BONETTI®

Piston Valves

INDEX

	Page
Rating	2
General Information	4
Construction Details	5-6
Straight Pattern	
- Female Screwed Ends - PN 16	7
- Female Screwed Ends, Socket Weld Ends (SW), Butt Weld Ends (BW) - PN 40/63 - API 602 - ASME Class 800	8
- Flanged Ends	
- to DIN - PN 16 – DN 10÷150	9
- to DIN - PN 16 – DN 65÷200	10
- to DIN - PN 40 – DN 10÷50	11
- to DIN - PN 40 – DN 65÷200	12
- to ASME Class 150 lb – DN 1/2"÷6"	13
- to ASME Class 300 lb – DN 1/2"÷6"	14
Automated Valves	15
Modulating Flow Control Valves	16
Flow Coefficient	16
Valve Rings	17
ISO - EN/ISO 9001 : 2000 Certificate	18
Conversion Table	19

FIGURE NUMBER INDEX

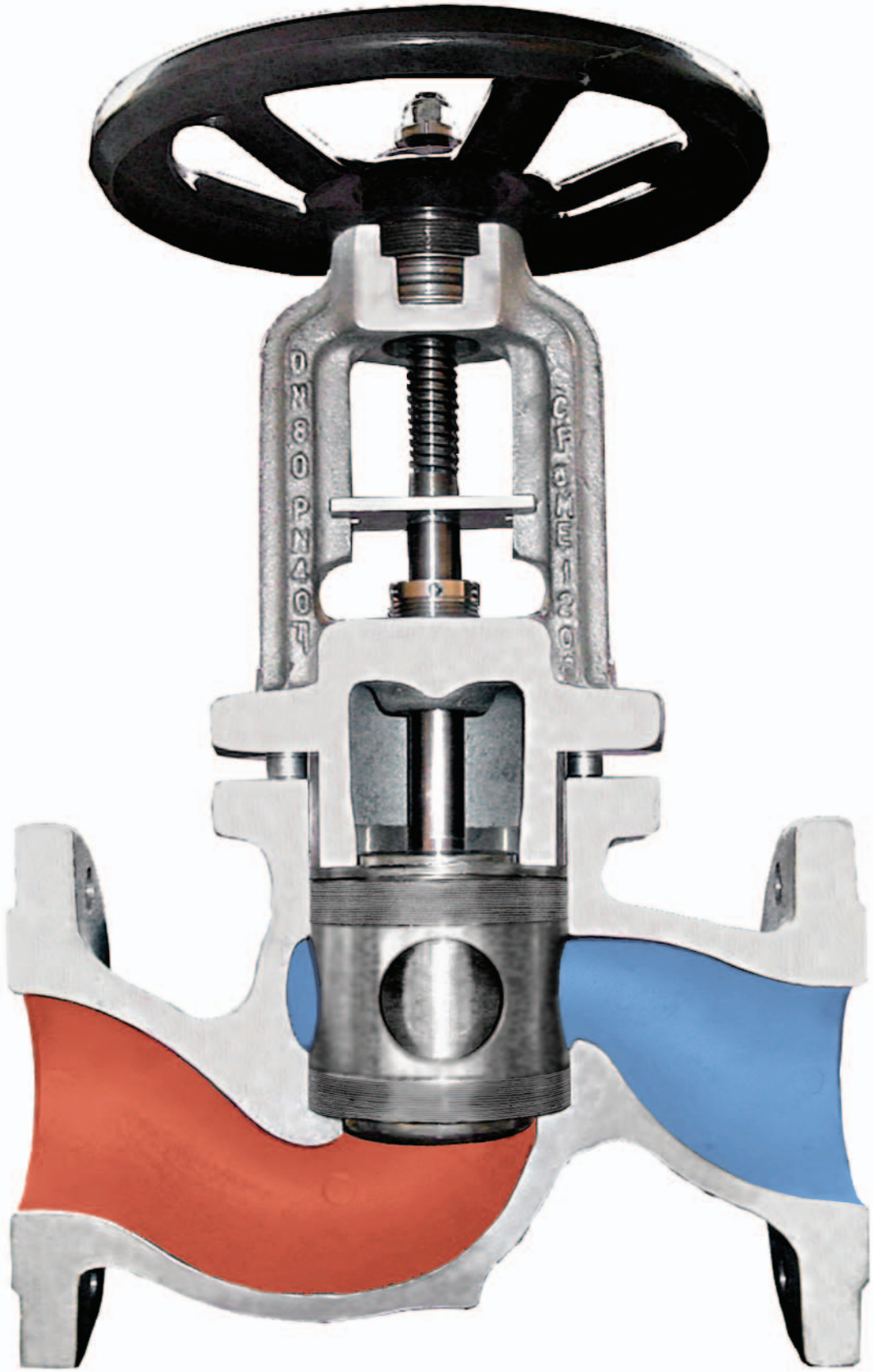
Fig.	Page	Fig.	Page	Fig.	Page	Fig.	Page	Fig.	Page	Fig.	Page	Fig.	Page
1001	17	1020	6	1024	14	1061	2	1072	17	1078.1	8	1080	11
1004	5	1020.1	6	1039	14	1065	17	1075	9	1079	8	1206	15
1009	17	1021	10	1045	9	1070	16	1077	8	1079.1	8	1207	15
1010	9	1022	12	1046	5	1071	17	1078	8	1079.2	8	1208	15
1018	7	1023	13	1053	13								

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

Max. Operating TEMPERATURE to DIN	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	Mater. Sched. GS	Mater. Sched. GS	Mater. Sched. FS - F - M/H	Mater. Sched. FS - M/H
°C	bar	bar	bar	bar	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	Max. Operating PRESSURE to					
	ASME Class 150 Gr. 1.1	ASME Class 150 Gr. 2.2	ASME Class 300 Gr. 1.1	ASME Class 300 Gr. 2.2	API 602 Class 800 Gr. 1.1	API 602 Class 800 Gr. 2.2
°C	bar	bar	bar	bar	bar	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	89.1
300	10.2	10.2	38.7	31.6	112.0	84.5
350	8.4	8.4	37.0	30.4	98.0	81.1
400	6.5	6.5	34.5	29.1	82.5	77.6
425	5.6	5.6	28.8	28.7	71.5	76.4

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).


DN 80 PN40F
ACCIAIO FUSO

BONETTI® Piston Valves

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 ½" (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 10.

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
- Druckbehalter verodnung 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

BONETTI® Piston Valves – Cast Iron

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.

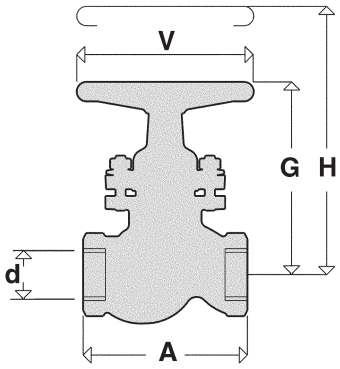


Fig. 1018

Type	DN inches	Fig.	Mater. Sched.	B.S.P. Thread d inches	Dimensions A mm	G mm	H mm	V mm	Weight kg	Valve Rings (see page 17) 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

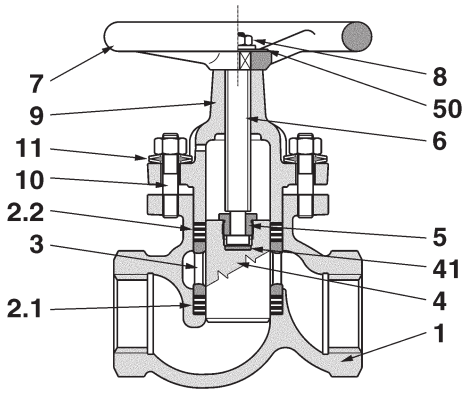


Fig. 1018

	Part	Part Material for Material Schedule G
1	**Body**	JL 1040
2.1	**Lower Valve Ring**	Graphite T1
2.2	**Upper Valve Ring**	Graphite T4
3	**Lantern Bush**	Carbon Steel / Cast iron★
4	**Piston**	ASTM A582 - XM 34
5	**Split Nut ●**	Fe37 + H.T.
6	**Spindle**	C30
7	**Handwheel**	Cast iron
8	**Handwheel Nut**	5.6 - 5-2
9	**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

● not existing for d = 15 and 20 mm

★ depending upon Size
■ for Size 1.1/4" and larger, only