0.86 - 1.38	12.5 - 20.0	Blue
1.38 - 2.59	20.0 - 37.5	Orange
2.59 - 4.31	37.5 - 62.5	Purple
4.31 - 6.03	62.5 - 87.5	Green/Blue
6.03 - 8.62	87.5 - 125.0	Green
8.62 - 12.00	125.0 - 175.0	White
12.00 - 15.52	175.0 - 225.0	Red/Yellow
15.52 - 18.97	225.0 - 275.0	Red/Green
18.97 - 22.41	275.0 - 325.0	Red/Orange
22.41 - 24.00	325.0 - 350.0	Yellow/Blue

Note: 65mm valve max pressure is 18 Barg (261 Psig)

480/490 Series Spring Range and Selection

Barg	Psig	Colour Code
0.3 - 0.7	5 - 10	Yellow
0.7 - 1.0	10 - 15	Blue
1.0 - 1.7	15 - 25	Orange
1.7 - 3.4	25 - 50	Purple
3.4 - 5.2	50 - 75	Green/Blue
5.2 - 6.9	75 - 100	Green
6.9 - 10.3	100 - 150	White
10.3 - 13.8	150 - 200	Red/Yellow
13.8 - 17.2	200 - 250	Red/Green
17.2 - 20.7	250 - 300	Red/Orange
20.7 - 24.0	300 - 350	Yellow/Blue

Note: 80mm valve max pressure is 10 Barg (147 Psig)

616D Series Spring Range and Selection

Barg	Psig		Colour Code
0.21 - 0.38	3.1 - 5.5		Red
0.39 - 0.67	5.6 - 9.8		Yellow
0.68 - 0.99	9.9 - 14.4		Blue
1.00 - 1.30	14.5 - 18.9		Orange
1.31 - 2.5	19.0 - 36.3	(DN40)	Purple
1.31 - 2.07	19.0 - 30.0	(DN50)	Purple
2.08 - 2.20	30.1 - 31.9	(DN50)	C2901
2.21 - 2.50	32.0 - 36.3	(DN50)	C2902

300 Series Spring Range and Selection

Barg	Psig	½" - 2"	2½"	3"	4"
0.173 - 0.52	2.5 - 7.5	Red	Red	Red	Yellow
0.52 - 0.86	7.5 - 12.5	Yellow	Blue	Yellow	Blue
0.86 - 1.38	12.5 - 20.0	Blue	Orange	Blue	Orange
1.38 - 2.59	20.0 - 37.5	Orange	Purple	Orange	Purple
2.59 - 4.31	37.5 - 62.5	Purple	Green/Blue	Purple	Green
4.31 - 6.03	62.5 - 87.5	Green/Blue	Green	Green/Blue	White
6.03 - 8.62	87.5 - 125.0	Green	White	Green	Red/Yellow
8.62 - 12.00	125.0 - 175.0	White	Red/Green	White	Red/Green
12.00 - 15.52	175.0 - 225.0	Red/Yellow			
15.52 - 18.97	225.0 - 275.0	Red/Green			
18.97 - 22.41	275.0 - 325.0	Red/Orange			
22.41 - 24.0	325.0 - 375.0	Yellow/Blue			

(Maximum pressure 2½" - 4" 10 Barg [147 Psig])

Notes

Specification

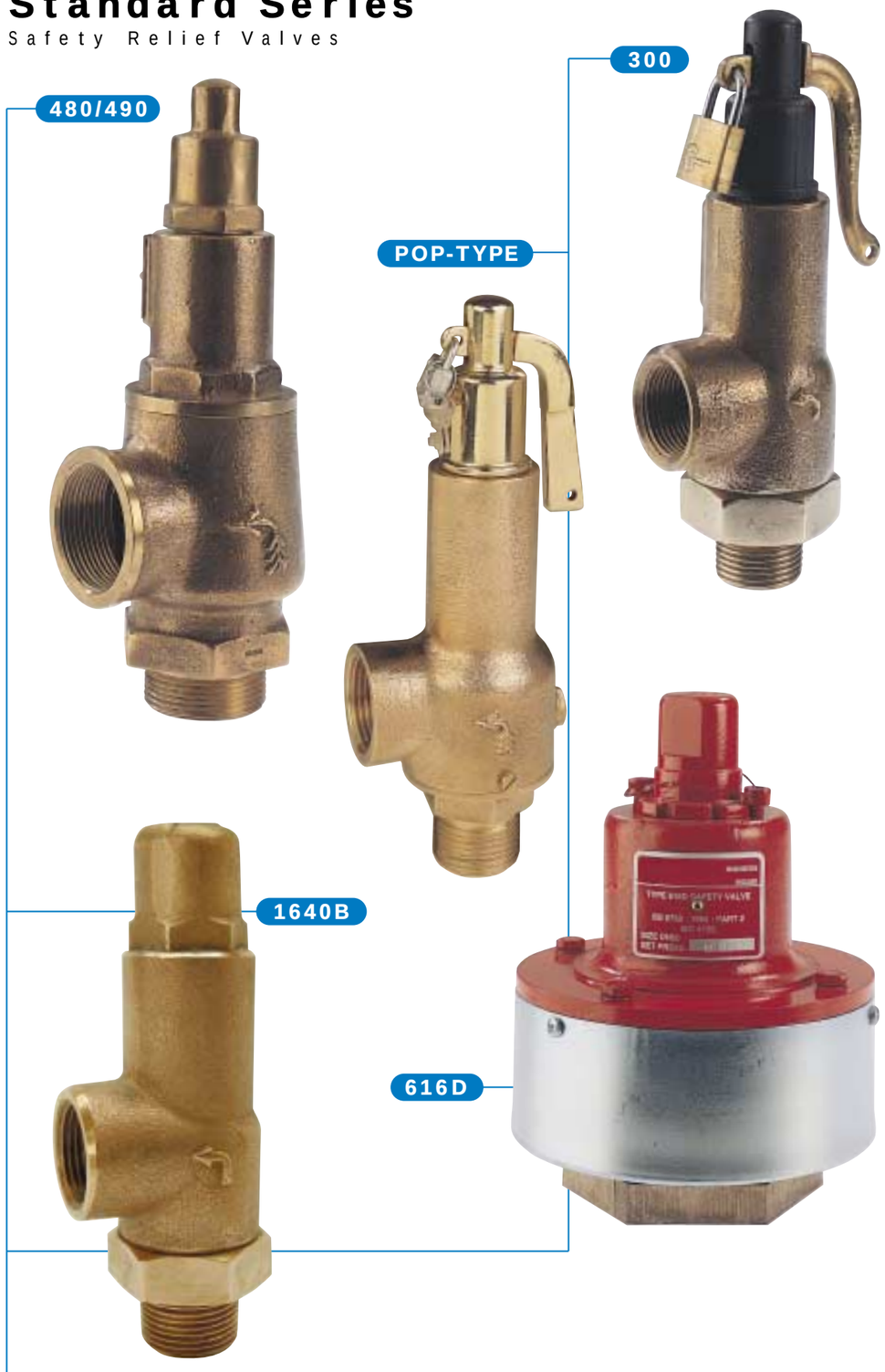
STANDARD SERIES TECHNICAL SPECIFICATION

Fig. No	Pop-Type	1640B	300	480/490	616D
Material	Bronze	Bronze	Bronze	Bronze Stainless Steel	Aluminium
Approvals Code Part	**BS6759** 1, 2, & 3	—	—	**BS6759** 3	**BS6759** 2
Guiding	Bottom	Bottom	Bottom	Top	Top
Size Range	½" – 2½" 15 to 65	½" – 4" 15 to 100	½" – 4" 15 to 100	¾" – 3" 20 to 80	1½" – 2" 40 to 50
Orifice Areas (mm^2)					
DN15	126	126	126	—	—
DN20	285	285	285	285	—
DN25	507	507	507	507	—
DN32	791	791	791	—	—
DN40	1140	1140	1140	1140	1140
DN50	2027	2027	2027	2027	2027
DN65	3167	3167	3167	—	—
DN80	—	4560	4560	4560	—
DN100	—	8107	8107	—	—
Pressure Range** (Barg)	0.35 to 24	0.173 to 24	0.173 to 24	0.35 to 24†	0.2 to 2.5
Temp Range (°C)	–59 to +224	–59 to +224	–59 to +224	–20 to +260	–30 to +200
Connection	Screwed Flanged‡	Screwed	Screwed Flanged§	Screwed	Screwed
Trim Options	Bronze	Bronze	Bronze	Bronze Stainless Steel	PTFE
Cap Options	Open lever or Dome	Dome	Open lever or Dome	Dome	Dome
Kdr. Cert. Coeff. *Steam/Air/Gases	0.167	0.085	0.085	—	Variable
Kdr. Cert. Coeff. Liquids	—	0.055	0.055	0.110	—
Maximum Back Pressure	10% (5.5 Barg Max)	10% (5.5 Barg Max)	10% (5.5 Barg Max)	80% (5.5 Barg Max)	—

*As Applicable.

**Some sizes may have a lower pressure range.
† BS6759 approved up to 10 Barg.
‡ DN15 and DN65 are not available with flanges.
§ DN15 is not available with flanges.

Bailey
Standard Series
Safety Relief Valves



Standard Series