McSYS®

BUTTERFLY VALVE INSTALLATION, OPERATION AND MAINTAIN MANUAL

McSYS® Mechanical and Fluid Control Systems

Contents

1. General

1.1 Introduction to valves

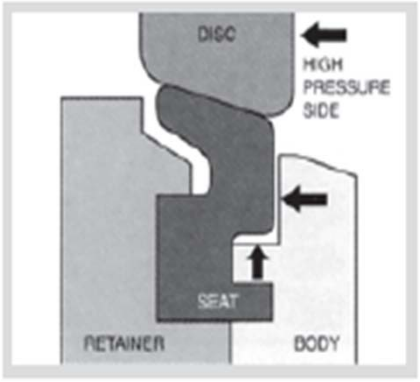
① The most important feature of the butterfly valve is its body that has been manufactured in appropriate sizes to meet the requirements of piping. It consists of a body that includes a disc to a seat ring, accesory, and an actuator.

② The butterfly valve is designed for easy maintenance.

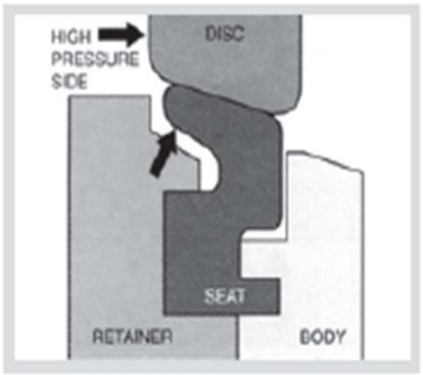
③ To use system to its full life span, you should install it correctly according to the manual and maintain it according to the prescribed procedures while using it.

1.2 High-performance Butterfly Valve structure

There is soft seat type of butterfly valve. (See Fig 1.1 & 1.2)



<Fig 1.1>



<Fig 1.2>

2. Storage

① Do not throw, drop, trip or drag butterfly valves when transporting them.

② Keep all parts of the the butterfly valve in a well-ventilated place protected from fire, rain and wind.
- store the valve at a temperature between -29°C(-20°F) and 48°C(120°F).
- The storage area must be protected from flooding.

3. Installation

Like any other valves, the butterfly valve must be installed carefully at first according to the following cautions to use it for many years without malfuntion.

① Remove the packing and check whether there are any foreign substances in the body. If you find foreign substances, remove them before starting installation.

② As cast steel products are processed with rust preventive oil before shipping to prevent corrosion, remove the rust preventive oil from the pipes before installing them on the line.

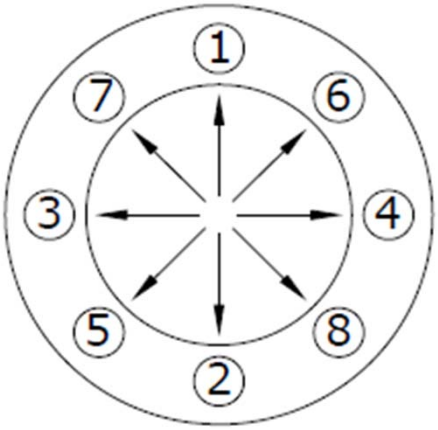
③

⚠ - WARNING -

To prevent damages to disc and seat, you must blow out (flashing) foreign substances such as weld beads, scales, and chips from the pipeline acctording to the prescriptions before installing the butterfly valve.

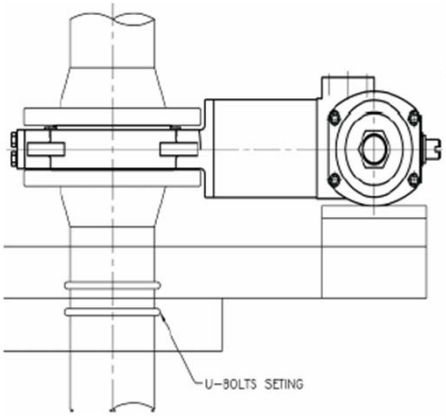
④ Install valves in the direction of arrow marked on the body.

⑤ When installing the Triple offset butterfly valve, you should use a specified gasket, and install it in parallel with the other flange. Also, you are recommended to fasten the bolts in several parts in a balanced manner sequentially in diagonal direction. (See Fig 3.1)

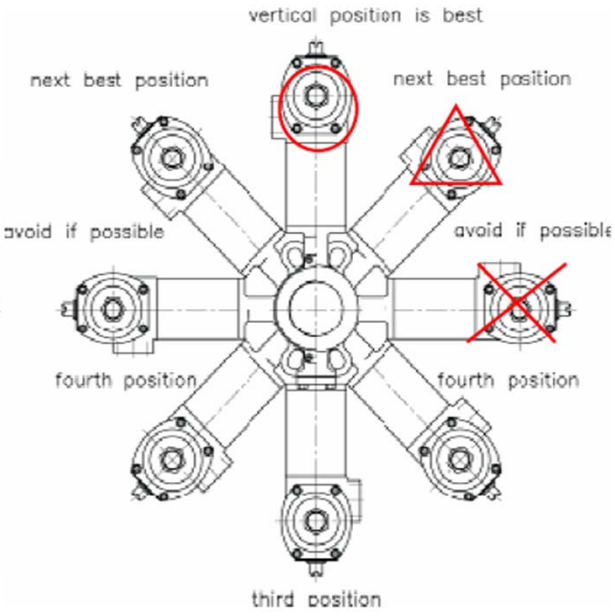


<Fig 3.1 Procedure for Fastening Flange Bolts>

⑥ When installing if the actuator is incluided the valve at right angle to the ground as much as possible. If it is impossible, attach a support th the valve before installing (See Fig 3.2 & 3.3)



<Fig 3.2 Installing support>

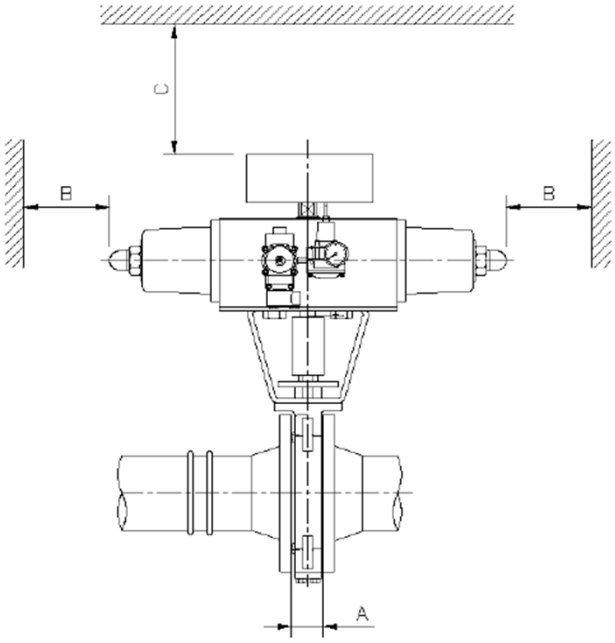


<Fig 3.3 Installation Location of Actuator>

⚠ CAUTIONS

- Avoid verticality piping if possible because it may adversely affect the funtion and performance of valve during operation.
- When moving butterfly valves, you should handle them carefully so that the componets and air piping will not be damaged. The electronic and electric parts such as solenoid valve, positioner and limit switch may get damaged or the valve travel may change.
- Be careful not to damage the sealing surface of valve flange.
- Apply thermal insulation as needed but do not apply thermal insulation to the cooling fin and extensions.

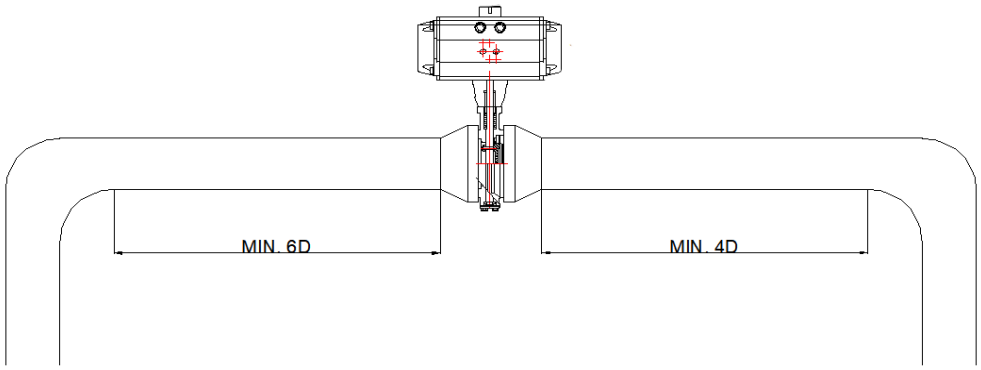
⑦ A minimum space is required for maintenance of the valve installation area (See Fig 3.4). In addition, a space for manual operation is required if a manual hand wheel has been installed.



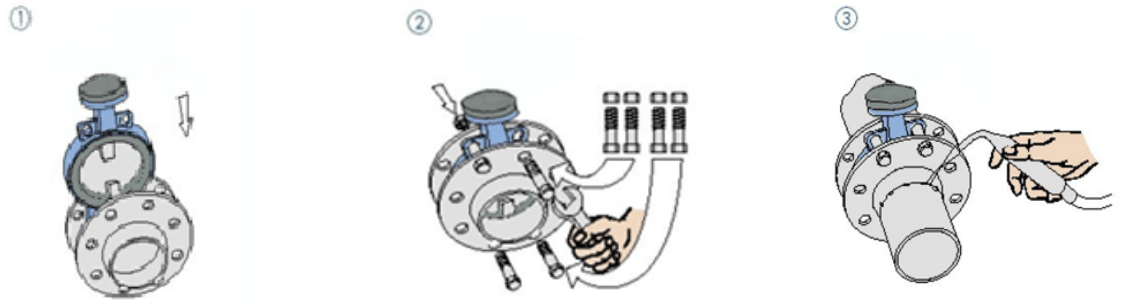
<Fig 3.4 Space required for control valve installation>

※ A : Face to Face Dimension
B : Minimum distance from obstacles (Approx. 300mm)
C : Space for removing the actuator (Approx. 500mm)

⑧ In order to prevent turbulence flow in VALVE INLET and OUTLET and maintain steady pressure, set the front VALVE to MIN. 6D, and the rear to MIN. 4D or above.



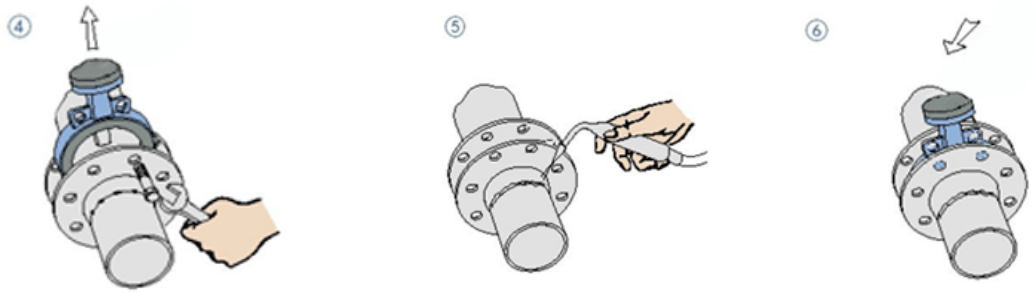
3.1 Rubber Seat Butterfly Valve Installation



1. Place the valve between the two pre-installed flanges as shown. Note that the bolt holes should be aligned

2. Gently insert four pairs of bolts and nuts into the flange hole and tighten the nuts slightly to correct the flatness of the flange.

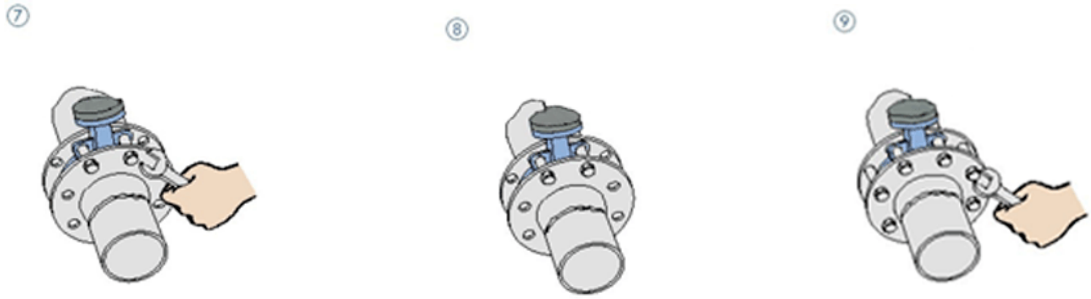
3. Fix the flange to the pipe by spot welding;



4. Remove the valve

5. Weld the flange completely to the pipe

6.Install the valve after the welding joint is cooled. Ensure that the valve has sufficient room in the flange to prevent damage to the valve. Also ensure that the disk has a certain opening



7.Correct the valve position and tighten the four pairs of bolts. (Be careful not to tighten them too tightly)

8.Open the valve to ensure that the valve disk can be opened and closed freely, then slightly open the valve disk

9. Tighten all nuts in cross-balancing

10. Confirm that the valve can be opened and closed freely. Confirm that the valve disk does not touch the pipe.

⚠ **- WARNING -**

1.Do not use a gasket 2. Be sure to install the valve after welding the flange. Do not weld after installing the valve

4. Operation(with actuator system)

4.1 Inspection & Check before operation

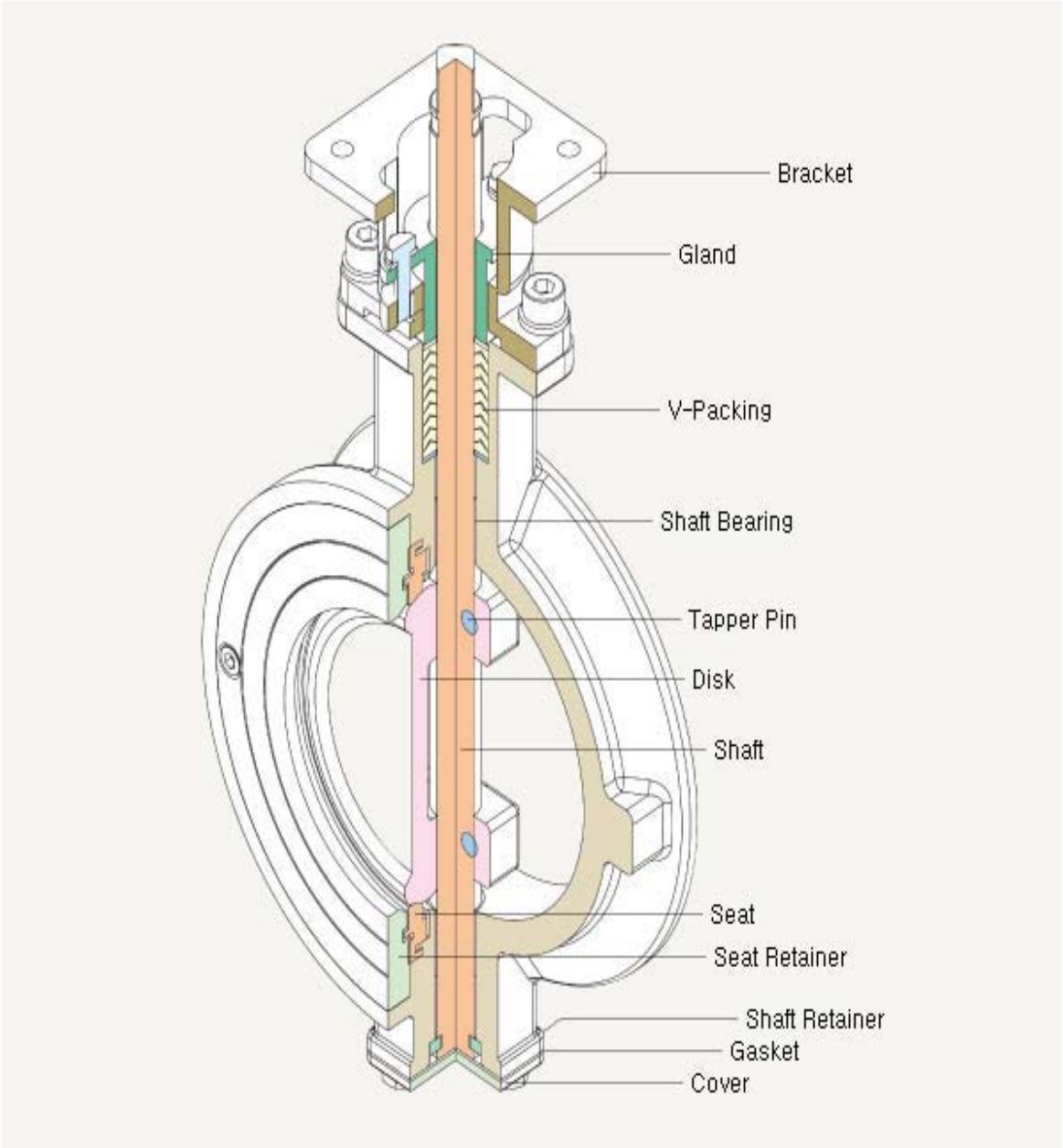
① Check whether there is any leak from all connections including the are pipe connections.
② To check whether there is any leak from gland packing and gaskets, apply a pressure to the pipeline. If any leak is detected, remove pressure from the pipeline and fasten the gland flange nut.
③ Check whether there are any loose nuts at the valve stem and spindle of the actuator.
④ Check whether there is any short circuit in the electric signal system.
⑤ Check whether the system operates accurately and flexibly according to the signals from the controller.
⑥ When raising the pressure, do it slowly. Never raise the pressure quickly.
⑦ Check whether the air pressure required for valve operation is accurately set. (Please see provided data sheet)
⑧ Electrical devices such as positioner, solenoid valve, limit switch etc. are attached to an control valve. Even if the manufacturer has adjusted them, the tubing may be bent or the valve stem`s position become incorrect due to a shock during transportation or careless during assembly. Therefore, it is recommended to readjust the valve during the test run.

⚠ **- WARNING -**

If the actual pressure of use exceeds 20bar,please consult with our technical team about the operating conditions.

5. Part name of High-performance Butterfly Valve

(Depending on customer requirements, the structure may differ slightly)

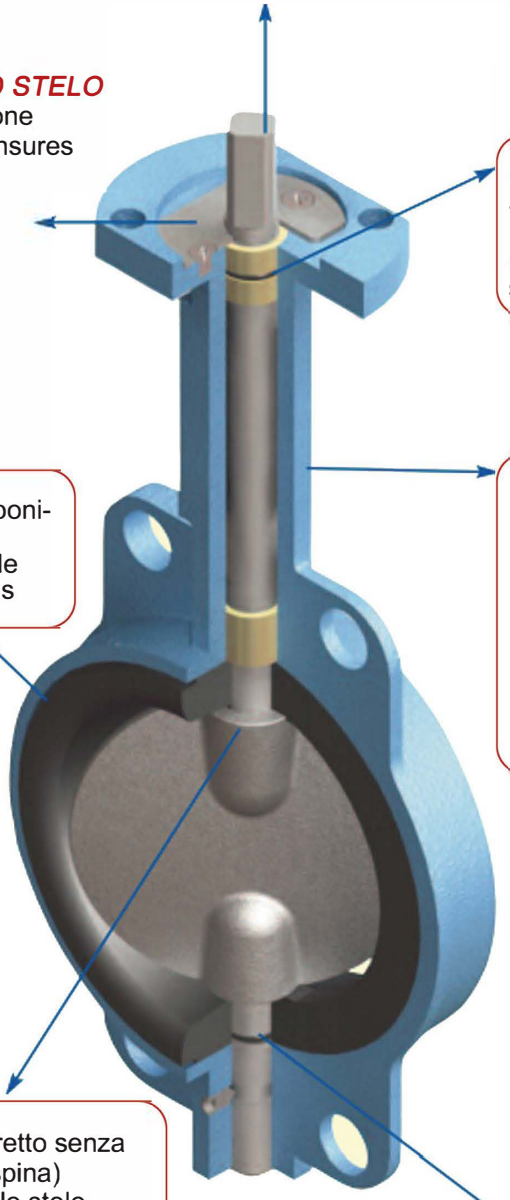


5.1 Rubber seat Butterfly Valve

(Depending on customer requirements, the structure may differ slightly)

STELO con estremità quadra secondo ISO 5211 per facilità di automazione
DRIVE STEM Automation excellence with ISO 5211 standard drive stem

PIASTRINA DI BLOCCAGGIO STELO assicura protezione antiespulsione
STEM RETAINER PLATE ensures blowout protection



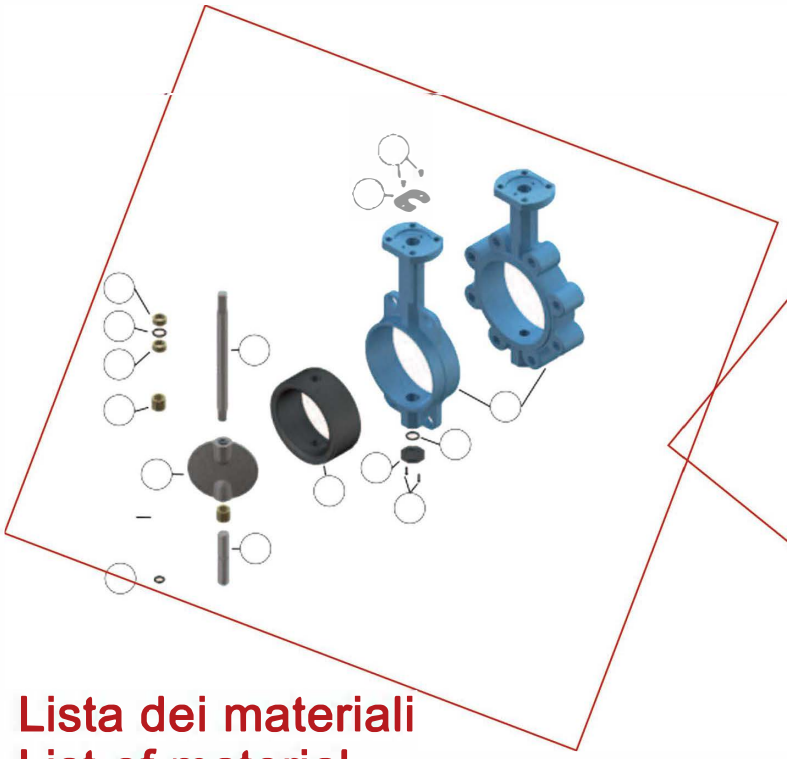
STELO OR stelo garantiscono una lubrificazione a vita ed una protezione secondaria per la tenuta
STEM OR ensures life lubrication and secondary seal protection

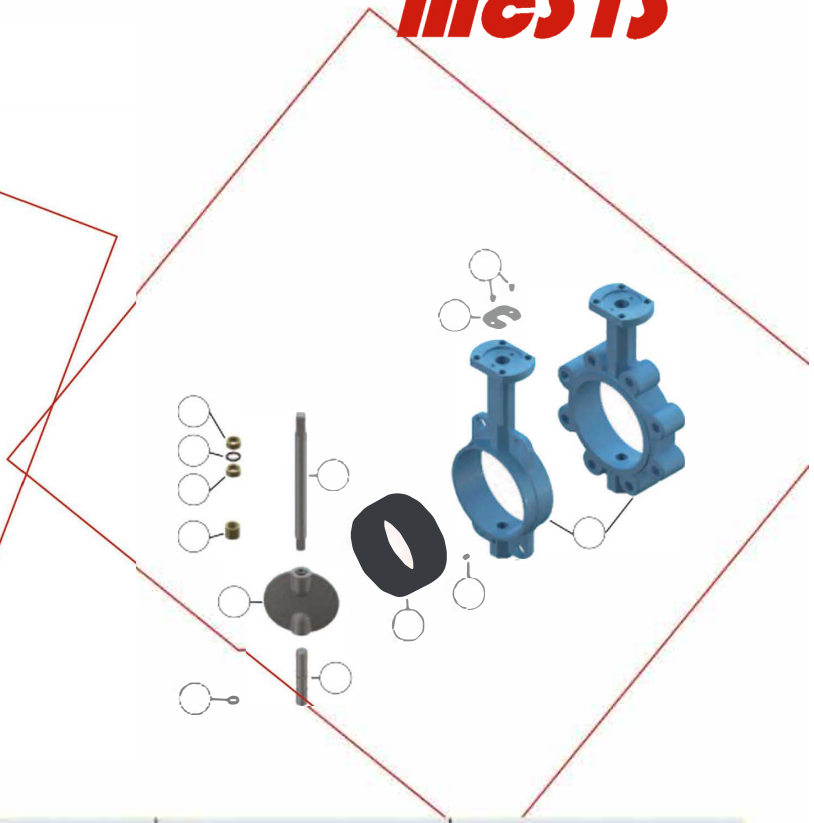
ELASTOMERO sostituibile e disponibile in diversi materiali
SEAT replaceable cartridge style seat available in different materials

CORPO fuso in pezzo unico garantisce resistenza e peso minimo. Dotato di collo prolungato per installazione con tubature con isolamento
BODY casted in 1 pc ensures high strength and minimum weight. Features an extended neck to allow use with insulated pipes

INNESTO STELO – DISCO diretto senza alcun elemento di fissaggio (spina) garantisce al disco di flottare sullo stelo e pertanto di autocentrarsi all'interno della guarnizione, garantendo così una tenuta continua su tutto il profilo
STEM FITS DIRECTLY IN THE DISC without any taper pin. This allows the disc to float on the stem and to self-center inside the seal guaranteeing a perfect seal

ANELLO in RESINA FENOLICA che garantisce stabilità geometrica e pertanto coppie di manovra ridotte e costanti
BACKING RING phenolic thermoset resin backing ring ensures blowout proof protection and geometrical stability





Lista dei materiali
List of material

Items	DESCRIZIONE	MATERIALE - *MATERIALS*	ASTM	Note
1	Corpo *Body*	Ghisa Grigia GG25 DIN1639 - *Cast Iron*	ASTM A126 CLASS B	
		Ghisa Sferoidale GGG40 (DIN1639) *Ductile Iron*	ASTM A536 GR.65-45-18	
		Acciaio al Carbonio GS-C25 (DIN 17245) - *Carbon Steel*	WCB ASTM A216	
		Acciaio Inox CF8M - *Stainless Steel*	ASTM A351	
2 & 4	Stelo *Shaft*	Acciaio Inox SS416 - *Stainless Steel* Acciaio Inox SS316/410/420	ASTM A476	
3	Disco *Disc*	Stainless Steel		
		Ghisa Sferoidale GGG40 (DIN1639) *Ductile Iron*	ASTM A536 GR.65-45-18	Nickel plated (Nylon 11 coated as opt.)
		Acciaio Inox - *Stainless Steel*	ASTM A351 CF8M	Electropolished (mirror finished) as optional
		Bronzo Alluminio - *Alu-Bronze*	B148-954	
5 & 7	Bussola super. e infer. *Upper and Lower Bushing*	Teflon® con grafite Teflon® w/ graphite		
6,8 & 13	O Ring	Buna - Viton®		
9	Tenuta *Seat*	NBR (BUNA)		-10°C +80°C
		EPDM		-20°C +120°C
		EPT		-20°C +140°C
		PTFE over EPDM		-20°C +120°C
		SILICON		-30°C +150°C
		VITON®		-18°C +200°C
10	Vite bloccaggio stelo inf. *Lower stem retainer Screw*	Acciaio Inox *Stainless steel*		
11	Piastrina bloccaggio stelo *Stem Retainer Plate*	Acciaio Inox *Stainless steel*		
12 & 15	Viti - *Screws*	Acciaio Inox - *Stainless steel*		
14	Coperchio Inferiore End Cover	Ghisa GG25 Cast Iron Acciaio Inox - *Stainless steel*		

6. Preventive Maintenance and Troubleshooting

6.1 Troubleshooting(with pneumatic actuator operated)

Table 6-1 shows some remedies to general problems that may occur at the site while using valves.

Problem	Solution
Leak from stem packing (Gland)	1. Fasten the Gland bolt. Check for leaking.
Excessive internal leak when the valve is closed (Seat)	1. Check the air pressure supplied to the valve. 2. If you suspect any damage to disc or seat, disassemble the valve. Visually check disc and seat for damages. Replace them if any damage is found.
The disc does not move	1. Check the air pressure supplied to the valve and the condition of the filter regulator. 2. Disassemble the valve and check whether there are any foreign substances in the disc and seat. 3. Check the design temperature and actual line temperature. 4. Remove the actuator and try to operate the actuator only.
The valve does not repond to input signals.	1. Check the air pressure supplied to the valve. 2. Check the voltage of the accessories. 3. Apply the correct air pressure to the actuator to see whether it works properly or leaks. (If leak, fasten the cylinder cover bolt)

Teflon lined butterfly valve installation and maintenance Instruction

7. 1 Selection and Installation

There are various kinds of valves with different specifications, and we should choose a right valve very carefully. The main considerations are: working Conditions (such as Medium, Pressure, Temperature and Pipe size etc.) Operation requirements (End connection ,Actuator etc)

① Selection of materials:

A105、WCB : Non corrosive medium, such as Oil, Gas, Water, etc.
304、CF8: Nitric acid
316、CF8M: Acetic acid
WC6、WC9: High temperature medium, such as steam of Temp.<540°C
LCB、LC3: Medium of temp.< -29°C
PTFE, PFA, FEP, PP, PO, PE: corrosive medium
Select the right material according to actual medium conditions.

② Pressure and Temperature Class
The max bearable pressures without impact of the valves made from different material under different Pressure and Temperature Class have been listed in Standard ASTM B16.34, which is the basic of valve designing and selection. So that we should select the material (for Body) and pressure class (PN) as per the pressure and temperature class in ASME B16.34. Otherwise,it will cause damage to valve.
Note: When selecting ball valve, you should also consider the working conditions carefully to avoid the overload operation of ball valve.

③ It should add thermal insulation to the valve body in order to protect workers from being scalded or frost-bitten when the operating temperature is too high or too low.

④ The thickness of valve is designed as per the corrosion allowance standard in ASME B16.34. User can calculate the service life of valve according to the corrosion rate of different medium (specially the harmful and poisonous medium), and valve must be replaced after its service life expired.

7.2 Installation

① valve has passed the API 598、API 6D and other relative testing standards before delivery at factory.

② Before you install the valve, you need to inspect it carefully and make sure it is free from foreign matter. And you also need to check if any bolt、n ut or gland flange has loosened ,if yes,please tighten it.

③Before installation, you need to insert some lube oil into all grease fittings of the valve if any.

④ Install the valve in the pipelines as per the end connection designs, and it should not make too much pulling, pressing, bending or tensional stress onto the gate valve body.

7.3 Installation and maintenance instruction for lined valve, pipe & fittings

Lined valves, pipe and fittings as special equipment for corrosion resistance, need special care for product installation and maintenance.

① flange cover of valves or pipe fittings should not open before installation. If it would open for inspection, please rest the flange cover back immediately after inspection in order to protect the liner. Otherwise the sealing surface may be caused distortion because of temperature difference, knock against scratches.

② When the lined valves and fittings are connected to the pipeline, it generally does not recommend using the gasket. However when with dissimilar materials (metal surface) of the flange connection, it should use appropriate gasket sealing surface to protect liner of valve or fittings. Only pure PTFE gasket or PTFE coated carbide shim is appropriate.

③ When the products using in the plant, leakage occurs at high temperature, it should firstlower the temperature down to room temperature and then clean the product, and check the reason of leakage for further maintenance.

④ It is not allowed to do any welding, gas cutting on lined valves, pipe and fittings to prevent any damage to the liner layer.

⑤ It should adjust two flange sealing surface of the products to the same level while installing, and then matched with appropriate bolts (with spring washers) then press the diagonal evenly tighten and proper torque

⑥ If leakage occurs at the flange sealing surface, and the leakage location nuts have been locked. In this situation, it should be appropriate to relax leak location nut around half circle and uniform along the diagonal to tighten again.

⑦ If the above method does not work, it should check PTFE whether is concave-convex indentation or scratch. If yes, use the fine polish paper to grind smooth PTFE surface and reinstall.

⑧ When the products are operating or stopped for a period of time, it should be evenly tighten the bold once each again.

⑨The lined valves, pipe and fittings should be stored in a cool and ventilated room. Do not stack.

If under the sun exposure in summer, because of the thermal expansion coefficient of fluorine plastic is ten times of that of metal parts, there will be a sealing surface becoming warped edge or becoming longer. If the liner out of metal pipe length no more than 3 cm, it will not affect the product quality.

⑩ When not in use for a long time, the lined valve should be slightly opened or open and close on a regular basis, generally every two weeks, in order to prevent distortion or deformation because of compression on sealing surface.