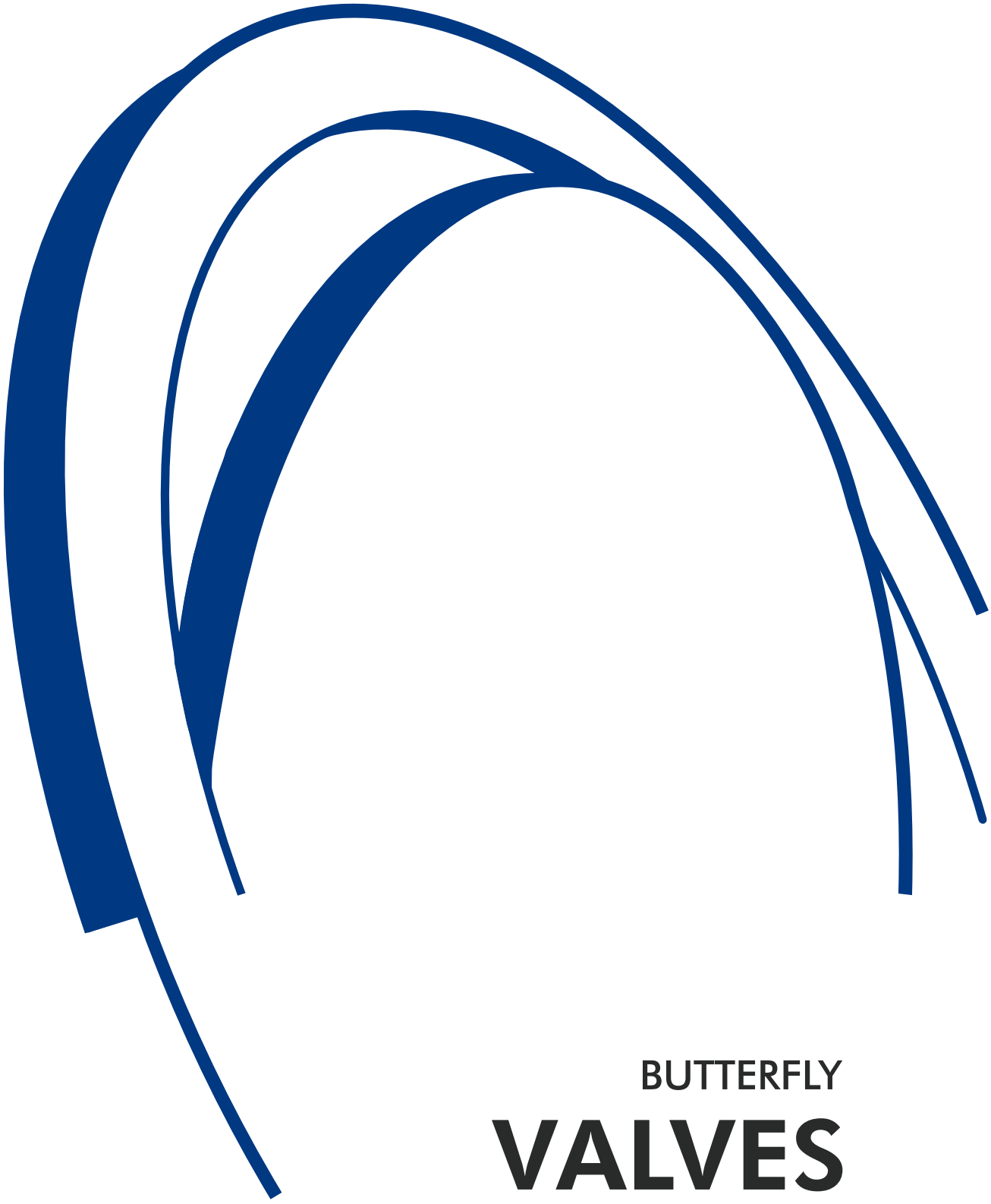
SAMSUN MAKİNA SANAYİ



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 250,000 tons 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 $m^2$ open, 100,000 $m^2$ 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.







# BUTTERFLY VALVES


CERTIFICAZIONE DI PRODOTTO
PRODUCT CERTIFICATION
ICIM
002BH/2
SAMSUN MAKINA SANAYI A.S.
DUCTILE CAST IRON BUTTERFLY VALVES FOR WATER SUPPLY SYSTEMS


CERTIFICAZIONE DI PRODOTTO
PRODUCT CERTIFICATION
ICIM
009BH/0
SAMSUN MAKINA SANAYI A.S.
DUCTILE CAST IRON BUTTERFLY VALVES FOR WATER SUPPLY SYSTEMS


CERTIFICAZIONE DI PRODOTTO
PRODUCT CERTIFICATION
ICIM
010BH/0
SAMSUN MAKINA SANAYI A.S.
DUCTILE CAST IRON BUTTERFLY VALVES FOR WATER SUPPLY SYSTEMS

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, PN 10, 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).

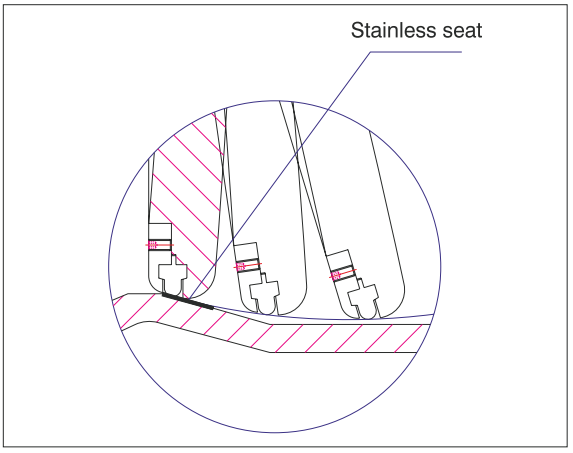
## ADVANTAGES, SUPERIORITIES

- 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

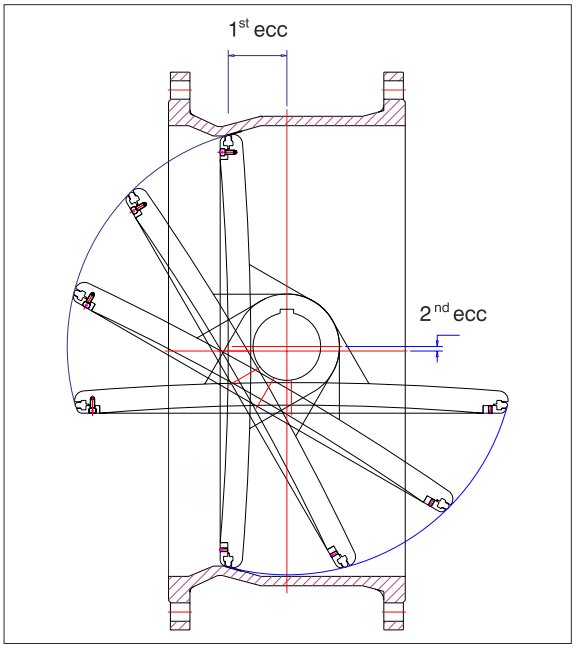
The seats of all the valves are made of stainless steel by welding, precisely machined, to extend the life of the seal ring by providing a lower coefficient of friction between the seal and the seat during the operation.

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

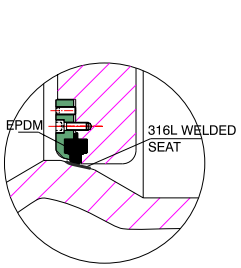
When used for throttling purposes, especially if the operating conditions are not evaluated well, cavitation may occur in butterfly valves. This can cause excessive noise and result in damages to the valve and downstream components.

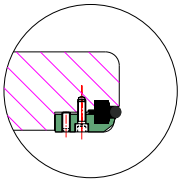
Cavitation occurs at the localized low-pressure zones which can be created by the sudden pressure and flow rate changes. If the pressure at these zones drops below the vapor pressure of the liquid, the liquid vaporizes, forming small vapor bubbles. As these bubbles flow downstream while the pressure 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:

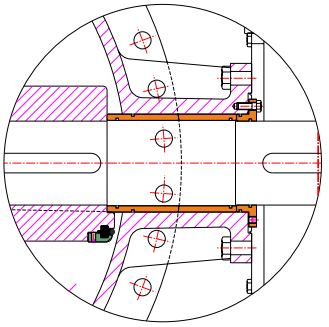
1. Increase the downstream pressure by relocating the valve or provide additional downstream measures, such as additional valves or permanent orifices.
2. Decrease the pressure drop through the valve by installing two or more valves in series, caring for the drop in each.

## CONSTRUCTIONAL DETAILS

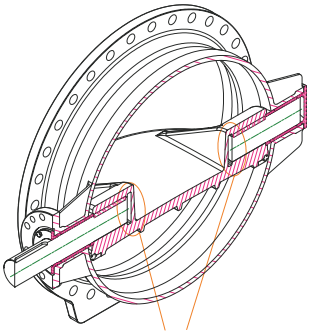


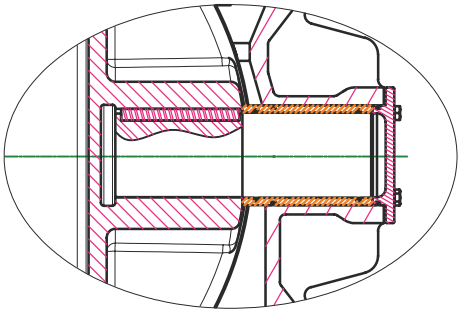



Disc Seal

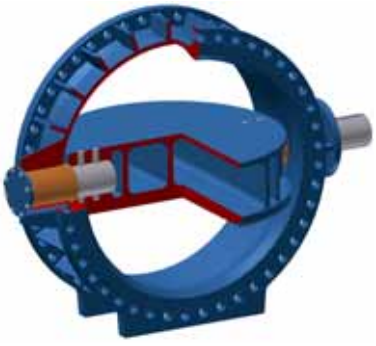


Shaft Sealing

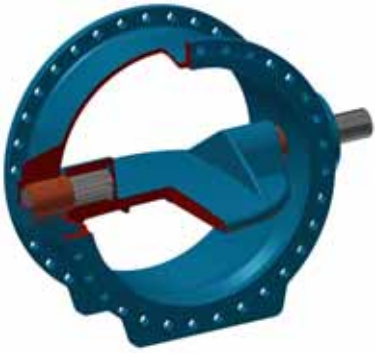




Corrosion Resistant Fully Enclosed Shaft and Disc Design



Shaft - Disc Connection With Pin

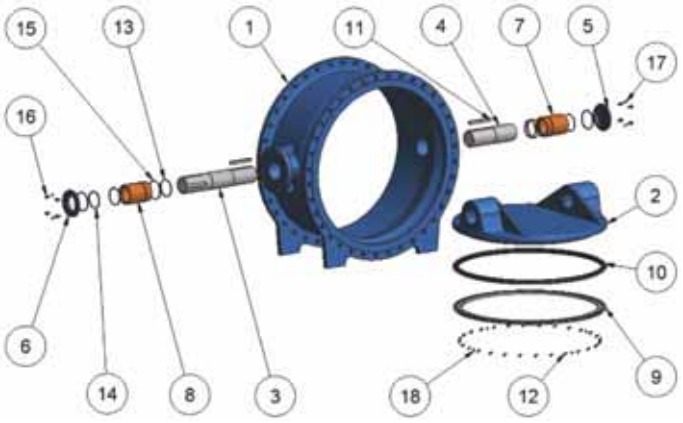


Shaft - Disc Connection With Key



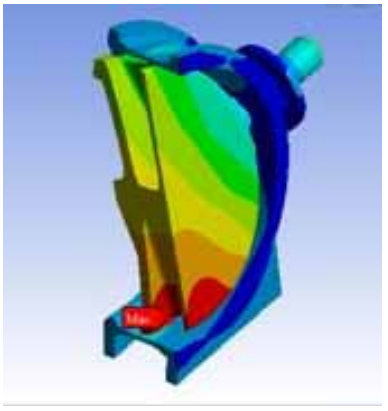

3. Throttle the valve with a different opening position, even if to enlarge the valve size will become necessary. A larger valve used in a more closed or throttled position usually creates a lower cavitation.
4. Install a bypass line around the valve to handle low-flow characteristics.
5. Install air 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 | Steel, stainless steel |
| | | GGG 40/50 DIN 1693 | |
| 2 | Disc | EN-GJS-400-15/500-7 | Steel, stainless steel |
| | | GGG 40/50 DIN 1693 | |
| 3 | Driving shaft | X20 Cr13 EN 10088-3 | Other stainless steel grades |
| | | (ASTM 420) | |
| 4 | Shaft | X20 Cr13 EN 10088-3 | Other stainless steel grades |
| | | (ASTM 420) | |
| 5 | Blank cap | EN-GJS-400-15/500-7 | Stainless Steel |
| | | GGG 40/50 DIN 1693 | |
| 6 | Bearing cap | EN-GJS-400-15/500-7 | Stainless Steel |
| | | GGG 40/50 DIN 1693 | |
| 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 | Stainless Steel |
| | | GGG 40/50 DIN 1693 | |
| 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 | - |






## 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.


Butterfly Valve With Manual Actuator

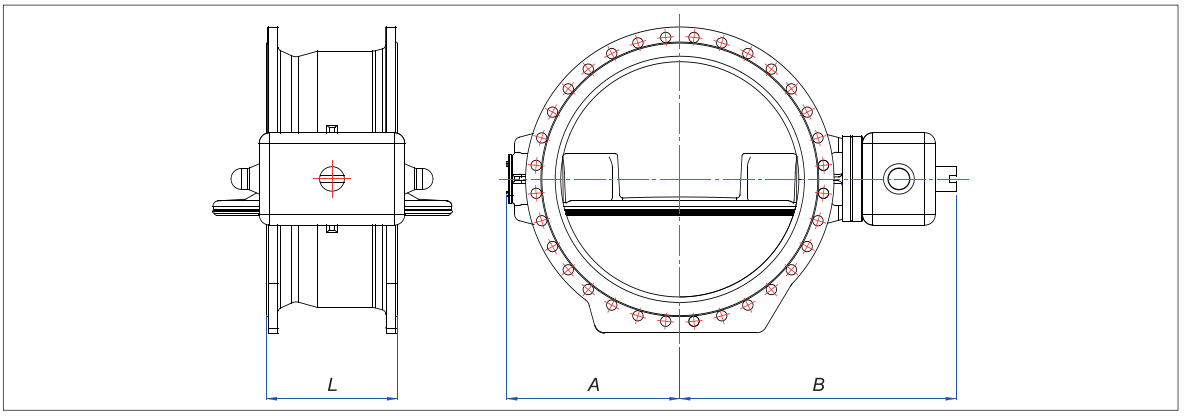
### Electrical Actuator:

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.

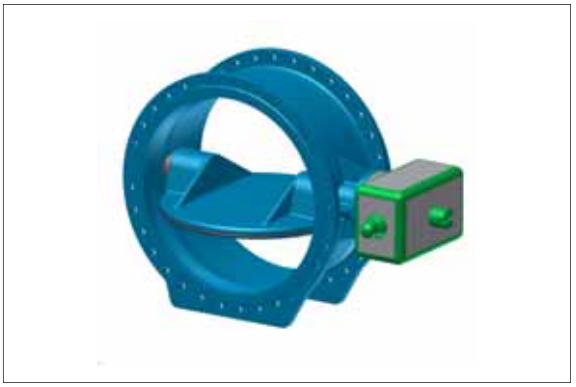

Butterfly Valve With Electrical Actuator

## 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 |



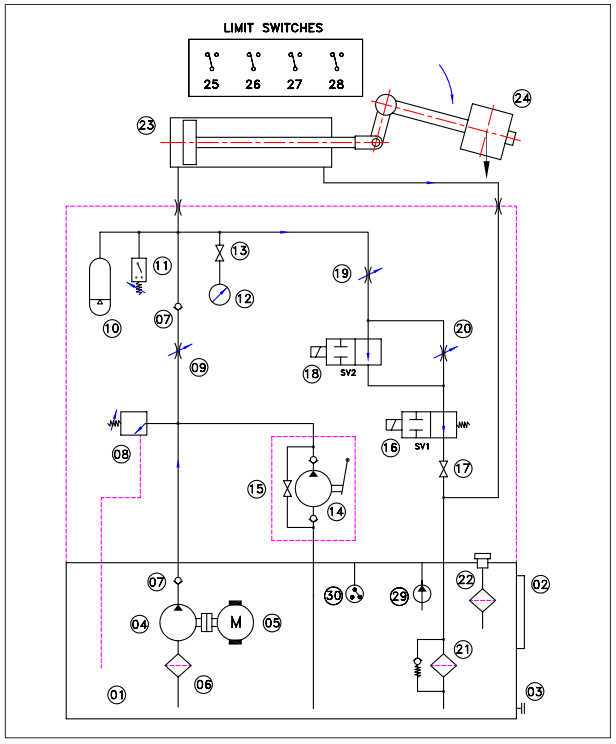
Butterfly Valve With Pneumatic Actuator





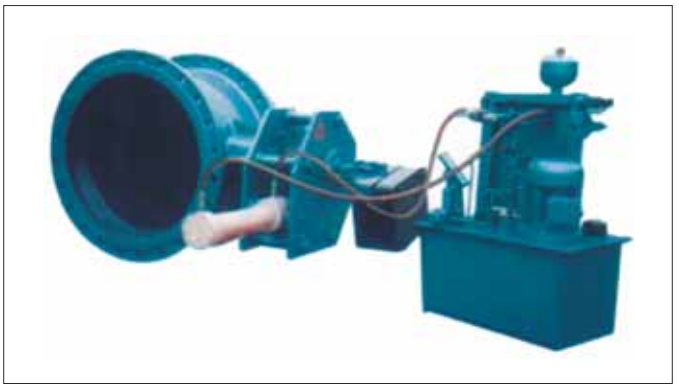

## Hydraulic Actuator

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.




Hydraulic Control Plan

| 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 |
| Gauce | 12 | 1 |
| Regulating Pressure Switch | 11 | 1 |
| Oil Accumulatör | 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 |

Butterfly Valve With Hydraulic Actuator

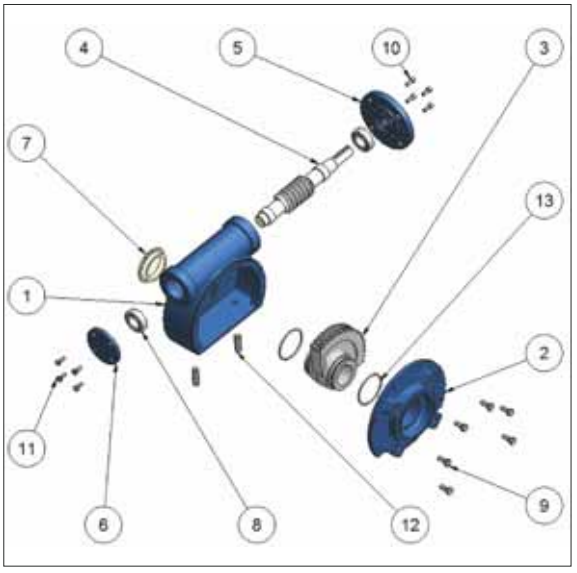
## GEARBOXES

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. |
| 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 | - |
| 8 | Bearing | Anti-friction bearing | - |
| 9,10,11 | Bolt | 8 x 8 zinc coated | Stainless st. |
| 12 | Locking bolt | 8 x 8 zinc coated | Stainless st. |
| 13 | O-ring | EPDM | NBR |

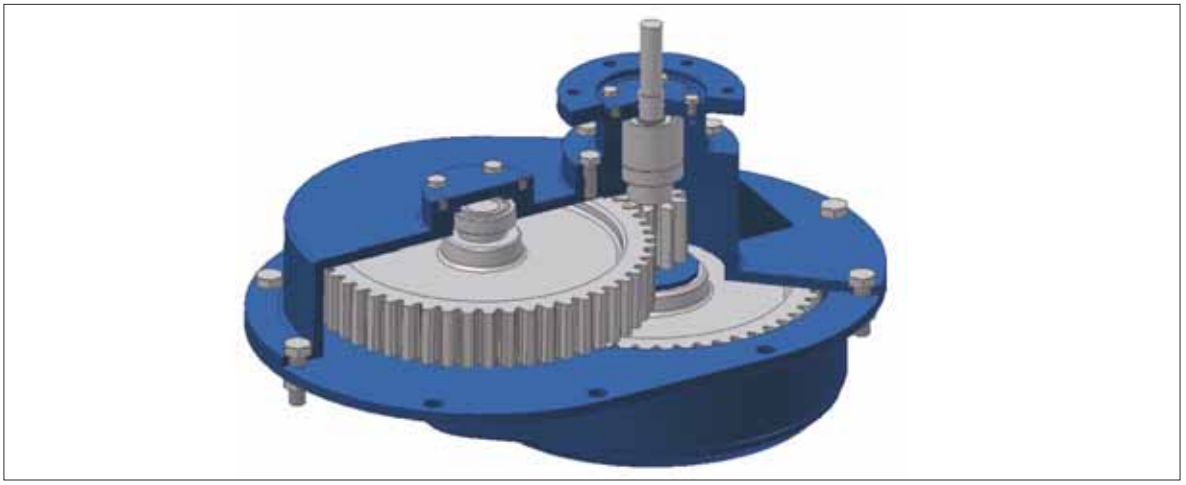



Gearbox Details



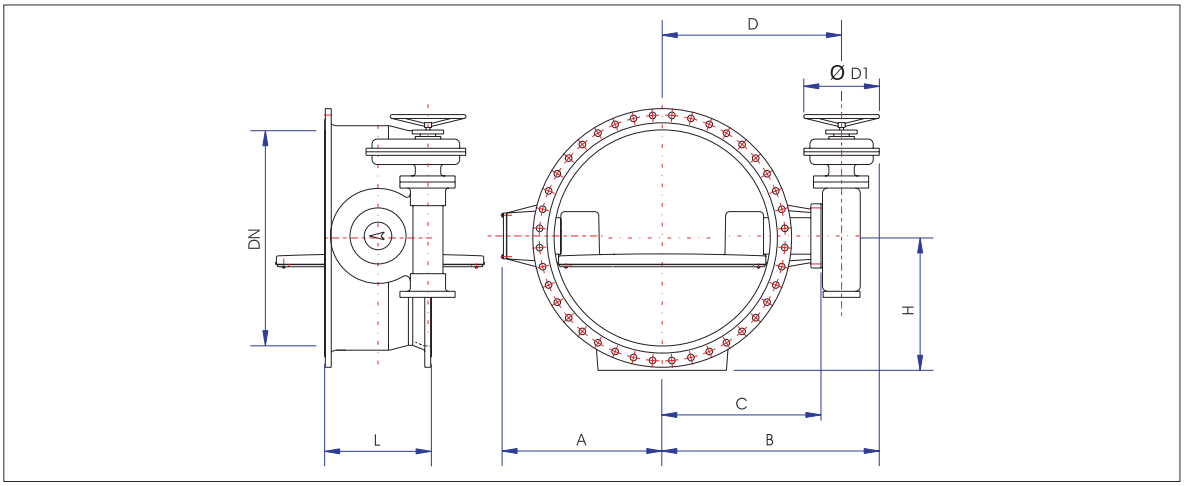

## GEARBOX TYPES & RECOMMENDED ACTUATORS

| 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 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 | 350 | 450.000 | 52:1 | 9:1;9:1 | 4212:1 | 1053 |
| DTK 630 | D5 | 540 | 700.000 | 52.1 | 8,4:1;8.4:1 | 3669:1 | 917 |



An Additional Gearset

## DIMENSIONS



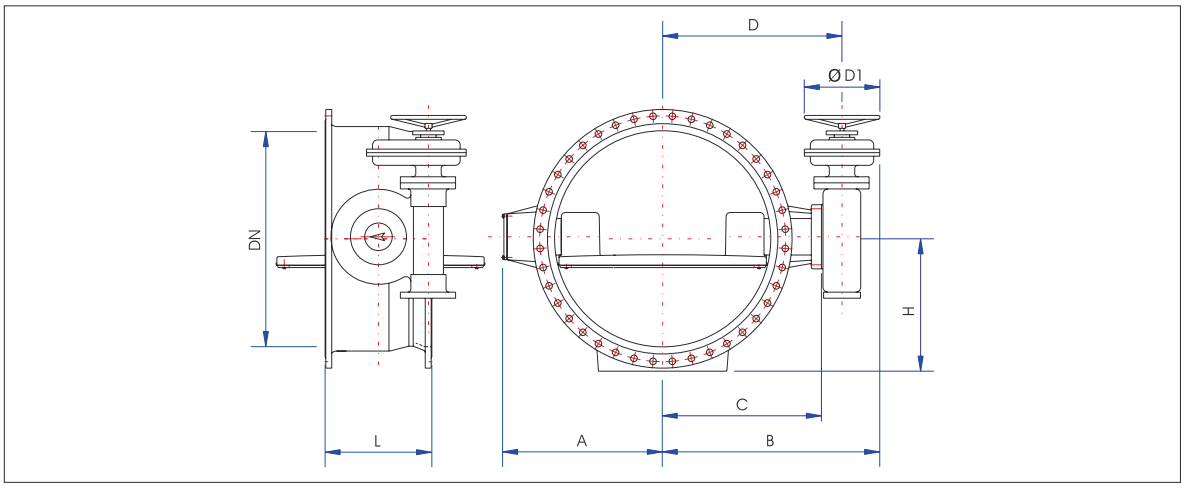

### PN 10

| DN | DIN 3202 F4 EN 558-1 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 | 480 | 325 | 413 | 295 | Ø250 | DTK125.1 | 50:1;3.8:1 | SA 07.6 | 25 | 155 |
| 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* | 1830 | 2430 | 1790 | 2055 | 1610 | 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 milimeters. 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

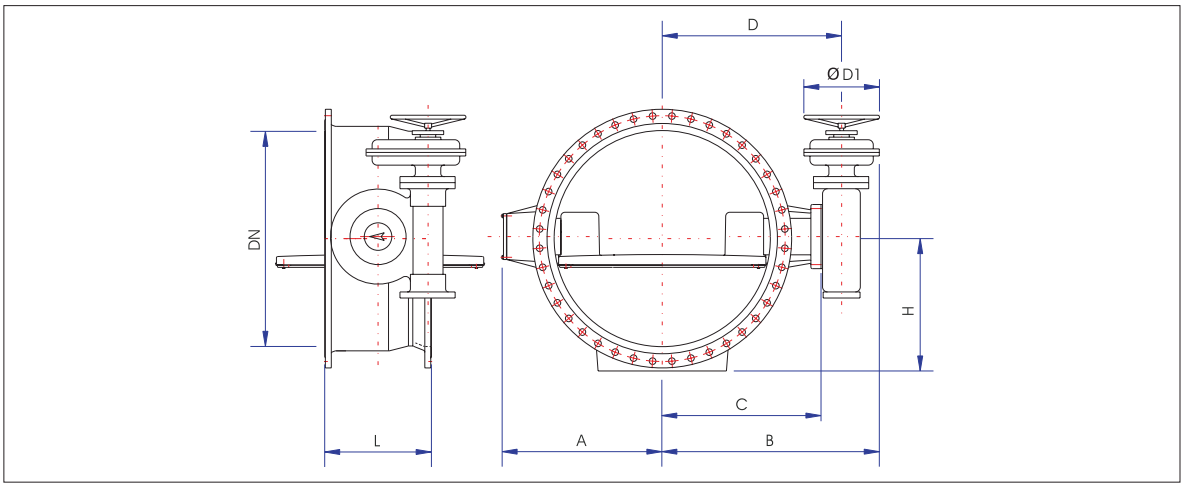



### PN 16

| DN | DIN 3202 F4 EN 558-1 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 | 445 | 290 | 378 | 265 | Ø250 | DTK125.1 | 50:1;3.8:1 | SA 07.6 | 27 | 130 |
| 400 | 310 | 295 | 465 | 325 | 400 | 295 | Ø250 | DTK100 | 50:1 | SA 10.2 | 95 | 151 |
| 400 | 310 | 295 | 480 | 325 | 413 | 295 | Ø250 | DTK125.1 | 50:1;3.8:1 | SA 07.6 | 29,5 | 160 |
| 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 milimeters. 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



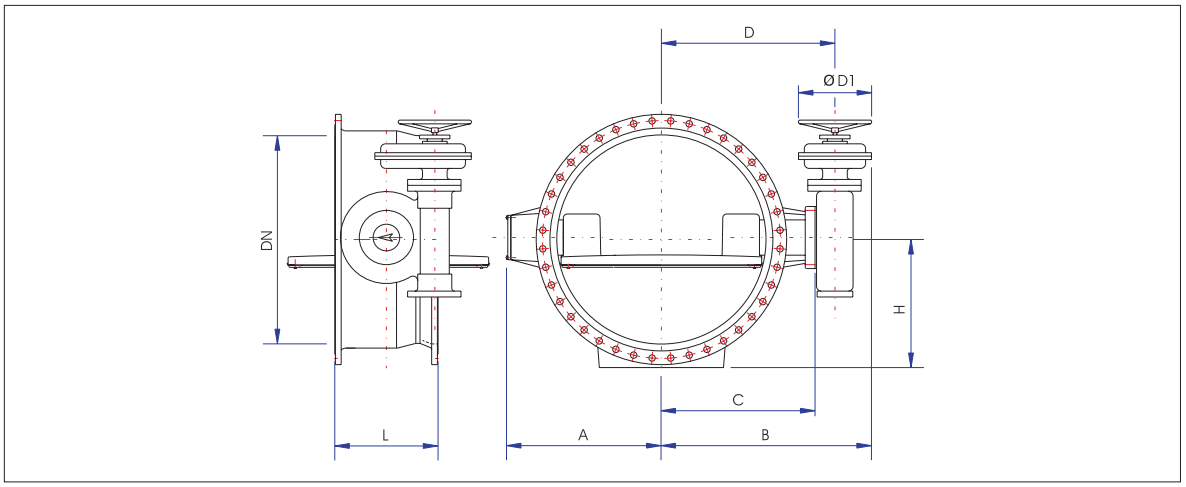

### PN 25

| DN | DIN 3202 F4 EN 558-1 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 |
| 350 | 290 | 275 | 440 | 300 | 382 | 285 | Ø250 | DTK100 | 50:1 | SA 10.2 | 85 | 160 |
| 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 | 18000 |
| 2600 | 900* | 1800 | 2450 | 1800 | 2090 | 1550 | Ø600 | DTK630 | 52:1;8.4:1;8.4:1 | SA 16.2 | 498 | 20000 |
| 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 milimeters. 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




### PN 40

| DN | DIN 3202 F4 EN 558-1 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 |
| 300 | 270 | 310 | 432 | 296 | 370 | 265 | Ø250 | DTK125 | 50:1 | SA 10.2 | 80 | 183 |
| 350 | 290 | 350 | 487 | 333 | 424 | 295 | Ø250 | DTK125 | 50:1 | SA 10.2 | 95 | 232 |
| 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 |

Dimensions are in milimeters. Any value presented here is subject to change without prior notice.
Butterfly valve can be produced according to BS 5155 AWWA standards, upon request.

## 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.

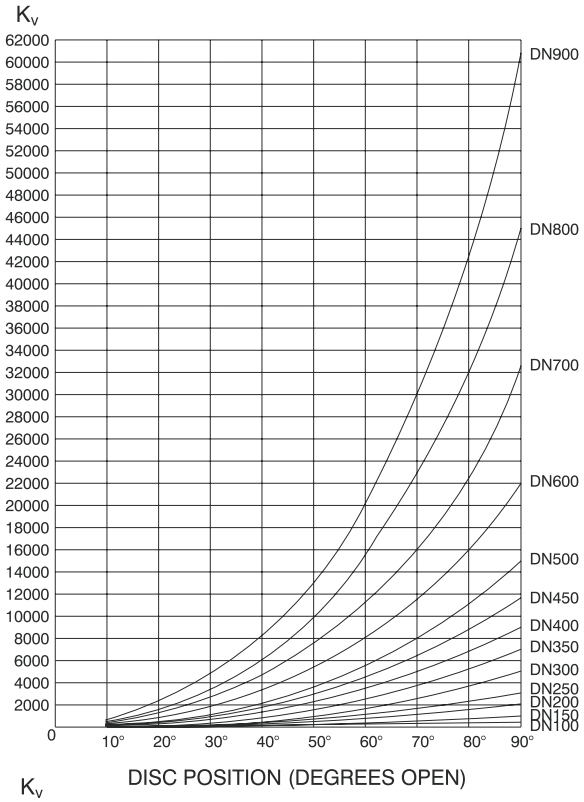
| Pressure (bar) | Maximum flow rate (m/sec) |
|---|---|
| Up to 6 | 2.5 |
| 10 | 3 |
| 16 | 4 |
| >25 | 5 |

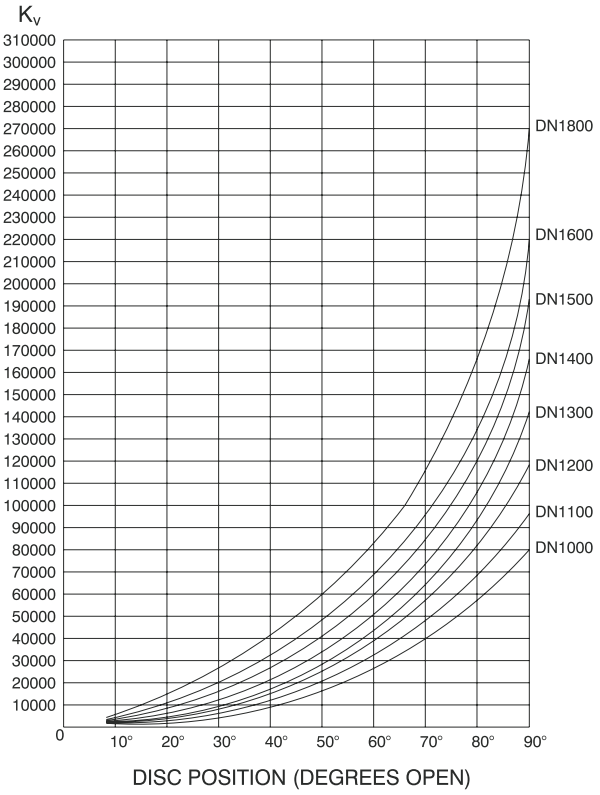
Flow rate of a valve depends on the pressure drop in the valve. The most common way to predict the flow rate, with respect to the disc opening, is by the use of flow coefficient $K_v$. The flow coefficient gives the flow rate of the liquid ($m^3/h$) for 1 bar pressure drop through the valve. The higher 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.

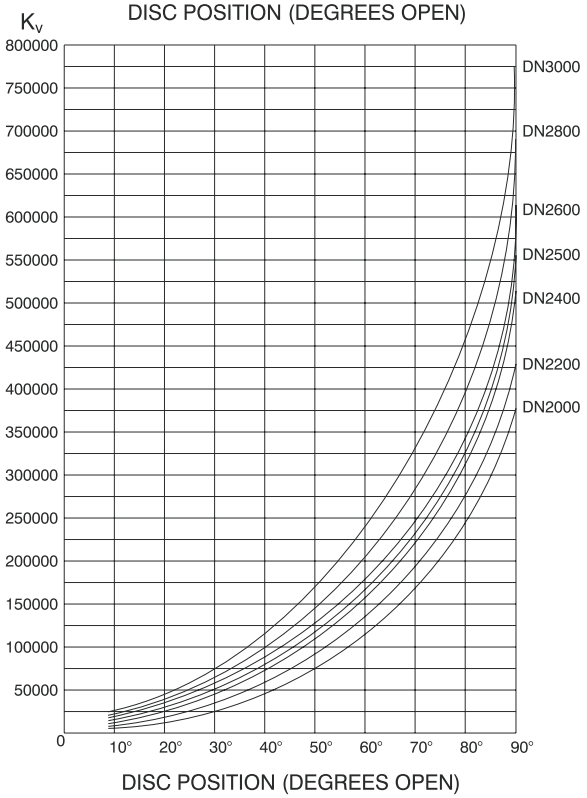
The approximate effective throttling range for a butterfly valve is 20° to 70° open, but the range can vary depending on the application. Throttling at higher angles causes unreliable control as the valve has little effect on the system flow in most applications. Throttling at lower angles on the other 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.




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

$K_v$: Flow coefficient

$q_v$: Flow rate in $m^3/h$

$\rho$ : Density of water in $kg/m^3$

$\rho_0$ : Density of water at 15°C in $kg/m^3$

$\Delta p_v$: 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 :

1. The diameter and pressure class suitability should be controlled from the marking on the valve before installation,
2. 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.
3. By closing the valve, its fully closed position should be checked.
4. If the valve is equipped with actuator and if electricity is available at the location, open-close function and adjustment should be controlled by actuator open-close process.
5. According to the diameter and pressure class of the valve to be used, appropriate size bolt, nut, washer, flange gasket should be obtained.
6. 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

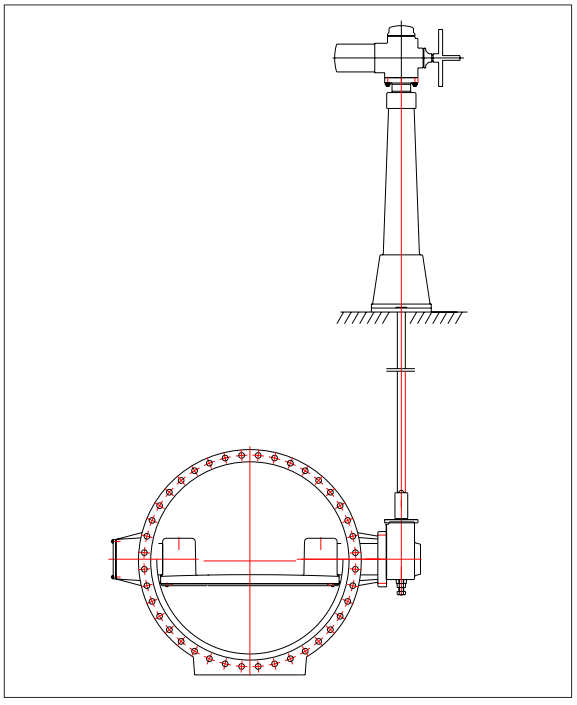
1. The flange, to be coupled, should be welded properly, vertically to the pipe axis.
2. The valve is laid to the ground over its flange.
3. The dismantling joint is put on with four pins to the valve, with the appropriate sizes given in the catalogue.
4. The other flange, unwelded, which the valve shall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



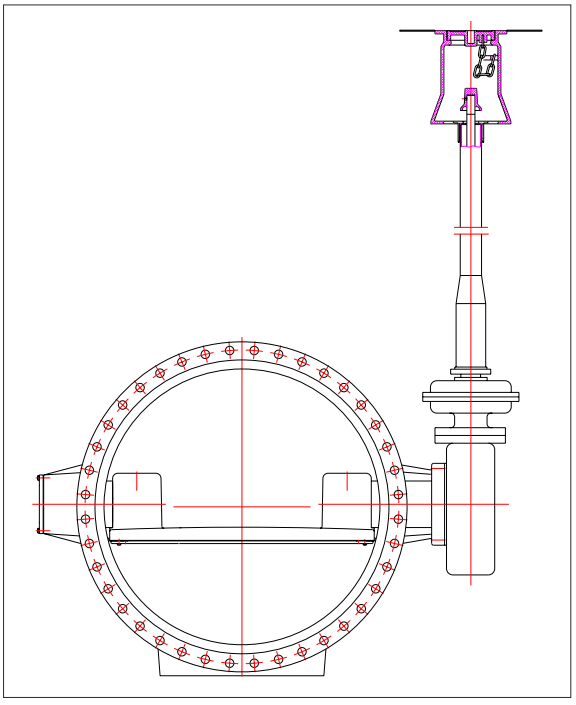

8. By controlling the parallelism in between flanges, the flange is point-welded to the pipe.
9. The dismantling joint and the valve are removed from the flanges and placed to the ground.
10. After controlling the parallelism, the point-welded flange is welded to the pipe.
11. Dirt inside the pipe, like weld ashes, is cleaned thoroughly.
12. 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.
13. Electrical connection is performed if the valve has an electric actuator.
14. Till the time of water intake, the valve should be left slightly open position.

## INSTALLATION ACCESSORIES

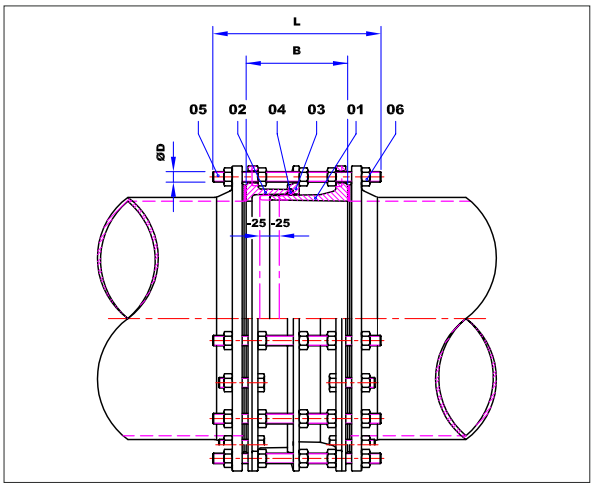
Extension spindle and headstock with position indicator.



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



## DISMANTLING PIECE



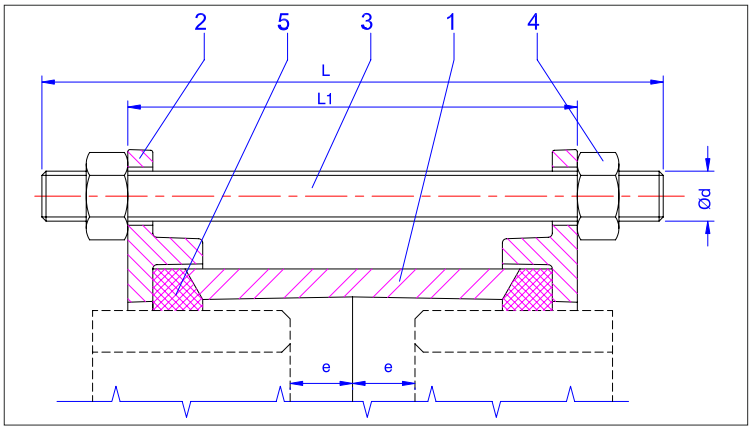

| Item No | Part Name | Material |
|---|---|---|
| 1 | Long piece | EN-GJS-400-15/500-7 |
| 2 | Short piece | EN-GJS-400-15/500-7 |
| 3 | Retaining flange | EN-GJS-400-15/500-7 |
| 4 | Seal ring | NBR - EPDM |
| 5 | Stud | Zinc coated steel |
| 6 | Nut | 8 x 8 Zinc coated |

| DN | PN10 | | | | PN16 | | | | PN25 | | | | PN40 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | STUD | | | B | STUD | | | B | STUD | | | B | STUD | | |
| | | L | D | Quantity | | L | D | Quantity | | L | D | Quantity | | L | D | Quantity |
| 50 | 180 | 280 | M16 | 2 | 180 | 280 | M16 | 2 | 180 | 280 | M16 | 2 | 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 | 200 | 300 | M16 | 4 | 200 | 300 | M16 | 4 | 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 | - | - | - | - |
| 2400 | 460 | 750 | M52 | 28 | 460 | 790 | M56 | 28 | 520 | 890 | M64 | 28 | - | - | - | - |
| 2500 | 460 | 750 | M52 | 28 | 460 | 790 | M56 | 28 | 560 | 1030 | M64 | 28 | - | - | - | - |
| 2600 | 460 | 750 | M52 | 30 | 460 | 790 | M56 | 30 | 560 | 1030 | M64 | 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.




## FLEXIBLE COUPLING



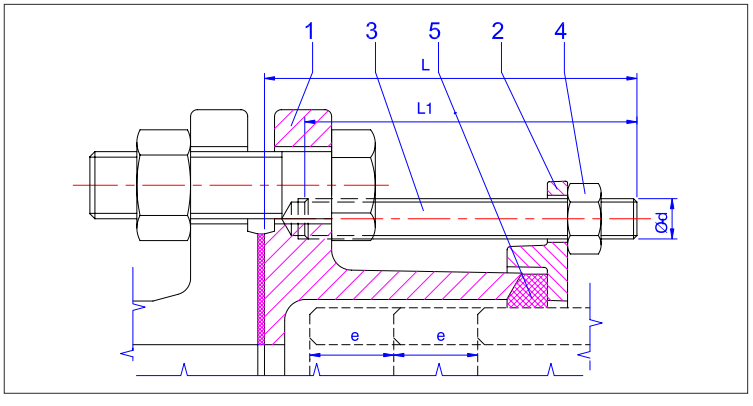

| Item No | Part Name | Material |
|---|---|---|
| 1 | Body | EN-GJS-400-15/500-7/St37 |
| 2 | Retaining flanges | EN-GJS-400-15/500-7 |
| 3 | Studs | Zinc coated steel |
| 4 | Nuts | 8 x 8 zinc coated |
| 5 | Seal ring | EPDM |

**PN 10 -16**

| DN | L | L1 | ±e | Ød |
|---|---|---|---|---|
| 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 PN 25, 40 pressure ratings can be produced.

## FLANGE ADAPTOR




| 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 |

**PN 10 -16**

| DN | L | L1 | ±e | Ød |
|---|---|---|---|---|
| 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 PN 25, 40 pressure ratings can be produced.

## 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:

1. For dismantling and re-installation
   Open-end, box-end, allen wrench sets, etc.
2. In case of malfunctioning of the valve:
   O-ring sets, bushings, sealing gasket, bolts for sealing ring.
3. For gear boxes:
   Ball bearing, silicon, O-ring sets.
4. 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.
5. If there exist many electric actuators at the system with the same characteristics, it is recommended to have one more electric actuator as spare.
6. 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.




**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:

1. Turn the disc till the sealing gasket leaves the seat surface at the entire body.
2. Remove the seal clamping ring bolts.
3. By tightening the adjustment bolts, pull the seal clamping ring.
4. Remove the sealing gasket by taking out the seal clamping ring.
5. Clean the gasket seat surfaces.
6. Pull back the adjustment bolts over the ring.
7. Place the new gasket to its body.
8. Place the flange bolts with loose tightening.
9. Position the disc to close.
10. Check whether the gasket touches the seat surface properly.
11. Tighten the seat clamping ring bolts.
12. 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:

a. 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.
b. 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.
c. The setscrews over the seal clamping ring are tightened.

## SAFETY PRECAUTIONS AND ADVICES

1. Beyond open-close limits, do not force to turn the hand wheel.
2. 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.
3. Use appropriate pressure class valve according to the line pressure.
4. 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.
5. In order to open-close large size valves easily, use bypass devices in order to protect valve and pipeline.
6. Perform the pipeline fill through by-pass valve slowly. Sudden opening of the valve may harm the pipeline.
7. While carrying the valves use lifting places on the valve.
8. 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.
9. Have the actuator electricity connections be made by skilled persons. Check the open-close and torque switches while the line is empty.
10. Use valves for isolation purposes. At pumping stations, use them as modulating valve purposes as much as possible.
11. 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.
12. Definitely use dismantling joint together with the valve.
13. 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 $C^{o}$ to +60 $C^{o}$. 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.






| Problem | Reason | Solution |
|---|---|---|
| • Valve is not opening or closing | • Valve shafts may be bended<br>• A foreign part may be jammed in between disc and body<br>• Line pressure is more than valve nominal pressure<br>• Problem at gearbox parts<br>• If valve is electrically operated, problem at switch connections | • Replace valve shaft<br>• Remove jammed piece<br>• Take precautions to lower the line pressure to valve nominal pressure or use a valve with higher pressure class<br>• Check the gearbox, if required replace the necessary parts<br>• Change valve control to manual control. If worked check switch connections |
| • Valve disc is leaking | • Disc closing adjustment may be broken down<br>• A foreign part may be jammed in between disc and body<br>• Line pressure is more than valve nominal pressure<br>• Sealing gasket may be broken down | • Change closed adjustment screw to proper position<br>• Remove the jammed piece. Replace watertight rubber if broken down.<br>• Take precautions to lower the line pressure to valve nominal pressure or use a valve with higher pressure class<br>• Replace sealing gasket |
| • Excess vibration at valve | • Water flow may be too high<br>• Disc-shaft connection may be broken down<br>• Valve and pipes are not supported from bottom | • Take precautions to decrease water flow<br>• Replace disc shaft connections like wedge, pin<br>• Find proper solutions to support valve and pipe |
| • If valve has actuator, valve is not performing open-close function because of torque problem | • May be mechanically defected<br>• Actuator torque value may not be adjusted appropriately<br>• Line pressure may be more than valve nominal pressure | • Control shafts, bushing, gearbox equipment, if necessary, replace them.<br>• Change actuator torque value to maximum torque value<br>• Take precautions to lower the line pressure to valve nominal pressure or use a valve with higher pressure class and use appropriate actuator |
| • Valve is leaking from its side covers | • Cover O- rings may be broken down | • 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.

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