DATA SHEET

Type RVM7 Butterfly Valve

ANSI version · DIN version

Application

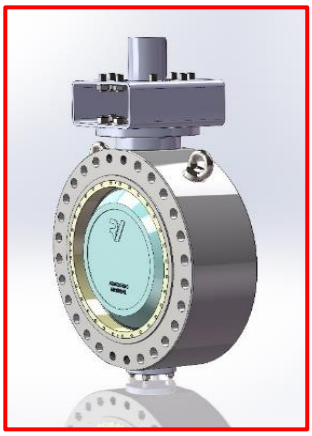
ON-OFF and control valve for high flow rate services in a compact face to face dimensions. Compact and robust construction that provides smooth operation, suitable for the installation in the major industries and usual when size and weight of the valve is a target.

Valve size	NPS 3 to 120 · DN 80 to 3000
Pressure rating	Class 150 to 2500 · PN 10 to 400
Temperatures	-60 to +400 °C

Special features

- Butterfly valves Type RVM7 configuration consists of a disc assembled on a shaft. Shaft rotation with a quarter turn movement enables contact between disc and seat. When the disc is oriented parallel to the flow direction, valve is in the open position, allowing the fluid pass through with reduced pressure drops. When disc is turning towards the close position (90°), flow is restricted till it is finally cut off (at 90°)
- Butterfly valves are designed and produced according to main standards API 609, BS EN 593, ASME B16.34 and other international standards as well as customer specifications on request.
- Can be produced for Control (60° opening) and On-off applications (90° opening).

Fig. 1: *Type RVM7 butterfly valve*



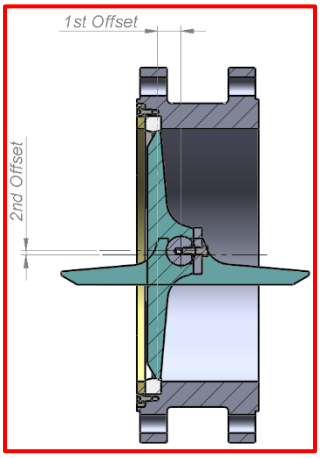


Fig. 2: *Double offset design*

Versions

Double offset design

The centerline of the disc is slightly displaced from the horizontal and vertical axis of the valve body in order to reach first and second offsets. The displacement of the stem from the centerline of the disc (first offset), provides a high grade of accuracy in the disc and seat adjustment. The sealing principle of second offset design is based in the reduction of the areas subjected to mechanical rubbing during opening and closing operations, this feature minimizes the wear due to the contact between disc and seat.

Centric design

The shaft is centered in the valve body and matches with the axis of the disc allowing compact design. This valves are normally supplied for process temperatures up to 100°C,

although it is also possible to select configurations suitable for wide ranges of temperature. Simplicity of concentric design is an advantage to reach high tightness rate.

Valve construction

Lug and Wafer

Standard configuration of the body is compact, which allows to install the valve in places with limitation of space. Type RVM7 Wafer and Lug body types are specifically designed to restrain face to face dimension and valve weight. With clear advantage in front other valve types when the save is a must.

Double flanged construction

The construction of Type RVM7 Butterfly valves shall keep in mind limitations of space when valve is installed in the plant and therefore Type RVM7 Butterfly valves aim to be compact solutions. When the requirements of the customer need the use of flanged body, Type RVM7 can be supplied with body material in forged or casted versions and fulfilling the International standards for the design of valve, face to face dimension and end connections.

Seat assembly

Depending on the Trim type, the available seat assembly consists in an outer metallic seat ring with a soft seat insert or a soft seat ring directly installed on the valve body. The soft insert can be located into a groove in the disc, into a groove in the body, or into the metallic seat ring. Depending on the vale size.

The seat assembly can be provided with O-ring and graphite back up ring which ensure the tightness and avoid leakage through the assembled pieces.

Depending on the fluid composition where chemical compatibility is main goal, soft seats are selected with consideration of other process data, mainly pressure and temperature.

Optional features

Bonnet types

Type RVM7 Butterfly valves are commonly designed with Bolted bonnet and Lantern ring sealed with O-Rings and Graphite back up ring to make the design to be fire safe.

When the conditions of the service of the valve require different solution, Butterfly valves adopt the bonnet with Gland, Packing and Stem bushing.

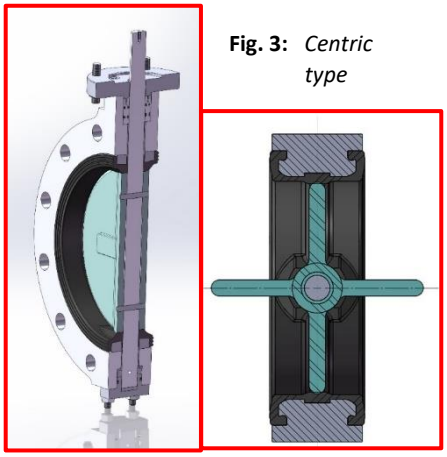


Fig. 3: *Centric type*

Fig. 4: *End valve connection types*

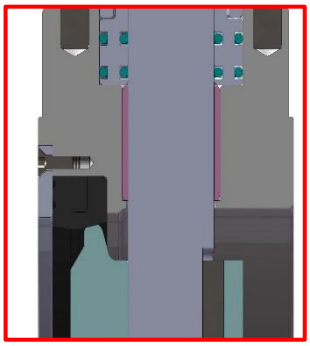


Fig. 5: *Seat assembly detail*

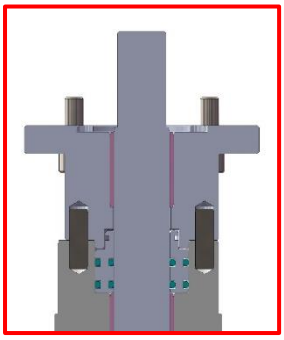


Fig. 6: *O-ring bonnet*

In order to protect environment from poisonous, explosive or flammable media, valves can be supplied with double or special packing to comply with fugitive emission requirement according to ISO 15848 standard.

Live loaded packing

Valve packing is tightened by means of a gland and its related bolting. After long working time withstanding the service pressure, gland load retention may be reduced and could cause leakage in some cases so Type RVM7 offers also a solution for that by means of using Belleville springs installed on gland bolting in order to assure a continuous compression force on gland, to guarantee the load retention of the stem packing to avoid leakage to atmosphere.

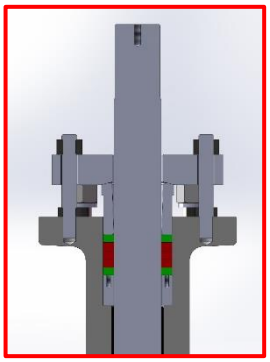


Fig. 7: *Packing type bonnet*

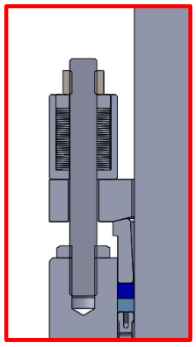


Fig. 8: *Live loading packing*

Metal to Metal seat type

Type RVM7 offers the metal seated butterfly valves solution with direct contact of the disc on the seat ring. Contact surfaces are hardened in order to achieve regular hardness up to 45 HRC and resistance to high temperatures.

Metal to metal feature shall be selected when soft seat type is not a suitable selection.

• Solid particles are present in the fluid; these particles could damage the soft seat.

• High temperature services, design temperature exceeds soft seat recommended temperature range.

• High pressure or regulation services, when soft seat may be deformed as a result of the high forces applied on it.

Type RVM7 metal seat consists of a metallic ring which is capable to absorb the energy of the disc movement with a slight elastic deformation of the seat surface. This surface in contact with the disc is hard-faced with Stellite. Type RVM7 are designed at request, special seat rings produced with graphite and stainless steels are also produced, and capable to reach high tightness rates.

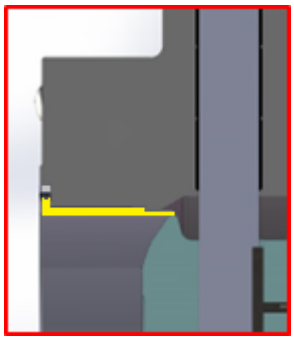


Fig. 9: *Metal to metal seat (yellow detail marked)*

Stem extension

Type RVM7 can be provided with stem extension when required by customer (length is adapted to customer requirement). This extension is designed according to the different purposes of the same:

- Underground installation
- Remote operation
- High temperature services

Materials

Type RVM7 butterfly valves are supplied with all material types to fulfill all the different combinations of service fluid, design pressure and temperature. Valves can be supplied either forged or casted based on the valve configurations and customer specifications. Following materials can be supplied:

- Carbon Steel valves
- Low temperature carbon steel
- Stainless Steel Valves
- Super Austenitic Stainless Steel
- Duplex Stainless Steel
- Super Duplex Stainless Steel
- Ni Alloy
- Titanium
- Aluminum bronze

See below table 2 with the main guidelines of material selection.

Actuators

Type RVM7 can be supplied with the following operator types:

- Manual: Lever, gear operated
- Electrical actuator
- Pneumatic actuator
- Hydraulic actuator
- Electro-hydraulic actuator

Bare shaft with ISO 5210 flange for actuator coupling suitable either for actuator to be assembled by customer or actuator to be supplied by customer and assembled, regulated, and tested at factory.

Table 1: *Manufacture range*

	Nominal Pipe Size NPS (inches)														
RATING	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	28"	30"	32"	36"
150#															
300#															
600#															
900#															
1500#															
2500#															
	Nominal Pipe Size NPS (inches)														
RATING	40"	48"	54"	60"	66"	72"	76"	80"	84"	88"	92"	94"	96"	100"	120"
150#															
300#															

Remark: Oher sizes/ratings are available on request

Flange Standards ANSI B16.5 (3" to 24"), ANSI B16.47 Series A (28" to 60), AWWA C207 Class E 275 psi (larger sizes)

Table 2: *Materials*

Butterfly valves			Casting	Forging
Body and Bonnet	Standard materials	Steel	A216 WCB	A105
		High-temperatura steel	A217 WC6 · A217 WC9	A182 F11 · A182 F22
		Low temperature steel	A217 C12A · A352 LCB · A352 LC2	A350 LF2- A182 F91
		Stainless steel 18% Cr	A351 CF8M · A351 CF8C	A182 F316 · A182 F321
	Special materials	Chromium-nickel steel	20 % alloy · A351CK3MCuN	20 % alloy · A182 F44
		Duplex steel	A995 Gr. 4A	A182 F51
		Super duplex steel	A995 Gr. 5A- A995 Gr. 6A	A182 F53- A182 F55
		Nickel alloys	●	●
		Inconel	●	●
		Hastelloy	●	●
		Monel	●	●
		Titanium	●	●
Stem	Standard materials	Austenitic	-	A276 316
	Special materials	Chromium-nickel steel	-	20 % alloy · A351CK3MCuN
		Duplex steel	-	A182 F51
		Super duplex steel	-	A182 F53- A182 F55
		Nickel alloys	-	●
		Inconel	-	●
		Hastelloy	-	●
		Monel	-	●
		Titanium	-	●
Valve disc	Standard materials	Austenitic	-	A276 316
		High-temperature stainless	-	A182 F321H · A182 F347H
	Special materials	Chromium-nickel steel	-	20 % alloy · A182 F44
		Duplex steel	-	A182 F51
		Super duplex steel	-	A182 F55
		Nickel alloys	-	●
		Inconel	-	●
		Hastelloy	-	●
		Monel	-	●
		Titanium	-	●
Linings and coatings (soft seat)		MATERIAL	TEMPERATURE	REMARKS
		BUNA (NBR)	From -45 to +120ºC	AED feature for 600# and above
		BUNA HIDROGENATED (HNBR)	From -48ºC to +150ºC	AED feature for 600# and above
		VITON (FKM)	From -20ºC to +240ºC	AED feature for 600# and above. NOT TO BE USED FOR METHANOL SERVICE
		VITON GLT (FKM GLT)	From -40ºC to +240ºC	AED feature for 600# and above. NOT TO BE USED FOR METHANOL SERVICE
		EPDM	From -55ºC to +150ºC	Not recommended for hydrocarbon environments.

Remark: Oher materials available on request

Table 3: *Flow coefficients for full bore valves for control application* [1)]

	Valve characteristic: (% opening / degree opening)				
NPS	**30% / 27º**	**45% / 40,5º**	**60% / 54º**	**66,6% / 60º**	**100% / 90º**
3	24	52	145	180	415
4	45	94	262	320	750
6	98	206	577	720	1650
8	174	362	1020	1280	2900
10	276	574	1610	2000	4600
12	407	868	2460	2880	6950
14	534	1100	3080	3920	8800
16	677	1415	3960	5120	11300
18	884	1840	5160	6480	14720
20	1092	2270	6360	8000	18200
24	1700	3520	9970	11520	28320
28	2393	4960	13923	15840	39773
30	2740	5680	15900	18000	45500
32	3000	6220	17400	20640	49867
36	3520	7300	20400	25920	58600
40	4407	9157	25400	32640	73400
48	6180	12870	35400	46080	103000
54	7860	16300	45800	58320	131000
60	9240	19250	53800	72000	154000
66	11100	23000	64400	87120	184000
72	13600	27700	77200	103680	222000

Further / other flow coefficients on request

Table 4: *Main dimensions* [1)]

1) *Dimensions may vary slightly depending on valve design conditions. Other sizes and ra request.*

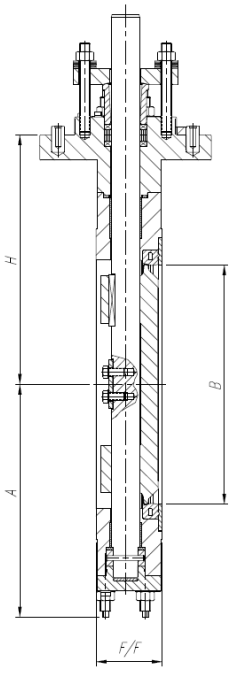


Table 4.1: ANSI Class 150

	FACE TO FACE (mm)		VALVE BORE (mm)	VALVE HEIGHT (mm)	
NPS	Wafer/Lug	Double Flanged	B	A	H
3	48	114	74	120	125
4	54	127	99	150	160
6	57	140	149	190	200
8	64	152	201	220	235
10	71	165	250	250	265
12	81	178	301	290	305
14	92	190	333	320	330
16	102	216	385	350	360

18	114	222	435	375	400
20	127	229	486	415	450
NPS	FACE TO FACE (mm) Wafer/Lug	Doble Flanged	VALVE BORE (mm) B	VALVE HEIGHT (mm) A	H
24	154	267	586	450	480
28	165	292	688	515	535
30	165	318	739	580	610
32	190	318	788	590	620
36	200	330	890	640	670
40	216	410	992	700	730
48	276	480	1195	800	840

Table 4.2: ANSI Class 300

NPS	FACE TO FACE (mm) Wafer/Lug	Doble Flanged	VALVE BORE (mm) B	VALVE HEIGHT (mm) A	H
3	48	114	74	125	135
4	54	127	99	160	165
6	59	140	149	200	210
8	73	152	201	235	240
10	83	165	250	260	270
12	92	178	301	300	310
14	117	190	333	325	335
16	133	216	385	365	370
18	149	222	435	400	410
20	159	229	486	450	460
24	181	267	586	520	540
28	209	114	688	580	610
30	241	292	739	600	630
32	241	318	788	630	660
36	260	318	890	700	730
40	300	330	992	720	740
48	320	410	1195	820	860

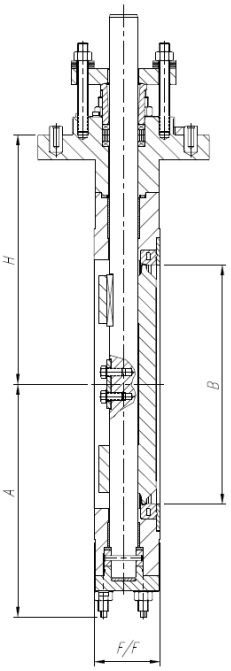


Table 4.3: ANSI Class 600

NPS	FACE TO FACE (mm) Wafer/Lug	Doble Flanged	VALVE BORE (mm) B	VALVE HEIGHT (mm) A	H
3	54	180	74	130	135
4	64	190	99	175	180
6	78	210	149	225	235

8	102	230	197	265	275
10	117	250	244	310	320
NPS	FAC155E TO FACE (178mm) Wafer/Lug	Doble Flanged	VALVE BORE (mm) B	VALVE HEIGHT (mm) A	H
12	140	270	295	335	340
14	216	290	323	375	385
16	232	310	371	410	420
18	292	330	415	440	450
20	216	350	460	485	490
24	232	390	554	550	610
28	292	450	644	580	640
30	318	480	691	620	670
32	318	510	733	660	700
36	330	540	825	720	740

Table 4.4: ANSI Class 900

NPS	FACE TO FACE (mm) Wafer/Lug	Doble Flanged	VALVE BORE (mm) B	VALVE HEIGHT (mm) A	H
3	64	210	71	135	140
4	80	235	96	215	225
6	104	250	143	265	280
8	112	310	187	300	310
10	135	350	235	350	375
12	170	380	279	380	400
14	190	400	308	395	415
16	202	430	352	425	440
18	230	460	396	460	480
20	252	490	441	500	530
24	312	530	529	590	630

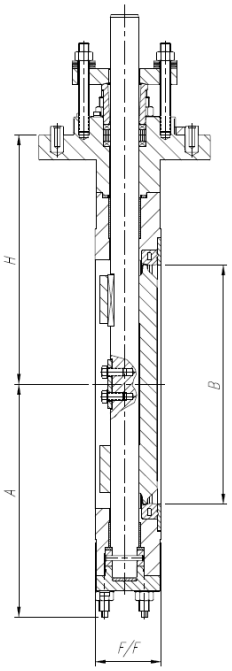
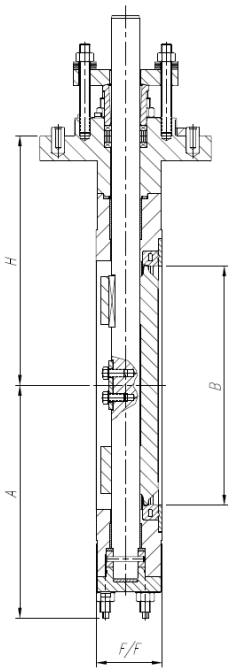


Table 4.5: ANSI Class 1500

NPS	FACE TO FACE (mm) Wafer/Lug	Doble Flanged	VALVE BORE (mm) B	VALVE HEIGHT (mm) A	H
3	72	220	66	198	205
4	85	245	88	220	225
6	110	260	133	265	280
8	130	420	174	310	320
10	160	460	219	360	385
12	190	500	260	390	430

14	220	570	285	430	470
16	260	610	337	480	510
	FACE TO FACE (mm)		VALVE BORE (mm)	VALVE HEIGHT (mm)	
NPS	Wafer/Lug	Doble Flanged	B	A	H
18	300	660	367	490	530
20	330	710	412	540	580
24	385	790	495	650	680

Table 4.6: ANSI Class 2500

Dimensions on request