



BUTTERFLY
VALVES

BUTTERFLY VALVES



Samsun Makina Sanayi, known as SMS, is a main manufacturer of infrastructure goods, such as centrifugal pumps, shut-off and control valves, their connection items, DI pipes and fittings for irrigation, water supply and waste water projects, treatment plants, distribution and collection networks with extensive services for design, production and commissioning since 1967.

Having an annually 200,000 tonnes of production capacity, SMS, owns one of the most integrated, modern, high capacity foundry based manufacturing facility in the world; which is located in Samsun city, in the Industrial Zone, with a 200.000 m² open, 100.000 m² closed area.

Variety of well equipped offices, factories and workshops, power of innovative technology and know-how, experience and richness of man-power enable SMS to carry out all below activities within the same address, without any need for outsourcing :

- Engineering,
- Research and development,
- Pattern making,
- Casting and machining,
- Steel construction,
- Heat treatment,
- Painting and coating,
- Gearbox production,
- Rubber parts production,
- Quality control and testing,
- Design verification and performance testing.

Depending on the customer requirements, not only the standard valves with different materials and/or coatings required for operational conditions, but tailor made engineered ones are being also manufactured. Wide product range is supported by maximum possible selection of coating techniques suitable for drinking and waste water media, such as enamel, rubber, electrostatic epoxy powder and double component epoxy coatings.

Every butterfly valve, in addition to their routine performance controls and quality checks, is being hydrostatically tested before delivery.





Starting from procurement to after-sales, every single phase of SMS activities is being performed along with its ISO 9001 certified quality management system.

Product conformity certification for SMS butterfly valves, are being done by ICIM and TSE.



ISO 9001 Quality Management System Certificate



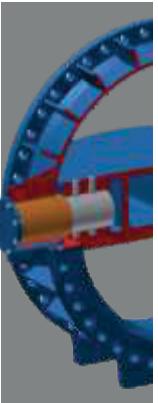
TS EN 593 TSE Product Conformity Certificate



EN 593, EN 1074-1/2 and EN 558-1
PN10 for Butterfly Valve Product Conformity
Certificate
Accredited Certification Institution: ICIM SpA- Italy



EN 593, EN 1074-1/2 and EN 558-1
PN10-16 for Butterfly Valve Product Conformity
Certificate
Accredited Certification Institution: ICIM SpA- Italy



BUTTERFLY VALVES



EN 593, EN 1074-1/2 and EN 558-1
PN16 for Butterfly Valve Product Conformity
Certificate
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EN 593, EN 1074-1/2 and EN 558-1
PN25 for Butterfly Valve Product Conformity
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EN 593, EN 1074-1/2 and EN 558-1
PN40 for Butterfly Valve Product Conformity
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Beyond the ability of delivering specially designed products with specific materials, standard valves of SMS, double flanged ones, offer a wide selection possibility to the customers.

Ductile iron cast body with integral feet, or cast feet on the flanges, together with welded stainless steel seat and double eccentric design, ensure durability, reliability and economic life cycle of SMS butterfly valves.

Trouble free operation is supported by robustly designed compact gearboxes with high torque capacities for nominal pressure ratings of the valves, PN10, 16, 25 and 40.



APPLIED STANDARDS

SMS butterfly valves are designed according to EN 593 (DIN 3354).

Face to face dimensions conform to EN 558 series 14 (DIN 3202 F4) or EN 558 series 13 (BS 5155 short body) or AWWA C504 short body.

Flanges conform to EN 1092-2 (DIN 2501) and BS 4504 (ANSI), (AWWA).

The valves are tested according to EN 1074-1, EN 1074-2 and EN 12266-1, EN 12266-2.

BUTTERFLY VALVES



APPLICATIONS

Butterfly valves are designed for shut-off, throttling and/or flow control purposes at :

- Water supply plants;
pumping stations,
distribution networks,
well chambers,
high-level reservoirs,
filter plants,
pipelines,
(with rubber lining for aggressive
untreated water, sea water and
desalination plants)
- Power stations;
primary and secondary cooling circuits
- Waste water disposal;
de-watering stations,
water engines,
treatment plants,
- Chemical industry
untreated, process and circulating water piping
(with rubber lining for alkaline and acid lines).

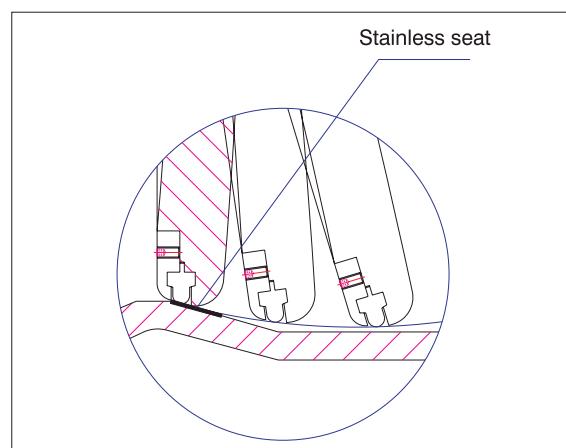
ADVANTAGES, SUPERIORITIES

- Functional design,
- Smaller space requirements,
- Excellent flow characteristics,
- High safety,
- High quality production,
- Variety of material applications,
- Use in water, petroleum and other liquid transfer systems,
- 100% tested and quality controlled products,
- Ease of installation,
- Ease of operation,
- Long service life,
- Maintenance free operation,
- Perfect sealing in both directions,
- Low torque requirements.

STAINLESS STEEL SEAT

The seats of all the valves are made of stainless steel by welding, precisely machined, to extend the life of the seal ring by providing a lower coefficient of friction between the seal and the seat during the operation.

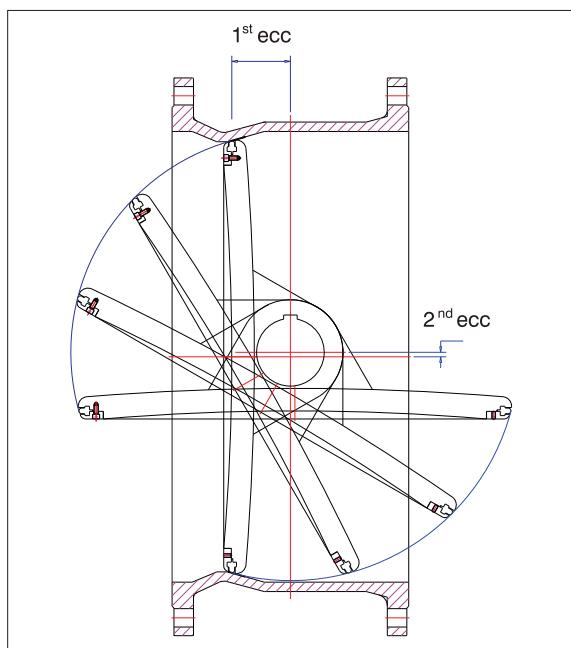
A very frequently faced problem for ordinary valves is the sticking of the seal ring to seat surfaces, when they are rarely opened or kept closed for long periods. The stainless steel seats of SMS valves, prevents this functional defect, by providing an inert contact surface.





DOUBLE ECCENTRICITY

The first eccentricity is given by offsetting the axis of rotation, outside or away from the sealing plane. This provides a full-circle, uninterrupted sealing between disc and body seat. As a consequence, the leakage at the shaft bearing area is prevented and drop-tightness is ensured by evenly compressed rubber seal on the periphery.



The second eccentricity is obtained by an offset of rotating axis of disc from the valve axis. This provides the easy and quick relief of rubber seal from compression, especially in the area of the shaft by a slight rotation of the disc. As a result, rubber seal is prevented from scuffing and abrasive wear within a few degrees of disc rotation.

SMS butterfly valves are designed for “quarter turn” from closed to open position. Since such valves require the maximum opening torque in the very first degrees of rotation of the disc, seat-downstream installations will increase the torque requirements. Additionally, the spring effect of the rubber seal resulting in high friction between the seat and the seal, causes the required torque to be even greater. SMS valves are two sided, which can maintain safe sealing in down-stream and up-stream positions, ensuring lower torque and smaller gear boxes.

CAVITATION

When used for throttling purposes, especially if the operating conditions are not evaluated well, cavitation may occur in butterfly valves. This can cause excessive noise and result in damages to the valve and downstream components.

Cavitation occurs at the localized low-pressure zones which can be created by the sudden pressure and flow rate changes. If the pressure at these zones drops below the vapor pressure of the liquid, the liquid vaporizes, forming small vapor bubbles. As these bubbles flow downstream while the pressure recovers in the pipe at an instant, they turn into liquid form by violent implosions. It has been shown that localized pressures up to 690 MPa can be created within these bubble implosions.

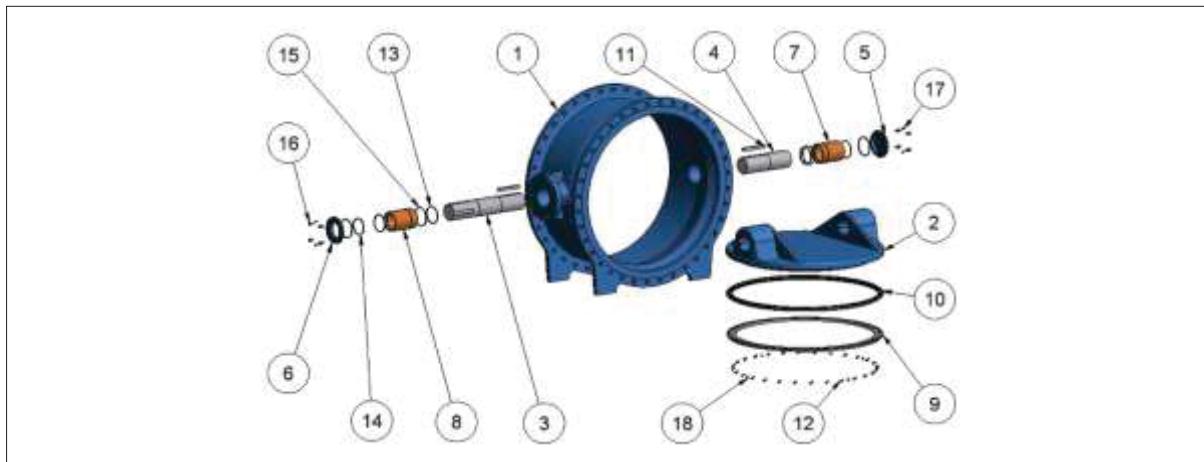
Protecting the pipeline and the valves from cavitation is an important design constraint for piping systems. In order to prevent the occurrence of cavitation, following measures can be taken:

- Increase the downstream pressure by relocating the valve or provide additional downstream measures, such as additional valves or permanent orifices.
- Decrease the pressure drop through the valve by installing two or more valves in series, caring for the drop in each.



- Throttle the valve with a different opening position, even if to enlarge the valve size will become necessary. A larger valve used in a more closed or throttled position usually creates a lower cavitation.
- Install a bypass line around the valve to handle low-flow characteristics.
- Install air inlet ports just after the valve in downstream to take air in and reduce the pressure fluctuations. In order to do this, the system should be able to withstand air or air should be removed from the system afterwards (by the use of an air relief valve etc.).

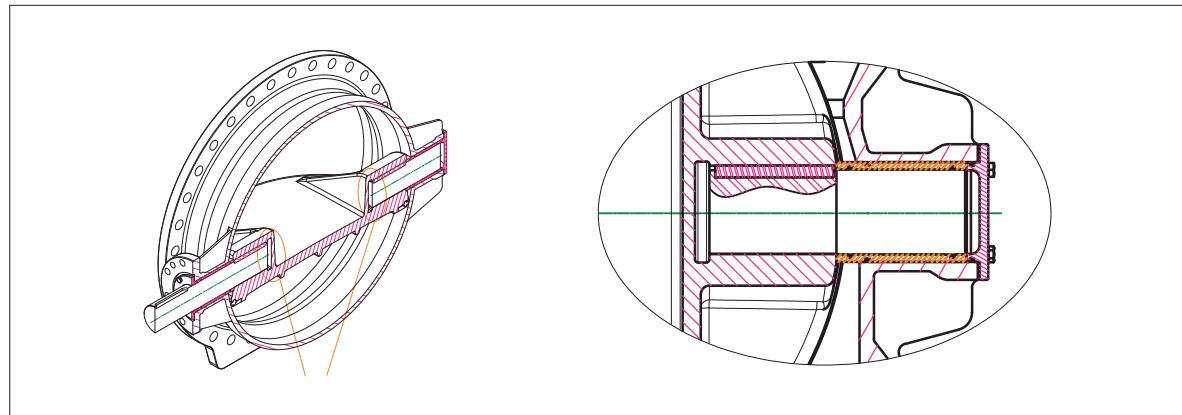
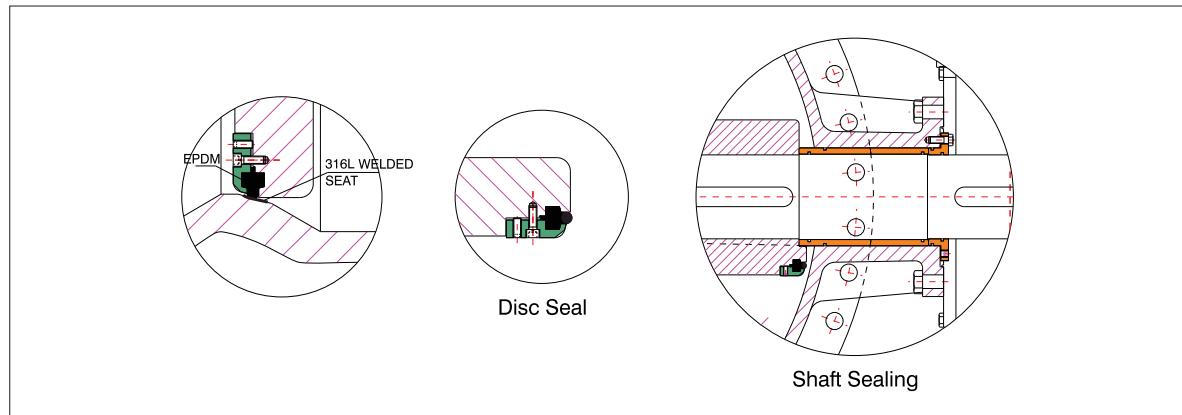
PART LIST



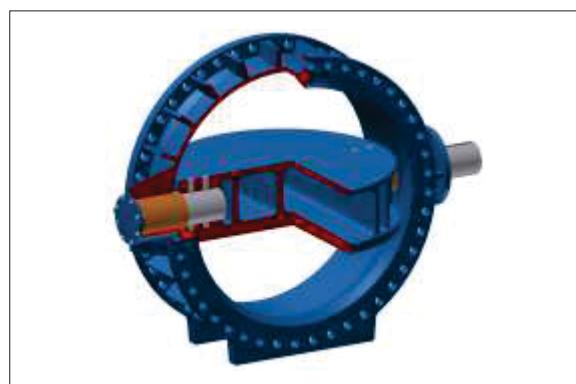
Item No	Part Name	Material	
		Standard	Optional
1	Body	EN-GJS-400-15/500-7 GGG 40/50 DIN 1693	Steel, stainless steel
2	Disc	EN-GJS-400-15/500-7 GGG 40/50 DIN 1693	Steel, stainless steel
3	Driving shaft	X20 Cr13 EN 10088-3 (ASTM 420)	Other stainless steel grades
4	Shaft	X20 Cr13 EN 10088-3 (ASTM 420)	Other stainless steel grades
5	Blank cap	EN-GJS-400-15/500-7 GGG 40/50 DIN 1693	Stainless Steel
6	Bearing cap	EN-GJS-400-15/500-7 GGG 40/50 DIN 1693	Stainless Steel
7	Bearing bush, short	CuSn6Zn4Pb2-B EN 1982	-
8	Bearing bush, long	CuSn6Zn4Pb2-B EN 1982	-
9	Seal clamping ring	EN-GJS-400-15/500-7 GGG 40/50 DIN 1693	Stainless Steel
10	Sealing ring	EPDM	NBR
11	Key	St50	Stainless Steel
12	Allen Bolt	Stainless Steel	-
13,14,15	O-ring	EPDM	NBR
16	Bolt	8 x 8 Zinc Coated	Stainless Steel
17	Set screw	8 x 8 Zinc Coated	Stainless Steel
18	Set screw	Stainless Steel	-



CONSTRUCTIONAL DETAILS



Corrosion Resistant Fully Enclosed Shaft and Disc Design



Shaft - Disc Connection with Pin



Shaft - Disc Connection with Key



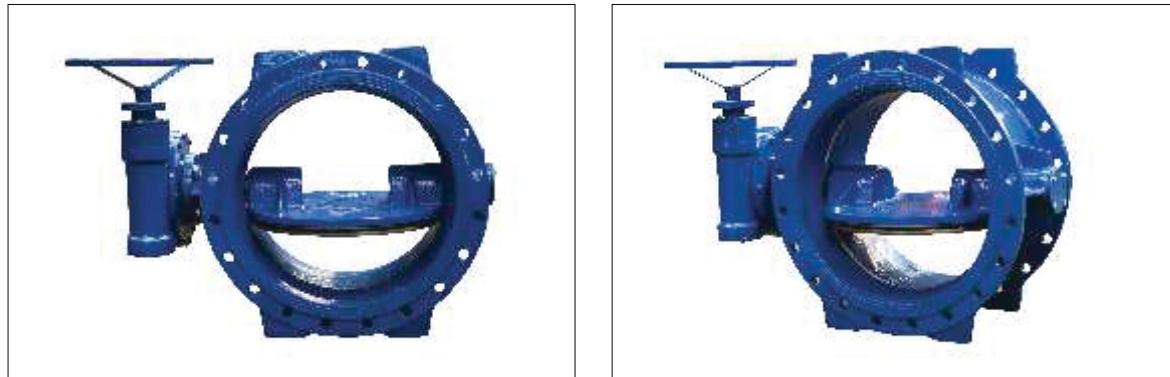
BUTTERFLY VALVES

VALVE ACTUATION TYPES

SMS butterfly valves can be operated by;

Manual Actuator:

Smaller diameter and low pressure valves can be controlled by hand-wheels, especially where there is lack of electricity and/or the valve is not serving for a SCADA system. Big size valves are generally equipped with a by-pass line, which is helping to balance the line pressure on both sides of a disc by permitting a limited flow from high pressure side to lower, for the ease of opening and closing.



Manuel (Manually Operated) Actuated Butterfly Valve

Electrical Actuator:

Electrical actuators are used to control the valves serving within a SCADA (data based control and monitoring system) systems, pumping stations, water distribution lines or any automation required situations regardless the valve pressure class and size. Actuators can be single phased (220 V) or three phased (380 V) due to the operational conditions. Electrical actuation can be utilized both for open-close operations and/or flow regulation. Actuator sizing can be done according to pressure class and opening-closing time, as per the data given on selection tables. For bigger sizes and higher pressures, an auxiliary bypass line is recommended to decrease mechanical forces on the disc and ease the disc movements.

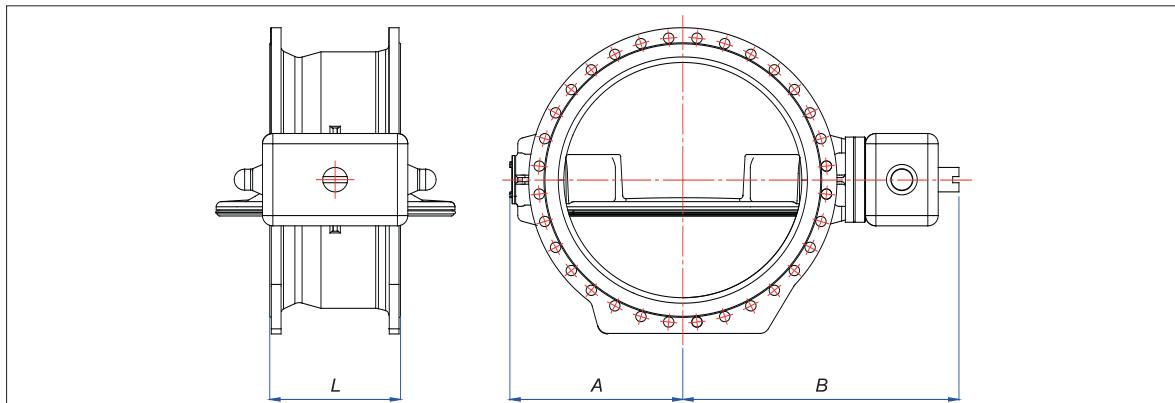


Butterfly Valve with Electrical Actuator

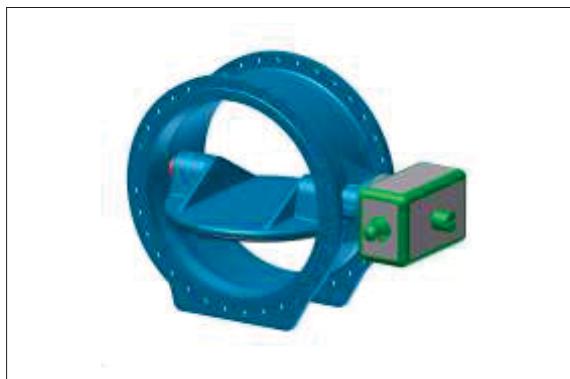


Pneumatic Actuator

Pneumatic actuators are used for fast and frequent opening and closing, where the valve pressure is less than 6 bars and the valve size is not bigger than DN1000; which is a typical application for water treatment system valves. The pneumatic actuators are connected to the valve drive flange directly as to be in connection with the valve stem. Electricity and at least 8 bar air pressure, which provides actuator open-close process, should be available at the valve location.



DN (mm)	L (mm)	A (mm)	B (mm)	Actuation Type
100	190	125	275	GD0106
125	200	155	290	GD0106
150	210	135	320	GD0180
200	230	170	365	GD0180
250	250	200	400	GD0240
300	270	235	475	GD0480
350	290	265	505	GD0720
400	310	295	560	GD0960
450	330	340	615	GD1440
500	350	360	655	GD1440
600	390	430	740	GD1920
700	430	475	895	GD2880
800	470	550	950	GD3840
900	510	615	1060	GD5760
1000	550	675	1120	GD8000



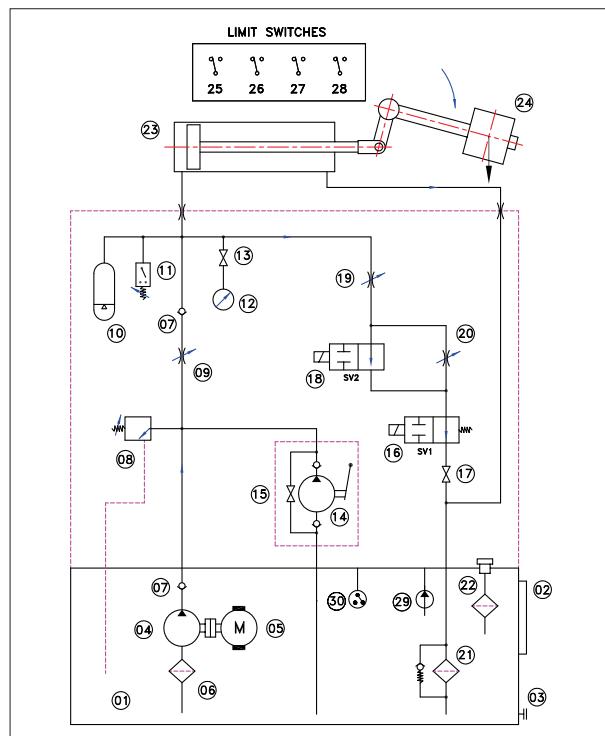
Butterfly Valve with Pneumatic Actuator



BUTTERFLY VALVES

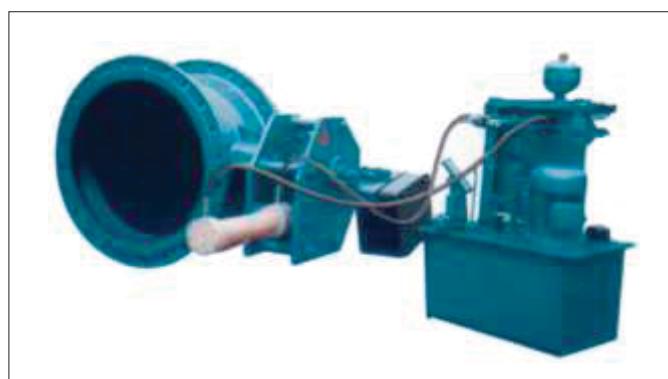
Hydraulic Actuator

Hydraulic actuators are used as safety valves as of their sudden closing function where the butterfly valve is used (especially at pumping stations) as check-valve (the opening by hydraulic energy, closing by counter weight), at water distribution line valves where valve open-close is provided by hydraulic energy. Electricity is required at the location where the valve is situated in order the hydraulic system to operate. In situations where the electricity is not available those actuators could be operated by hand pump. The reason for preferring hydraulic actuators is the specialty of high pressurized butterfly valves operating without any problem. The hydraulic actuator flow diagram is given herein under.



Description	No. in Drawing	Quantity
Oil Level Contact	30	1
Oil Temperature Indicator (Thermometer)	29	1
Switch For Fully Open	28	1
Switch For 80° Open Position	27	1
Switch For 20° Open Position	26	1
Switch For Fully Closed	25	1
Counter Weight	24	1
Hydraulic Cylinder	23	1
Oil Filling	22	1
Drain Filter	21	1
Flow Regulating Valve 2 Closing-Phase	20	1
Flow Regulating Valve 1 Closing-Phase	19	1
Solenoid Valve 24V Or 110V DC.	18	1
Isolating Valve	17	1
Solenoid Valve 220V AC.	16	1
By-Pass Valve	15	1
Hand Pump	14	1
Isolating Valve	13	1
Gauge	12	1
Regulating Pressure Switch	11	1
Oil Accumulator	10	1
Flow Control Valve in Opening	09	1
Pressure Relief Valve	08	1
Check Valve	07	2
Suction Filter	06	1
Electric Motor	05	1
Oil Pump	04	1
Oil Drain	03	1
Oil Level Indicator	02	1
Oil Tank	01	1

Hydraulic Control Scheme



Butterfly Valve with Hydraulic Actuator



GEARBOXES

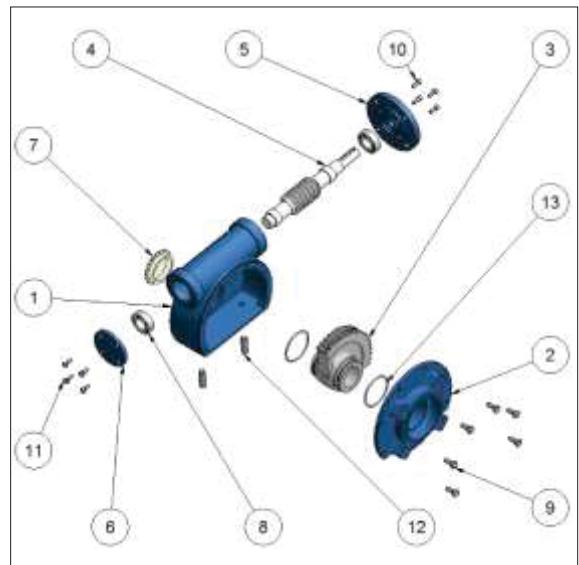
Manually or electrically actuated gearboxes are used for all types of valves. Gearbox multiplies the input torque and also increases safety by slowing down the actuation speed of the valve; thereby, helping to prevent from sudden pressure drops and water hammer.

The basic gearbox is formed by a quadrant gear, coupled with the disc shaft and a worm gear. Additional gearboxes can be encountered by one or two pinion gear sets depending on the required end torque.

The quadrant gear is designed for working in a 0° to 90° arc. The rotation of the quadrant gear is limited by two adjustable bolt-stops.

Working angle of the quadrant gear can be shifted ± 5° to cope with the manufacturing and assembly tolerances by adjustment of these bolt-stops. The worm gear engaged with the quadrant gear is a self-locking design and prevent the closure of the valve by the torque applied to the valve disc.

Item No	Part Name	Material	
		Standard	Optional
1	Housing	EN-GJS-400-15/500-7	-
		GGG 40/50 DIN 1693	-
2	Housing cover	EN-GJS-400-15/500-7	-
		GGG 40/50 DIN 1693	-
3	Helical gear	EN-GJS-500-7	Bronze
		GGG 50 DIN 1693	-
4	Worm gear	St70.2	Stainless st.
		EN-GJS-400-15/500-7	-
5	Bearing cap	EN-GJS-400-15/500-7	-
		GGG 40/50 DIN 1693	-
6	Blank cap	EN-GJS-400-15/500-7	-
		GGG 40/50 DIN 1693	-
7	Display cap	Polycarbonate	-
		Anti-friction bearing	-
9,10,11	Bolt	8 x 8 zinc coated	Stainless st.
		8 x 8 zinc coated	Stainless st.
12	Locking bolt	EPDM	NBR
13	O-ring		



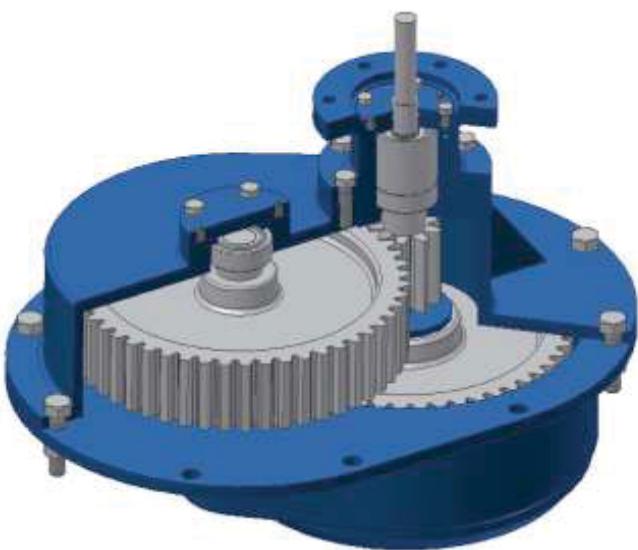
Gearbox Details



BUTTERFLY VALVES

GEARBOX TYPES & RECOMMENDED ACTUATORS

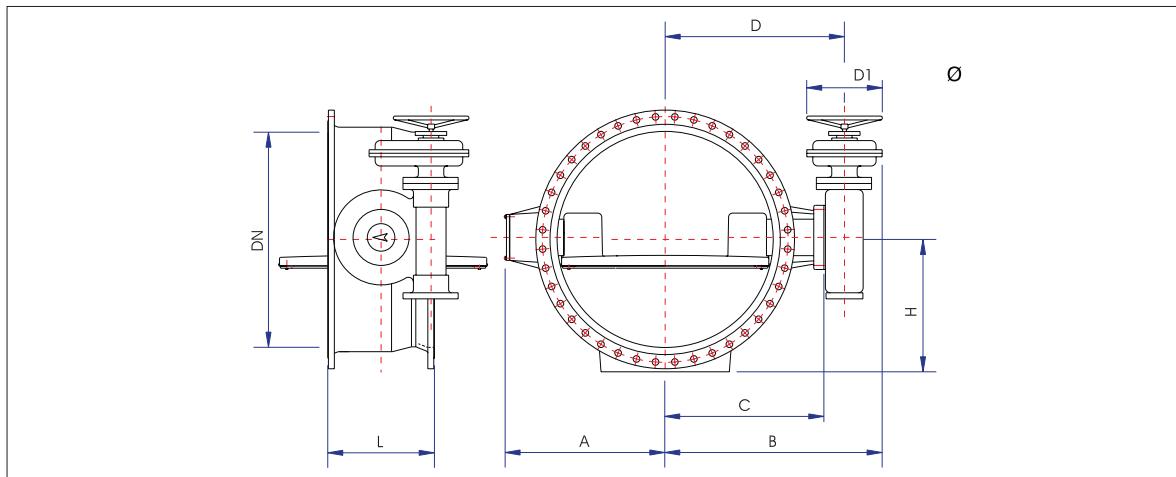
Gearbox	Additional gearset	Max. input torque (Nm)	Max. output torque (Nm)	Reduction ratio		Total reduction ratio	Turns for 90° of rotation
DTK 62	-	52	700	38:1	-	38:1	9.5
DTK 85	-	78	1.100	40:1	-	40:1	10
DTK 100	-	115	2.000	50:1	-	50:1	12.5
DTK 100.1	P2	33	2000	50:1	3.8:1	190:1	47.5
DTK 125	-	257	4.500	50:1	-	50:1	12.5
DTK 125.1	P2	75	4.500	50:1	3.8:1	190:1	47.5
DTK 160	P2	140	9.000	54:1	3.8:1	205.2:1	51.3
DTK 200.1	D1	158	16.000	49:1	6:1	294:1	73.5
DTK 200.2	P2+D1	46	16.000	49:1	6:1;3.8:1	1117.2:1	279.3
DTK 200A.1	D1	297	30.000	49:1	6:1	294:1	73.5
DTK 200A.2	P2+D1	87	30.000	49:1	6:1;3.8:1	1117.2:1	279.3
DTK 250	D2	140	70.000	51:1	5.6:1;5.6:1	1599.36:1	399.84
DTK 322	D2	205	120.000	53:1	5.6:1;5.6:1	1662.08:1	415.52
DTK 400	D3	335	220.000	52:1	6:1;6:1	1872:1	468
DTK 500	D4	520	550.000	52:1	9:1;9:1	4212:1	1053
DTK 630	D5	875	800.000	52.1	8.4:1;8.4:1	3669:1	917



An Additional Gearset



DIMENSIONS



PN10

DN	DIN 3202 F4 EN 558 SERIES14 (L)	A	B	C	D	H	ØD1	Gearboxes DTK	Ratio	Actuator	Output torque (Nm)	DIN 3202 F4 weight (Kg)
100	190	125	265	140	199	115	Ø250	DTK62	38:1	SA 07.2	8	26
125	200	155	270	158	200	140	Ø250	DTK62	38:1	SA 07.2	9	32
150	210	135	275	150	209	150	Ø250	DTK62	38:1	SA 07.2	10	33
200	230	170	320	198	257	175	Ø250	DTK62	38:1	SA 07.2	20	46
250	250	200	350	228	288	210	Ø250	DTK85	40:1	SA 07.2	25	67
300	270	235	400	275	335	235	Ø250	DTK85	40:1	SA 07.6	40	85
350	290	265	430	290	365	265	Ø250	DTK100	50:1	SA 07.6	55	120
400	310	295	465	325	400	295	Ø250	DTK100	50:1	SA 10.2	75	143
400	310	295	465	325	400	295	Ø250	DTK100.1	50:1;3.8:1	SA 07.2	25	151
450	330	340	515	360	450	325	Ø400	DTK125	50:1	SA 10.2	100	219
450	330	340	515	360	450	325	Ø400	DTK125.1	50:1;3.8:1	SA 07.6	33	220
500	350	360	550	395	485	365	Ø400	DTK125	50:1	SA 10.2	105	228
500	350	360	550	395	485	365	Ø400	DTK125.1	50:1;3.8:1	SA 07.6	37	245
600	390	430	610	460	542	425	Ø400	DTK160	54:1;3.8:1	SA 10.2	75	346
700	430	475	640	490	572	455	Ø400	DTK160	54:1;3.8:1	SA 10.2	90	477
800	470	550	865	585	691	515	Ø400	DTK200.1	49:1;6:1	SA 10.2	100	752
900	510	615	910	630	736	565	Ø400	DTK200A.1	49:1;6:1	SA 10.2	115	933
1000	550	675	970	690	796	620	Ø400	DTK200A.2	49:1;6:1;3.8:1	SA 07.6	55	1088
1100	590	760	1049	770	876	720	Ø400	DTK200A.2	49:1;6:1;3.8:1	SA 10.2	75	1617
1200	630	805	1170	815	953	735	Ø400	DTK250	51:1;5.6:1;5.6:1	SA 10.2	90	1960
1300	670	850	1235	880	1018	800	Ø400	DTK250	51:1;5.6:1;5.6:1	SA 10.2	100	2385
1400	710	920	1267	915	1053	845	Ø600	DTK250	51:1;5.6:1;5.6:1	SA 10.2	115	2850
1500	750	975	1307	995	1133	915	Ø600	DTK250	51:1;5.6:1;5.6:1	SA 14.2	135	3075
1600	790	1075	1420	1055	1205	975	Ø600	DTK322	53:1;5.6:1;5.6:1	SA 14.2	160	3720
1800	870	1195	1535	1170	1320	1065	Ø600	DTK322	53:1;5.6:1;5.6:1	SA 14.2	180	5330
2000	950	1290	1725	1270	1460	1170	Ø600	DTK400	52:1;6:1;6:1	SA 14.2	190	6880
2200	1030	1445	1880	1425	1615	1280	Ø600	DTK400	52:1;6:1;6:1	SA 14.2	220	8000
2400	850*	1630	2055	1600	1790	1375	Ø600	DTK400	52:1;6:1;6:1	SA 14.2	235	9450
2500	850*	1680	2100	1645	1835	1440	Ø600	DTK400	52:1;6:1;6:1	SA 14.6	265	9880
2600	900*	1730	2155	1700	1890	1490	Ø600	DTK400	52:1;6:1;6:1	SA 14.6	315	11500
2800	1100*	1825	2430	1795	2060	1605	Ø600	DTK500	52:1;9:1;6:1	SA 14.2	220	15000
3000	1200*	1930	2530	1890	2160	1745	Ø600	DTK500	52:1;9:1;6:1	SA 14.6	260	18600

Dimensions are in millimeters. Any value presented here is subject to change without prior notice.

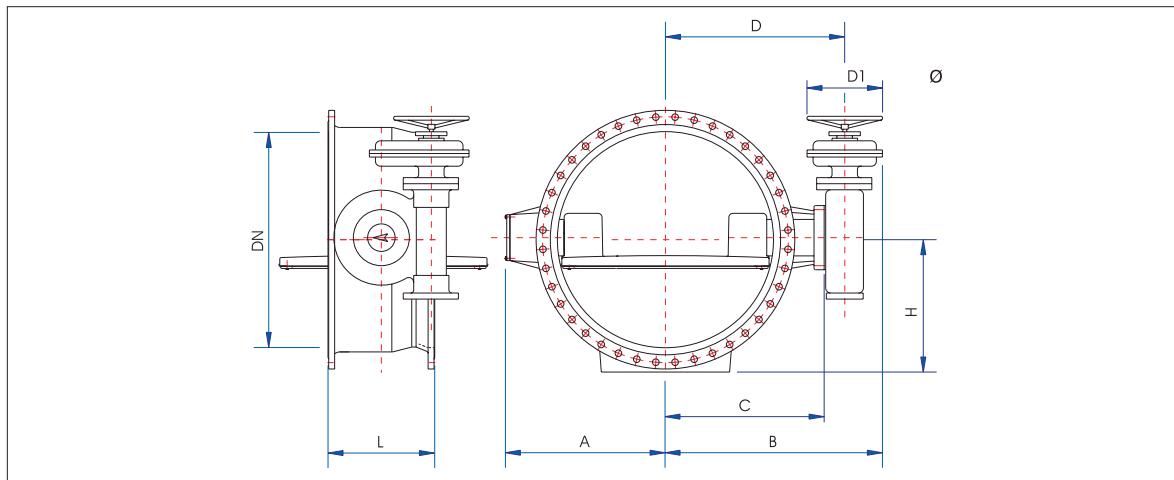
Butterfly valve can be produced according to BS 5155 AWWA standards, upon request.

* Specific dimensions designed by the factory, not described in the standards.



BUTTERFLY VALVES

DIMENSIONS



PN16

DN	DIN 3202 F4 EN 558 SERIES14 (L)	A	B	C	D	H	ØD1	Gearboxes DTK	Ratio	Actuator	Output torque (Nm)	DIN 3202 F4 weight (Kg)
100	190	125	265	140	199	115	Ø250	DTK62	38:1	SA 07.2	10	26
125	200	155	270	158	200	140	Ø250	DTK62	38:1	SA 07.2	12	32
150	210	135	275	150	209	150	Ø250	DTK62	38:1	SA 07.2	15	36
200	230	170	320	198	257	175	Ø250	DTK62	38:1	SA 07.2	25	44
250	250	200	350	228	288	210	Ø250	DTK85	40:1	SA 07.6	40	65
300	270	235	400	275	335	235	Ø250	DTK85	40:1	SA 07.6	55	85
350	290	265	430	290	365	265	Ø250	DTK100	50:1	SA 10.2	70	114
350	290	265	430	290	365	265	Ø250	DTK100.1	50:1;3.8:1	SA 07.2	20	122
400	310	295	465	325	400	295	Ø250	DTK100	50:1	SA 10.2	95	151
400	310	295	465	325	400	295	Ø250	DTK100.1	50:1;3.8:1	SA 07.6	30	158
450	330	340	515	360	450	325	Ø400	DTK125	50:1	SA 10.2	115	223
450	330	340	515	360	450	325	Ø400	DTK125.1	50:1;3.8:1	SA 07.6	38	232
500	350	360	550	395	485	365	Ø400	DTK125.1	50:1;3.8:1	SA 07.6	50	255
600	390	430	610	460	542	425	Ø400	DTK160	54:1;3.8:1	SA 10.2	95	395
700	430	500	810	530	636	460	Ø400	DTK200.1	49:1;6:1	SA 10.2	100	632
800	470	550	865	585	691	520	Ø400	DTK200.1	49:1;6:1	SA 10.2	115	842
900	510	625	945	665	771	570	Ø400	DTK200A.2	49:1;6:1;3.8:1	SA 07.6	55	1055
1000	550	705	1070	715	853	635	Ø400	DTK200A.2	49:1;6:1;3.8:1	SA 10.2	100	1265
1100	590	765	1122	770	908	720	Ø400	DTK250	51:1;5.6:1;5.6:1	SA 10.2	95	2110
1200	630	835	1177	825	963	750	Ø400	DTK250	51:1;5.6:1;5.6:1	SA 10.2	105	2110
1300	670	885	1232	880	1018	800	Ø400	DTK250	51:1;5.6:1;5.6:1	SA 14.2	125	2700
1400	710	970	1320	955	1105	850	Ø600	DTK322	53:1;5.6:1;5.6:1	SA 14.2	160	3275
1500	750	1025	1370	1005	1155	920	Ø600	DTK322	53:1;5.6:1;5.6:1	SA 14.2	180	3445
1600	790	1100	1530	1075	1265	970	Ø600	DTK400	52:1;6:1;6:1	SA 14.2	200	4785
1800	870	1250	1680	1225	1415	1075	Ø600	DTK400	52:1;6:1;6:1	SA 14.2	220	6380
2000	950	1385	1812	1357	1547	1180	Ø600	DTK400	52:1;6:1;6:1	SA 14.2	230	7450
2200	1030	1485	1912	1457	1647	1285	Ø600	DTK400	52:1;6:1;6:1	SA 14.6	265	8390
2400	850*	1630	2235	1600	1865	1390	Ø600	DTK500	52:1;9:1;9:1	SA 14.2	180	10500
2500	850*	1680	2280	1645	1910	1450	Ø600	DTK500	52:1;9:1;9:1	SA 14.6	240	11500
2600	900*	1730	2335	1700	1965	1490	Ø600	DTK500	52:1;9:1;9:1	SA 14.6	280	13500
2800	1100*	1890	2485	1850	2115	1610	Ø600	DTK500	52:1;9:1;9:1	SA 14.6	350	18000
3000	1200*	1930	2640	1890	2197	1740	Ø600	DTK630	52:1;8.4:1;8.4:1	SA 14.6	440	20000

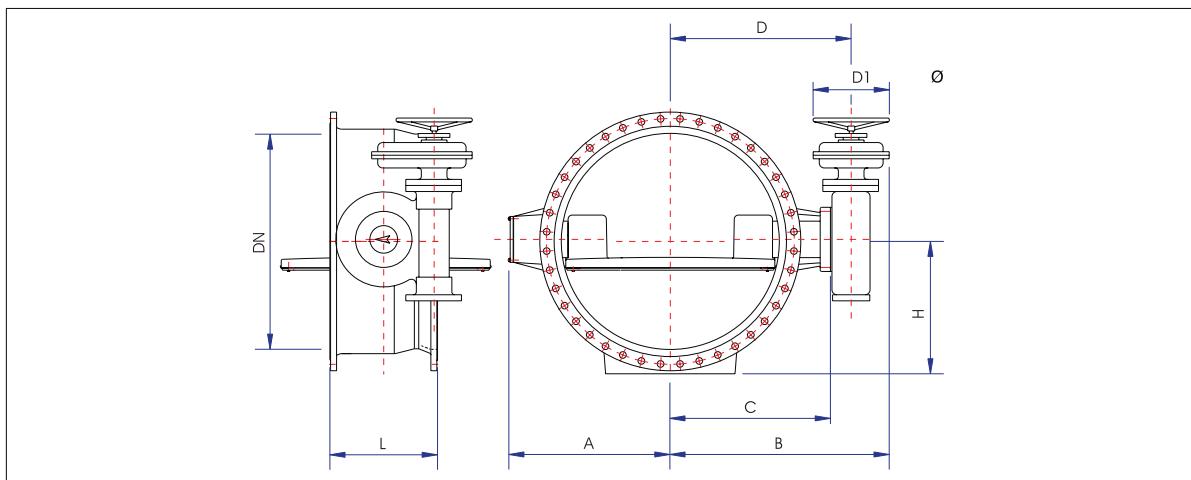
Dimensions are in millimeters. Any value presented here is subject to change without prior notice.

Butterfly valve can be produced according to BS 5155 AWWA standards, upon request.

* Specific dimensions designed by the factory, not described in the standards.



DIMENSIONS



PN25

DN	DIN 3202 F4 EN 558 SERIES14 (L)	A	B	C	D	H	ØD1	Gearboxes DTK	Ratio	Actuator	Output torque (Nm)	DIN 3202 F4 weight (Kg)
100	190	125	265	140	199	115	Ø250	DTK62	38:1	SA 07.2	14	28
125	200	155	270	158	200	140	Ø250	DTK62	38:1	SA 07.2	18	32
150	210	135	275	150	209	150	Ø250	DTK62	38:1	SA 07.2	20	36
200	230	170	320	198	257	175	Ø250	DTK62	38:1	SA 07.6	35	45
250	250	200	350	228	288	210	Ø250	DTK85	40:1	SA 07.6	50	70
300	270	240	430	290	365	245	Ø250	DTK100	50:1	SA 10.2	70	115
300	270	240	430	290	365	245	Ø250	DTK100.1	50:1;3.8:1	SA 07.2	20	123
350	290	275	440	300	382	285	Ø250	DTK100	50:1	SA 10.2	85	160
350	290	275	440	300	382	285	Ø250	DTK100.1	50:1;3.8:1	SA 07.6	28	168
400	310	320	510	355	445	315	Ø400	DTK125.1	50:1;3.8:1	SA 07.6	55	231
450	330	355	520	370	453	340	Ø400	DTK160	54:1;3.8:1	SA 10.2	70	275
500	350	380	700	420	526	370	Ø400	DTK200.1	49:1;6:1	SA 07.6	50	482
600	390	453	763	483	589	430	Ø400	DTK200.1	49:1;6:1	SA 10.2	100	666
700	430	530	825	545	651	490	Ø400	DTK200A	49:1;6:1	SA 10.2	110	858
800	470	583	895	615	721	550	Ø400	DTK200A.2	49:1;6:1;3.8:1	SA 10.2	70	1090
900	510	660	1022	670	808	600	Ø400	DTK250	51:1;5.6:1;5.6:1	SA 10.2	75	1507
1000	550	740	1097	745	883	670	Ø400	DTK250	51:1;5.6:1;5.6:1	SA 10.2	95	1860
1100	590	770	1175	810	960	720	Ø400	DTK322	53:1;5.6:1;5.6:1	SA 10.2	105	2300
1200	630	880	1225	860	1010	770	Ø600	DTK322	53:1;5.6:1;5.6:1	SA 14.2	155	2760
1300	670	935	1268	903	1053	825	Ø600	DTK322	53:1;5.6:1;5.6:1	SA 14.2	170	3100
1400	710	1050	1485	1030	1220	885	Ø600	DTK400	52:1;6:1;6:1	SA 14.2	185	4815
1500	750	1100	1555	1080	1215	935	Ø600	DTK400	52:1;6:1;6:1	SA 14.2	200	5025
1600	790	1190	1617	1162	1352	975	Ø600	DTK400	52:1;6:1;6:1	SA 14.2	235	5400
1800	870	1275	1700	1245	1435	1120	Ø600	DTK400	52:1;6:1;6:1	SA 14.6	275	6820
2000	950	1400	2100	1435	1700	1215	Ø600	DTK500	52:1;9:1;9:1	SA 14.6	298	12550
2200	1030	1595	2190	1555	1820	1350	Ø600	DTK500	52:1;9:1;9:1	SA 14.6	345	14000
2400	850*	1700	2350	1700	1990	1445	Ø600	DTK630	52:1;8.4:1;8.4:1	SA 14.6	395	16000
2500	850*	1750	2450	1705	2008	1500	Ø600	DTK630	52:1;8.4:1;8.4:1	SA 14.6	445	20000
2600	900*	1890	2605	1860	2165	1535	Ø600	DTK630	52:1;8.4:1;8.4:1	SA 16.2	498	23000
2800	1100*	1995	2697	1950	2257	1650	Ø600	DTK630	52:1;8.4:1;8.4:1	SA 16.2	600	27000
3000	1200*	2070	2785	2037	2344	1760	Ø600	DTK630	52:1;8.4:1;8.4:1	SA 16.2	715	30000

Dimensions are in millimeters. Any value presented here is subject to change without prior notice.

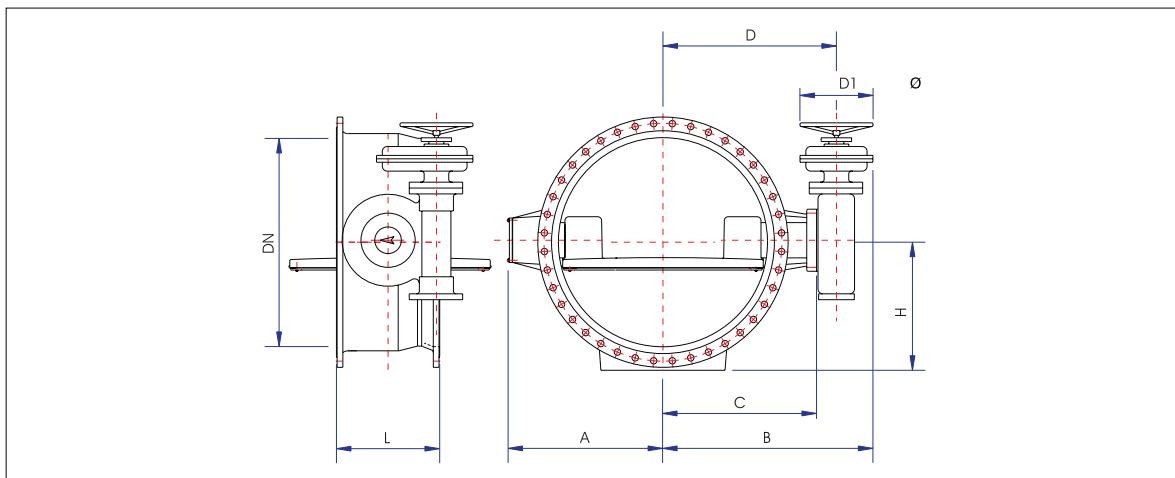
Butterfly valve can be produced according to BS 5155 AWWA standards, upon request.

* Specific dimensions designed by the factory, not described in the standards.



BUTTERFLY VALVES

DIMENSIONS



PN40

DN	DIN 3202 F4 EN 558 SERIES14 (L)	A	B	C	D	H	ØD1	Gearboxes DTK	Ratio	Actuator	Output torque (Nm)	DIN 3202 F4 weight (Kg)
100	190	161	287	165	224	125	Ø250	DTK62	38:1	SA 07.6	35	29
125	200	190	292	182	225	140	Ø250	DTK62	38:1	SA 07.6	37	40
150	210	171	297	175	234	160	Ø250	DTK85	40:1	SA 07.6	40	57
200	230	208	345	212	280	195	Ø250	DTK100	50:1	SA 07.6	55	86
250	250	265	390	255	330	230	Ø250	DTK100	50:1	SA 10.2	65	118
250	250	265	390	255	330	230	Ø250	DTK100.1	50:1;3.8:1	SA 07.2	19	126
300	270	310	432	296	370	265	Ø250	DTK125	50:1	SA 10.2	80	183
300	270	310	432	296	370	265	Ø250	DTK125.1	50:1;3.8:1	SA 07.2	24	191
350	290	350	487	333	424	295	Ø250	DTK125	50:1	SA 10.2	95	232
350	290	350	487	333	424	295	Ø250	DTK125.1	50:1;3.8:1	SA 07.6	29	240
400	310	375	515	365	447	335	Ø400	DTK160	54:1;3.8:1	SA 10.2	70	366
450	330	450	710	430	536	350	Ø400	DTK200.1	49:1;6:1	SA 10.2	75	548
500	350	410	715	435	541	385	Ø400	DTK200.1	49:1;6:1	SA 10.2	100	588
600	390	485	783	503	609	450	Ø400	DTK200A.2	49:1;6:1;3.8:1	SA 10.2	70	825
700	430	540	841	561	667	505	Ø400	DTK200A.2	49:1;6:1;3.8:1	SA 10.2	80	1015
800	470	705	1042	690	828	575	Ø400	DTK250	51:1;5:6:1;5:6:1	SA 10.2	90	1970
900	510	815	1141	789	927	630	Ø400	DTK250	51:1;5:6:1;5:6:1	SA 10.2	100	2335
1000	550	870	1205	840	990	685	Ø400	DTK322	53:1;5:6:1;5:6:1	SA 10.2	110	2800
1100	590	920	1355	900	1090	735	Ø600	DTK400	52:1;6:1;6:1	SA 14.2	135	3800
1200	630	1070	1495	1040	1230	800	Ø600	DTK400	52:1;6:1;6:1	SA 14.2	175	5520
1300	670	1120	1555	1100	1290	830	Ø600	DTK400	52:1;6:1;6:1	SA 14.2	215	6120
1400	710	1100	1520	1062	1250	910	Ø600	DTK400	52:1;6:1;6:1	SA 14.6	300	6640
1500	750	1250	1835	1200	1465	960	Ø600	DTK500	52:1;9:1;9:1	SA 14.2	170	9700
1600	790	1300	1915	1280	1545	1020	Ø600	DTK500	52:1;9:1;9:1	SA 14.6	240	11600
1800	870	1410	2005	1370	1635	1135	Ø600	DTK500	52:1;9:1;9:1	SA 14.6	280	12540
2000	950	1510	2105	1470	1735	1225	Ø600	DTK500	52:1;9:1;9:1	SA 14.6	340	15300
2200	950*	1600	2305	1560	1865	1340	Ø600	DTK630	52:1;8:4;1:8:4:1	SA 16.2	525	19000
2400	1000*	1815	2590	1780	2090	1460	Ø600	DTK630	52:1;8:4;1:8:4:1	SA 16.2	650	24000
2500	1000*	1895	2610	1900	2170	1530	Ø600	DTK630	52:1;8:4;1:8:4:1	SA 16.2	755	26000
2600	1000*	2015	2730	1980	2290	1570	Ø600	DTK630	52:1;8:4;1:8:4:1	SA 16.2	835	29000

Dimensions are in millimeters. Any value presented here is subject to change without prior notice.

Butterfly valve can be produced according to BS 5155 AWWA standards, upon request.

* Specific dimensions designed by the factory, not described in the standards.



BUTTERFLY VALVE WITH SQ ACTUATORS

SMS brand butterfly valves, in addition to the use of electrical actuators in various diameters and pressure category, also put into service of the customer to control the valves by means of a quarter turn actuator which is directly connected to the valve. The advantages of the butterfly valves associated with actuators, introduced as SQ, are as follows:

- Unnecessity of using extra gearbox for the valves,
- Reduction of costs due to the absence of gearbox,
- Preventing the mechanical losses due to the absence of the gearbox and consequently making the valve opening and closing operations at lower torque values,
- Having a more compact valve unit,
- Capability of making mechanical and electrical on and off settings just via the actuator,
- Having alternative valve opening and closing periods through the alternative speed selection of the actuators.

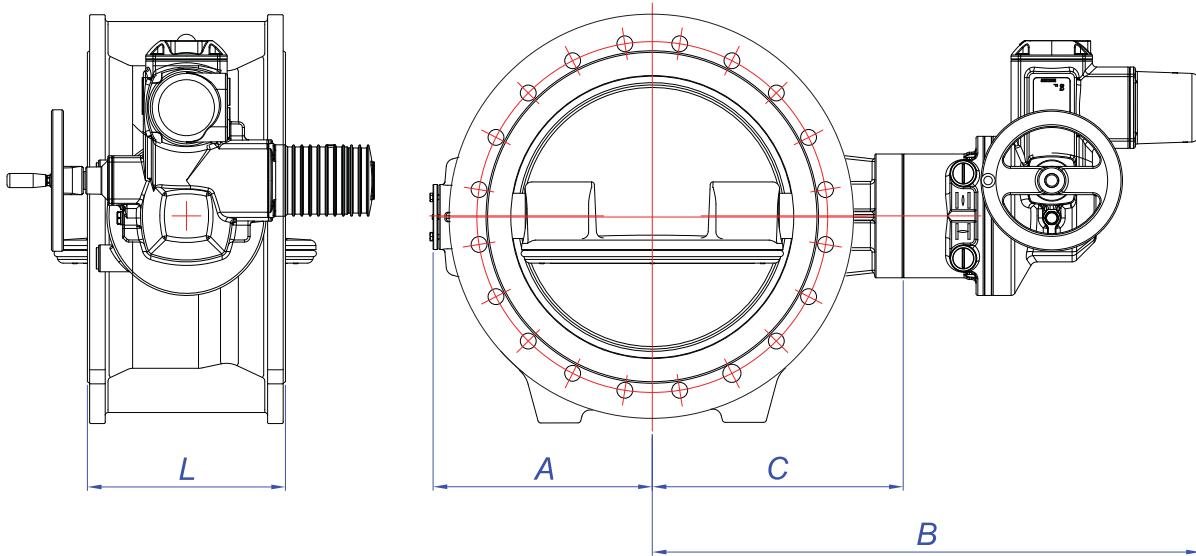


Butterfly Valve with SQ Actuators



BUTTERFLY VALVES

BUTTERFLY VALVE WITH SQ ACTUATORS



DN (mm)	PN (bar)	L (mm)	A (mm)	B (mm)	C (mm)	Actuator Type	Coupling Flange
100	10	190	125	525	155	SQ 05.2	F10
100	16	190	125	525	155	SQ 05.2	F10
100	25	190	125	525	155	SQ 07.2	F10
100	40	190	161	515	155	SQ 10.2	F10
125	10	200	155	535	165	SQ 05.2	F10
125	16	200	155	535	165	SQ 05.2	F10
125	25	200	155	535	165	SQ 07.2	F10
125	40	200	190	550	195	SQ 10.2	F10
150	10	210	135	535	165	SQ 07.2	F10
150	16	210	135	535	165	SQ 07.2	F10
150	25	210	135	535	165	SQ 07.2	F10
150	40	210	171	550	190	SQ 10.2	F12
200	10	230	170	585	215	SQ 07.2	F10
200	16	230	170	585	215	SQ 10.2	F10
200	25	230	170	575	215	SQ 10.2	F10
200	40	230	208	615	230	SQ 12.2	F14
250	10	250	200	605	245	SQ 10.2	F12
250	16	250	200	605	245	SQ 10.2	F12
250	25	250	200	630	245	SQ 12.2	F12
250	40	250	265	655	270	SQ 14.2	F14
300	10	270	235	675	290	SQ 12.2	F12
300	16	270	235	675	290	SQ 12.2	F12
300	25	270	240	730	310	SQ 14.2	F14
300	40	270	310	735	310	SQ 14.2	F16
350	10	290	265	695	310	SQ 12.2	F14
350	16	290	265	730	310	SQ 14.2	F14
350	25	290	275	740	320	SQ 14.2	F14
400	10	310	295	765	345	SQ 14.2	F14
400	16	310	295	765	345	SQ 14.2	F14

Using in SQ actuator "Auma" brand.



FLOW CHARACTERISTICS

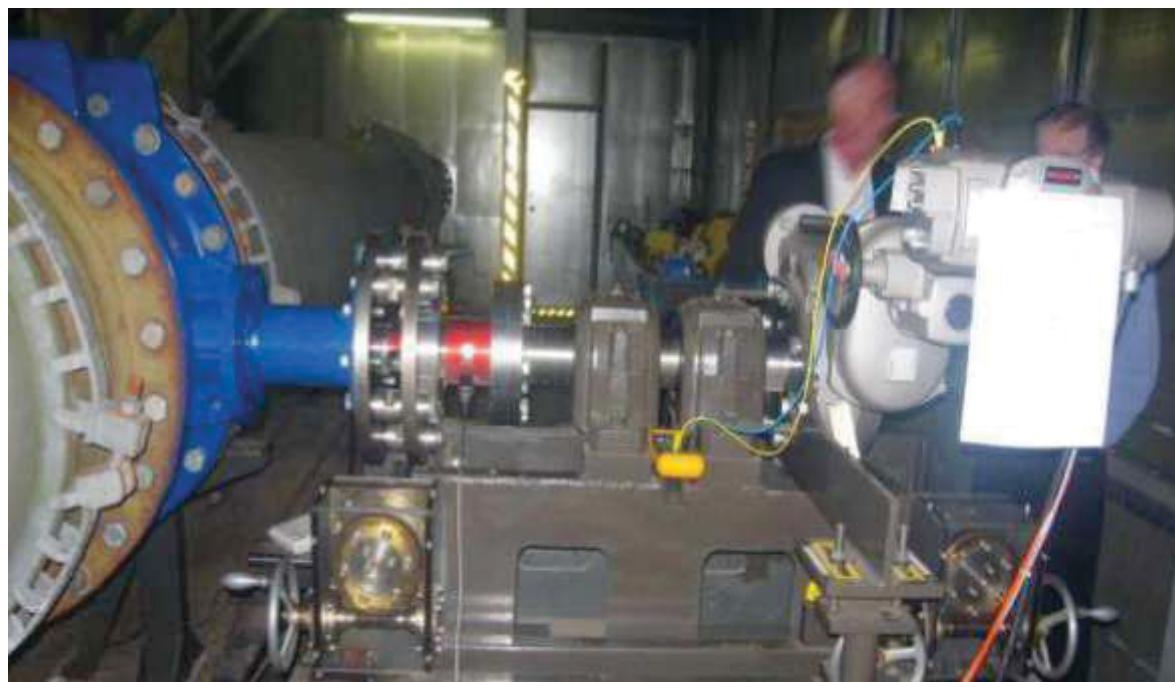
The maximum flow rates for butterfly valves are prescribed in EN 593, as given below, as per various pressure ratings. Appropriate valve sizes should be determined in accordance with existing flow characteristics.

Pressure (bar)	Maximum flow rate (m/sec)
Up to 6	2.5
10	3
16	4
≥ 25	5

Flow rate of a valve depends on the pressure drop in the valve. The most common way to predict the flow rate, with respect to the disc opening, is by the use of flow coefficient K_v . The flow coefficient gives the flow rate of the liquid (m^3/h) for 1 bar pressure drop through the valve. The higher the value of K_v means the easier the flow through the valve and implies better flow characteristics. The graphs show the K_v values of all sizes of SMS butterfly valves with respect to the opening angles of the valve discs.

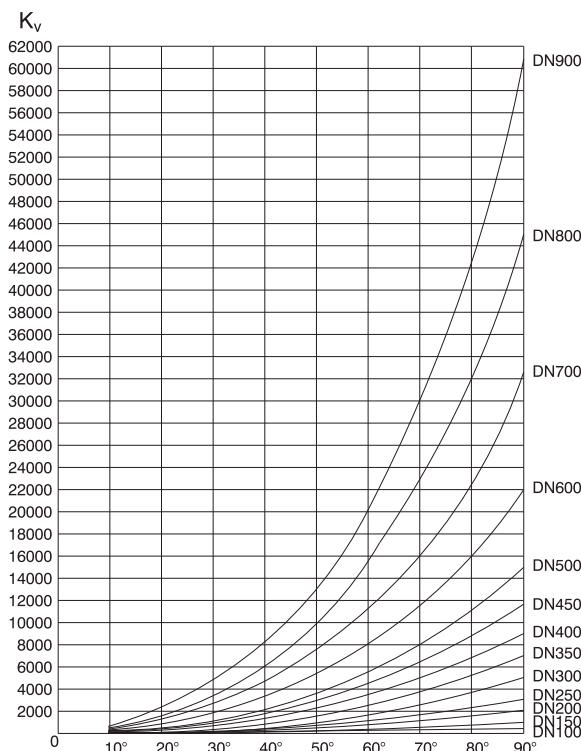
The approximate effective throttling range for a butterfly valve is 20° to 70° open, but the range can vary depending on the application. Throttling at higher angles causes unreliable control as the valve has little effect on the system flow in most applications. Throttling at lower angles on the other hand, can cause erosion due to the excessive velocities of the liquid flow or due to the cavitation. These effects and possible solutions are explained in the previous **Cavitation** section.

Coefficient K_v , cavitation and torque measurements of the SMS double eccentric butterfly valves, have been performed at the laboratory of WL/Delft Hydraulics according to ISA-75.02 and VDMA 244422.

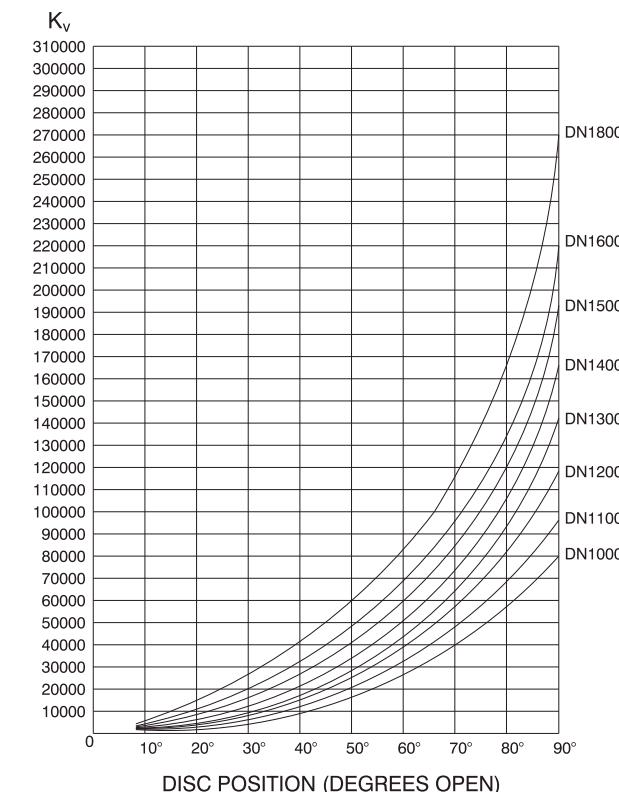




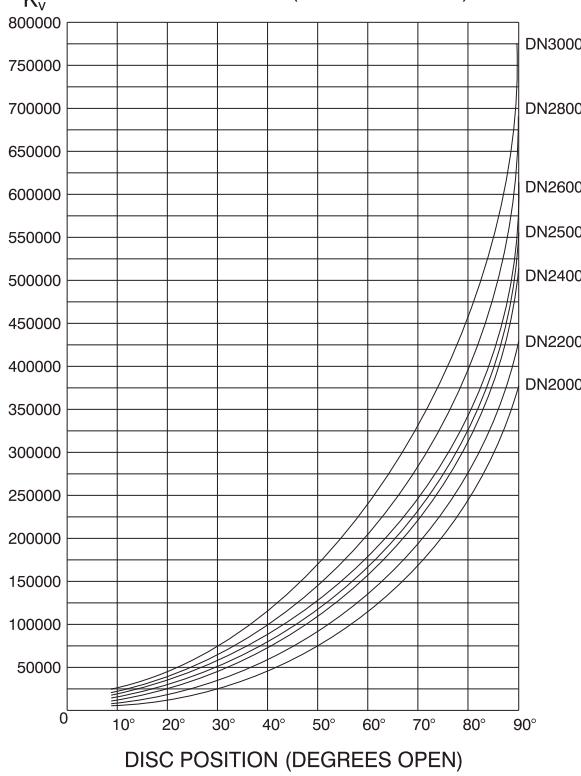
BUTTERFLY VALVES



DISC POSITION (DEGREES OPEN)



DISC POSITION (DEGREES OPEN)



DISC POSITION (DEGREES OPEN)

$$K_v = q_v \sqrt{\frac{\rho}{\Delta p_v \cdot \rho_0}}$$

K_v: Flow coefficient

q_v: Flow rate in m³/h

ρ : Density of water in kg/m³

ρ₀ : Density of water at 15°C in kg/m³

Δ p_v: Pressure loss of the valve in bar

$$C_v = 1.16 \times K_v$$

C_v: Flow coefficient based on US gallon/min and psi



INSTALLATION INSTRUCTION

Controls to be Performed Before Installation

Delivered valves could either be used promptly or after a long storage period. For this reason, the following controls should be performed before their installation:

- The diameter and pressure class suitability should be controlled from the marking on the valve before installation,
- By opening the valve, its fully open position should be checked, while the seat and gasket surfaces should be controlled and cleaned with a clean cloth. If possible, protective silicon grease should be applied to the sealing gasket.
- By closing the valve, its fully closed position should be checked.
- If the valve is equipped with actuator and if electricity is available at the location, open-closefunction and adjustment should be controlled by actuator open-close process.
- According to the diameter and pressure class of the valve to be used, appropriate size bolt, nut, flange gasket should be obtained.
- Appropriate size dismantling joint should be provided. Bolt and nut fitness of the dismantling joint should be controlled.

Installation Procedure

The SMS brand butterfly valves could be installed in vertical or horizontal positions. However, especially in large valves, in positions where the valve shaft is vertical, the loads against the valve could be higher. For this reason during order stage the installation position of the valve should be indicated. For the assembly-disassembly ease of butterfly valves, the installation should be performed together with their dismantling joint.

Valves should be installed minimum $8xD$ (pipe diameter) distance from the elbow beginning, in places where sudden turns are present in the pipe line. At pumping stations this distance should be minimum $2xD$ length from the pump outlet reduction part.

The Valves could be Installed as Follows

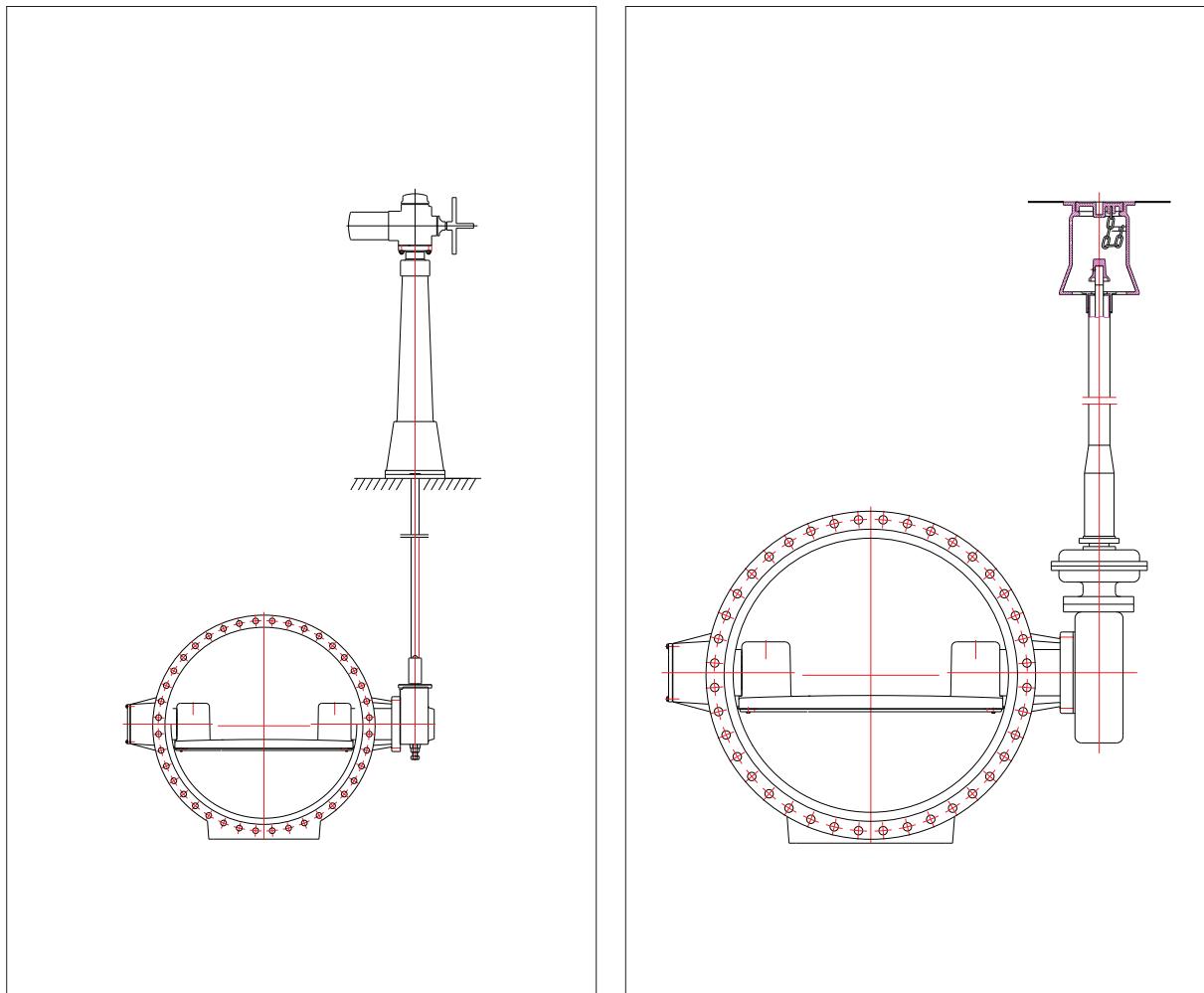
- The flange, to be coupled, should be welded properly, vertically to the pipe axis.
- The valve is laid to the ground over its flange.
- The dismantling joint is put on with four pins to the valve, with the appropriate sizes given in the catalogue.
- The other flange, unwelded, which the valve shall be coupled to, is installed with 4 studs.
- The valve-dismantling joint assembly and unwelded flange are lifted as installed and connected to the welded flange of the pipe with 4 studs.
- The catalogue size of the dismantling joint is controlled again.
- The other pipe, whose flange is not welded, is faced to the flange.

BUTTERFLY VALVES



- By controlling the parallelism in between flanges, the flange is point-welded to the pipe.
- The dismantling joint and the valve are removed from the flanges and placed to the ground.
- After controlling the parallelism, the point-welded flange is welded to the pipe.
- Dirt inside the pipe, like weld ashes, is cleaned thoroughly.
- By placing the gaskets in between the valve, dismantling joint and flanges, installation is done. In order to achieve equal pressure on the gaskets, reciprocal tightening is performed.
- Electrical connection is performed if the valve has an electric actuator.
- Till the time of water intake, the valve should be left slightly open position.

INSTALLATION ACCESSORIES

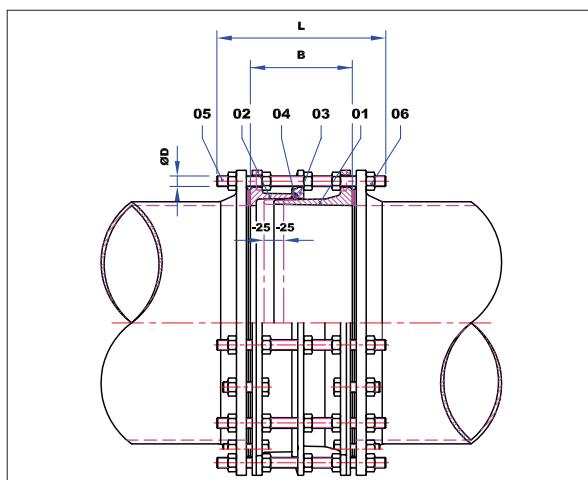


Extension spindle and headstock with position indicator.

Extension spindle and surface box with position indicator for buried installation.



DISMANTLING PIECE



Item No	Part Name	Material
1	Long piece	EN-GJS-400-15/500-7
2	Short piece	EN-GJS-400-15/500-7
3	Retaining flange	EN-GJS-400-15/500-7
4	Seal ring	NBR - EPDM
5	Stud	Zinc coated steel
6	Nut	8 x 8 Zinc coated

DN	PN10				PN16				PN25				PN40			
	B	STUD			B	STUD			B	STUD			B	STUD		
		L	D	Quantity												
50	180	280	M16	2												
60	180	280	M16	2	180	280	M16	2	180	280	M16	4	180	280	M16	4
65	180	280	M16	2	180	280	M16	2	180	280	M16	4	180	280	M16	4
80	200	300	M16	4												
100	200	300	M16	4	200	300	M16	4	200	300	M20	4	200	300	M20	4
125	200	300	M16	4	200	300	M16	4	200	320	M24	4	200	320	M24	4
150	200	320	M20	4	200	320	M20	4	200	320	M24	4	200	340	M24	4
200	220	340	M20	4	220	340	M20	6	220	340	M24	6	220	370	M27	6
250	220	360	M20	6	220	360	M24	6	220	360	M27	6	240	410	M30	6
300	220	360	M20	6	220	360	M24	6	220	360	M27	8	240	420	M30	8
350	230	360	M20	8	230	360	M24	8	230	380	M30	8	250	460	M33	8
400	230	380	M24	8	230	380	M27	8	230	390	M33	8	270	480	M36	8
450	230	380	M24	10	230	380	M27	10	230	390	M33	10	285	500	M36	10
500	260	420	M24	10	260	420	M30	10	260	440	M33	10	290	500	M39	10
600	260	430	M27	10	260	430	M33	10	260	450	M36	10	320	580	M45	10
700	260	430	M27	12	260	430	M33	12	260	460	M39	12	340	600	M45	12
800	290	460	M30	12	290	490	M36	12	290	540	M45	12	370	650	M52	12
900	290	490	M30	14	290	490	M36	14	320	560	M45	14	400	700	M52	14
1000	290	500	M33	14	290	520	M39	14	340	600	M52	14	400	750	M52	14
1100	310	530	M33	16	310	530	M39	16	360	630	M52	16	400	750	M52	16
1200	310	550	M36	16	310	570	M45	16	400	680	M52	16	460	820	M56	16
1300	330	550	M39	16	330	570	M45	16	400	680	M56	16	460	820	M56	16
1400	330	550	M39	18	330	610	M45	18	420	710	M56	18	475	840	M56	18
1500	360	640	M39	18	400	690	M52	18	420	740	M56	18	475	840	M56	18
1600	360	640	M45	20	400	690	M52	20	420	790	M56	20	490	860	M64	20
1800	380	640	M45	22	400	690	M52	22	470	850	M64	22	520	950	M64	22
2000	400	660	M45	24	450	790	M56	24	470	850	M64	24	520	950	M64	24
2200	400	660	M52	26	460	790	M56	26	500	870	M64	26	600	1200	M72	26
2400	460	750	M52	28	460	790	M56	28	520	890	M64	28	640	1300	M72	28
2500	460	750	M52	28	460	790	M56	28	570	1100	M64	28	650	1300	M72	28
2600	460	750	M52	30	460	790	M56	30	560	1030	M64	30	670	1300	M72	30
2800	500	800	M52	32	500	860	M56	32	635	1125	M64	32	-	-	-	-
3000	500	800	M56	34	500	860	M64	34	635	1125	M72	34	-	-	-	-

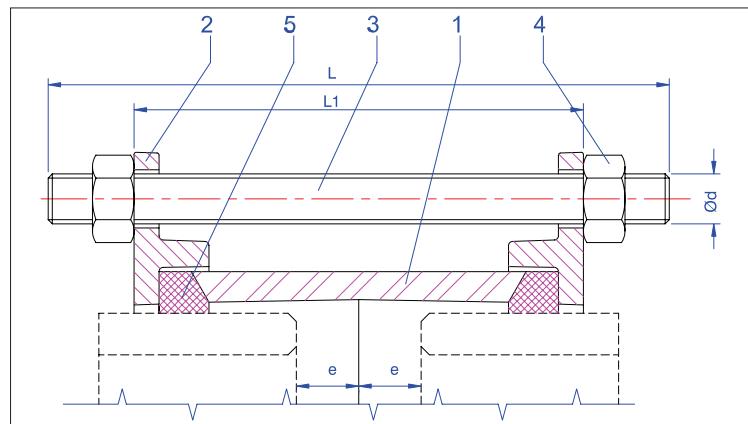
Can be manufactured as full stud upon request.



BUTTERFLY VALVES

FLEXIBLE COUPLING

PN10-16



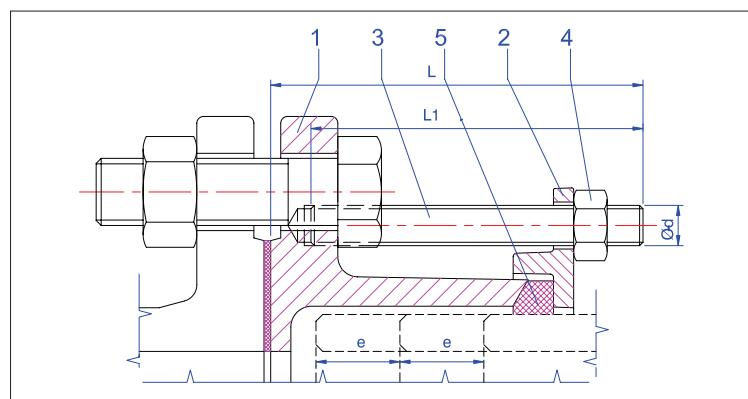
DN	L	L1	$\pm e$	$\varnothing d$
100	150	108	20	M12 (4 Pcs)
150	150	108	20	M12 (4 Pcs)
200	150	108	20	M12 (4 Pcs)
250	170	130	25	M12 (6 Pcs)
300	170	130	25	M12 (6 Pcs)
350	210	164	30	M16 (8 Pcs)
400	210	170	30	M16 (8 Pcs)
450	230	170	30	M16 (10 Pcs)
500	230	170	30	M16 (10 Pcs)
600	260	200	30	M16 (10 Pcs)
700	260	200	30	M16 (12 Pcs)
800	290	228	30	M16 (12 Pcs)
900	290	228	30	M16 (14 Pcs)
1000	310	250	30	M16 (14 Pcs)
1200	360	300	30	M16 (16 Pcs)
1400	360	300	30	M16 (18 Pcs)
1600	360	300	30	M16 (20 Pcs)

If required, flexible couplings with PN25, 40 pressure ratings can be produced.

Item No	Part Name	Material
1	Body	EN-GJS-400-15/500-7/St37
2	Retaining flanges	EN-GJS-400-15/500-7
3	Studs	Zinc coated steel
4	Nuts	8 x 8 zinc coated
5	Seal ring	EPDM

FLANGE ADAPTOR

PN10-16



DN	L	L1	$\pm e$	$\varnothing d$
65	102	100	± 20	M12 (2 Pcs)
80	102	100	± 20	M12 (4 Pcs)
100	102	100	± 20	M12 (4 Pcs)
150	111	100	± 25	M12 (4 Pcs)
200	111	100	± 25	M12 (4-6 Pcs)
250	127	120	± 25	M12 (6 Pcs)
300	127	120	± 25	M12 (6 Pcs)
350	143	135	± 30	M16 (8 Pcs)
400	143	135	± 30	M16 (8 Pcs)
450	143	135	± 30	M16 (10 Pcs)
500	143	135	± 30	M16 (10 Pcs)
600	160	145	± 30	M16 (10 Pcs)
700	177	165	± 30	M16 (12 Pcs)
800	177	165	± 30	M16 (12 Pcs)
900	177	135	± 30	M16 (14 Pcs)
1000	177	135	± 30	M16 (14 Pcs)
1200	240	230	± 30	M16 (16 Pcs)
1400	240	230	± 30	M16 (18 Pcs)
1600	240	230	± 30	M16 (20 Pcs)

If required, flange adaptors with PN25, 40 pressure ratings can be produced.

Item No	Part Name	Material
1	Body	EN-GJS-400-15/500-7/St37
2	Retaining flanges	EN-GJS-400-15/500-7
3	Studs	Zinc coated steel
4	Nuts	8 x 8 zinc coated
5	Seal ring	EPDM



MAINTENANCE AND REPAIR

Under proper operating conditions, SMS butterfly valves will have a long and maintenance free life. Considering inappropriate conditions, which may appear in systems, it is advised to acquire the following spare parts for maintenance and repair:

- For dismantling and re-installation:
Open-end, box-end, allen wrench sets, etc.
- In case of malfunctioning of the valve:
O-ring sets, bushings, sealing gasket, bolts for sealing ring.
- For gear boxes:
Ball bearing, silicon, o-ring sets.
- If there exist many valves in the system with the same diameter and pressure class, it is recommended to have one more gearbox as spare.
- If there exist many electric actuators at the system with the same characteristics, it is recommended to have one more electric actuator as spare.
- In the event of maintenance-repair of the valve by dismantling from the pipeline, the flange bolt nuts, flange gaskets have to be spared by the user.

MAINTENANCE AND REPAIR CONDITIONS REQUIRED AT THE INSTALLATION LOCATION

In order to perform the maintenance-repair at the installation location, butterfly valves have to be placed in a manhole. Size of the manhole should be large enough to position the valve at both directions, to work inside and large enough to remove the gear box from the valve. Inside the manhole there should be water discharge outlet. Otherwise water accumulation inside the manhole may cause harm to the parts of the valve like gearbox and actuator and may eliminate observation and working possibility. At pipelines where butterfly valve manholes are large enough to work inside and to dismantle the butterfly valve is not easy, a manhole cover should be placed over the pipeline large enough to enter. The manhole cover should be located at the nearest point to the valve.

When butterfly valves are used as isolation valves, they may stay at the same position continuously (some times for years) as long as there is no problem at the pipeline. This may cause co-working materials stuck. For that reason it should be observed that valve, gearbox actuator are performing their functions by open-close process of valve in certain periods.



BUTTERFLY VALVES

REPLACEMENT OF THE SEALING GASKET

The waterproof rubber seals of the butterfly valves could be replaced without dismantling the valve disc. The following steps are followed during a gasket replacement:

- Turn the disc till the sealing gasket leaves the seat surface at the entire body.
- Remove the seal clamping ring bolts.
- By tightening the adjustment bolts, pull the seal clamping ring.
- Remove the sealing gasket by taking out the seal clamping ring.
- Clean the gasket seat surfaces.
- Pull back the adjustment bolts over the ring.
- Place the new gasket to its body.
- Place the flange bolts with loose tightening.
- Position the disc to close.
- Check whether the gasket touches the seat surface properly.
- Tighten the seat clamping ring bolts.
- Test the leak tightness.

If it is possible to test with water, first the leak tightness should be checked with 0.5-1 bar low pressure. When the leak tightness is achieved, tighten the seat clamping ring bolts a little bit more. Then, rise the test pressure to the nominal value.

If it is not possible to test with water, it can be tested with the following way:

- If the valve is connected to the pipeline, use flash light to illuminate inside the pipe. The valve disc is closed till the light beams are not visible; the seat clamping ring bolts are tightened.
- The valve disc is opened. The entire seat tightness surface is marked with chalk and the valve disc is re-closed and opened. Bolts in place of unmarked parts of sealing gasket are tightened a bit more.
- The setscrews over the seal clamping ring are tightened.



SAFETY PRECAUTIONS AND ADVICES

- Beyond open-close limits, do not force to turn the hand wheel.
- If there is water in the line, do not dismantle the valve's gearbox for maintenance and repair. If you do so, the valve disc may turn by itself freely. Therefore, discharge the water in the line if the valve's gearbox has to be removed.
- Use appropriate pressure class valve according to the line pressure.
- Before entering inside the pipe in order to check or replace the valve sealing gasket, be sure that the water in the line is fully discharged. If one section of the pipeline is discharged, have a person ready at each isolation valve for safety till the end of repair.
- In order to open - close large size valves easily, use bypass devices in order to protect valve and pipeline.
- Perform the pipeline fill through by-pass valve slowly. Sudden opening of the valve may harm the pipeline.
- While carrying the valves use lifting places on the valve.
- While installing valves with actuator, to remove the actuator first and to install it to its place at the same position after the installation of the valve to the line, is more appropriate not to harm the actuator in anyway.
- Have the actuator electricity connections be made by skilled persons. Check the open-close and torque switches while the line is empty.
- Use valves for isolation purposes. At pumping stations, use them as modulating valve purposes as much as possible.
- At the pumping stations, especially in the events where light leakages could be eliminated by tightening the seal clamping ring, pay attention to install the valve as the seal clamping ring of the valve is on the non-pressurized side.
- Definitely use dismantling joint together with the valve.
- Take precautions to support valves and pipeline.

STORAGE

The SMS butterfly valves are packed and shipped either on pallets or in boxes according to their sizes. Till the time of installment, they have to be stored in their packages under the following conditions as mentioned below; these shall protect the valve's sealing surfaces, sealing elements, actuators, and paint color quality as well :

- Valves should be stored under a covered place in order to protect them from direct sunlight.
- The ambient temperature of the storage place should be in between +10 C° to +60 C°. Humidity should not exceed 70%.
- The storage floor should be concrete. Pallets or boxes should be protected from direct ground effects.
- Care should be given in for the storage, not to be dusty, dirty, etc.
- Storage area should be convenient for the operation of lifting vehicles like crane, forklift, etc.
- Valves left slightly open at the factory, must be left at the same position in the storage.



BUTTERFLY VALVES

Problem	Reason	Solution
<ul style="list-style-type: none"> • Valve is not opening or closing 	<ul style="list-style-type: none"> • Valve shafts may be bended • A foreign part may be jammed in between disc and body • Line pressure is more than valve nominal pressure • Problem at gearbox parts • If valve is electrically operated, problem at switch connections 	<ul style="list-style-type: none"> • Replace valve shaft • Remove jammed piece • Take precautions to lower the line pressure to valve nominal pressure or use a valve with higher pressure class • Check the gearbox, if required replace the necessary parts • Change valve control to manual control. If worked check switch connections
<ul style="list-style-type: none"> • Valve disc is leaking 	<ul style="list-style-type: none"> • Disc closing adjustment may be broken down • A foreign part may be jammed in between disc and body • Line pressure is more than valve nominal pressure • Sealing gasket may be broken down 	<ul style="list-style-type: none"> • Change closed adjustment screw to proper position • Remove the jammed piece. Replace watertight rubber if broken down. • Take precautions to lower the line pressure to valve nominal pressure or use a valve with higher pressure class • Replace sealing gasket
<ul style="list-style-type: none"> • Excess vibration at valve 	<ul style="list-style-type: none"> • Water flow may be too high • Disc-shaft connection may be broken down • Valve and pipes are not supported from bottom 	<ul style="list-style-type: none"> • Take precautions to decrease water flow • Replace disc shaft connections like wedge, pin • Find proper solutions to support valve and pipe
<ul style="list-style-type: none"> • If valve has actuator, valve is not performing open-close function because of torque problem 	<ul style="list-style-type: none"> • May be mechanically defected • Actuator torque value may not be adjusted appropriately • Line pressure may be more than valve nominal pressure 	<ul style="list-style-type: none"> • Control shafts, bushing, gearbox equipment, if necessary, replace them. • Change actuator torque value to maximum torque value • Take precautions to lower the line pressure to valve nominal pressure or use a valve with higher pressure class and use appropriate actuator
<ul style="list-style-type: none"> • Valve is leaking from its side covers 	<ul style="list-style-type: none"> • Cover O-rings may be broken down 	<ul style="list-style-type: none"> • Replace cover O-rings. If not solved check spindle straightness and cover O-ring housings.



GUARANTEE

Products, auxiliaries and parts thereof, of SMS valves, are guaranteed for a period of one year from date of shipment against defective workmanship and material only, when properly installed, operated and serviced in accordance with SMS's recommendations. Replacement for items of SMS valves will be made free of charge if proved to be defective within such time. No claim for special or consequential damages, transportation, or labor shall be allowed. Purchaser shall be solely responsible for determining suitability for use and in no event shall SMS be liable in this respect. Equipment or parts manufactured by others but furnished by SMS will be repaired or replaced, only to the extent provided in the original manufacturer's warranty to SMS. SMS does not guarantee resistance to corrosion, erosion, abrasion or other sources of failure, nor does SMS guarantee a minimum length of service. Failure of the purchaser to give prompt written notice of any alleged defect under this guarantee forthwith upon its discovery, or use and possession thereof after an attempt has been made and completed by someone other than SMS or an authorized representative to remedy defects therein, or failure to return products or parts for replacement as herein provided, of failure to install, operate and maintain said products or parts according to instructions provided by SMS, of failure to pay the entire contract price when due, shall be a waiver of all rights under these representations. The foregoing guarantee shall be null and void, if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as, but not limited to, an actuator is attached to the item by valves & controls other than an SMS Factory Service Personnel. All orders accepted shall be deemed accepted subject to this guarantee, which shall be exclusive of any other previous guarantee, and this shall be the only effective guarantee or warranty binding on SMS, anything to the contrary contained in the purchase order, or represented by any agent or employee of SMS, in writing or otherwise, notwithstanding, including but not limited to implied warranties.

THE FOREGOING OBLIGATIONS ARE IN LIEU OF ALL OTHER OBLIGATIONS AND LIABILITIES INCLUDING WARRANTIES OF FITNESS OR OF MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE SMS ENTIRE AND EXCLUSIVE LIABILITY AND PURCHASER'S EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THIS SALE OR FURNISHING OF SERVICES, GOODS, OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATION.

LIMITATION OF LIABILITY

In no event shall SMS be liable for any direct, indirect, special or consequential damages whatsoever, and SMS's liability, under no circumstances, will exceed the contract price for the goods and/or services for which liability is claimed. Any action for breach of contract, must be commenced within 1 year after the cause of the action has occurred.



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