

Piston Valves

Il futuro come tradizione



Our tradition is the future



GENERAL INFORMATION

Seat tightness in a piston valve is obtained by a cylindrically shaped plug, connected to a spindle, and operated by a hand wheel, which enables it to move through the inner diameter of two packing rings. When the piston is in the high position, that is, held by only the upper valve ring, (which also ensures tightness to the atmosphere), the valve is open. When the piston is lowered and is held in place by both the upper and lower valve rings (and thus ensuring seat tightness between the valve inlet and outlet), the valve is closed. Because of the use of the packing rings, which have alternate layers of graphite and stainless steel, the piston valve is considered a "soft-seated" valve.

The contact between the piston and rings (sealing effect) is positively assured by means of the pressure exerted by stud bolts with Depending on valve material, Belleville washers, are fitted to compensate expansion due to temperature variations.

A typical feature of piston valves - compared with globe valves - is that the piston is always held by at least one sealing ring. Therefore, there is no vibration during closing and opening operations. Another primary feature of the piston valve is that the two cylindrical seating surfaces, the bottom valve ring and the piston, come in contact when the fluid flow is already nearly cut off. Another unique property of the **BONETTI**[®] Piston Valve is that with the valve completely open and the piston completely supported in the inner diameter of the upper valve ring, it is protected against erosive/corrosive elements as well as prevented from having foreign matter deposited upon it.

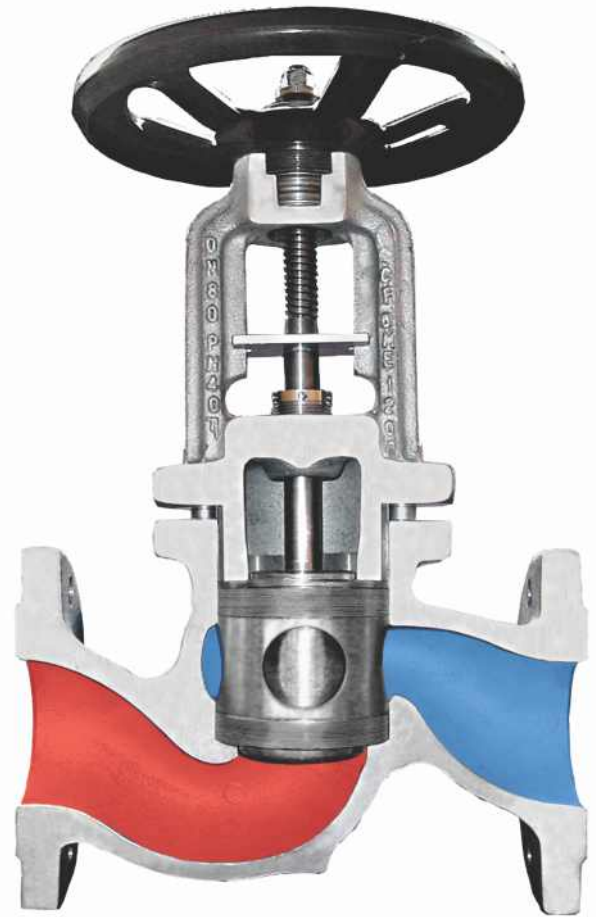
Piston valves - contrary to globe valves - are bi-directional. That is, they can be installed in a process line in both directions of flow. However, the most common installation is with the fluid inlet pressure below the valve piston.

Since no metallic sealing surfaces are present, there is perfect interchangeability of all components. A new set of spares can be immediately fitted without the need of adaptation to other existing parts. Therefore, inline reparability and maintenance is easy, does not require specialized personnel, and will always make the valve like new.

OPERATING RANGE

Engineering companies have been using our piston valves successfully for more than 75 years. Their first application, still widely used, was the tight shut-off of low and medium pressure steam.

In later years, piston valves have been selected to meet the severe demands of a large number of requirements in fluid handling applications in the industrial sector. As such, they are used in process lines containing many different fluids such as steam, superheated water, thermal transfer fluids, ammonia, LPG, hydrocarbons, acids, alkaloids, etc. Their ability to provide perfect seat shut off and packing tightness, and their long term trouble-free operation, ensured by our patented reinforced seal rings, have served to greatly expand the number and types of applications where the **BONETTI**[®] Piston Valves are used. This is particularly true of their use in the handling of harmful and flammable fluids where tight seat and packing shut off is essential.



Although the seat seal rings are suitable for use in temperatures in excess of 1022°F (550°C), their use is limited to the restrictions applicable to the body material, as well as that of other metallic pressure retaining valve components. It should be noted that carbon steel bodies can not be used in temperatures above 800°F (427°C).

DESIGN

Piston valves are usually T-pattern, straight through flow globe valves, with their stem perpendicular to the process line.

The present design is the result of our long experience in the design and manufacturing of this product, which began as early as 1926. Our latest designs reflect the remarkable progress in regards to the quality of the sealing rings, particularly for their application in valves size 2 1/2" (DN 65) and larger, as well as for their application in handling high pressure fluids using balanced pistons and rising, non-rotating spindles. Kindly refer to the details on page 6, where the BVE valves are described. (Please note: "e" means balanced piston.)

OPERATIONS

Piston valves are typically shut-off valves. But by replacing the standard lantern bushing with a characterized regulating lantern bushing, the valves can be turned into control valves to provide a characterized flow pattern, having manual or automatic service. Since the piston is always held by the upper valve seal ring, no vibration can occur.

Piston type flow control valves, contrary to globe type flow control valves, offer perfect seal tight shut off. Thus, a very interesting application of piston valves is their use as regulating or modulating valves in severe service applications. (See details on page 16.)

RATINGS

For reference purposes, the maximum operating pressure of a piston valve is directly related to the operating temperatures as shown on table Figure 1061, on page 2. The actual maximum operating conditions are those stated in the ASME B16.34 tables for the given material and pressure class.

In cases where severe duty will be experienced, such as thermal shock vibrations, repeated stresses, condensate hammering, and the handling of harmful or dangerous fluids, the customer should consult with the factory for the proper selection of materials of construction. When soliciting a quotation or sending an inquiry, it is necessary that you supply the worst operating conditions, including type of fluid, inlet and outlet pressures, and temperatures.

MATERIAL SCHEDULES

The term "Material Schedule" refers to the types of materials of the various components of the valve. Kindly refer to Figure 1062 - Material Schedules, below.

All valves may contain some copper bearing alloys, externally and not in direct contact with the fluid. In cases where this is not desirable, the factory can substitute these materials for special alloys. In such cases, a special material schedule designation, "H", shall be used. (ie.: "G/H", "FS/H", "F/H", etc.).

Fig. 1062 - Material Schedules

Material Schedule	Materials	
	Body	Piston
G	Cast iron	Stainless steel
GS	Nodular iron	Stainless steel
FS	Forged steel	Stainless steel
F	Cast steel	Stainless steel
M/H	Stainless steel	Stainless steel

SIZES (DN)

Standard sizes are: from size 3/8" (DN10) up to size 8" (DN 200)

CONNECTIONS

BONETTI® Piston Valves are available for pipe connections to:

- Flanged to UNI (DIN, AFNOR etc) PN 16 and PN 40
- Flanged to ASME 16.5, classes 150 and 300
- Female threaded, NPT as per ASME 1.20.1 and B.S.P. (DIN 2999)
- Socket weld as per ASME B16.11
- Butt weld as per ASME B16.2 and as per DIN 3239

AUTOMATED VALVES

BONETTI® Piston Valves of any size, pressure class, or material schedule can be automated with pneumatic, hydraulic, or electric actuators for remote control. See details on page XX.

MAINTENANCE

In-line maintenance and repairs of **BONETTI**® Piston Valves are very simple and can be done without removing the valve from the line. However, there cannot be fluid flow through the valve while it is being serviced or maintained.

SHIPPING PREPARATION

BONETTI® Valves are shipped only after they have passed all required dimensional and functional tests. All valves are supplied with valve ends protected by means of polyethylene covers, as well as with externally painted surfaces for storage and shipping purposes. Wooden containers are recommended and typically used for overseas shipments.

QUALIFICATION

All **BONETTI**® products, including Piston valves, are manufactured under ISO 9001 procedures (see certification on page 19). More than this, **BONETTI**® Piston Valves have been qualified according to:

- API 6 FA and BS 6775: Fire Safe
- TA Luft: German Clean Air, TUV Mannheim
- Druckbehälterverordnung 22: for railway and truck liquid tankers for service down to -40° F, TUV Munchen
- Pressure Equipment Directive 97/23/EC ("PED")
- Equipment for use in potentially Explosive Atmospheres (ATEX) Directive 94/9/EC

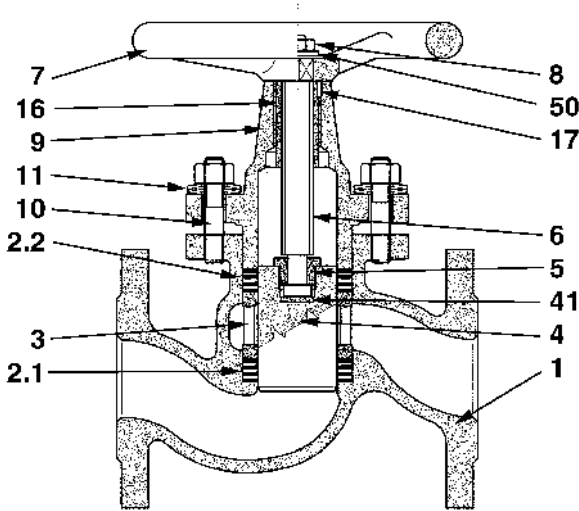


Fig. 1004

- | | |
|-----------------------|----------------------|
| 01 Body | 08 Handwheel Nut |
| 02.1 Lower Valve Ring | 09 Bonnet |
| 02.2 Upper Valve Ring | 10 Stud Bolt and Nut |
| 03 Lantern Bush | 11 Belleville Washer |
| 04 Piston | 16 Threaded Bush |
| 05 Split Nut | 17 Pin |
| 06 Spindle | 41 Thrust Plate |
| 07 Handwheel | 50 Name Plate |

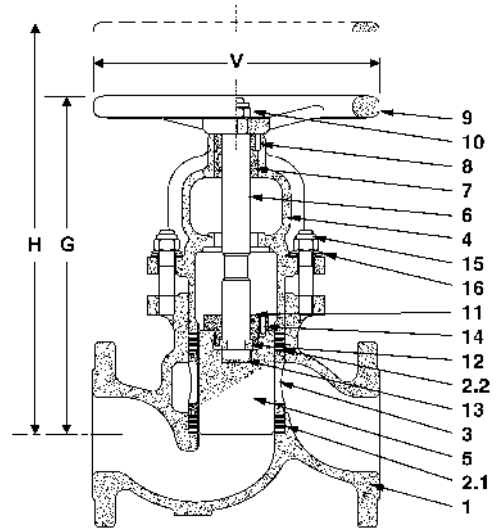
Figure 1004 shows the basic design of a **BONETTI**[®] Piston Valve. The valve consists of a body (1), which is internally fitted with two sealing rings. The lower valve ring (2.1) ensures upstream/downstream seat tightness. The lantern bushing (3) is the spacer between the valve rings. The upper valve ring (2.2) ensures tightness to the atmosphere. The two valve rings are compressed by the bonnet (9), which is compressed by the stud bolts and nuts (10) and by the Belleville washers (11). The latter compensates for expansion due to temperature variations.

The piston (4) is connected to the spindle (6), which is actuated by the hand wheel (7). When the piston is in the high position and fully encircled by the upper valve ring, the valve is open. When the piston is lowered into the inner diameter of the lower valve ring, the valve is closed. The opening stroke ends when the split nut (5) contacts the bonnet (9). The closing stroke ends when the hand wheel (7) contacts the bonnet (9).

The following **BONETTI**[®] Piston Valves are manufactured in accordance to figure 1004.

- Size DN 10 (3/8") through DN 50 (2") for DIN PN 16 - PN 40 and for API 602 - ASME Class 800
- Size DN 65 (2 1/2") through DN 150 (6") for DIN PN 16 and ASME Class 150

The valves, using this design, are fitted with non-balanced piston and are denominated BVn, where the "n" means "non-balanced." All valves are further fitted with anti-friction threaded bushings in the bonnet and a thrust plate between spindle and piston.



Type BK

Fig. 1046

- | | |
|-----------------------|----------------------|
| 01 Body | 08 Pin |
| 02.1 Lower Valve Ring | 09 Handwheel |
| 02.2 Upper Valve Ring | 10 Handwheel Nut |
| 03 Lantern Bush | 11 Piston Nut |
| 04 Bonnet | 12 Split Ring |
| 05 Piston | 13 Thrust Plate |
| 06 Spindle | 14 Pin |
| 07 Threaded Bush | 15 Stud Bolt and Nut |
| | 16 Belleville Washer |

Figure 1046 shows a **BONETTI**[®] Piston Valve, type BK, which is essentially the same design as figure 1004 but which is suitable for high pressure service in sizes DN 65 (2 1/2") to DN 150 (6"). The coupling between the threaded spindle (6) and the piston (5) is obtained by means of a split ring (12) and a piston nut (11). Actual force for valve closing is exerted by a thrust plate (13). The overall dimensions of figure 1046 valves are identical to those of other valves having the same size and pressure class with regards to body length and flanges. However, there are some deviations in these dimensions, and they are:

DN (mm)	65	80	100	125	150
ND (in.)	2.1/2"	3"	4"	5"	6"
G (mm)	320	365	420	470	530
(in.)	12.598	14.370	16.535	18.504	20.86
H (mm)	390	445	515	575	655
(in.)	15.354	17.520	20.276	22.638	25.787
V (mm)	250	300	350	350	400
(in.)	9.843	11.811	13.780	13.780	15.748

BONETTI[®] piston valves are particularly well suited for use in railway and truck tankers used for the transportation of liquids such as LPG, ammonia, and other hydrocarbons. Currently, many tankers are equipped with **BONETTI**[®] piston valves type BK. These valves have been approved by the German authority TUV.

Figure 1020 shows a **BONETTI**® Piston Valve type BVe with balanced piston (the "e" means balanced) and with rising, non-rotating stem. This design is required when the inlet pressure against the piston reaches such high values that the operation of the valve becomes difficult. By releasing some of the inlet fluid pressure through a hole in the balanced piston and against the bonnet (37) the piston is then in balance and the valve becomes easier to operate.

The valve is equipped with a standard gland nut (13) and packing rings (12.1 and 12.2). The following are also integral components of this new design of piston valves:

- Threaded stem (36) is rising and non-rotating.
- Integral anti-rotating device (23), which is also used as a stroke indicator.
- Perfect tightness when back seating is obtained by the back seating (32) wedging it self between the stem (36) and the bonnet (37) in an actual non-rotating motion
- Operating torque reduced by two roller bearings (30)

Valve Body Seal

Valve body seal tightness between body (1) and bonnet (37) is also ensured by an additional auto-sealing ring (35), which provides a tight seal. A perfect, durable body/bonnet seal is thus achieved. By so doing, we eliminate the need to use a third ring, which would take up considerable space and prevent the stud bolts from exerting the required pressure to the lower valve seat ring (2.1).

All **BONETTI**® Piston Valves are equipped with special graphite/metal alloy rings with the following features and advantages:

- Elimination of asbestos rings (environmentally sound practice).
- Wear and erosion resistance to nearly all types of fluid.
- Remarkable temperature stability and, consequently, substantial increase in the operating range, making it suitable for very high temperatures, since the limits of operation become a function of the body material and not of the seating rings.
- Reduced coefficient of friction resulting in longer life of both upper and lower sealing rings, as well as longer life for other components such as the threaded stem bushing, etc.

For special applications, PTFE valve rings can also be supplied on request.

The following **BONETTI**® piston valves are manufactured in accordance to figure 1020 BVe:

Size from DN 65 (2. 1/2") to DN 200 (8") for:

DIN PN 16 - PN 40 and ASME class 150 - 300

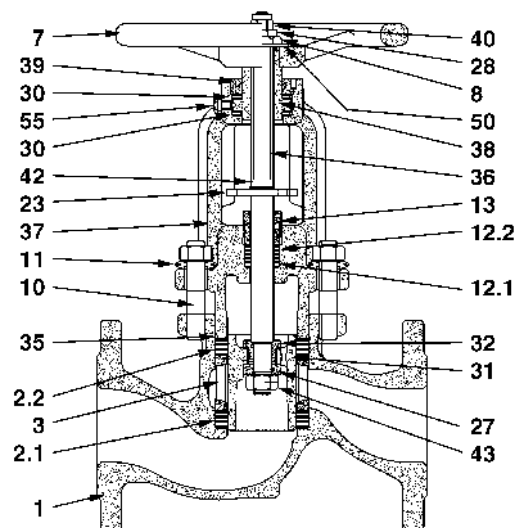


Fig. 1020

Type BVe

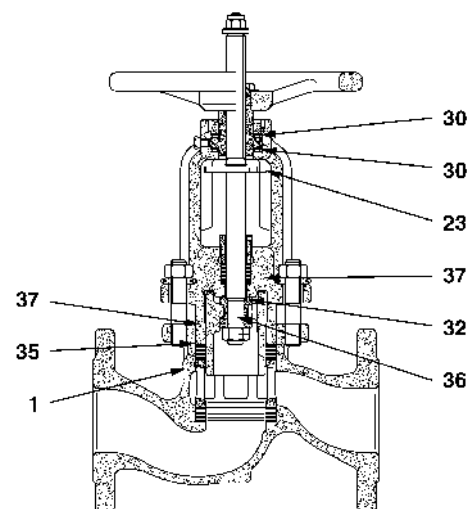


Fig. 1020.1

01	Body	30	Roller Bearing
2.1	Lower Valve Ring	31	Balanced Piston
2.2	Upper Valve Ring	32	Backseat
03	Lantern Bush	35	Autoseal Ring
07	Handwheel	36	Stem
08	Handwheel Nut	37	Bonnet
10	Stud Bolt and Nut	38	Stem Bush
11	Belleville Washer	39	Retaining Nut
12.1	Stuffing-box Lower Ring	40	Nut
12.2	Stuffing-box Upper Ring	42	Retaining Ring
13	Gland Nut	43	Notched Nut
23	Antirotating Device / Stroke Indicator	50	Name Plate
27	Nonrotating Disc	55	Lubricator
28	Locking Washer		

Stop Valves
Female Screwed Ends
Rating: DIN 2401 - PN 16
Size 3/8" to 2"

- 1 Standard female screwed ends to B.S.P. (DIN 2999).
- 2 Length of body (A) to DIN 3202 - M9 - (except 1.1/2", 2" and type B V R).
- 3 Standard Material Schedule: G - PN 16.
- 4 Pressure - Temperature Rating on page 2.

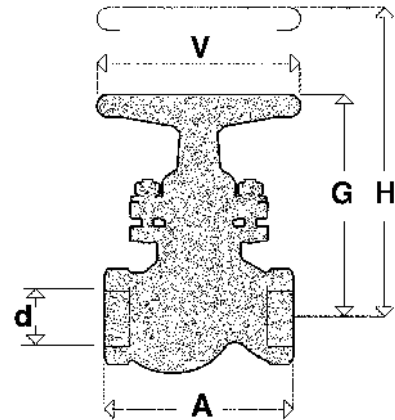


Fig. 1018

Type	DN inches	Fig.	Mater. Sched.	Thread d inches	Dimensions				Weight kg	Valve Rings (see page 17)		
					A mm	G mm	H mm	V mm		d mm	D mm	h mm
BV	3/8"	1018	G	3/8"	100	110	140	95	1,3	15	23,5	9
BV	1/2"	1018	G	1/2"	100	110	140	95	1,3	15	23,5	9
BV	3/4"	1018	G	3/4"	120	135	170	115	2,1	20	30,0	10
BV	1"	1018	G	1"	135	150	185	115	3,1	25	38,0	12
BV	1.1/4"	1018	G	1.1/4"	160	170	215	150	5,0	30	45,0	15
BV	1.1/2"	1018	G	1.1/2"	175	195	250	150	7,0	40	58,0	16
BV	2"	1018	G	2"	195	225	285	150	10,9	50	70,0	17
BVR	3/4"	1018	G	3/4"	100	110	140	95	1,4	15	23,5	9
BVR	1"	1018	G	1"	120	135	170	115	2,3	20	30,0	10

Part	Part Material for Material Schedule G
01 Body	JL 1040
02.1 Lower Valve Ring	Graphite T1
02.2 Upper Valve Ring	Graphite T4
03 Lantern Bush	Carbon Steel / Cast iron ★
04 Piston	ASTM A582 - XM 34
05 Split Nut ●	Fe37 + H.T.
06 Spindle	C30
07 Handwheel	Cast iron
08 Handwheel Nut	5.6 - 5-2
09 Bonnet	JL 1040
10 Stud Bolt and Nut	5.6 - 5-2
11 Belleville Washer	50 Cr V4
41 Thrust Plate ■	AISI 420 H.T.
50 Name Plate	Aluminium

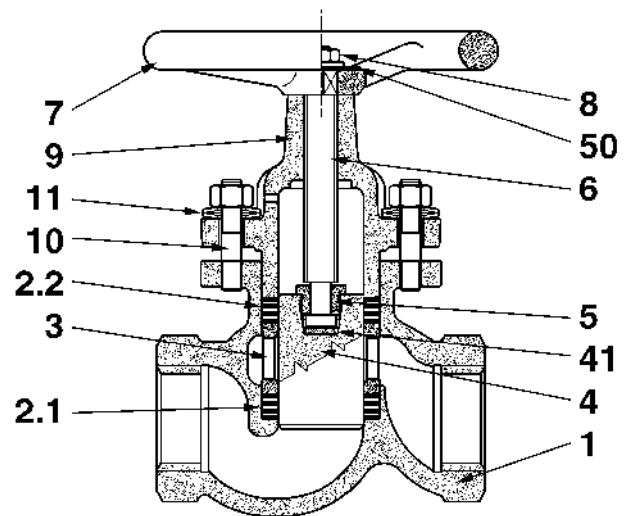


Fig. 1018

- not existing for d = 15 and 20 mm
- ★ depending upon Size
- for Size 1.1/4" and larger, only

PISTON VALVES

STEEL - STAINLESS STEEL

Stop Valves

Rating: API 602 - ASME Class 800

Rating: DIN 2401 - PN 40/63

Size 1/4" to 2"

Standard Female Screwed Ends to:

- B.S.P. (DIN 2999) - NPT - ASME B1.20.1
- Length of body (A) to DIN 3202 - M9, except type BVR.

Socket Weld Ends - SW to:

- ASME B16.11 (Minimum wall thickness of socket welding is 1,25 larger than nominal thickness of pipe having rating equal to valve rating. Length of body (A) is not binding)

Butt Weld Ends to:

- ASME B16.25 and pipe Sched. 160, or DIN 3239.
- When ordering, please indicate sizes of pipe to be welded to valve (outside and inside diameter).
- Fig. 1079.1 is the standard execution - Fig. 1079.2 available on request. Length of body (A1) is not binding.

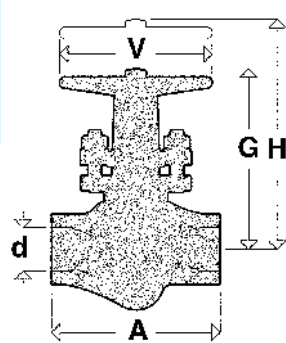


Fig. 1077
Fig. 1078

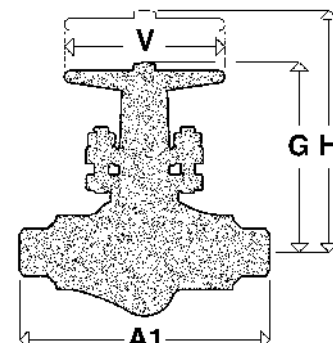


Fig. 1079

Standard Material Schedules: FS, F, M/H.
Pressure - Temperature Rating on page 2.
Size 2" BV type valves limited to ASME Class 600.

Type	DN inches	Mater. Sched.	Dimensions			Valve Rings (see page 17)			Screwed Ends Fig.	SW Ends Fig.	Dim. A (Note No. 2)	Weight kg	BW Ends Fig.	Dim. A1 (Note No. 3)	Weight kg
			G mm	H mm	V mm	d mm	D mm	h mm							
BV	3/8"	FS - M/H	110	140	95	15	23,5	9	1077	1078	100	1,9	1079	145	1,9
BV	1/2"	FS - M/H	110	140	95	15	23,5	9	1077	1078	100	1,9	1079	145	1,9
BV	3/4"	FS - M/H	135	170	115	20	30	10	1077	1078	120	3,3	1079	170	3,4
BV	1"	FS - M/H	150	185	150	25	38	12	1077	1078	135	4,7	1079	200	4,8
BV	1.1/4"	FS - M/H	170	215	150	30	45	15	1077	1078	160	7,1	1079	230	7,3
BV	1.1/2"	FS - M/H	195	250	150	40	58	16	1077	1078	185	11	1079	270	11,5
BV	2"	F - M/H	225	285	200	50	70	17	1077	1078	220	12,7	1079	320	13,7
BVR	1/4"	FS - M/H	90	109	75	10	18	6	1077	1078	85	1,2	1079	130	1,2
BVR	3/8"	FS - M/H	90	109	75	10	18	6	1077	1078	85	1,2	1079	130	1,2
BVR	1/2"	FS - M/H	90	109	75	10	18	6	1077	1078	85	1,2	1079	130	1,2
BVR	3/4"	FS - M/H	110	140	95	15	23,5	9	1077	1078	100	1,8	1079	150	1,9
BVR	1"	FS - M/H	135	170	115	20	30	10	1077	1078	120	3,2	1079	185	3,5
BVR	1.1/4"	FS - M/H	150	185	150	25	38	12	1077	1078	135	4,9	1079	245	5,3
BVR	1.1/2"	FS - M/H	170	215	150	30	45	15	1077	1078	160	6,8	1079	245	7,6
BVR	2"	FS - M/H	195	250	150	40	58	16	1077	1078	185	10,2	1079	285	11,6

Part	Part Material for Material Schedule	
	FS - F	M/H
01 Body	ASTMA105 ★ ASTMA216WCB ★	ASTMA182F316 ★ ASTMA351 CF8M ★
02.1 Lower Valve Ring	Graphite T1	Graphite T1
02.2 Upper Valve Ring	Graphite T1	Graphite T1
03 Lantern Bush	Carbon Steel ★ JL 1040 ★	ASTMA479 Tp.316
04 Piston	ASTMA582 - XM34	ASTMA479 Tp.316
05 Split Nut ●	Fe37 + H.T.	Fe37 + H.T.
06 Spindle	A479 Tp410	A479 Tp410
07 Handwheel	Cast iron	Cast iron
08 Handwheel Nut	5-2	5-2
09 Bonnet	ASTMA105	ASTMA105
10 Stud Bolt and Nut	A193 B7 - A194 2H	A193 B7 - A194 2H
11A Washer	Carbon Steel	Carbon Steel
16 Threaded Bush ▲	ASTMA439 D2	ASTMA439 D2
17 Pin ▲	Carbon Steel	Carbon Steel
41 Thrust Plate ■	AISI 420 H.T.	AISI 420 H.T.
50 Name Plate	Aluminium	Aluminium

- not existing for d = 10,15 & 20 mm
- ▲ for d = 30 mm and larger, only
- ★ depending upon Size
- for d = 30 mm and larger, only

Fig. 1077

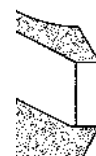
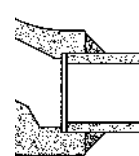
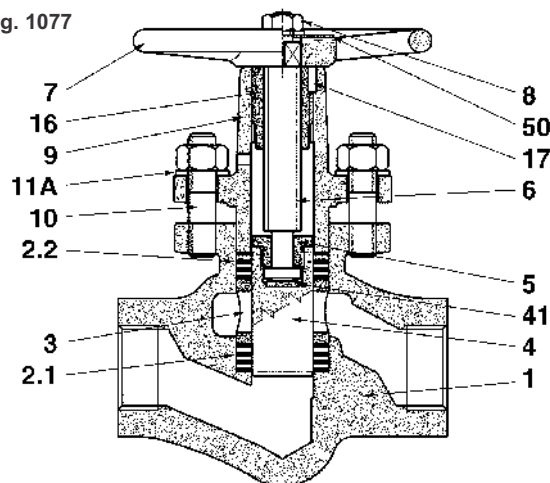


Fig. 1078.1

Fig. 1079.1

Fig. 1079.2

Stop Valves
Flanged Ends to DIN 2533 - PN 16
Rating: DIN 2401 - PN 16
Size DN 10 to DN 150

- 1 Full Bore - BV,
Standard Bore - BVn
Reduced Bore - BVR
2. Standard Flanges are Raised Face, drilled.
3. Face-to-Face Dimension (A) to DIN 3202 - F1.
4. Standard Material Schedule: G - PN 16.
5. Pressure - Temperature Rating on page 2.

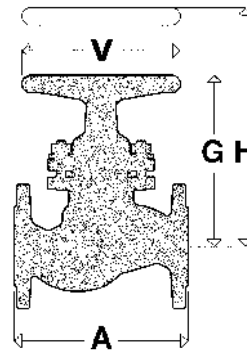


Fig. 1010 - 1075

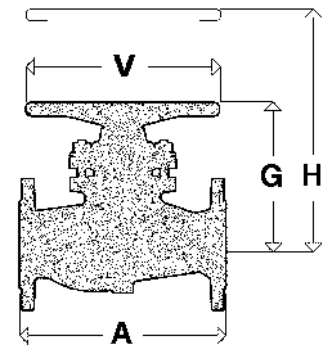


Fig. 1045

Type	DN mm	Fig.	Mater. Sched.	Dimensions				Flange Dimensions					Weight kg	Valve Rings (see page 17)		
				A mm	G mm	H mm	V mm	Outs. Dia. mm	Thick. mm	No. of Holes No.	Dia. of Holes mm	Dia. of Bolt Circle mm		d mm	D mm	h mm
BV	10	1010	G	120	110	140	95	90	14	4	14	60	2,3	15	23,5	9
BV	15	1010	G	130	110	140	95	95	14	4	14	65	2,5	15	23,5	9
BV	20	1010	G	150	135	170	115	105	16	4	14	75	3,8	20	30,0	10
BV	25	1010	G	160	150	185	125	115	16	4	14	85	5,3	25	38,0	12
BV	32	1010	G	180	170	215	150	140	18	4	18	100	7,7	30	45,0	15
BV	40	1010	G	200	195	250	150	150	18	4	18	110	11,3	40	58,0	16
BV	50	1010	G	230	225	285	200	165	20	4	18	125	15,4	50	70,0	17
BVn	65	1045	G	290	210	260	300	185	20	4	18	145	21,0	60	82,0	16
BVn	80	1045	G	310	230	290	300	200	22	8	18	160	28,0	70	94,0	19
BVn	100	1045	G	350	275	350	300	220	24	8	18	180	41,0	90	112,0	20
BVn	125	1045	G	400	310	395	400	250	26	8	18	210	65,0	110	135,0	22
BVn	150	1045	G	480	340	440	400	285	26	8	22	240	92,0	130	155,0	23
BVR	15	1075	G	130	90	108	75	95	14	4	14	65	2,2	10	18,0	6
BVR	20	1075	G	150	110	140	95	105	16	4	14	75	3,2	15	23,5	9
BVR	25	1075	G	160	135	170	115	115	16	4	14	85	4,5	20	30,0	10
BVR	32	1075	G	180	150	185	125	140	18	4	18	100	6,8	25	38,0	12
BVR	40	1075	G	200	170	215	150	150	18	4	18	110	8,6	30	45,0	15
BVR	50	1075	G	230	195	250	150	165	20	4	18	125	12,2	40	58,0	16

Part	Part Material for Material Schedule G
01 Body	JL 10401
02.1 Lower Valve Ring	Graphite T1
02.2 Upper Valve Ring	Graphite T4 / Graphite T1 ▲
03 Lantern Bush	Carbon Steel / Cast iron ★
04 Piston	ASTM A582 - XM34 ★ G-X 70 Cr Mo 292 ★
05 Split Nut ●	Fe37 + H.T.
06 Spindle	C30
07 Handwheel	Cast iron
08 Handwheel Nut	5-2
09 Bonnet	JL 1040
10 Stud Bolt and Nut	5.6 - 5-2
11 Belleville Washer	50 Cr V4
16 Threaded Bush ▲	OT58
17 Pin ▲	Carbon Steel
41 Thrust Plate ■	AISI 420 H.T.
50 Name Plate	Aluminium

- not existing for d = 10,15 & 20 mm
- ▲ for Size 65 and larger only
- ★ depending upon Size
- for Size 32 and larger, only

fig. 1010 - 1075

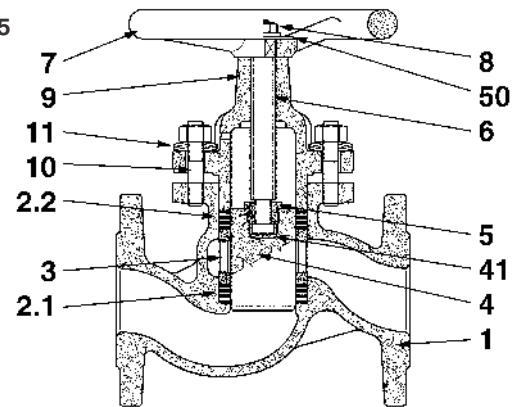
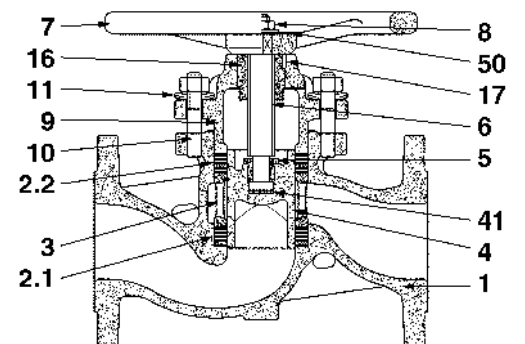


Fig. 1045



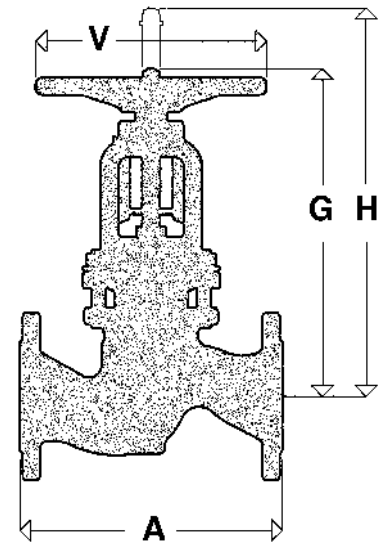
PISTON VALVES

Cast Iron, Nodular Iron

Stop Valves – Type Bve
Flanged Ends to DIN 2533 - PN 16
Rating: DIN 2401 - PN 16
Size DN 65 to DN 200

1. Standard Flanges are Raised Face, drilled.
2. Face-to-Face Dimension (A) to DIN 3202 - F1.
3. Standard Material Schedule: G - PN 16, GS - PN 16.
4. Pressure - Temperature Rating on page 2.
 These DN 200 valves are designed and suitable for PN 16.
 Some Countries accept DN 200 and larger sized valves of cast iron for lower PN, only. We suggest to examine carefully the relevant standards in force.

Fig. 1021



Type	DN	Fig.	Mater. Sched.	Dimensions				Flange Dimensions					Weight	Valve Rings (see page 17)			Stuffing-box Rings (see page 17)			
				A	G	H	V	Outs. Dia.	Thick.	No. of Holes	Dia. of Holes	Dia. of Bolt Circle		d	D	h	d	D	h	
	mm			mm	mm	mm	mm	mm	mm	No.	mm	mm	kg	mm	mm	mm	mm	mm	mm	mm
BVe	65	1021	G - GS	290	340	395	250	185	20	4	18	145	23,5	60	82	16	20	30	7	
BVe	80	1021	G - GS	310	370	430	250	200	22	8	18	160	31,0	70	94	19	20	30	7	
BVe	100	1021	G - GS	350	415	490	300	220	24	8	18	180	43,0	90	112	20	20	30	7	
BVe	125	1021	G - GS	400	460	545	350	250	26	8	18	210	65,0	110	135	22	25	38	9	
BVe	150	1021	G - GS	480	495	590	350	285	26	8	22	240	91,0	130	155	23	25	38	9	
BVe	200	1021	G - GS	600	580	695	400	340	30	12	22	295	175,0	170	200	15	25	38	9	

Part	Part Material for Material Schedule	
	G	GS
01 Body	JL 1040	JS 1049
02.1 Lower Valve Ring	Graphite T1	Graphite T1
02.2 Upper Valve Ring	Graphite T1	Graphite T1
03 Lantern Bush	Cast iron	Cast iron
07 Handwheel	Cast iron	Cast iron
08 Handwheel Nut	Carbon Steel	Carbon Steel
10 Stud Bolt and Nut	5.6 - 5-2	5.6 - 5-2
11 Belleville Washer	50 Cr V4	50 Cr V4
12.1 Stuff.-box Lower Ring	Graphite T1	Graphite T1
12.2 Stuff.-box Upper Ring	Graphite T1	Graphite T1
13 Gland Nut	Carbon Steel	Carbon Steel
23 Antirotating Device		
Stroke Indicator	Carbon Steel	Carbon Steel
27 Nonrotating Disc	Carbon Steel	Carbon Steel
28 Locking Washer	ASTM A182 F6	ASTM A182 F6
30 Roller Bearing	Alloy Steel	Alloy Steel
31 Balanced Piston	ASTM A582 XM34	ASTM A582 Xm34
32 Backseat	ASTM A182 F6	ASTM A182 F6
35 Autoseal Ring	Graphite T3	Graphite T3
36 Stem	ASTM A479 Tp.410 c.3	ASTM A479 Tp.410 c.3
37 Bonnet	JL 1040	JS 1049
38 Stem Bush	ASTM A439 D2 / GGG NiCr	ASTM A439 D2 / GGG NiCr
39 Retaining Nut	Carbon Steel	Carbon Steel
40 Nut	Carbon Steel	Carbon Steel
42 Retaining Ring	Stainless Steel	Stainless Steel
43 Notched Nut	Carbon Steel	Carbon Steel
50 Name Plate	Aluminium	Aluminium
55 Lubricator	1/8" BSP	1/8" BSP

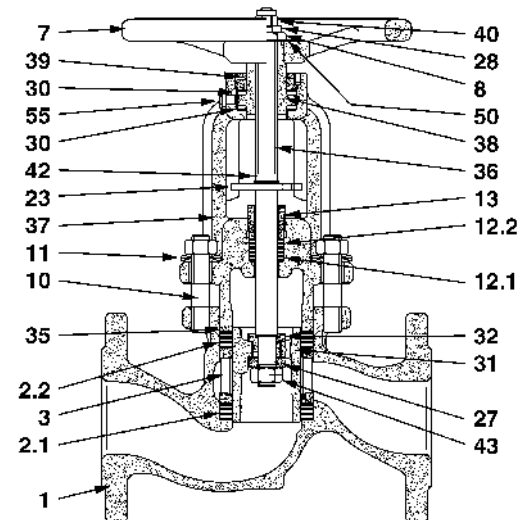


Fig. 1021

Stop Valves
Flanged Ends to DIN 2545 - PN 40
Rating: DIN 2401 - PN 40
Size DN 10 to DN 50

1. Full Bore - BV
 Reduced Bore - BVR - Available on request
2. Standard Flanges are Raised Face, drilled.
3. On request instead of Raised Face flanges can have following finishings:
4. - large female to DIN 2513
 - groove to DIN 2512
5. Face-to-Face Dimension (A) to DIN 3202 - F1.
6. Standard Material Schedules: FS - PN 40, F - PN 40, M/H - PN 40, GS - PN 40.

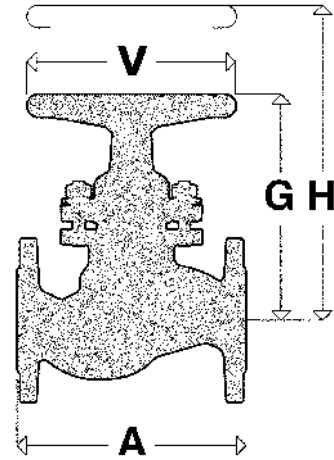


Fig. 1080

Pressure - Temperature Rating on page 2.

Type	DN mm	Fig.	Mater. Sched.	Dimensions				Flange Dimensions					Weight kg	Valve Rings (see page 17)		
				A mm	G mm	H mm	V mm	Outs. Dia. mm	Thick. mm	No. of Holes No.	Dia. of Holes mm	Dia. of Bolt Circle mm		d mm	D mm	h mm
BV	10	1080	FS - M/H - GS	120	110	140	95	90	16	4	14	60	2,6	15	23,5	9
BV	15	1080	FS - M/H - GS	130	110	140	95	95	16	4	14	65	2,9	15	23,5	9
BV	20	1080	FS - M/H - GS	150	135	170	115	105	18	4	14	75	4,4	20	30,0	10
BV	25	1080	FS - M/H - GS	160	150	185	125	115	18	4	14	85	6,1	25	38,0	12
BV	32	1080	F - M/H - GS	180	170	215	150	140	18	4	18	100	9,2	30	45,0	15
BV	40	1080	F - M/H - GS	200	195	250	150	150	18	4	18	110	12,2	40	58,0	16
BV	50	1080	F - M/H - GS	230	225	285	200	165	20	4	18	125	17,1	50	70,0	17
BVR ★	15	1080	FS - M/H	130	90	108	75	95	16	4	14	65	2,6	10	18,0	6
BVR ★	20	1080	FS - M/H	150	110	140	95	105	18	4	14	75	3,8	15	23,5	9
BVR ★	25	1080	F - M/H	160	135	170	115	115	18	4	14	85	5,3	20	30,0	10
BVR ★	32	1080	F - M/H	180	150	185	125	140	18	4	18	100	8,3	25	38,0	12
BVR ★	40	1080	F - M/H	200	170	210	150	150	18	4	18	110	10,2	30	45,0	15
BVR ★	50	1080	F - M/H	230	195	250	150	165	20	4	18	125	14,0	40	58,0	16

★ Available on request

Part	Part Material for Material Schedule		
	FS - F	M/H	GS
01 Body	C22.8 ★ GS - C25 ★	X5 Cr Ni Mo 17 222 ★	JS 1049
02.1 Lower Valve Ring	Graphite T1	Graphite T1	Graphite T1
02.2 Upper Valve Ring	Graphite T1	Graphite T1	Graphite T1
03 Lantern Bush	Carbon Steel. / Cast iron	X5 Cr Ni Mo 17 222	Carbon Steel. / Cast iron ★
04 Piston	ASTM A582 - XM34	X5 Cr Ni Mo 17 222	ASTM A582 - XM34
05 Split Nut ●	Fe37 + H.T.	Fe37 + H.T.	Fe37 + H.T.
06 Spindle	A479 Tp410	A479 Tp410	A479 Tp410
07 Handwheel	Cast iron	Cast iron	Cast iron
08 Handwheel Nut	5-2	5-2	5-2
09 Bonnet	C22.8 / ASTM A105	C22.8 / ASTM A105	JS 1049
10 Stud Bolt and Nut	5.6 - 5-2	5.6 - 5-2	5.6 - 5-2
11 Belleville Washer	50 Cr V4	50 Cr V4	50 Cr V4
16 Threaded Bush ▲	OT 58	ASTM A439 D2	OT 58
17 Pin ▲	Carbon Steel	Carbon Steel	Carbon Steel
41 Thrust Plate ■	AISI 420 H.T.	AISI 420 H.T.	AISI 420 H.T.
50 Name Plate	Aluminium	Aluminium	Aluminium

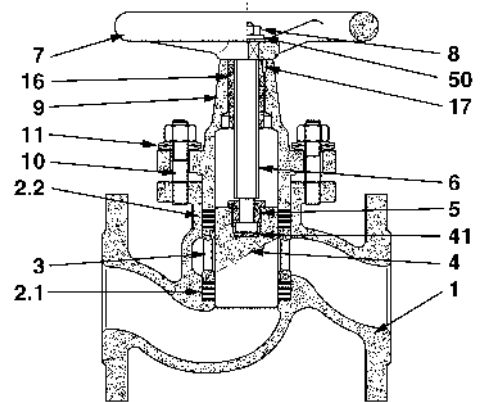


Fig. 1080

● not existing for d = 10,15 & 20 mm ★ depending upon Size
 ▲ for Size 32 and larger only ■ for Size 32 and larger, only

PISTON VALVES

Steel, Nodular Iron

Stop Valves – Type Bve

Flanged Ends to DIN 2545 - PN 40

Rating: DIN 2401 - PN 40

Size DN 65 to DN 200

1. Standard Flanges are Raised Face, drilled.
2. On request instead of Raised Face flanges can have following finishings:
 - large female to DIN 2513
 - groove to DIN 2512.
3. Face-to-Face Dimension (A) to DIN 3202 - F1.
4. Standard Material Schedules: F - PN 40, M/H - PN 40, GS - PN 40.
5. Pressure - Temperature Rating on page 2.

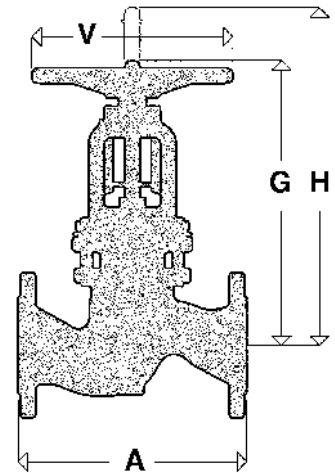


Fig. 1022

Type	DN	Fig.	Mater. Sched.	Dimensions				Flange Dimensions					Weight	Valve Rings (see page 17)			Stuffing-box Rings (see page 17)		
				A	G	H	V	Outs. Dia.	Thick.	No. of Holes	Dia of Holes	Dia of Bolt Circle		D	h	d	D	h	mm
	mm			mm	mm	mm	mm	mm	mm	No.	mm	mm	kg	mm	mm	mm	mm	mm	mm
BVe	65	1022	F - M/H - GS	290	345	400	250	185	22	8	18	145	26	60	82	16	20	30	7
BVe	80	1022	F - M/H - GS	310	375	435	250	200	24	8	18	160	33	70	94	19	20	30	7
BVe	100	1022	F - M/H - GS	350	415	490	300	235	24	8	22	190	50	90	112	20	20	30	7
BVe	125	1022	F - M/H - GS	400	460	545	350	270	26	8	25	220	80	110	135	22	25	38	9
BVe	150	1022	F - M/H - GS	480	495	590	350	300	28	8	25	250	110	130	155	23	25	38	9
BVe	200	1022	F - M/H - GS	600	580	695	400	375	34	12	29	320	190	170	200	15	25	38	9

Part		Part Material for Material Schedule		
		F	M/H	GS
01	Body	GS - C 25 / ASTM A216 WCB	G - X6 Cr Ni Mo 18 10 / ASTM A351 CF8M	JS 1049
02.1	Lower Valve Ring	Graphite T1	Graphite T1	Graphite T1
02.2	Upper Valve Ring	Graphite T1	Graphite T1	Graphite T1
03	Lantern Bush	Cast iron	X5 Cr Ni Mo 18 10 / ASTM A182 F316	Cast iron
07	Handwheel	Cast iron	Cast iron	Cast iron
08	Handwheel Nut	Carbon Steel	Carbon Steel	Carbon Steel
10	Stud Bolt and Nut	5.6 - 5-2	5.6 - 5-2	5.6 - 5-2
11	Belleville Washer	50 Cr V4	50 Cr V4	50 Cr V4
12.1	Stuff.-box Lower Ring	Graphite T1	Graphite T1	Graphite T1
12.2	Stuff.-box Upper Ring	Graphite T1	Graphite T1	Graphite T1
13	Gland Nut	Carbon Steel	Stainless Steel	Carbon Steel
23	Antirotating Device Stroke Indicato	Carbon Steel	Stainless Steel	Carbon Steel
27	Nonrotating Disc	Carbon Steel	ASTM A182 F316	Carbon Steel
28	Locking Washer	ASTM A182 F6	ASTM A182 F6	ASTM A182 F6
30	Roller Bearing	Alloy Steel	Alloy Steel	Alloy Steel
31	Balanced Piston	ASTM A582 - XM 34	X5 Cr Ni Mo 17 12 2 / ASTM A479 Tp.316	ASTM A582 - XM 34
32	Backseat	ASTM A182 F6	ASTM A182 F316	ASTM A182 F6
35	Autoseal Ring	Graphite T3	Graphite T3	Graphite T3
36	Stem	ASTM A479 Tp.410 c.3	ASTM A564 T.630 / X5 Cr Ni Cu Nb 17 4	ASTM A479 Tp.410 c.3
37	Bonnet	GS - C 25 / ASTM A216 WCB	G - X6 Cr Ni Mo 18 10 / ASTM A351 CF8M	JS 1049
38	Stem Bush	ASTM A439 D2 / GGG NiCr	ASTM A439 D2 / GGG NiCr	ASTM A439 D2 / GGG NiCr
39	Retaining Nut	Carbon Steel	Carbon Steel	Carbon Steel
40	Nut	Carbon Steel	Carbon Steel	Carbon Steel
42	Retaining Ring	Stainless Steel	Stainless Steel	Stainless Steel
43	Notched Nut	Carbon Steel	Stainless Steel	T.316 Carbon Steel
50	Name Plate	Aluminium	Aluminium	Aluminium
55	Lubricator	1/8" BSP	1/8" BSP	1/8" BSP

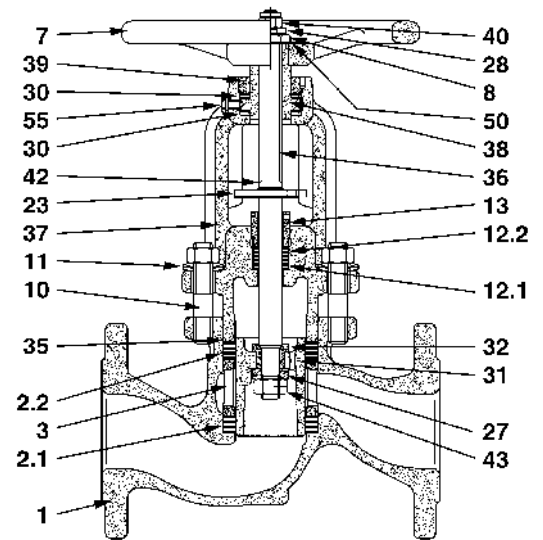


Fig. 1022

Stop Valves – Flanged Ends to ASME B16.5 - Class 150
Rating: ASME Class 150 – Size 1/2" to 6"

1. Flanges are according to ASME B16.5 - 1988 Class 150 Raised Face
2. Face-to-Face Dimension (A) to ASME B16.10 - 1986.
3. Standard Material Schedules: FS - F -M/H, Class150.
4. Pressure - Temperature Rating on page 2.
5. Valves sized up to 2" are made according to Fig. 1053.
Valves sized 3" and larger are made to Fig. 1023 namely Type BVe, with balanced piston and rising nonrotating stem.

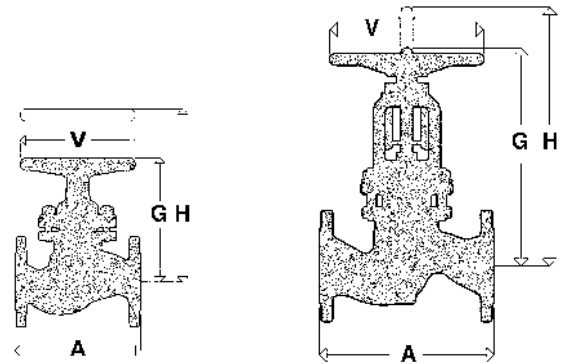
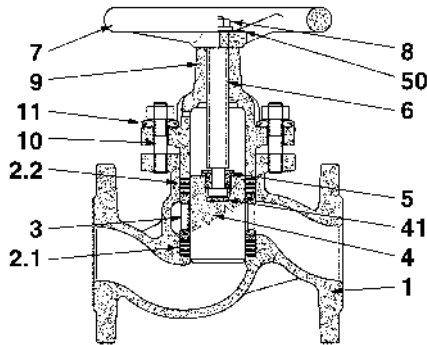


Fig. 1053

Fig. 1023

Type	DN	Fig.	Mater. Sched.	Dimensions				Flange Dimensions					Weight	Valve Rings (see page 17)			Stuffing-box Rings (see page 17)		
				A	G	H	V	Outs. Dia.	Thick.	No. of Holes	Dia. of Holes	Dia. of Bolt Circle		d	D	h	d	D	h
	inches			mm	mm	mm	mm	mm	mm	No.	mm	mm	kg	mm	mm	mm	mm	mm	mm
BV	1/2"	1053	FS - M/H	108	108	134	95	89,0	11,2	4	16	60,3	2,0	15	23,5	9	=	=	=
BVR	3/4"	1053	FS - M/H	117	108	134	95	98,5	12,7	4	16	69,9	2,5	15	23,5	9	=	=	=
BVR	1"	1053	FS - M/H	127	133	165	115	108,0	14,3	4	16	79,4	4,2	20	30,0	10	=	=	=
BVR	1.1/2"	1053	F - M/H	165	170	212	150	127,0	17,5	4	16	98,4	8,7	30	45,0	15	=	=	=
BVR	2"	1053	F - M/H	203	194	245	150	152,0	19,0	4	19	120,0	13,8	40	58,0	16	=	=	=
BVe	3"	1023	F - M/H	241	375	435	250	190,0	24,0	4	19	152,0	40,0	70	94,0	19	20	30	7
BVe	4"	1023	F - M/H	292	415	490	300	230,0	24,0	8	19	190,0	50,0	90	112,0	20	20	30	7
BVe	6"	1023	F - M/H	406	495	590	350	280,0	25,0	8	22	241,0	98,0	130	155,0	23	25	38	9

Fig. 1053



Part	Part Material for Material Schedule	
	FS - F	M/H
1. Body	ASTM A105 ★ ASTM A216 WCB ★	ASTM A182 F316 ★ ASTM A351 CF8M ★
2.1 Lower Valve Ring	Graphite T1	Graphite T1
2.2 Upper Valve Ring	Graphite T1	Graphite T1
3 Lantern Bush	Cast iron	ASTM A182 F316
4 Piston	ASTM A582 - XM 34	ASTM A479 T.316
5 Split Nut ●	Fe37+H.T.	Fe37+H.T.
6 Spindle	ASTM A479 T.410	ASTM A479 T.410
7 Handwheel	Cast iron	Cast iron
8 Handwheel Nut	5.2	5.2
9 Bonnet	ASTM A105 / C22.8	ASTM A105 / C22.8
10 Stud Bolt and Nut	A193 B7 - A194 2H	A193 B7 - A194 2H
11 Belleville Washer	50 Cr V4	50 Cr V4
12.1 Stuff.-box Lower Ring	Graphite T1	Graphite T1
12.2 Stuff.-box Upper Ring	Graphite T1	Graphite T1
13 Gand Nut	Carbon Steel	Stainless Steel
16 Threaded Bush ▲	ASTM A439 D2	ASTM A439 D2
17 Pin ▲	Carbon Steel	Carbon Steel
23 Antirotating Device	Carbon Steel	Stainless Steel
Stroke Indicator		
27 Nonrotating Disc	Carbon Steel	ASTM A182 F316
28 Locking Washer	ASTM A182 F6	ASTM A182 F6
30 Roller Bearing	Alloy Steel	Alloy Steel
31 Balanced Piston	ASTM A582 - XM 34	ASTM A351 CF8M
32 Backseat	ASTM A182 F6	ASTM A182 F316
35 Autoseal Ring	Graphite T3	Graphite T3

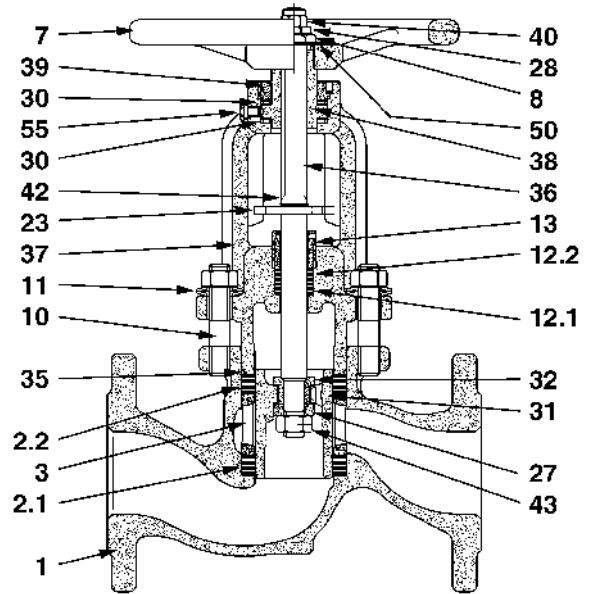


Fig. 1023

Part	Part Material for Material Schedule	
	FS - F	M/H
36 Stem	ASTM A479 T.410 c.3	ASTM A564 T.630
37 Bonnet	ASTM A216 WCB	ASTM A351 CF8M
38 Stem Bush	ASTM A439 D2 / GGG NiCr	ASTM A439 D2 / GGG NiCr
39 Retaining Nut	Carbon Steel	Carbon Steel
40 Nut	Carbon Steel	Carbon Steel
41 Thrust Plate ■	AISI 420 H.T.	AISI 420 H.T.
42 Retaining Ring	C. Steel + ENP	C. Steel+ENP
43 Notched Nut	Carbon Steel	Stainless Steel T.316
50 Name Plate	Aluminium	Aluminium
55 Lubricator	1/8" BSP	1/8" BSP

● not existing for DN 1/2", 3/4", 1" ★ depending upon Size
▲ for DN 1.1/2" and 2" only ■ for DN 1.1/2" and 2" only

PISTON VALVES

Steel

Stop Valves – Flanged Ends to ASME B16.5 - Class 300 Rating: ASME Class 300 – Size 1/2" to 8"

1. Flanges are according to ASME B16.5 - 1988 Class 300, Raised Face
2. Face-to-Face Dimension (A) to ASME B16.10 - 1986.
3. Standard Material Schedules: FS - F - M/H, Class 300
4. Pressure - Temperature Rating on page 2.
5. Valves sized up to 2" are made according to Fig. 1039.
Valves sized 3" and larger are made to Fig. 1024 namely Type BVe, with balanced piston and rising nonrotating stem.

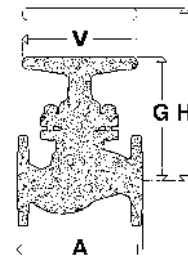


Fig. 1039

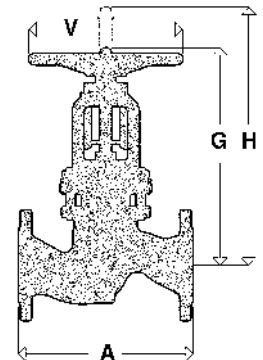
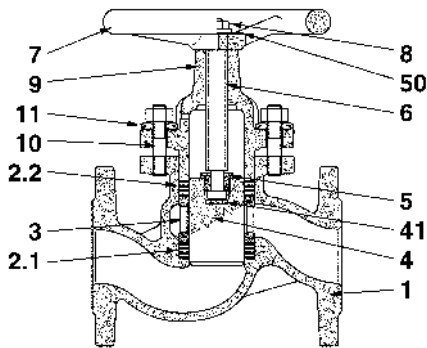


Fig. 1024

Type	DN inches	Fig.	Mater. Sched.	Dimensions				Flange Dimensions					Weight kg	Valve Rings (see page 17)			Stuffing-box Rings (see page 17)			
				A	G	H	V	Outs. Dia.	Thick.	No. of Holes	Dia. of Holes	Dia. of Bolt Circle		d	D	h	d	D	h	
				mm	mm	mm	mm	mm	mm	No.	mm	mm	kg	mm	mm	mm	mm	mm	mm	mm
BV	1/2"	1039	FS-M/H	152	110	140	95	95	14	4	16	67	2,7	15	23,5	9	=	=	=	
BV	3/4"	1039	FS-M/H	178	135	170	115	118	16	4	19	83	4,6	20	30	10	=	=	=	
BV	1"	1039	FS-M/H	203	150	185	115	124	18	4	19	89	7,0	25	38	12	=	=	=	
BV	1.1/2"	1039	F - M/H	228	195	250	150	155	21	4	22	114	14,0	40	58	16	=	=	=	
BV	2"	1039	F - M/H	267	225	285	200	165	22	8	19	127	19,0	50	70	17	=	=	=	
BVd	3"	1024	F - M/H	317	375	455	300	210	29	8	22	168	50,0	80	105	20	25	38	12	
BVd	4"	1024	F - M/H	356	420	515	350	255	32	8	22	200	67,0	100	130	22	30	45	15	
BVd	6"	1024	F - M/H	445	530	655	400	318	37	12	22	270	125,0	150	180	28	30	45	15	
BVe	8"	1024	F - M/H	559	580	700	400	381	41	12	25	330	180,0	170	200	15	25	38	9	

Fig. 1039



Part	Part Material for Material Schedule	
	FS - F	M/H
1. Body	ASTM A105 ★ ASTM A216 WCB ★	ASTM A182 F316 ★ ASTM A351 CF8M ★
2.1 Lower Valve Ring	Graphite T1	Graphite T1
2.2 Upper Valve Ring	Graphite T1	Graphite T1
3 Lantern Bush	Cast iron	ASTM A182 F316
4 Piston	ASTM A582 - XM 34	ASTM A479 T.316
5 Split Nut ●	Fe37+H.T.	Fe37+H.T.
6 Spindle	ASTM A479 T.410	ASTM A479 T.410
7 Handwheel	Cast iron	Cast iron
8 Handwheel Nut	5.2	5.2
9 Bonnet	ASTM A105 / C22.8	ASTM A105 / C22.8
10 Stud Bolt and Nut	A193 B7 - A194 2H	A193 B7 - A194 2H
11 Belleville Washer	50 Cr V4	50 Cr V4
12.1 Stuff.-box Lower Ring	Graphite T1	Graphite T1
12.2 Stuff.-box Upper Ring	Graphite T1	Graphite T1
13 Gand Nut	Carbon Steel	Stainless Steel
16 Threaded Bush ▲	ASTM A439 D2	ASTM A439 D2
17 Pin ▲	Carbon Steel	Carbon Steel
23 Antirotating Device	Carbon Steel	Stainless Steel
27 Nonrotating Disc	Carbon Steel	ASTM A182 F316
28 Locking Washer	ASTM A182 F6	ASTM A182 F6
30 Roller Bearing	Alloy Steel	Alloy Steel
31 Balanced Piston	ASTM A351 CF8M	ASTM A351 CF8M
32 Backseat	ASTM A182 F6	ASTM A182 F316
35 Autoseal Ring	Graphite T3	Graphite T3

- not existing for DN 1/2", 3/4"
- ▲ for DN 1.1/2" and 2" only
- ★ depending upon Size
- for DN 1.1/2" and 2" only

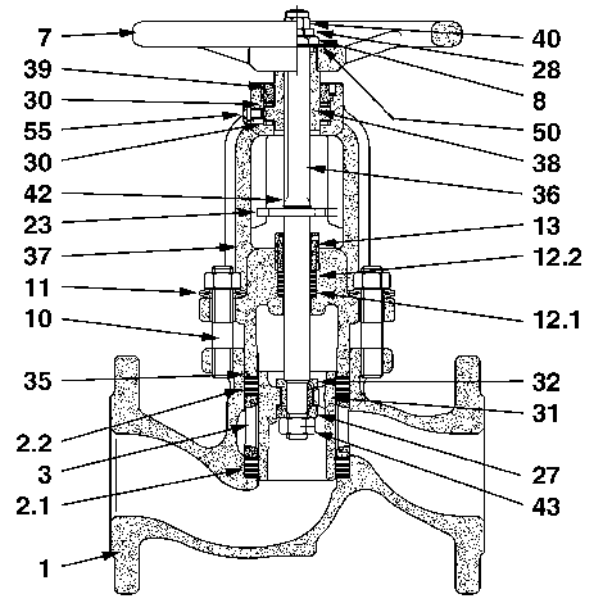


Fig. 1024

Part	Part Material for Material Schedule	
	FS - F	M/H
36 Stem	ASTM A479 T.410 c.3	ASTM A564 T.630
37 Bonnet	ASTM A216 WCB	ASTM A351 CF8M
38 Stem Bush	ASTM A439 D2 / GGG NiCr	ASTM A439 D2 / GGG NiCr
39 Retaining Nut	Carbon Steel	Carbon Steel
40 Nut	Carbon Steel	Carbon Steel
41 Thrust Plate ■	AISI 420 H.T.	AISI 420 H.T.
42 Retaining Ring	C. Steel + ENP	C. Steel+ENP
43 Notched Nut	Carbon Steel	Stainless Steel T.316
50 Name Plate	Aluminium	Aluminium
55 Lubricator	1/8" BSP	1/8" BSP

All **BONETTI**[®] Piston Valves can be automated for automatic or remote control service using:

- electric actuators
- pneumatic actuators
- hydraulic actuators

Electrically Actuated Valves Fig. 1206

Piston valves can be easily outfitted with "on-off", "inching" and "modulating" type electric actuators, including tight-seal or explosion proof enclosures.

These actuators are usually equipped with handwheel for emergency manual operation as well as with control and remote warning unit.

Upon request we can supply the following accessories:

- local remote inverter,
- ancillary limit switches,
- anticondensing resistor,
- inductive, capacitive or resistive position transmitter.

The temperature ambient range for the electric actuator is usually -20°C to +65°C (4 °F to 150 °F).

Pneumatically Actuated Valves (Fig. 1207)

Single or double acting pneumatic actuators can be installed on piston valves; single-acting actuators are of two types: "fail-closed" or "fail-open".

Upon request we supply the following fixtures:

- handwheel for emergency manual operation with by-pass circuit for double-acting actuators,
- solenoid valves,
- mechanical or proximity limit switches,
- air filters, pressure regulators, pressure gauges, lubricator,
- pneumatic or electropneumatic positioner for Modulating Flow Control Valves.

The temperature ambient range for the pneumatic actuators is usually -20°C to +65°C (4 °F to 150 °F).

Hydraulically Actuated Valves (Fig. 1208)

Single or double acting hydraulic actuators can be installed on piston valves; single-acting actuators are of two types "fail-closed" or "fail- open".

The hydraulic fluid shall be supplied by a suitable pump, provided by us.

Upon request we supply the following fixtures:

- handwheel for emergency manual operation with by-pass circuit for double-acting actuators,
- solenoid valves,
- mechanical or proximity limit switches,
- electronic positioner with position transmitter, if required, for Modulating Flow Control Valves.

The temperature ambient range for the hydraulic actuators is usually -20°C to +65°C (4 °F to 150 °F).

Fig. 1206

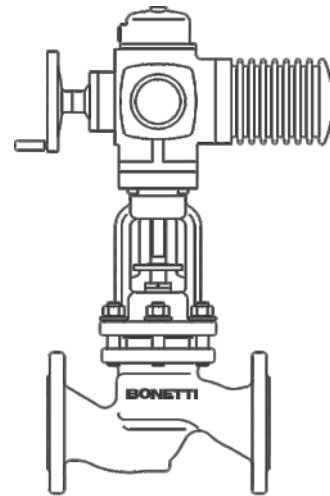


Fig. 1207

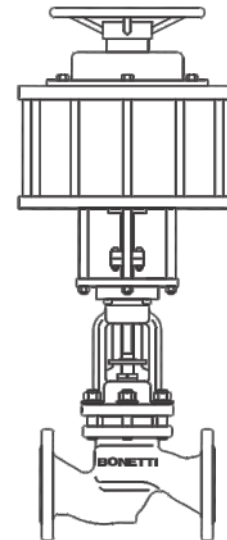
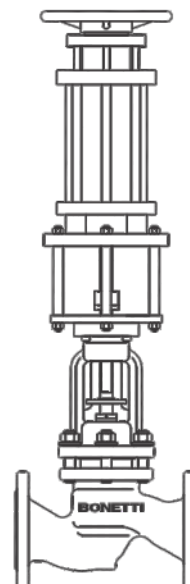


Fig. 1208



Modulating Flow Control Valves

Although piston valves are primarily used as on/off valves they are also suitable for use as modulating control valves. (Please refer to page 4.) The flow path for **BONETTI**® piston valves provides an excellent means of flow control, even when just the standard lantern bushing component is used, and which is not necessarily designed for modulating flow control.

The modulating flow control piston valve design is fitted with a lantern bushing (fig. 1070) that has a multiple hole design and which will yield an equal percentage flow characteristic. Upon request, linear or quick opening flow characteristics are also available.



Fig. 1070

We also wish to point out that:

- The flow control piston valve design provides tight sealing when closed, like all other **BONETTI**® piston valves, and therefore it is not necessary to use additional valves for shut-off.
- Even with high differential pressure, our piston flow control valves do not allow vibration or noise thanks to their having a continually guided piston, which is very much in contrast with that of control valves with contoured plugs.

Our piston modulating valves are equipped with actuators operated by means of signals coming from process controllers.

In order to submit a proper quotation, it is suggested that the specially designed product data sheet should be submitted to us for evaluation.

In most cases, the following data should be sufficient:

- Kind of fluid
- Upstream and downstream pressure
- Operating temperature
- Flow rate
- Type of controlling signal.

Flow Coefficient

BONETTI® Piston Valve Flow Coefficient

Based on theory and experimentation, a series of mathematical equations have been developed which facilitate the estimation of a valve's ability to handle a fluid based on the type of fluid, the inlet pressure, and the temperature.

The use of the aforementioned equations can yield a parameter, which is often constant within certain limits, and directly related to the type of valve and its internal dimensions and configuration. The parameter can then be proven through testing and experimentation and, thus, becomes valid for an entire series of similar valves, for all operating conditions. Once established, this parameter can be an effective aid in the selection of a valve size suitable for proper handling of a set of flow conditions.

The parameter, which is known as Flow Coefficient, is used to estimate the volume of water, under standard conditions, that can flow through a valve under a stated pressure drop. Accordingly, Flow Coefficient (stated as Cv under the ASME system, and Kv under the European system) is defined as:

One Cv is the ability to flow one U.S. gallon of water per minute, at 60 °F, through a fully opened valve, under 1 psi pressure differential.

One Kv is the ability to flow one cubic meter of water per hour, at 20 °C, through a fully opened valve, under 1 bar pressure differential.

The Flow Coefficients for the selection of **BONETTI**® Piston Valves are as follows:

Flow Coefficient for Stop Valves

DN	Fig.	Cv (Kv)	Fig.	Cv (Kv)
10	3/8"	3,5 (3,5)		
15	1/2"	5 (4,5)		
20	3/4"	10 (8,5)		
25	1"	16 (14,0)		
32	1.1/4"	24 (20,5)		
40	1.1/2"	38 (32)		
50	2"	58 (50)		
65	2.1/2"	82 (70)		95 (82)
80	3"	120 (105)	1024	150 (130)
100	4"	190 (165)	1046	220 (190)
125	5"	290 (255)		340 (290)
150	6"	420 (360)		515 (440)
200	8"	690 (590)		

For BVR type Valves, select the Cv and Kv values of a valve having nominal bore (DN) one size smaller.

Flow Coefficient for Flow Control Valves

DN	Fig.	Cv (Kv)	Fig.	Cv (Kv)
10	3/8"	4 (3,5)		
15	1/2"	7 (6,0)		
20	3/4"	12 (10,5)		
32	1.1/4"	18 (15,5)		
40	1.1/2"	28 (24)		
50	2"	44 (38)		
65	2.1/2"	62 (53)		75 (65)
80	3"	92 (79)	1024	115 (100)
100	4"	140 (120)	1046	210 (180)
125	5"	220 (190)		260 (220)
150	6"	300 (260)		360 (310)
200	8"	510 (440)		

For BVR type Valves, select the Cv and Kv values of a valve having nominal bore (DN) one size smaller.

The dimensions of the rings fitted in each valve are indicated in the last column, on the right side, of each descriptive table. The spare rings are normally pre-compressed and their height (H dimension) is lower than the value listed on the tables.

- The patented BONETTI® Piston Valve Rings are made of alloy metal reinforced lamellar graphite. Their composition, design, and manufacturing have been established after a long period of laboratory testing as well as actual field applications. The primary features of these rings are as follows:
 - Durable perfect class VI seat tightness - Resistance to temperatures up to 1022°F
 - Resistance to etching by the processed fluids
 - Practically only one type of valve ring material to handle all fluids which reduces inventory and eliminates confusion
 - Low coefficient of friction and low operating torques
 - No need to re-torque bolts during extended service
- For piston valve figure 1071 (with non-balanced piston) one complete kit of sealing rings consists of:
 - Two rings (items 2.1 and 2.2) of metal alloy re-enforced lamellar graphite (figure 1001)
- For piston valve figure 1072 (with balance piston) one complete kit of seating rings consists of:
 - Two rings (items 2.1 and 2.2) of metal alloy reinforced lamellar graphite (figure 1001)
 - 2 Stuffing-box rings (item 12.1 and 12.2)
 - 1 Auto seal ring (item 35 - Fig. 1009)
- We usually supply spare valve rings kits, each consisting of all the rings necessary for the complete replacement in any given valve type and size
- Upon request, and for very special applications, we supply PTFE valve rings with same dimensions as in Fig. 1065.
- The Spare Rings are normally precompressed and their height (h) could be lower then the value shown in Fig. 1065.
- The recommended torques of the bonnet nuts (item 10) are listed on the table of Fig. 1065.

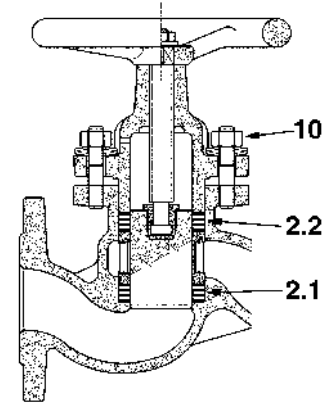


Fig. 1071

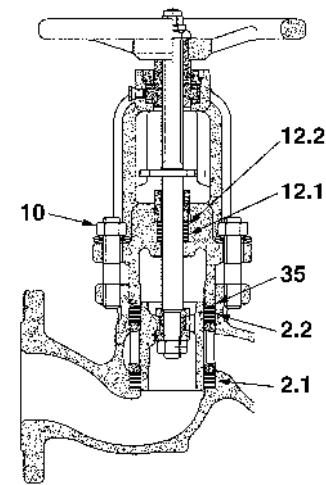


Fig. 1072

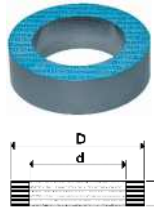


Fig. 1001

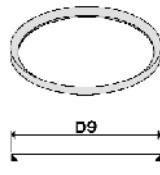


Fig. 1009
Autoseal Ring

Fig. 1065

Note	For Valve				Dimensions of Rings (Note 6)						Bolting Torque (Note 7)								
											BV - BVR - BVn		BVe		BVd 300 lb				
	Type	DN mm inches	Type	DN mm inches	Valve Rings (items 2.1 and 2.2)			Stuffing-box Rings (items 12.1 and 12.2)			Auto seal Ring (item 35)		PN 16 PN 40 150 lb 300 lb	PN 63 800 lb		PN 16	PN 40 150 lb	300 lb	
				d	D	h	d	D	h	D9	h9	Nm	Nm	Nm	Nm	Nm			
2	BV	10	3/8"	BVR	15	3/8" 1/2"	10	18,0	6	=	=	=	=	=	5	8			
	BV	15	1/2"	BVR	20	3/4"	15	23,5	9	=	=	=	=	=	5	10			
	BV	20	3/4"	BVR	25	1"	20	30,0	10	=	=	=	=	=	6	12			
	BV	25	1"	BVR	32	1.1/4"	25	38,0	12	=	=	=	=	=	6	17			
	BV	32	1.1/4"	BVR	40	1.1/2"	30	45,0	15	=	=	=	=	=	8	18			
	BV	40	1.1/2"	BVR	50	2"	40	58,0	16	=	=	=	=	=	9	18			
	BV	50	2"	BVR			50	70,0	17	=	=	=	=	=	10	18			
2	BVn	65					60	82,0	16	=	=	=	=	=	10				
	BVn	80					70	94,0	19	=	=	=	=	=	5				
	BVn	100					90	112,0	20	=	=	=	=	=	5				
	BVn	125					110	135,0	22	=	=	=	=	=	14				
	BVn	150					130	155,0	23	=	=	=	=	=	12				
3	BVe	65					60	82,0	16	20	30	7	82	4,2			12	20	
	BVe	80	3"				70	94,0	19	20	30	7	94	4,2			8	18	
	BVe	100	4"				90	112,0	20	20	30	7	112	4,2			8	20	
	BVe	125					110	135,0	22	25	38	9	135	5,4			18	27	
	BVe	150	6"				130	155,0	23	25	38	9	155	5,4			16	28	
	BVe	200	8"				170	200,0	15	25	38	9	200	5,4			40	50	55
3	BVd	65/70					70	94,0	19	25	38	12	94	4,2					-
	BVd	80	3"				80	105,0	20	25	38	12	105	4,2					18
	BVd	100	4"				100	130,0	22	30	45	15	130	5,4					20
	BVd	125					125	155,0	22	30	45	15	155	5,4					-
	BVd	150	6"				150	180,0	28	30	45	15	180	5,4					28

Conversion Table from °C to °F

°C	°F	°C	°F	°C	°F	°C	°F
-270	-454	165	329	520	968	1100	2012
-260	-436	170	338	525	977	1120	2048
-250	-418	17.5	347	530	986	1140	2084
-240	-400	180	356	535	995	1160	2120
-230	-382	185	365	540	1004	1180	2156
-220	-364	190	374	545	1013	1200	2192
-210	-346	195	383	550	1022	1220	2228
-200	-328	200	392	555	1031	1240	2264
-190	-310	205	401	560	1040	1260	2300
-180	-292	210	410	565	1049	1280	2336
-170	-274	215	419	570	1058	1300	2372
-160	-256	220	428	575	1067	1320	2408
-150	-238	225	437	580	1076	1340	2444
-140	-220	230	446	585	1085	1360	2480
-130	-202	235	455	590	1094	1380	2516
-120	-184	240	464	595	1103	1400	2552
-110	-166	245	473	600	1112	1420	2588
-100	-148	250	482	605	1121	1440	2624
-95	-139	255	491	610	1130	1460	2660
-90	-130	260	500	615	1139	1480	2696
-85	-121	265	509	620	1148	1500	2732
-80	-112	270	518	625	1157	1520	2768
-75	-103	275	527	630	1166	1540	2804
-70	-94	280	536	635	1175	1560	2840
-65	-85	285	545	640	1184	1580	2876
-60	-76	290	554	645	1193	1600	2912
-55	-67	295	563	650	1202	1620	2948
-50	-58	300	572	655	1211	1640	2984
-45	-49	305	581	660	1220	1660	3020
-40	-40	310	590	665	1229	1680	3056
-35	-31	315	599	670	1238	1700	3092
-30	-22	320	608	675	1247	1750	3182
-25	-13	325	617	680	1256	1800	3272
-20	-4	330	626	685	1265	1850	3362
-17.8	0	335	635	690	1274	1900	3452
-15	5	340	644	695	1283	1950	3542
-10	14	345	653	700	1292	2000	3632
-5	23	350	662	710	1310	2050	3722
0	32	355	671	720	1328	2100	3812
5	41	360	680	730	1346	2150	3902
10	50	365	689	740	1364	2200	3992
15	59	370	698	750	1382	2250	4082
20	68	375	707	760	1400	2300	4172
25	77	380	716	770	1418	2350	4262
30	86	385	725	780	1436	2400	4352
35	95	390	734	790	1454	2450	4442
40	104	395	743	800	1472	2500	4532
45	113	400	752	810	1490	2550	4622
50	122	405	761	820	1508	2600	4712
55	131	410	770	830	1526	2650	4802
60	140	415	779	840	1544	2700	4892
65	149	420	788	850	1562	2750	4982
70	158	425	797	860	1580	2800	5072
75	167	430	806	870	1598	2850	5162
80	176	435	815	880	1616	2900	5252
85	185	440	824	890	1634	2950	5342
90	194	445	833	900	1652	3000	5432
95	203	450	842	910	1670		
100	212	455	851	920	1688		
105	221	460	860	930	1706		
110	230	465	869	940	1724		
115	239	470	878	950	1742		
120	248	475	887	960	1760		
125	257	480	896	970	1178		
130	266	485	905	980	1796		
135	275	490	914	990	1814		
140	284	495	923	1000	1832		
145	293	500	932	1020	1868		
150	302	505	941	1040	1904		
155	311	510	950	1060	1940		
160	320	515	959	1080	1976		

Pressure/Temperature Table for Saturated Water / Steam

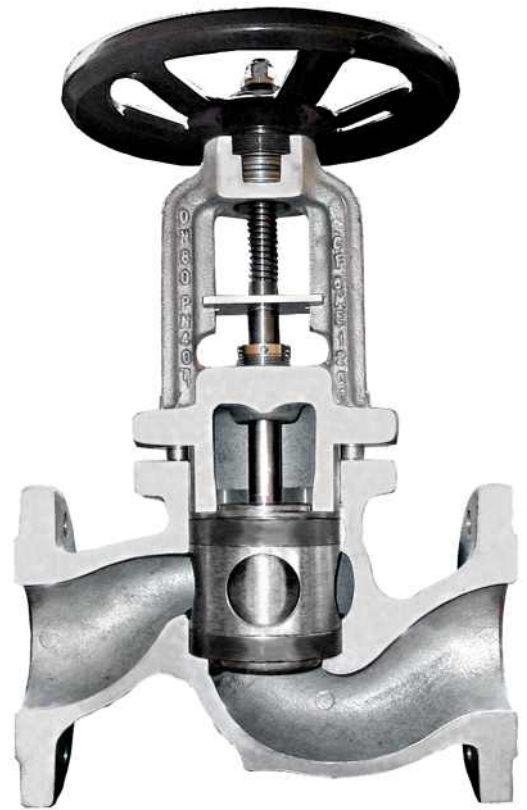
bar	psi	°C	°F
1	14.5	99.1	210.38
1.5	21.75	110.7	231.26
2	29.00	119.6	247.28
2.5	36.26	126.7	260.06
3	43.51	132.8	271.04
3.5	50.76	138.1	280.58
4	58.00	142.9	289.22
4.5	65.27	147.2	296.96
5	72.51	151.1	303.98
5.5	79.77	154.7	310.46
6	87.02	158.0	316.40
6.5	94.27	161.1	321.98
7	101.53	164.1	327.38
7.5	108.78	167.1	332.78
8	116.03	169.6	337.28
8.5	123.28	172.2	341.96
9	130.53	174.5	346.10
9.5	137.79	176.7	350.06
10	145.04	179.0	354.20
11	159.54	183.2	361.76
12	174.05	187.0	368.60
13	188.55	190.7	375.26
14	203.05	194.1	381.38
15	217.56	197.3	387.14
16	232.06	200.4	392.72
17	245.56	203.3	397.94
18	261.07	206.1	402.98
19	275.57	208.8	407.84
20	290.07	211.4	412.52
22	319.08	216.2	421.16
24	348.09	220.7	429.26
26	377.10	225.0	437.00
28	406.11	228.9	444.02
30	435.11	232.7	450.86
35	507.63	241.4	466.52
40	580.15	249.1	480.38
45	652.67	256.2	493.16
50	725.19	262.7	504.86
55	797.71	268.6	515.48
60	870.23	274.2	525.56
65	942.74	279.5	535.10
70	1015.26	284.4	557.55
75	1087.78	289.1	552.38
80	1160.30	293.6	566.75
85	1232.82	297.8	570.95
90	1305.34	301.9	575.42
95	1377.86	305.8	582.44
100	1450.38	309.5	582.65
105	1522.90	313.3	595.94
110	1595.41	316.5	589.65
115	1667.93	319.8	592.95
120	1740.45	323.1	596.25
125	1812.97	326.2	619.16
130	1885.49	329.3	624.74
135	1958.01	332.2	629.96
140	2030.53	335.1	635.18
145	2103.05	337.8	640.04
150	2175.57	340.6	645.08
155	2248.08	343.2	649.76
160	2320.60	345.7	618.85
165	2393.12	348.3	658.94
170	2465.64	350.6	663.08
175	2538.16	353.0	667.40
180	2610.68	355.4	671.72
185	2683.20	357.5	675.50
190	2755.72	359.8	679.64
195	2828.24	361.9	683.42
200	2900.75	364.1	687.38
205	2973.27	366.1	690.98
210	3045.79	368.1	694.58
215	3118.31	370.2	698.36
220	3190.83	372.0	701.60
225	3263.35	374.0	705.20

Fig. 1061 - RATING for the Materials mentioned in this Bulletin

Max. Operating TEMPERATURE to DIN °C	Max. Operating PRESSURE to				
	DIN 2401 Class PN 16	DIN 2401 Class PN 16	DIN 2401 Class PN 40	DIN 2401 Class PN 40	DIN 2401 Class PN 63
	Mater. Sched. G bar	Mater. Sched. GS bar	Mater. Sched. GS bar	Mater. Sched. FS - F - M/H bar	Mater. Sched. FS - M/H bar
-10 +20	16	16	40	40	63
120	16	16	38	40	63
200	13	13	33	35	50
250	11	12	32	32	45
300	10	11	28	28	40
350	=	10	24	24	36
400	=	=	=	21	32

Max. Operating TEMPERATURE to ASME and API °C	ASME Class 150 Gr. 1.1 bar	Max. Operating PRESSURE to				
		ASME Class 150 Gr. 2.2 bar	ASME Class 300 Gr. 1.1 bar	ASME Class 300 Gr. 2.2 bar	API 602 Class 800 Gr. 1.1 bar	API 602 Class 800 Gr. 2.2 bar
-29 +38	19.6	19.0	51.1	49.6	136.2	132.4
100	17.7	16.2	46.4	42.2	136.0	112.5
200	14.0	13.7	43.8	35.7	130.0	95.1
250	12.1	12.1	41.7	33.4	123.0	089.1
300	10.2	10.2	38.7	31.6	112.0	84.5
350	08.4	08.4	37.0	30.4	098.0	081.1
400	6.5	6.5	34.5	29.1	82.5	77.6
425	05.6	05.6	28.8	28.7	071.5	076.4

Max. Operating Conditions for Gr. 1.1 are related to valves of Carbon Steel (Mat. Sched. FS, F); for Gr. 2.2 to valves of Austenitic Stainless Steel (Mat. Sched. M/H).



CERTIFICATE

No. 064 TA 05 003/B

Technical Instruction on Air Quality Control Nr. 5.2.6.4 (TA-Luft)

We hereby certify that the below listed item has been tested according to:

1. Allgemeine VwV zum Bundes-Immissionsschutzgesetz (BImSchG) with satisfactory result.

Company: CESARE BONETTI S.p.A.

Address: Via Cesare Bonetti, 17
- Garbagnate Milanese (MI) - ITALY

Valve type: Piston Valves Type BV and BVe for DN10 up to DN200
Seal type: Graphite packing
Temperature: Ambient and High temperature
Valve rating: Pn15 / PN40, up to ANSI 800
Drawing: Type BV : R&S05/A3 - CBP20052/1 rev.4
Type BVe : R&S06/A3 - CBP20052/2 rev.4 - B60.XX.0680 rev.1

Legnano - January 31st 2016



Managing Director

Dott. Ing. A. C. Bayetton



Inspector

Mr. E. Maruzza



Certificate of Registration

APIQR® REGISTRATION NUMBER

1566

This certifies that the quality management system of

CESARE BONETTI S.P.A.
Via Cesare Bonetti, 17
Garbagnate Milanese, Milan
Italy

has been assessed by the American Petroleum Institute Quality Registrar (APIQR®) and found it to be in conformance with the following standard:

ISO 9001:2008

The scope of this registration and the approved quality management system applies to the **Design and Manufacture of Valves, Glass, Magnetic and Electronic Level Gauges, Magnetic and Electronic Limit Switches and Related Accessories**

APIQR® approves the organization's justification for excluding:

No Exclusions Identified as Applicable

Effective Date: July 2, 2015

Expiration Date: June 14, 2015

Registered Since: June 14, 2012

W. Dan Whitaker
Manager of Operations, APIQR

This certificate is valid for the period specified herein. The registered organization must continuously meet all requirements of APIQR. Registration Programs and the requirements of the Registration Agreement. Inspection is maintained and records maintained through annual third party audits. Further clarification regarding the scope of this certificate and the applicability of 2008 ISO standard requirements may be obtained by consulting the registration agreement. This certificate has been issued from APIQR offices located at 12111 North 13th, Richardson, TX, 75081-0111 U.S.A. For the purposes of APIQR, and must be obtained upon request. To verify the authenticity of this certificate, go to www.apiqr.org/registrants.





Garbagnate Milanese (MI) | Italy

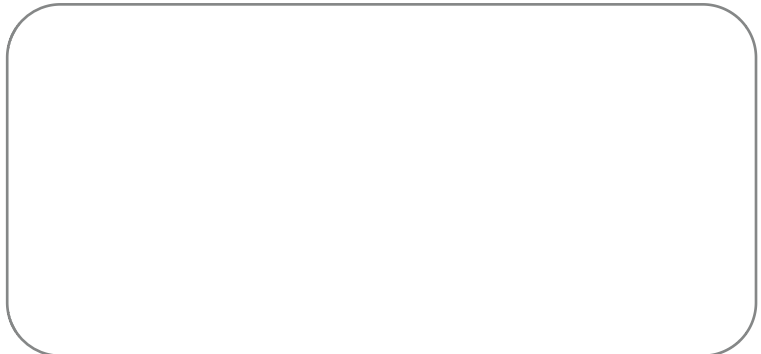
Vapi - Gujarat | India

Limburg an der Lahn | Germany

Suzhou - Jiangsu | China



A Complete International sales network, covering more than 70 countries across the world.



Cesare Bonetti S.p.A.
20024 Garbagnate Milanese,
Via Cesare Bonetti 17, Italy.

Cesare Bonetti India Pvt. Ltd.
Survey No. 36, 39 & 42, On N.H. No. 08,
Karambele, Vapi - 396 105 Gujarat - India.
Tel : +91-260-6634000

Bonetti Armaturen GmbH & Co. KG.
D-65549 Limburg an der Lahn,
In Den Fritzenstucker, 4. Germany.

Cesare Bonetti (Suzhou) Level Gauges & Valves Co. Ltd.
No. 8, Lane 1, Wupu Road, Shengpu District,
Suzhou Industrial Park, Jiangsu, China - 215 126.

Local Sales: Tel.: +39-02 99072333, Fax : +39-02 99072300
Email : italia@cesare-bonetti.com
Export Sales: Tel.: +39-02 99072444, Fax : +39-02 99072400
Email : export@cesare-bonetti.com
Website : www.cesare-bonetti.com

Sales Office: Tel.: +91-22-27751851
Email : cbindia@cesare-bonetti.com
Website : www.cesare-bonetti.com

Sales Office: Tel.: +49-06431 598310, Fax : +49-06431 598329
Email : armaturen@bonetti.de
Website : www.bonetti.de

Sales Office: Tel.: +86-512-62816396, Fax : +86-512-62816393
Email : bonettisuzhou@cesare-bonetti.cn
Website : www.cesare-bonetti.cn

Copyright © Cesare Bonetti. All rights reserved.

Unless otherwise indicated, all materials on these pages are copyrighted by Cesare Bonetti S.p.A. All rights reserved. Any reproduction, modification, storage in a retrieval system or retransmission, in any form or by any means, electronic, mechanical or otherwise is strictly prohibited.