

**TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600
with concentric design and interchangeable soft seat**

CONCENTRIC BUTTERFLY VALVES

MANUAL OF WORKING INSTRUCTIONS, ASSEMBLING, MAINTENANCE AND STORAGE

**CE**

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INSTRUCTIONS MANUAL

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1) GENERAL

This instructions manual contains important information concerning the installation, operation, maintenance and storage of **TTV** butterfly valves, specifically:

For **CONCENTRIC BUTTERFLY VALVES** Wafer, Lug and Flange (S20) type and Double flanged valves (S13):

- Range from **DN32** to **DN1600**
- In the case of ranges **above DN 1600**, specific instructional manuals will be defined

Please read carefully these instructions and keep them for future occasions.

It is important that only well- informed and qualified people operate the valves. The assembly and disassembly of the valve is only allowed for staff of the company **TTV** or personnel authorized by it. If these norms are not followed, then the guarantee will not have any validity.

2) WARNINGS

- Make sure that the valves are used within the limits established in the technical specifications.
- Using the valves above the temperature and pressure limits can damage the internal and the external elements. Using the valves according to the appropriate temperature and pressure relationship as outlined in the specifications contained in this manual.
- Using the valve in corrosive environments, without the proper protection, can damage the internal and the external elements.
- Do not try to dismantle any part of the valve while it is installed in the pipe, and do not do it neither if there is fluid inside.
- Purge the whole installation, being sure there is no air inside when the fluid is liquid.

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- Do not dismantle the shaft while the valve is installed in the pipe; the disc would be carried away through the pipe due to the pressure of the fluid.
- Make sure which is the rotation way of the valve when mounting any type of actuation (there are stops clearly marked and opening / closing icons of the disc at 90°).
- Be careful during its installation as the painting could be damaged.
- When the valves are installed at the pipeline end, it is necessary to install counter flanges with their corresponding bolting.
- It is necessary to perform a valve operation test of the valve at least once a year, taking care to moisten the elastomer before, so that the manoeuvre is smooth and the elastomer is not damaged.
- It is necessary for the concentric valves with rubber elastomer to be installed in the pipe **without any gasket** between the valve and the pipe since **they are not necessary**. The elastomer acts as a gasket ensuring optimal operation of the valve.
- Using protective equipment and following appropriate safety instructions when assembling or handling the valves.
- Minimizing waste generation and/or managing it in a way that promotes its recovery.

3) WORKING CONDITIONS AND TECHNICAL INFORMATION

The standard technical data of the supplied valves is provided below; however, it is the customer's responsibility or the Engineer which leads the project, the decision of choosing the most appropriate materials for the required service, as well as the evaluation of the installation risks.

- Fluids:

The valves are supplied for use with both gases and liquids. Although the valves are designed for a **maximum pressure (PS) of 20 bars**, the recommended fluid flow velocities for uncured elastomers range from 3 m/s for liquids and 30 m/s for gases, which can be increased to 5 m/s and 40 m/s for cured elastomers.

Annex 1 includes the values of the flow coefficients (Kv) depending on the degree of opening of the butterfly valve.

- Working pressure:

These standard valves are delivered for a working pressure of **20 bar maximum**. For special constructions with different pressure or vacuum services, **contact to** the technical department of **TTV**.

The following are the valid general data for the torque on shaft when the fluid is water at room temperature:

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DN	Torque (Nm) – working pressure
	16 bar
32/40	9
50	11
65	20
80	29
100	47
125	82
150	130
200	210
250	360
300	475
350	760
400	1300
450	1600
500	2340
600	3300
700	6250
750	7644
800	8938
900	11760
1000	15876
1100	18535
1200	21000
1300	22320
1400	24800
1500	26540
1600	36000

30% safety factor included

- Working temperature:

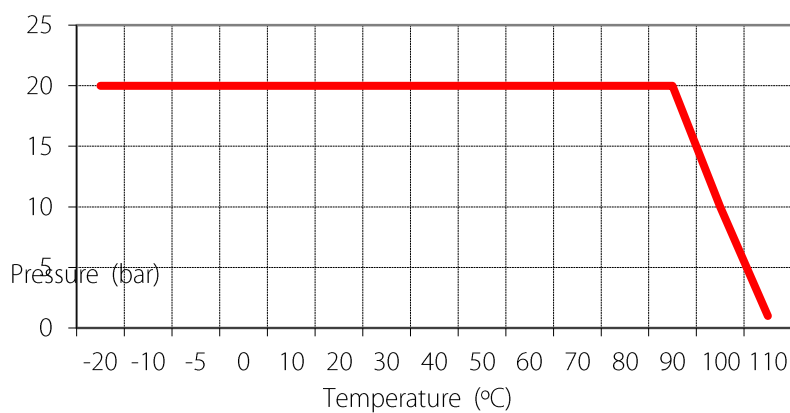
The standard valves delivered are designed to operate at the following ranges of temperatures:

SEAT MATERIAL	TEMPERATURE RANGE
EPDM	-20°C + 110°C
EPDM HIGH TEMPERATURE	-20°C + 130°C
EPICLORHYDRINE	-30°C + 130°C
SILICONE	-40°C + 150°C
POLYURETHANE	-40°C + 90°C
FKM (VITON®)	-5°C + 180°C
NITRILE, HYPALON, NATURAL RUBBER, EPDM NORDEL	-10°C + 90°C

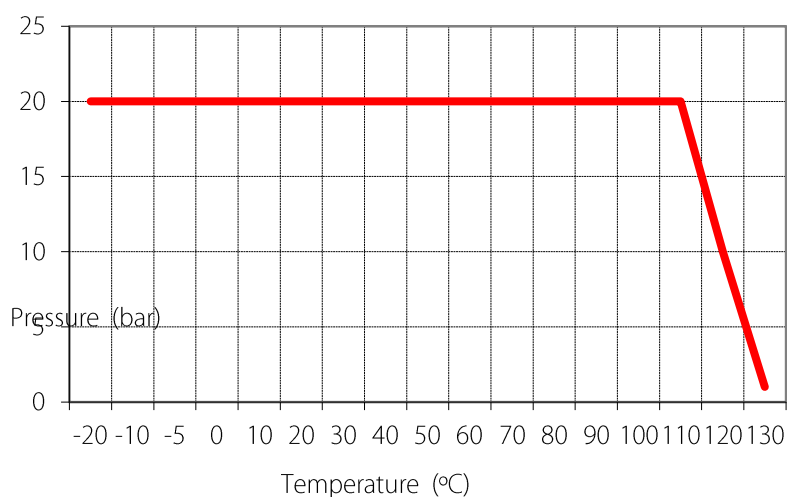
Although the optimal working temperature will depend on the pressure, in order for the valve to operate correctly, the following relationship between temperature and working pressure for each type of elastomer must be taken into account:

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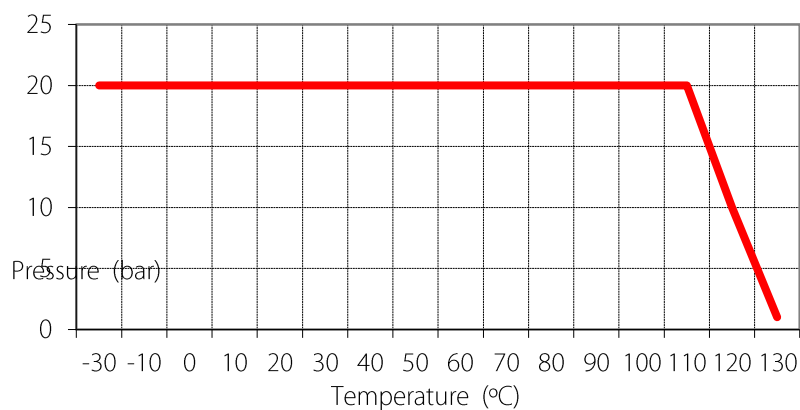
Pressure-Temperature Rating **EPDM 150#**



Pressure-Temperature Rating **EPDM HT 150 #**

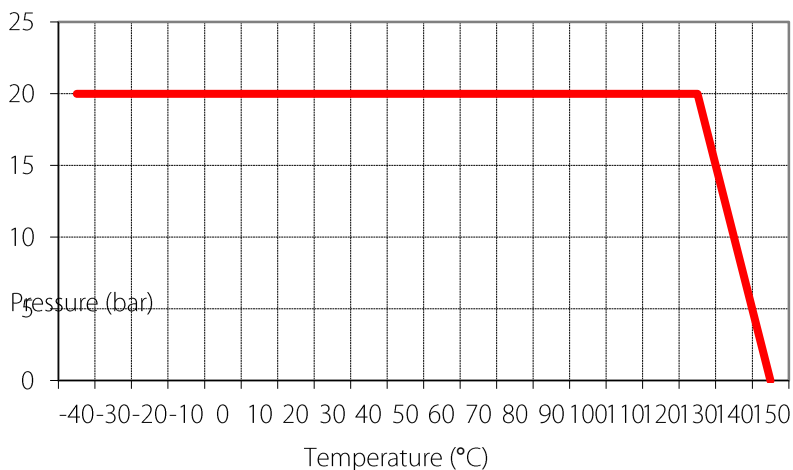


Pressure-Temperature Rating **EPICLOROHYDRIN 150 #**

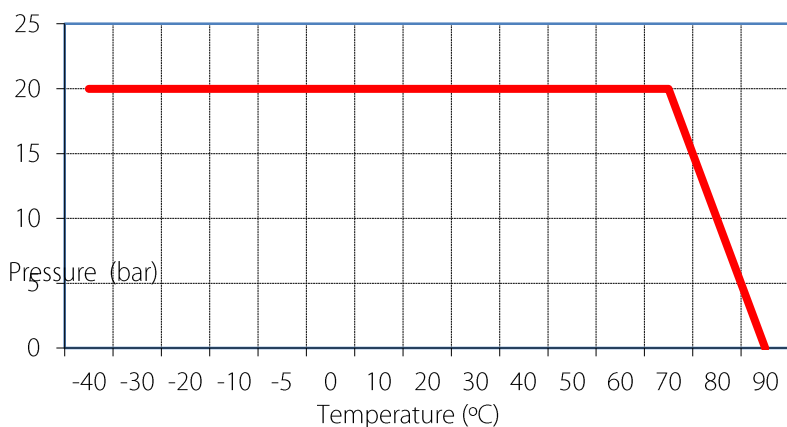


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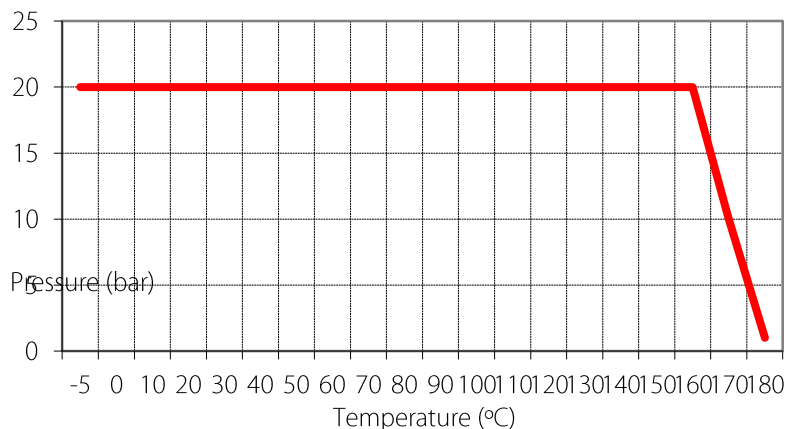
Pressure-Temperature Rating **SILICONE**



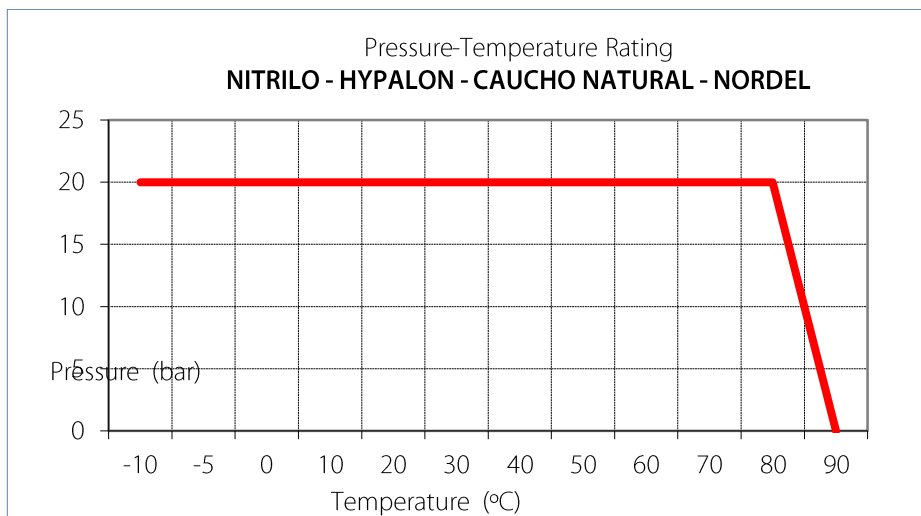
Pressure- Temperature Rating **POLYURETHANE**



Pressure-Temperature Rating **VITON 150#**



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- Ambient temperature:

The **standard valves** supplied **painted** are designed to operate in the range of **-10 °C to +80 °C**. If the **standard valve does not require painting**, the lower range **could reach -50 °C** and the maximum value is as indicated in the previous section, depending on the elastomer used.

- Operation time:

These valves are delivered with a connecting flange as per ISO 5211.

The time of operation will vary depending on the type of operation mounted.

- Elastomer:

It is important to keep in mind that if the supplied elastomer is **vulcanized (It is a piece attached to the body)**, this element **cannot be replaced**.

In this way, **TTV** supplies all **vulcanized double flange valves** and the rest according to the customer's requirements.

Ensuring that the stored elastomer parts maintain their properties, we recommend following and consulting the storage guidelines according to standard DIN 7716 and ISO 2230. Key points to highlight to prolong the shelf life of an elastomer:

1. The storage space designated for elastomers should never be outdoors, must be dry and as dust-free as possible, and moderately ventilated.
2. The storage temperature should be between +15 °C and +25 °C. Under no circumstances should the maximum temperature of +25 °C be exceeded.
3. Items must be protected from any heat sources and water condensation. The relative humidity of the environment should be below 65%.
4. Rubber products should be protected from UV radiation and ozone, preferably in airtight and light-blocking packaging.

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5. It should be verified that there are no chemicals in the storage environment that could accidentally deteriorate the elastomer of interest.
6. At the time of removing the item from the shelf for use, it is recommended to inspect for cracks, cuts, discoloration, or other surface changes. If so, the piece should be properly disposed of. Otherwise, the piece may be put into service.
7. The recommended period for each elastomer is:

CLASSIFICATION	INITIAL STORAGE PERIOD WITHOUT TECHNICAL INSPECTION	EXTENSION OF THE INITIAL PERIOD AFTER A TECHNICAL INSPECTION
NATURAL RUBBER, POLYURETHANE	5 years	2 years
NITRILE, EPICLORHYDRINE	7 years	3 years
EPDM, EPDM HT, SILICONE, FKM, HYPALON, EPDM NORDEL	10 years	5 years

For a composite product that contains components made of different rubbers, the classification should be as the group of the rubber considered most susceptible to degradation.

- Travel:

The standard construction has a rotating travel from 0 to 90 degrees and from 90 to 0 degrees.

- Lubrication:

TTV butterfly are not lubricated.

- Construction:

Movement transmission through the splined shaft and disc up to sizes of DN400 or key systems from DN450 onwards, designed for inside and outside installations. The valves of these models are bidirectional.

- Protection and resistance against corrosion:

Every standard valve is delivered with protection against corrosion for normal environmental conditions.

Before installing the valves in aggressive environmental conditions, make sure you have chosen the appropriate protection.

- Maintenance:

The proper maintenance of valves involves cleaning of surface of valves. This procedure should be carried out softly and with neutral soap. This is advisable to carry out an "open/close" trial as well.

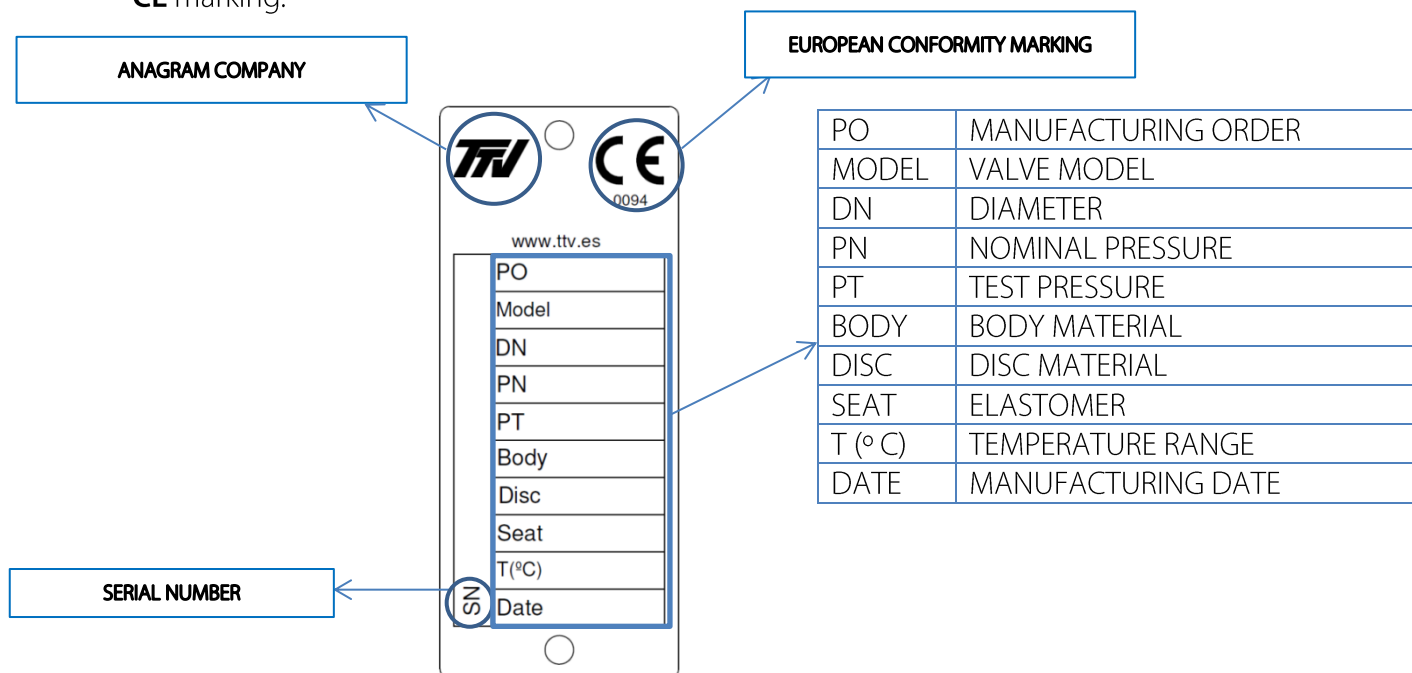
- Valves labelling and designation:

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The type of valve, diameter, pressure design, maximum working pressure, lining, reference, etc. is stated in the valve designation.

TTV valves are delivered with labels containing the following information: **TTV** anagram, type, model, type of operation, pressure design, maximum pressure, lining, manufacturing order, date and **CE** marking.



4) OPERATION AND WAY OF ROTATION

The valve disc is operated by adjusting the actuator. This way, the flow passing through it can be controlled, opening or closing according to the required needs. The most common types are as follows:

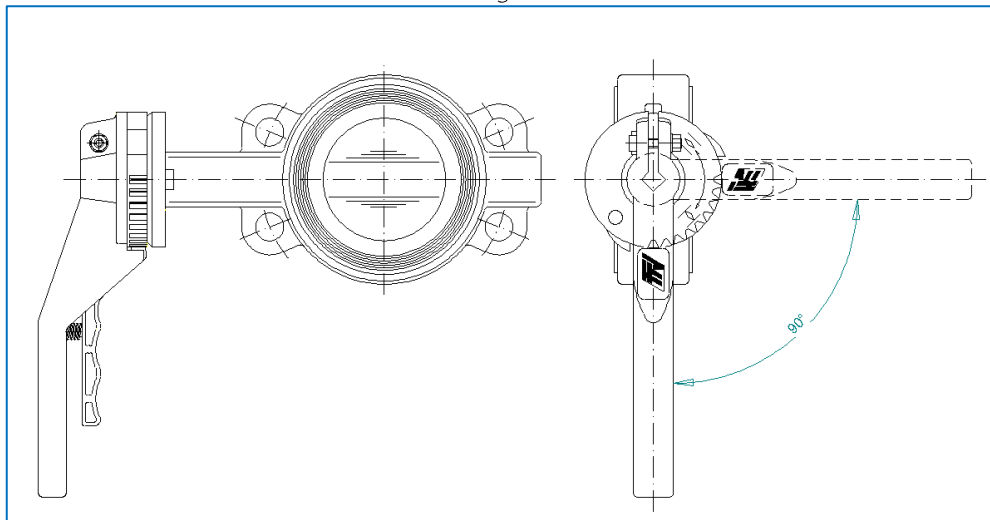
a) Manual actuator with lever

The regulation is carried out by means of the notch flange and the lever's latch. In order to **close** the valve, **the shaft is moved clockwise**; to **open** the valve; the shaft is moved **in the opposite direction**.

For this purpose, the latch is clutched from the flange and it is turned in the appropriate direction to open or to close the valve. Then the latch is clutched again in the flange in the desired position.

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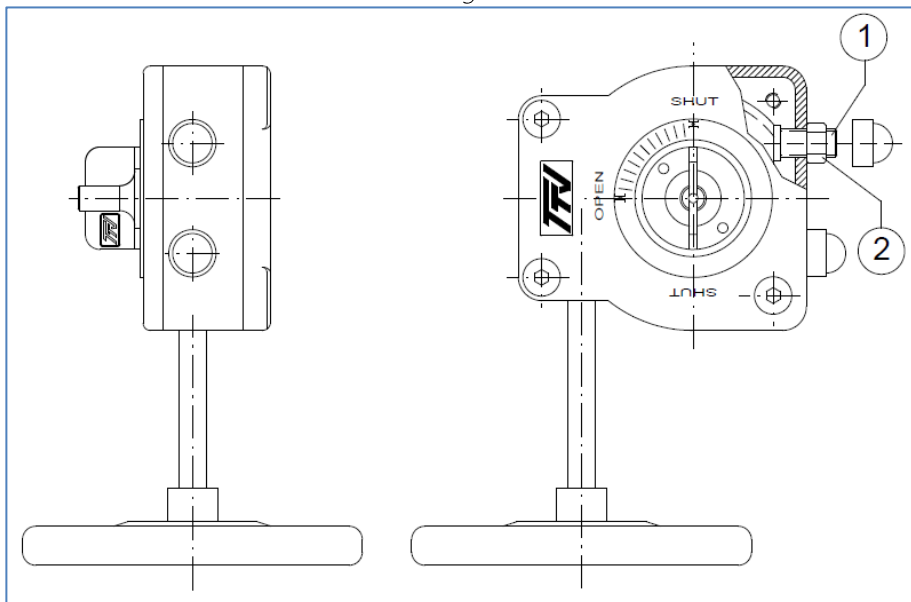
See figure A



b) Manual actuator with Gearbox

Before the installation of the valve, the closing position of the disc must be adjusted. To do this, the stops (positions 1 and 2 of figure B) are adjusted according to the instructions associated with the type of reducer incorporated. Once adjusted, the valve will **open** by turning the **handle clockwise**, and to **close** it, turn it **counter clockwise**.

See figure B



c) Pneumatic actuator

Request working instructions, assembly and maintenance for the specific actuator.

d) Actuator with electric actuator

Request working instructions, assembly and maintenance for the specific electric actuator.

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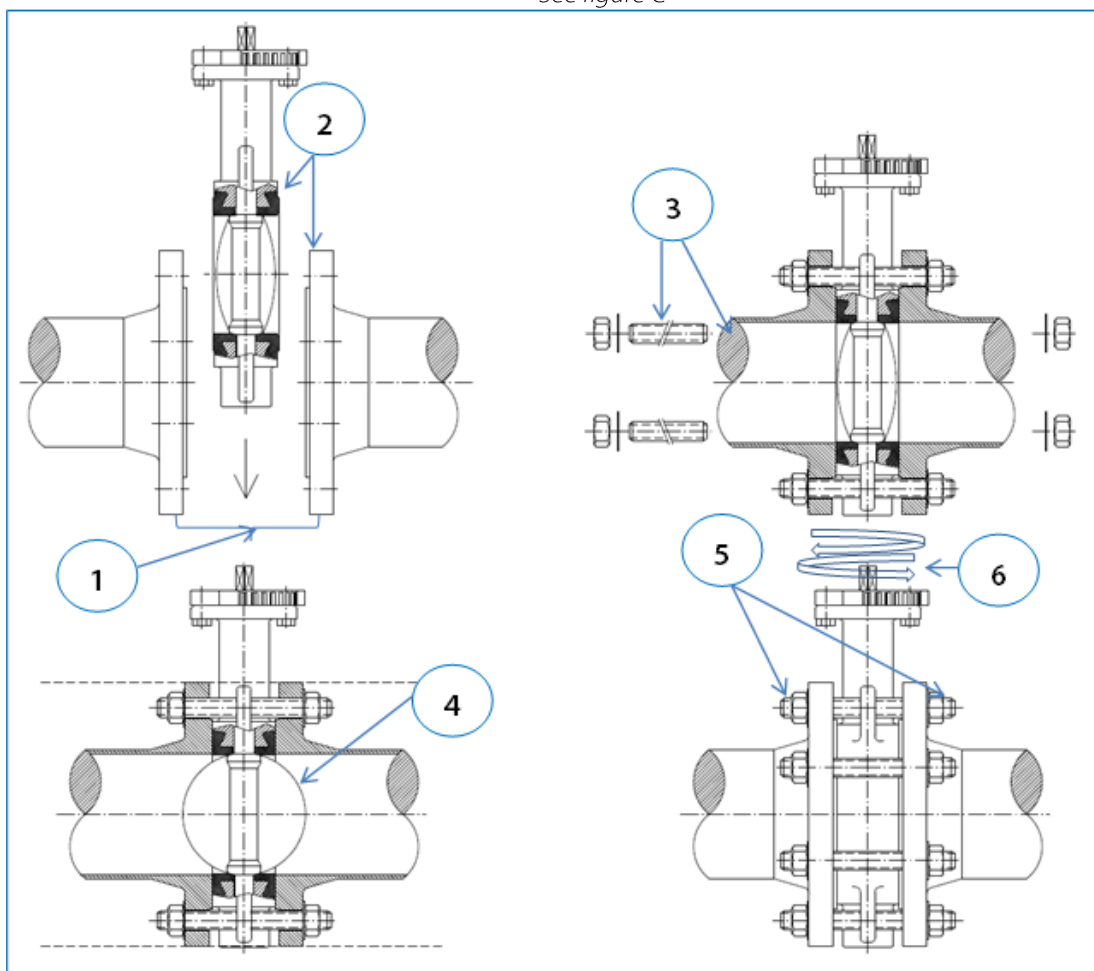
5) INSTALLATION INSTRUCTIONS

5.1 Installation of Wafer and Flange type valves

The valves are usually delivered slightly open. Check they are so before proceeding to assemble them following this process:

1. Checking that the space to accommodate the valve is adequate.
2. Locating the valve aligned with the pipe according to section 5.4 and annex 2 of this manual.
3. Positioning some studs to properly relate it to the pipe.
4. Fully opening the disk to 90°, placing the remaining studs with their nuts.
5. Tightening all the nuts by triangulation in order to leave all the studs evenly tightened and not producing deformations in the elastomer.
6. Checking that the valve closes and opens without any problem.

See figure C

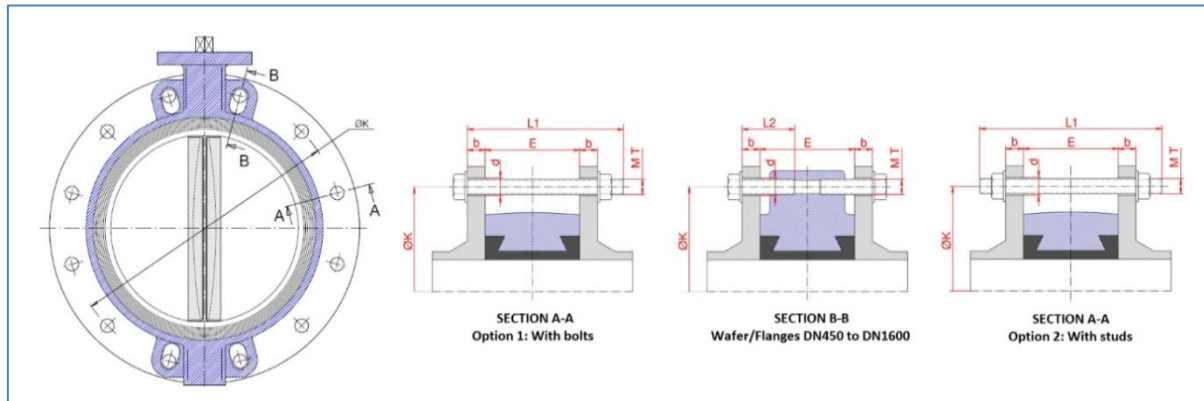


NOTE (ONLY TO BE APPLIED TO FLANGE TYPE VALVES):

IT IS NOT ALLOWED TO USE SCREWS WITH NUTS TO FIX THE FLANGES OF THE VALVE TO THE PIPE FLANGES, THIS MUST BE DONE WITH COMPLETE PASSING STUDS AND NUTS.

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WAFFER/FLANGES – DIN PN10



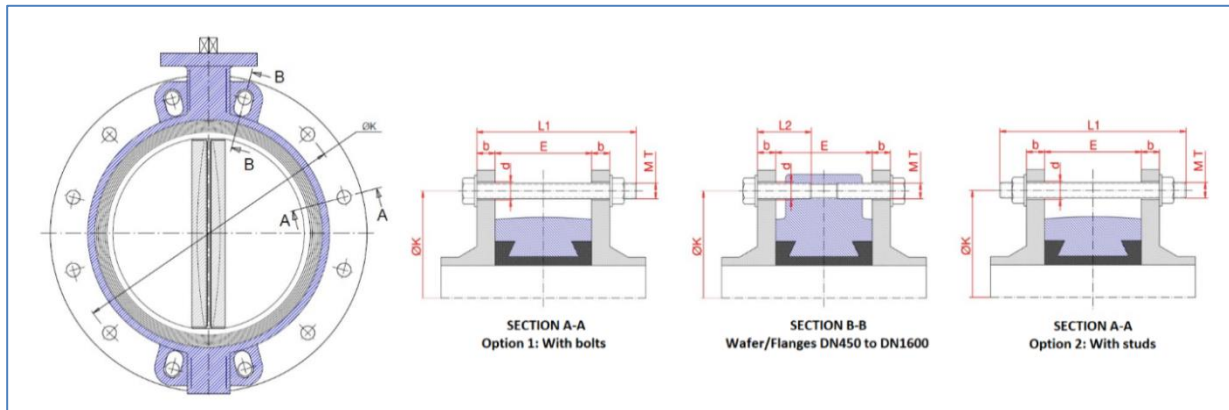
OPTION 1: WITH BOLTS	VALVE		FLANGE				BOLTS A-A			BOLTS B-B		
	DN	E	b	ØK	N° Tal	d	N° Bolts.	M T1	L1	N° Bolts.	M T1	L2
	32	33	16	100	4	18	4	M16	90	-	-	-
	40	33	16	110	4	18	4	M16	90	-	-	-
	50	43	18	125	4	18	4	M16	100	-	-	-
	65	46	18	145	4	18	4	M16	105	-	-	-
	80	46	20	160	8	18	8	M16	110	-	-	-
	100	52	20	180	8	18	8	M16	120	-	-	-
	125	56	22	210	8	18	8	M16	130	-	-	-
	150	56	22	240	8	23	8	M20	130	-	-	-
	200	60	24	295	8	23	8	M20	140	-	-	-
	250	68	26	350	12	23	12	M20	150	-	-	-
	300	78	26	400	12	23	12	M20	160	-	-	-
	350	78	26	460	16	23	16	M20	160	-	-	-
	400	102	26	515	16	27	16	M24	190	-	-	-
	450	114	28	565	20	27	16	M24	210	4+4	M24	65
	500	127	28	620	20	27	16	M24	230	4+4	M24	65
	600	154	28	725	20	30	16	M27	260	4+4	M27	70

OPTION 2: WITH STUDS	VALVE		FLANGE				STUDS A-A			STUDS B-B		
	DN	E	b	ØK	N° Tal	d	N° Bolts.	M T1	L1	N° Bolts.	M T1	L2
	32	33	16	100	4	18	4	M16	120	-	-	-
	40	33	16	110	4	18	4	M16	120	-	-	-
	50	43	18	125	4	18	4	M16	130	-	-	-
	65	46	18	145	4	18	4	M16	140	-	-	-
	80	46	20	160	8	18	8	M16	140	-	-	-
	100	52	20	180	8	18	8	M16	150	-	-	-
	125	56	22	210	8	18	8	M16	150	-	-	-
	150	56	22	240	8	23	8	M20	160	-	-	-
	200	60	24	295	8	23	8	M20	170	-	-	-
	250	68	26	350	12	23	12	M20	180	-	-	-
	300	78	26	400	12	23	12	M20	190	-	-	-
	350	78	26	460	16	23	16	M20	190	-	-	-
	400	102	26	515	16	27	16	M24	220	-	-	-
	450	114	28	565	20	27	16	M24	230	4+4	M24	65
	500	127	28	620	20	27	16	M24	250	4+4	M24	65
	600	154	28	725	20	30	16	M27	280	4+4	M27	70

Diameters greater than DN600, please consult the point 5.4

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WAFFER/FLANGES – DIN PN16

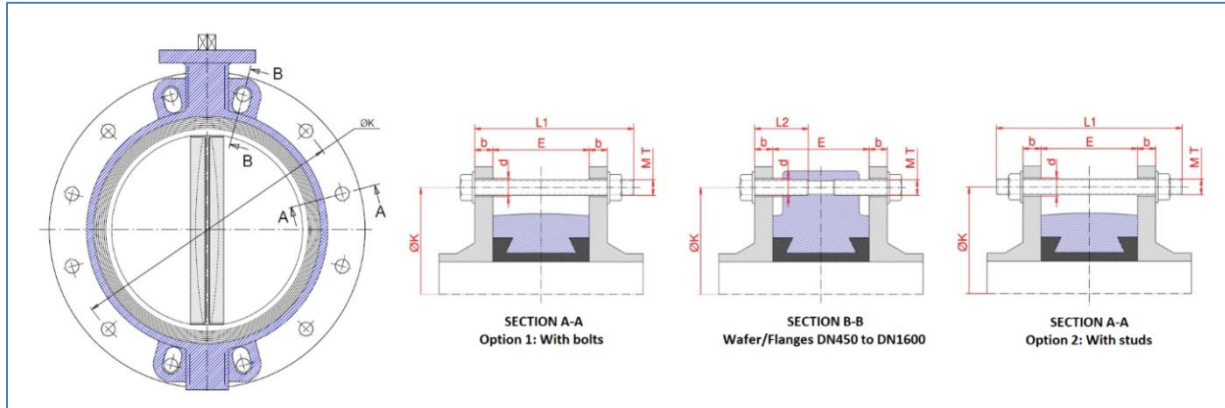


OPTION 1: WITH BOLTS	VALVE		FLANGE				BOLTS A-A			BOLTS B-B		
	DN	E	b	ØK	N° Tal	d	N° Bolts.	M T1	L1	N° Bolts.	M T1	L2
	32	33	16	100	4	18	4	M16	90	-	-	-
	40	33	16	110	4	18	4	M16	90	-	-	-
	50	43	18	125	4	18	4	M16	100	-	-	-
	65	46	18	145	4	18	4	M16	105	-	-	-
	80	46	20	160	8	18	8	M16	110	-	-	-
	100	52	20	180	8	18	8	M16	120	-	-	-
	125	56	22	210	8	18	8	M16	130	-	-	-
	150	56	22	240	8	23	8	M20	130	-	-	-
	200	60	24	295	12	23	12	M20	140	-	-	-
	250	68	26	355	12	27	12	M24	160	-	-	-
	300	78	28	410	12	27	12	M24	170	-	-	-
	350	78	30	470	16	27	16	M24	170	-	-	-
	400	102	32	525	16	30	16	M27	210	-	-	-
	450	114	34	585	20	30	16	M27	230	4+4	M27	70
	500	127	34	650	20	33	16	M30	240	4+4	M30	70
	600	154	36	770	20	36	16	M33	280	4+4	M33	80
OPTION 2: WITH STUDS	VALVE		FLANGE				STUDS A-A			BOLTS B-B		
	DN	E	b	ØK	N° Tal	d	N° Bolts.	M T1	L1	N° Bolts.	M T1	L2
	32	33	16	100	4	18	4	M16	120	-	-	-
	40	33	16	110	4	18	4	M16	120	-	-	-
	50	43	18	125	4	18	4	M16	130	-	-	-
	65	46	18	145	4	18	4	M16	140	-	-	-
	80	46	20	160	8	18	8	M16	140	-	-	-
	100	52	20	180	8	18	8	M16	150	-	-	-
	125	56	22	210	8	18	8	M16	160	-	-	-
	150	56	22	240	8	23	8	M20	160	-	-	-
	200	60	24	295	12	23	12	M20	170	-	-	-
	250	68	26	355	12	27	12	M24	200	-	-	-
	300	78	28	410	12	27	12	M24	210	-	-	-
	350	78	30	470	16	27	16	M24	220	-	-	-
	400	102	32	525	16	30	16	M27	230	-	-	-
	450	114	34	585	20	30	16	M27	250	4+4	M27	70
	500	127	34	650	20	33	16	M30	270	4+4	M30	70
	600	154	36	770	20	36	16	M33	310	4+4	M33	80

Diameters greater than DN600, please consult the point 5.4

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WAFFER/FLANGES – ANSI 150 lbs.



OPTION 1: WITH BOLTS	VALVE		FLANGES				BOLTS A-A			BOLTS B-B		
	DN	E	b	ØK	Nº Ta	d	Nº Bolts.	MT1	L1	Nº Bolts.	MT1	L2
	32	33	15.9	88.9	4	15.9	4	1/2"	90	-	-	-
	40	33	17.5	98.4	4	15.9	4	1/2"	90	-	-	-
	50	43	19	120.6	4	19	4	5/8"	110	-	-	-
	65	46	22.2	139.7	4	19	4	5/8"	120	-	-	-
	80	46	23.8	152.4	4	19	4	5/8"	120	-	-	-
	100	52	23.8	190.5	8	19	8	5/8"	130	-	-	-
	125	56	23.8	215.9	8	22.2	8	3/4"	130	-	-	-
	150	56	25.4	241.3	8	22.2	8	3/4"	140	-	-	-
	200	60	28.6	298.4	8	22.2	8	3/4"	150	-	-	-
	250	68	30.2	361.9	12	25.4	12	7/8"	160	-	-	-
	300	78	31.7	431.8	12	25.4	12	7/8"	180	-	-	-
	350	78	34.9	476.2	12	28.6	12	1"	190	-	-	-
	400	102	36.5	539.7	16	28.6	16	1"	210	-	-	-
	450	114	39.7	577.8	16	31.7	12	1 1/8"	240	4+4	1 1/8"	80
	500	127	42.9	635	20	31.7	16	1 1/8"	260	4+4	1 1/8"	80
	600	154	47.6	749.3	20	34.9	16	1 1/3"	300	4+4	1 1/4"	85
OPTION 2: WITH STUDS	VALVE		FLANGE				STUDS A-A			BOLTS B-B		
	DN	E	b	ØK	Nº Ta	d	Nº Bolts.	MT1	L1	Nº Bolts.	MT1	L2
	32	33	15.9	88.9	4	15.9	4	1/2"	110	-	-	-
	40	33	17.5	98.4	4	15.9	4	1/2"	110	-	-	-
	50	43	19	120.6	4	19	4	5/8"	140	-	-	-
	65	46	22.2	139.7	4	19	4	5/8"	150	-	-	-
	80	46	23.8	152.4	4	19	4	5/8"	150	-	-	-
	100	52	23.8	190.5	8	19	8	5/8"	160	-	-	-
	125	56	23.8	215.9	8	22.2	8	3/4"	170	-	-	-
	150	56	25.4	241.3	8	22.2	8	3/4"	180	-	-	-
	200	60	28.6	298.4	8	22.2	8	3/4"	180	-	-	-
	250	68	30.2	361.9	12	25.4	12	7/8"	200	-	-	-
	300	78	31.7	431.8	12	25.4	12	7/8"	210	-	-	-
	350	78	34.9	476.2	12	28.6	12	1"	220	-	-	-
	400	102	36.5	539.7	16	28.6	16	1"	250	-	-	-
	450	114	39.7	577.8	16	31.7	12	1 1/8"	280	4+4	1 1/8"	80
	500	127	42.9	635	20	31.7	16	1 1/8"	300	4+4	1 1/8"	80
	600	154	47.6	749.3	20	34.9	16	1 1/3"	340	4+4	1 1/4"	85

Diameters greater than DN600, please consult the point 5.4

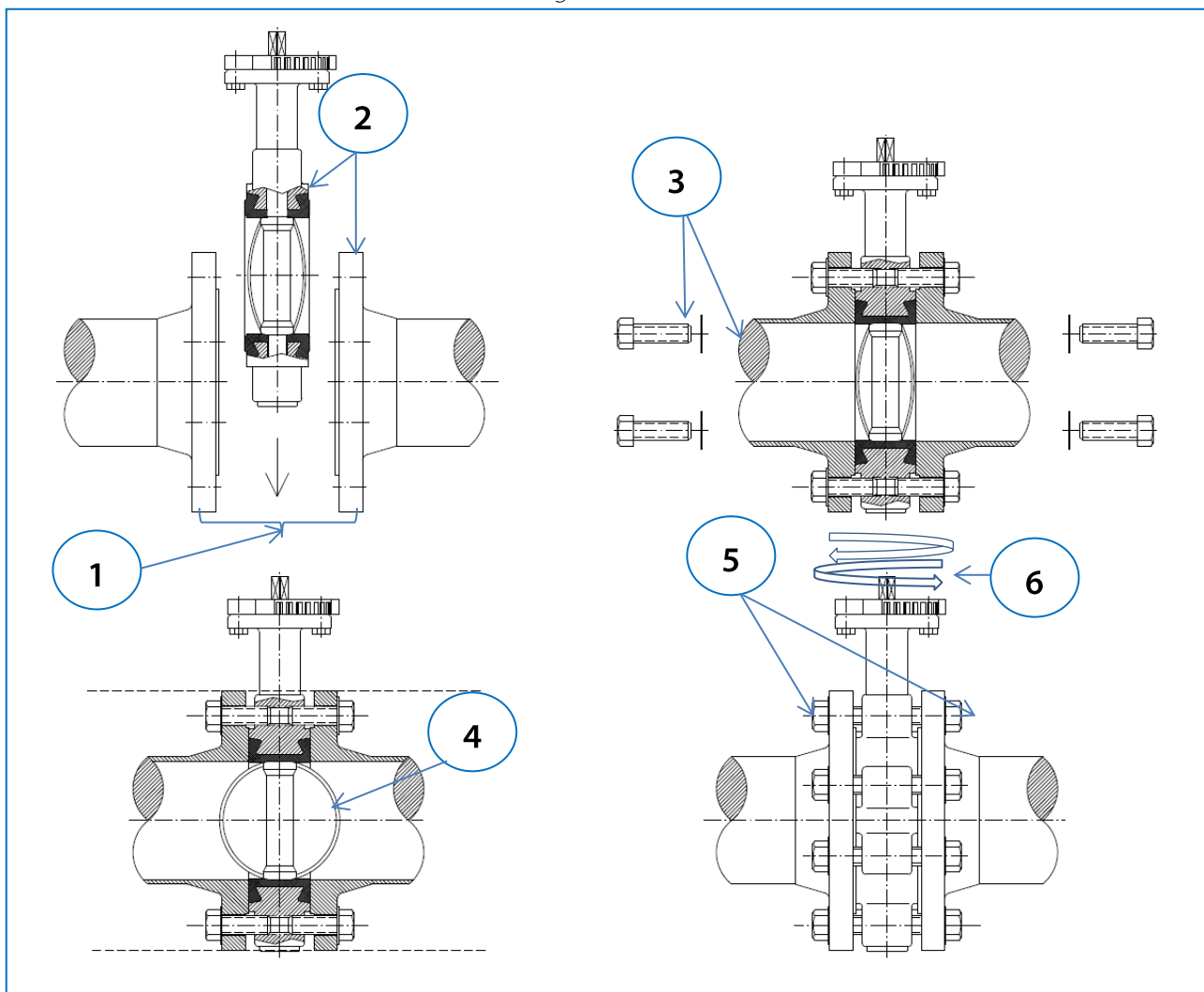
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5.2 Installation of LUG type valve

It follows the same procedure detailed for the other type of valves.

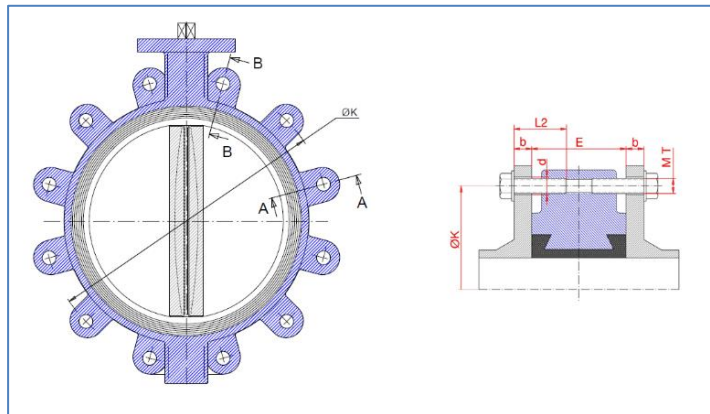
These valves should be installed with screws, whose length allows the perfect tightening between the flanges and the pipe. These screws cannot be longer than allowed.

See figure D



TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

LUG – DIN PN10-16



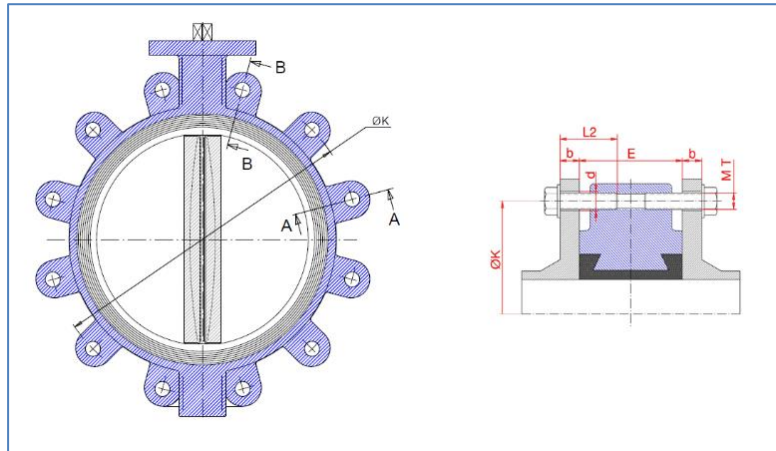
PN 10	VALVE		FLANGE				BOLTS		
	DN	E	b	ØK	Nº Tal	d	Nº Torn.	MT1	L2
	32	33	16	100	4	18	4+4	M16	30
	40	33	16	110	4	18	4+4	M16	30
	50	43	18	125	4	18	4+4	M16	35
	65	46	18	145	4	18	4+4	M16	35
	80	46	20	160	8	18	8+8	M16	40
	100	52	20	180	8	18	8+8	M16	40
	125	56	22	210	8	18	8+8	M16	45
	150	56	22	240	8	23	8+8	M20	45
	200	60	24	295	8	23	8+8	M20	50
	250	68	26	350	12	23	12+12	M20	55
	300	78	26	400	12	23	12+12	M20	60
	350	78	26	460	16	23	16+16	M20	65
	400	102	26	515	16	27	16+16	M24	70
	450	114	28	565	20	27	20+20	M24	70
500	127	28	620	20	27	20+20	M24	70	
600	154	28	725	20	30	20+20	M27	70	

PN 16	VALVE		FLANGE				BOLTS		
	DN	E	b	ØK	Nº Tal	d	Nº Torn.	MT1	L2
	32	33	16	100	4	18	4+4	M16	30
	40	33	16	110	4	18	4+4	M16	30
	50	43	18	125	4	18	4+4	M16	35
	65	46	18	145	4	18	4+4	M16	35
	80	46	20	160	8	18	8+8	M16	40
	100	52	20	180	8	18	8+8	M16	40
	125	56	22	210	8	18	8+8	M16	45
	150	56	22	240	8	23	8+8	M20	45
	200	60	24	295	12	23	12+12	M20	50
	250	68	26	355	12	27	12+12	M24	55
	300	78	28	410	12	27	12+12	M24	60
	350	78	30	470	16	27	16+16	M24	65
	400	102	32	525	16	30	16+16	M27	70
	450	114	34	585	20	30	20+20	M27	80
500	127	34	650	20	33	20+20	M30	85	
600	154	36	770	20	36	20+20	M33	90	

Diameters greater than DN600, please consult the point 5.4

TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

LUG – ANSI 150 lbs.



ANSI 150 lbs	VALVE		FLANGE				BOLTS			
	DN	E	b	ØK	Nº Tal	d	Nº Torn.	M T1	Hilos por pulgada	L2
	32	33	15.9	88.9	4	15.9	4+4	1/2"	12	30
	40	33	17.5	98.4	4	15.9	4+4	1/2"	12	30
	50	43	19	120.6	4	19	4+4	5/8"	11	35
	65	46	22.2	139.7	4	19	4+4	5/8"	11	40
	80	46	23.8	152.4	4	19	4+4	5/8"	11	45
	100	52	23.8	190.5	8	19	8+8	5/8"	11	45
	125	56	23.8	215.9	8	22.2	8+8	3/4"	10	50
	150	56	25.4	241.3	8	22.2	8+8	3/4"	10	50
	200	60	28.6	298.4	8	22.2	8+8	3/4"	10	55
	250	68	30.2	361.9	12	25.4	12+12	7/8"	9	60
	300	78	31.7	431.8	12	25.4	12+12	7/8"	9	65
	350	78	34.9	476.2	12	28.6	12+12	1"	8	70
	400	102	36.5	539.7	16	28.6	16+16	1"	8	80
	450	114	39.7	577.8	16	31.7	16+16	1.1/8"	7	90
	500	127	42.9	635	20	31.7	20+20	1.1/8"	7	90
	600	154	47.6	749.3	20	34.9	20+20	1.1/4"	7	90

Diameters greater than DN600, please consult the point 5.4

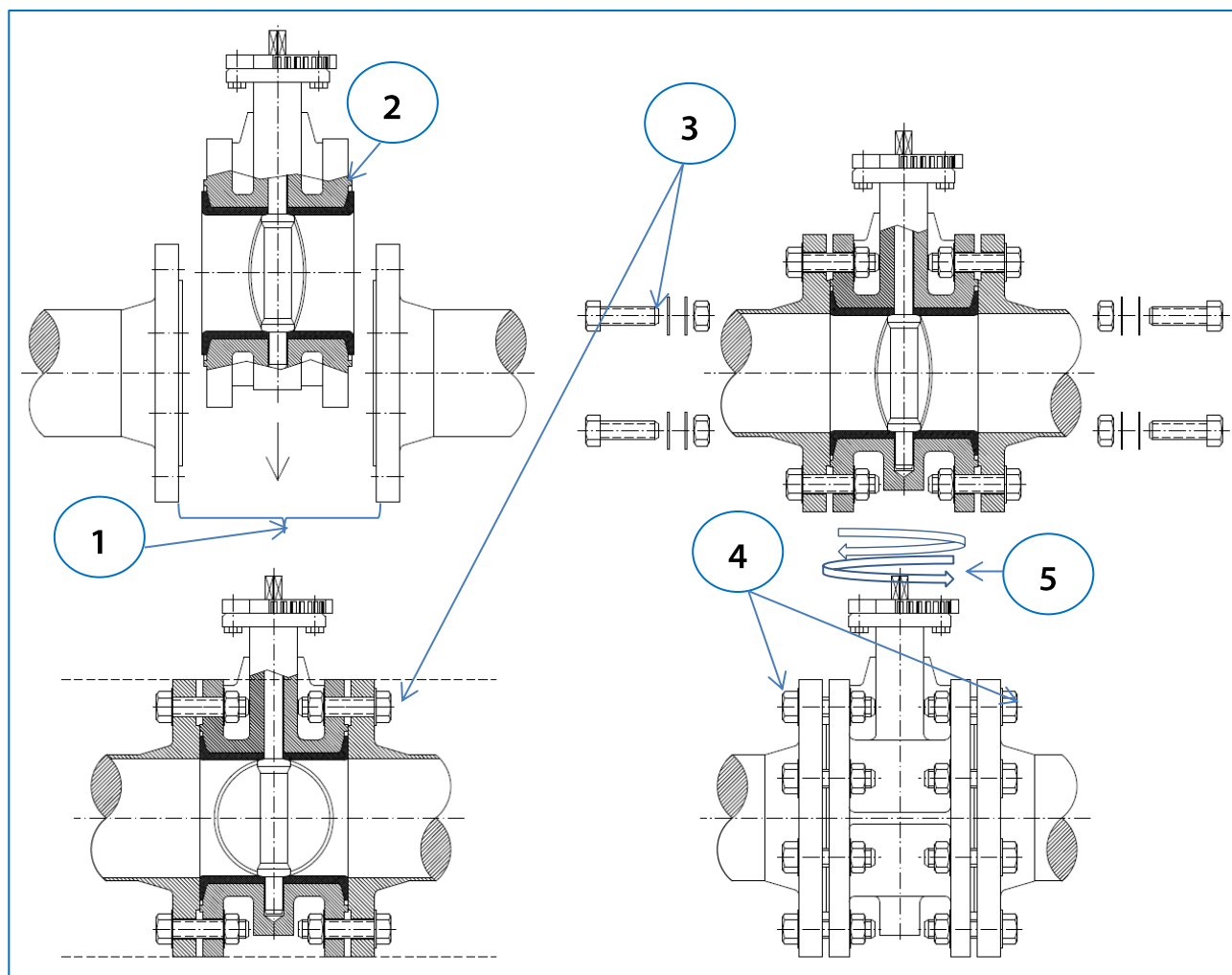
TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

5.3 Installation of double flanged type valve

To install this type of valve, the following steps will be followed:

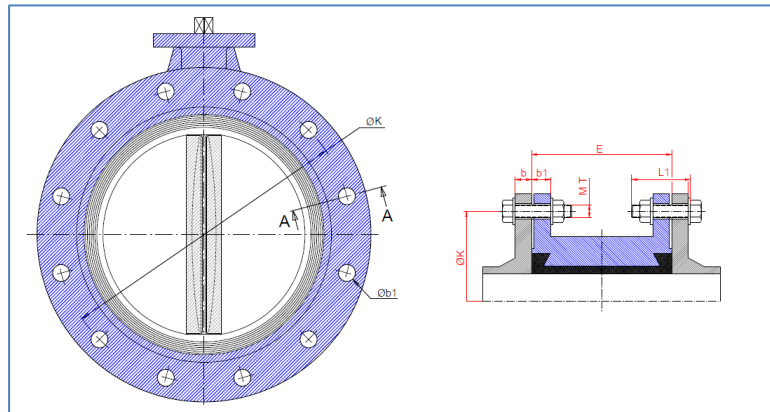
1. Checking that the space to accommodate the valve is adequate.
2. Locating the valve aligned with the pipe according to section 5.4 and annex 2 of this manual.
3. Position some bolts to properly connect it to the pipe.
4. Tighten all the nuts by triangulation in order to uniformly tighten all the bolts.
5. Verify that the valve opens and closes normally.

See figure E



TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

DOUBLE FLANGES S.13 – PN10-16



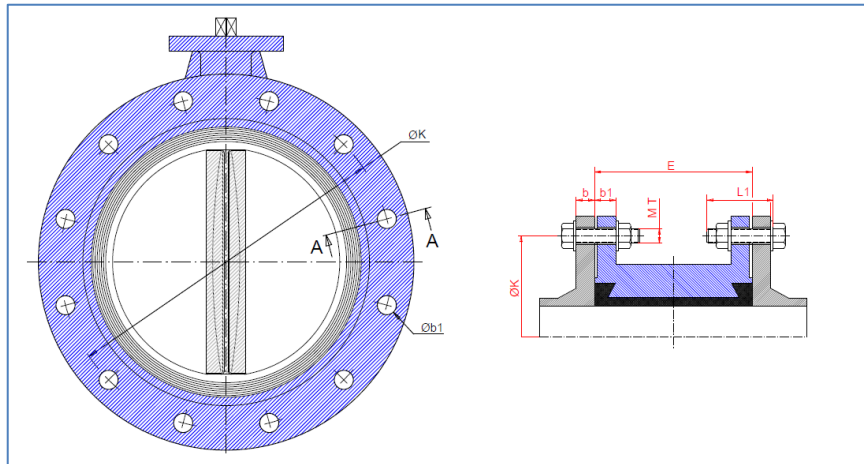
PN 10	VALVE		FLANGE					BOLTS		
	DN	E	b	b1	ØK	Nº Tal	d	Nº Torn.	MT1	L1
	32	106	16	16	100	4	18	4+4	M16	60
	40	106	16	16	110	4	18	4+4	M16	60
	50	108	18	17	125	4	18	4+4	M16	70
	65	112	18	19	145	4	18	4+4	M16	70
	80	114	20	21	160	8	18	8+8	M16	70
	100	127	20	21	180	8	18	8+8	M16	70
	125	140	22	22	210	8	18	8+8	M16	80
	150	140	22	25	240	8	23	8+8	M20	80
	200	152	24	26	295	8	23	8+8	M20	80
	250	165	26	28	350	12	23	12+12	M20	90
	300	178	26	29	400	12	23	12+12	M20	90
	350	190	26	32	460	16	23	16+16	M20	90
	400	216	26	32	515	16	27	16+16	M24	100
	450	222	28	35	565	20	27	20+20	M24	100
	500	229	28	34	620	20	27	20+20	M24	100
	600	267	28	35	725	20	30	20+20	M27	100

PN 16	VALVE		FLANGE					BOLTS		
	DN	E	b	b1	ØK	Nº Tal	d	Nº Torn.	MT1	L2
	32	106	16	16	100	4	18	4+4	M16	60
	40	106	16	16	110	4	18	4+4	M16	60
	50	108	18	17	125	4	18	4+4	M16	70
	65	112	18	19	145	4	18	4+4	M16	70
	80	114	20	21	160	8	18	8+8	M16	70
	100	127	20	21	180	8	18	8+8	M16	70
	125	140	22	22	210	8	18	8+8	M16	80
	150	140	22	25	240	8	23	8+8	M20	80
	200	152	24	26	295	12	23	12+12	M20	80
	250	165	26	28	355	12	27	12+12	M24	90
	300	178	28	29	410	12	27	12+12	M24	90
	350	190	30	32	470	16	27	16+16	M24	100
	400	216	32	32	525	16	30	16+16	M27	100
	450	222	34	35	585	20	30	20+20	M27	110
	500	229	34	34	650	20	33	20+20	M30	110
	600	267	36	35	770	20	36	20+20	M33	110

Diameters greater than DN600, please consult the point 5.4

TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

DOUBLE FLANGES S.13 – ANSI 150 lbs.



	VALVE		FLANGE					BOLTS			
	DN	E	b	b1	ØK	N° Tal	d	N° Torn.	M T1	Hilos pulgada	L1
ANSI 150 Lbs	32	106	15.9	16	88.9	4	15.9	4+4	1/2"	12	60
	40	106	17.5	16	98.4	4	15.9	4+4	1/2"	12	70
	50	108	19	17	120.6	4	19	4+4	5/8"	11	70
	65	112	22.2	19	139.7	4	19	4+4	5/8"	11	70
	80	114	23.8	21	152.4	4	19	4+4	5/8"	11	80
	100	127	23.8	21	190.5	8	19	8+8	5/8"	11	80
	125	140	23.8	22	215.9	8	22.2	8+8	3/4"	10	80
	150	140	25.4	25	241.3	8	22.2	8+8	3/4"	10	90
	200	152	28.6	26	298.4	8	22.2	8+8	3/4"	10	90
	250	165	30.2	28	361.9	12	25.4	12+12	7/8"	9	100
	300	178	31.7	29	431.8	12	25.4	12+12	7/8"	9	100
	350	190	34.9	32	476.2	12	28.6	12+12	1"	8	110
	400	216	36.5	32	539.7	16	28.6	16+16	1"	8	110
	450	222	39.7	35	577.8	16	31.7	16+16	1.1/8"	7	120
	500	229	42.9	34	635	20	31.7	20+20	1.1/8"	7	120
	600	267	47.6	35	749.3	20	34.9	20+20	1.1/4"	7	130

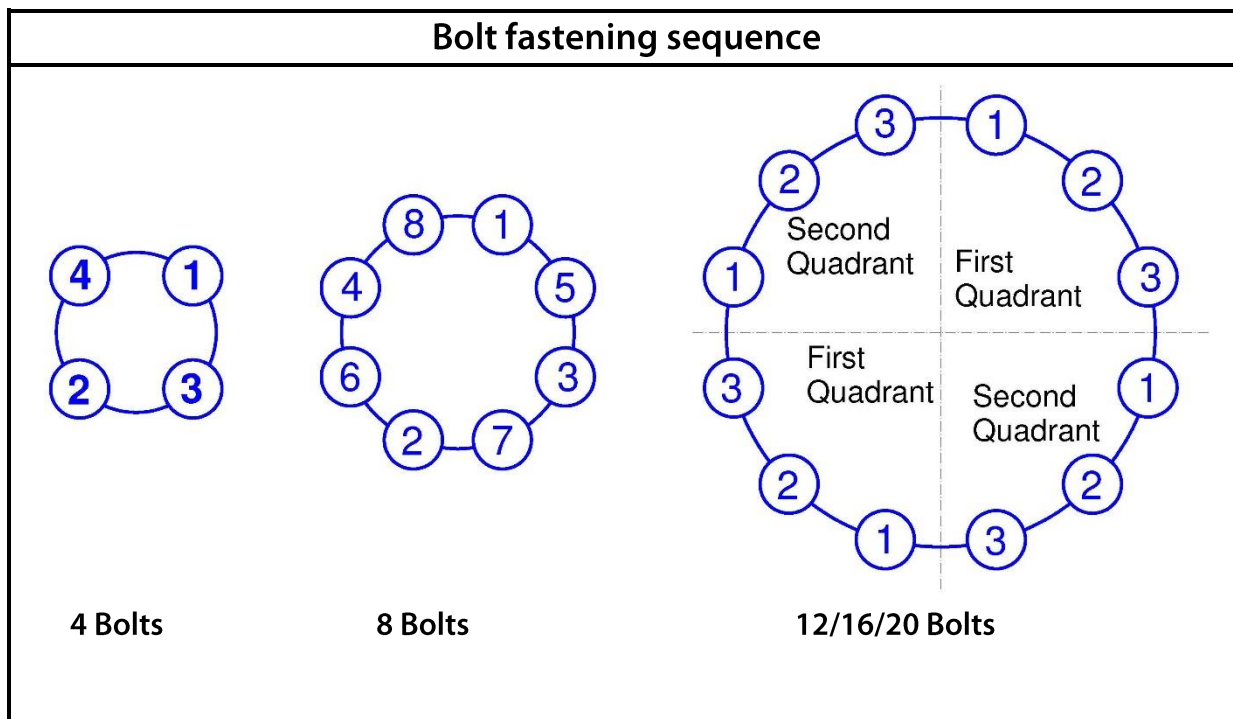
Diameters greater than DN600, please consult the point 5.4

TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

5.4 Recommendations for the tightening screw pair for Wafer, Flange, Lug, and Double Flange

Minimum recommended bolt torques to ensure a complete sealing of the valve in the pipeline.

DN	Minimum recommended tightening torque (N·m)			
	10 Bar	16 Bar	20 Bar	25 Bar
40	60	60	65	65
50	60	60	65	65
65	65	65	70	70
80	70	70	75	75
100	75	80	80	80
125	95	100	110	110
150	115	120	125	135
200	130	140	150	150
250	155	165	175	180
300	165	180	190	210
350	160	175	185	200
400	200	220	235	270
450	195	215	230	260
500	240	270	295	345
600	305	365	425	505



This article is intended to provide a basic overview only. Please refer ASME PCC-1 2019 to determine the correct procedure for your particular application. It is important to note that the bolting sequence is just one of the many important things to get right to ensure joint integrity. There are many other factors to consider such as gasket selection, bolt lubrication, bolt selection, and the condition of the flange sealing surface. TTV, cannot accept any liability for any errors and omissions of any sort.

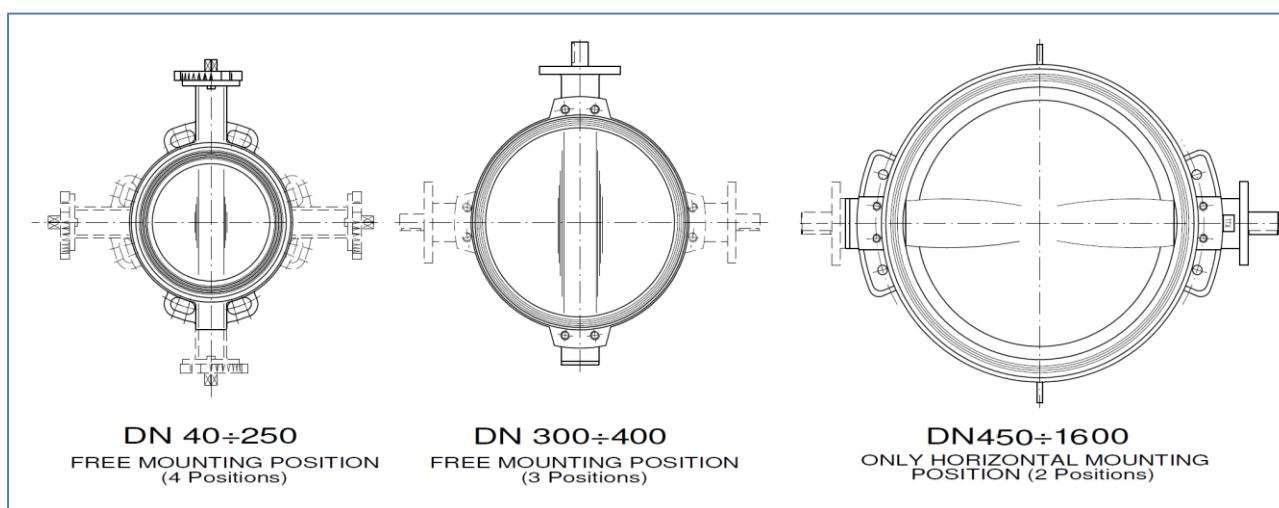
TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

5.5 Mounting position

The position of the valve will depend on the situation of the pipe. In annex 2-MOUNTING RECOMMENDATIONS of this document, various ways of locating the valves based on the size and direction of the flow are shown.

TTV recommends that valves from DN450 onward are installed with the shaft in horizontal position. The valves are bidirectional. They can be installed on any side as it is not necessary to keep the fluids direction.

See figure F



6) INSTRUCTIONS FOR REPLACEMENT SPARE PARTS

TTV valves require little maintenance. However, due to the possible high working requirements, the following maintenance actions should be conducted, if so required.

The assembly and disassembly of the valve is only allowed for staff of the company **TTV** or personnel authorized by it. If these norms are not followed, then the guarantee will not have any validity.

It is important to keep in mind that if the supplied elastomer is **vulcanized (It is a piece attached to the body)**, this element **cannot be replaced**.

TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

6.1 Description and spare parts recommended

6.1.1 Wafer, Lug and Flange type valves DN32 to DN200

Recommended spare parts:

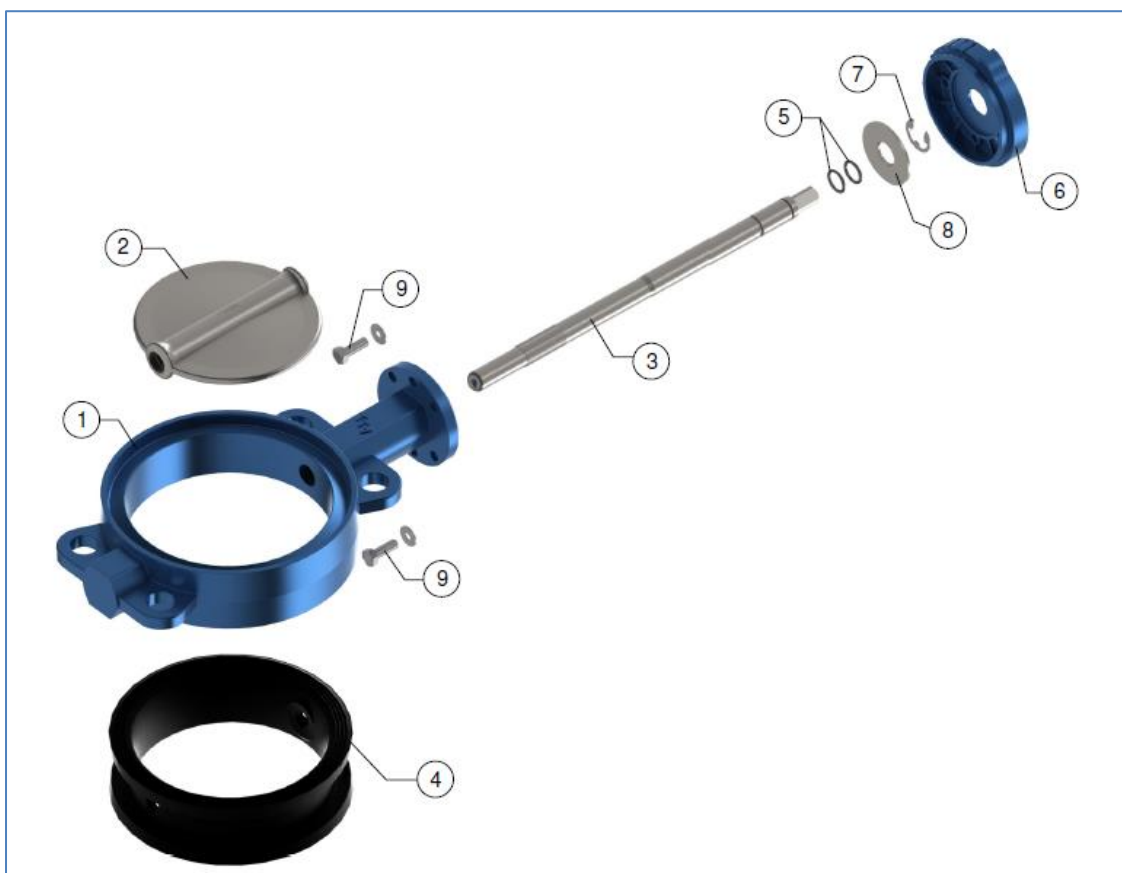
- Liner (position 4).
- O'Rings (position 5).

Phases for its replacement:

1. Remove the actuator and top adjustable flange (position 6) by loosening the bolts (position 9).
2. Using a screwdriver as a lever on the Circlip (position 7) start taking the shaft off.
3. Take off the shaft completely and remove the disc (positions 2 and 3).
4. Using the same screwdriver as a lever on the liner, and taking care not to damage the surface, push the liner to the inside until its final removal.
5. Replace the liner and O'Rings with new ones (positions 4 and 5).

By hand, without using any screwdriver, re-assemble the valve following inversely the above steps.

See figure G



TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

6.1.2 Wafer, Lug and Flange type valves DN250 to DN400

Recommended spare parts:

- Liner (position 4).
- O'Rings (position 5).

Phases for its replacement:

1. Remove the actuator and take out the spring (position 8) and the Washer (position 7).
2. Using a screwdriver as a lever on the Circlip (position 6) and proceed as described before.
3. Completely remove the shaft and extract the disc (positions 2 and 3).
4. Using the same screwdriver as a lever on the elastomer, being careful not to damage the surface, proceed to push it outward until it is completely removed.
5. Subsequently, proceed to replace it with a new one, along with new O-Rings (positions 4 and 5).

By hand, without using any screwdriver, re-assemble the valve following inversely the above steps.

See figure H



TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

6.1.3 Wafer, Lug and Flange type valves DN450 to DN1600

Recommended spare parts:

- Liner (position 4).
- O'Rings (positions 14, 15 and 16).

Phases for its replacement:

1. Remove the actuator and take out the screws (positions 11 and 12), removing the caps (positions 9 and 10).
2. Remove the screw (position 13).
3. Now the shaft is free and can be removed with an extractor, which will be placed in the threaded part of the shaft.
4. Then the disc is removed and the liner is taken out.

For its installation, follow the opposite steps.

Warning: DUE TO DIAMETER, WEIGHT AND INSTALLATION COMPLEXITY, THIS PROCESS SHOULD ALWAYS BE DONE IN **TTV**.

See figure I



TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

6.1.4 Double flanged valves DN32 to DN200

Recommended spare parts:

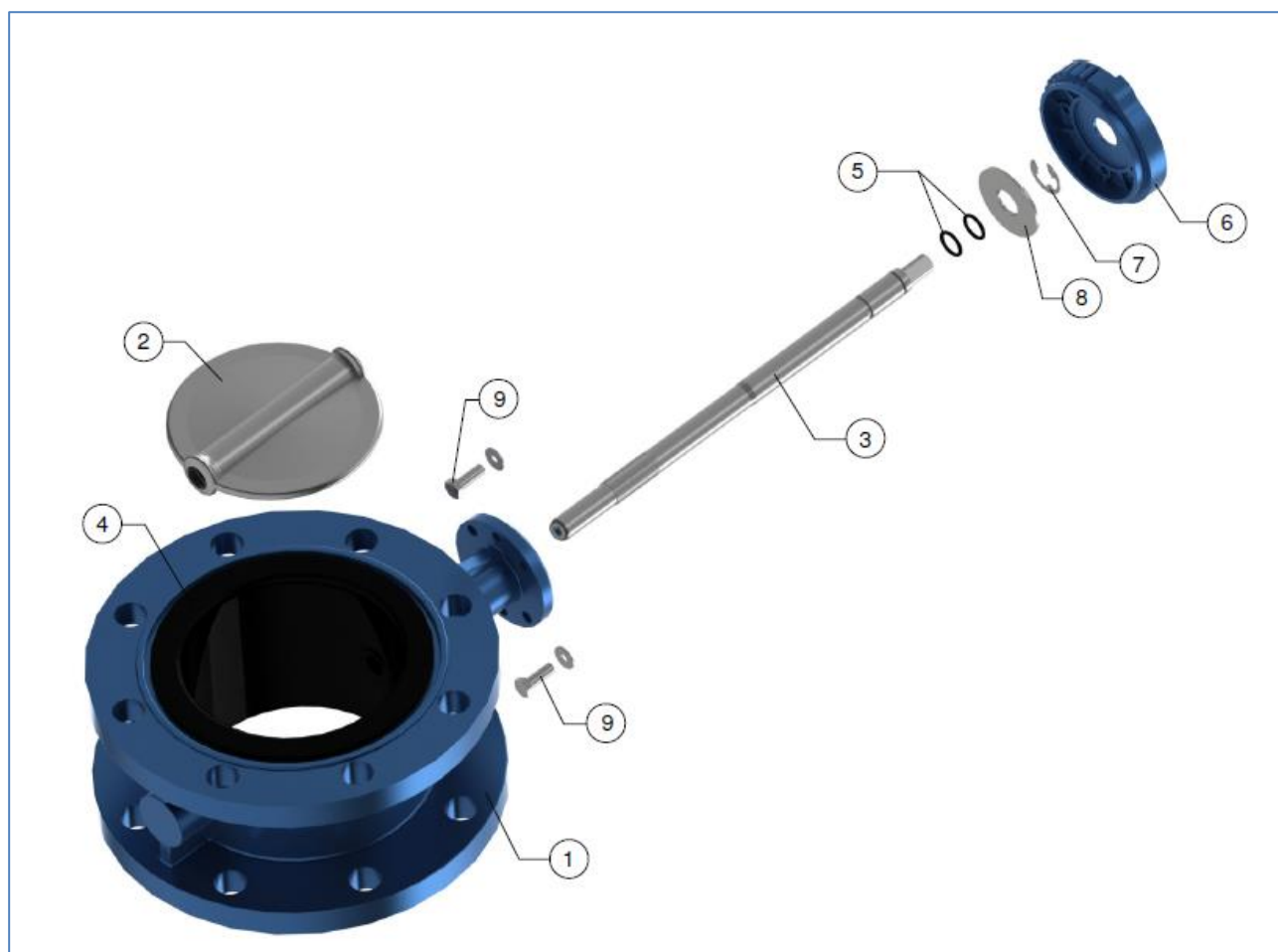
- Liner (position 4): The liner is vulcanized with the body, so it is not possible to replace it, so the body must be changed.
- O'Rings (position 5).

Phases for its replacement:

1. Remove the actuator and top adjustable flange (position 6) by loosening the screws (position 9).
2. Using a screwdriver as a lever on the Circlip (position 7) start taking the shaft a little off.
3. Replace the O'Rings by new ones (position 5).

By hand, without using any screwdriver, re-assemble the valve following inversely the above steps.

See figure J



TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

6.1.5 Double flanged valves DN250 to DN400

Recommended spare parts:

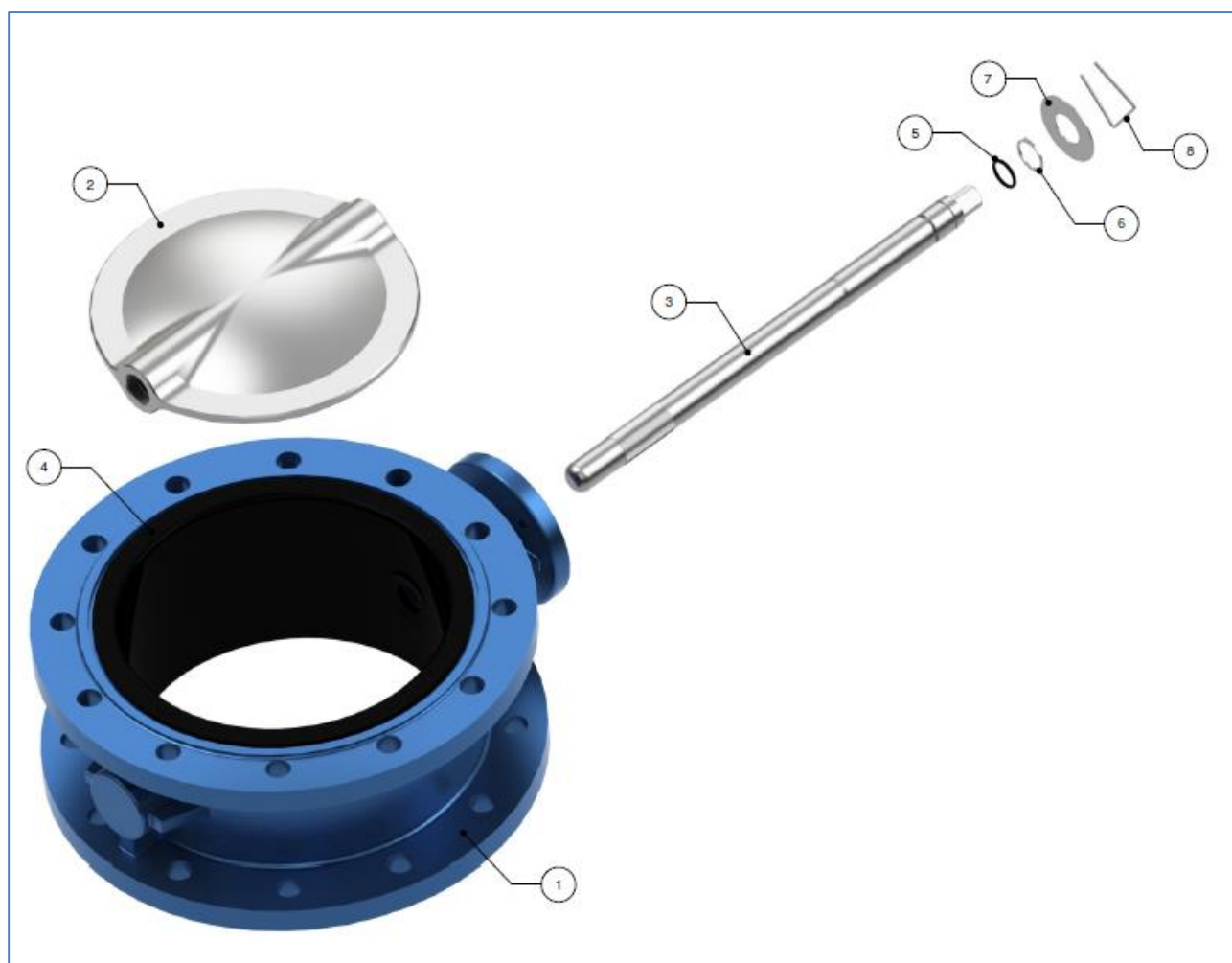
- Liner (position 4): The liner is vulcanized with the body, so it is not possible to replace it, so the body must be changed.
- O'Rings (position 5).

Phases for its replacement:

1. Remove the actuator and take out the spring (position 8) and the washer (position 7).
2. Using a screwdriver as a lever on the Circlip (position 6) start taking the shaft a little off.
3. Replace the O'Ring by a new one (position 5).

By hand, without using any screwdriver, re-assemble the valve following inversely the above steps.

See figure K



TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat



6.1.6 Double flanged valves DN450 to DN1600

Recommended spare parts:

- Liner (position 4): The liner is vulcanized with the body, so it is not possible to replace it, so the body must be changed.
- O'Rings (positions 14, 15 and 16).

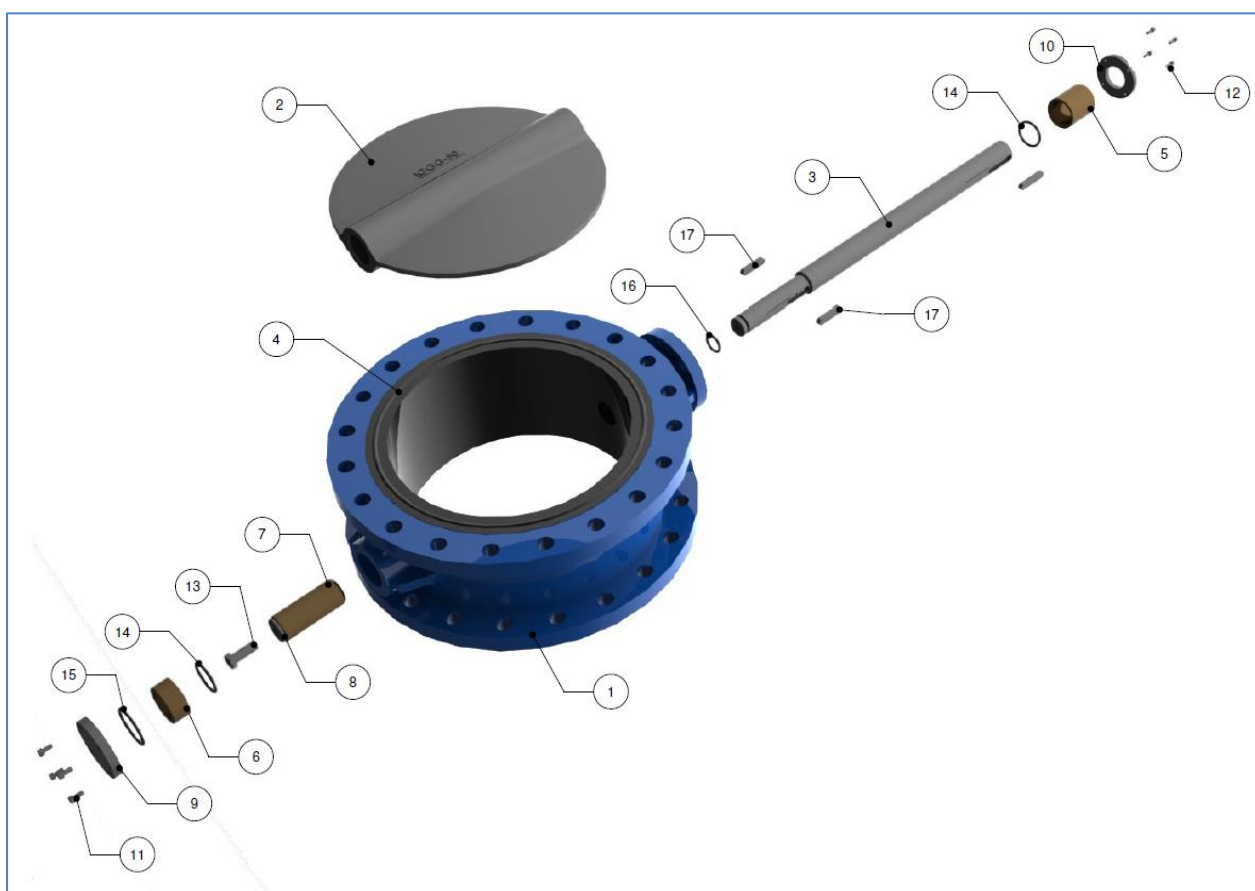
Phases for its replacement:

1. Remove the actuator and take out the screws (positions 11 and 12), removing the caps (position 9 and 10).
2. Remove the screw (position 13). Now the shaft (position 3) is free and can be removed a little with an extractor, which will be placed in the threaded part of the shaft.
3. Replace the O'Rings (positions 14, 15 and 16) by new ones.

To re-assemble the valve, follow inversely the above steps.

WARNING: Due to the big diameter, weight and assembly complexity, this process must always be done in **TTV**.

See figure L



TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat



7) STORAGE INSTRUCTIONS

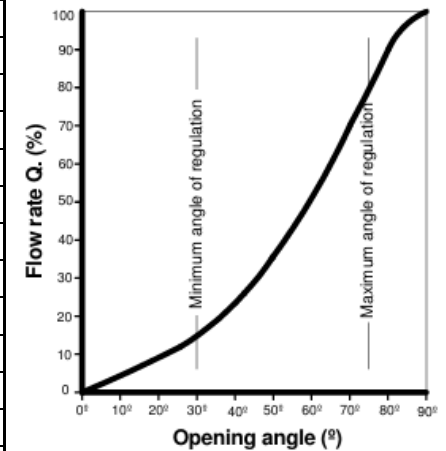
The aim of these specifications is the appropriate preservation and storage of **TTV** valves.

- **Temperature:** It would normally be no higher than 25 °C.
- **Humidity:** It should be avoided. There must not be condensations.
- **Light:** They have to protect against sun light and ultraviolet rays.
- **Oxygen and Ozone:** Protected from air in circulation and against Ozone.
- **Deformation:** They must be stored avoiding any deformation.
- **Contact with metals:** The liners' parts should not be in contact with copper or manganese.
- **Contact with liquids:** They must be kept away from dissolvent, grease, oil, acid, etc.
- **Contact with dusty materials:** They must be free from talcum powder, ceramic products, etc.
- **Rotation of stored products:** The older ones have to be used first.
- **Cleaning:** If it is necessary to clean the valves, do not use abrasive products, trichloroethylene, hydrocarbon, etc.

ANNEX 1: VALUES OF THE FLOW COEFFICIENT Kv

DN	10°	20°	30°	40°	50°	60°	70°	80°	90°
32-40	3	4	8	17	25	35	45	56	70
50	3	6	14	22	37	60	95	147	164
65	4	7	18	28	48	78	140	160	201
80	5	12	29	52	88	156	216	281	359
100	9	21	48	87	147	234	346	519	627
125	19	35	78	148	232	372	562	761	995
150	28	48	108	203	324	536	865	1211	1471
200	35	91	206	320	554	952	1427	2163	2509
250	43	143	329	562	865	1471	2336	3460	3936
300	69	216	476	770	1341	2206	3460	4758	5865
350	87	282	606	1101	1817	2768	4325	6661	8179
400	112	363	779	1453	2318	3547	6055	7785	10660
450	138	476	1021	1730	2941	4758	7785	9515	12889
500	173	593	1254	2336	3806	5882	9515	12543	16023
600	260	839	1817	3287	5320	7785	13840	18598	22741
700	346	1038	2336	4325	6470	11678	18079	24609	32448
750	389	1125	2682	4498	7353	11937	19376	29843	35033
800	476	1557	3460	6315	9515	15570	27680	34492	44850
900	952	1903	4239	7699	121110	18598	31659	42385	51247
1000	1644	2682	5017	8564	14705	22923	40655	50170	66104
1100	1817	3028	6920	11245	18165	22950	43250	60193	81526
1200	2509	4325	10380	17300	25950	38925	58820	75688	97355
1300	2768	5190	12975	21625	32870	47575	73525	87365	119787
1400	3287	6055	13840	22490	34600	54495	84770	95583	138400
1500	5865	13408	24220	42385	65394	74823	96880	116948	157430
1600	7482	22836	41953	58820	79580	86677	105530	134421	166080

Relationship between the degrees of valve opening and flow



TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

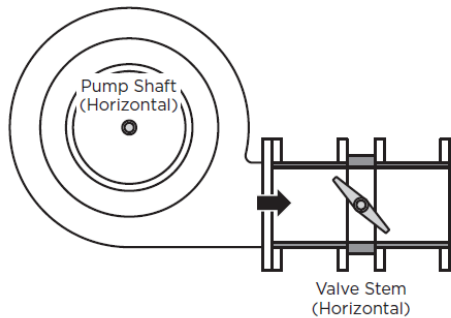
ANNEX 2: MOUNTING RECOMMENDATIONS

Centrifugal pump (with pump shaft horizontal).



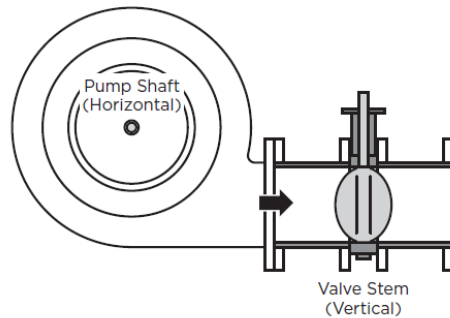
INCORRECT

Valve stem horizontal.



CORRECT

Valve stem vertical.

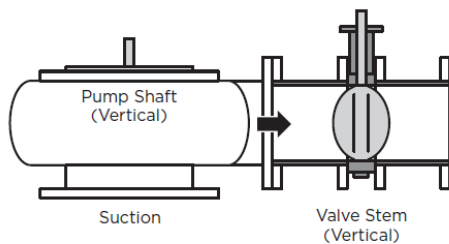


Centrifugal pump (with pump shaft vertical).



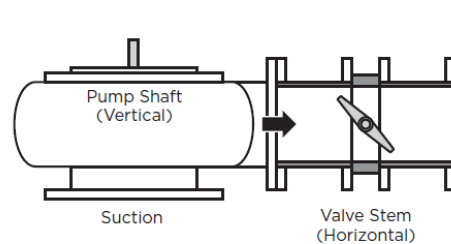
INCORRECT

Valve stem horizontal.



CORRECT

Valve stem vertical.

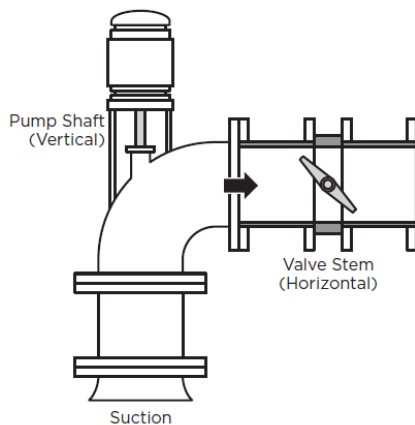


Axial pump (with pump shaft vertical).



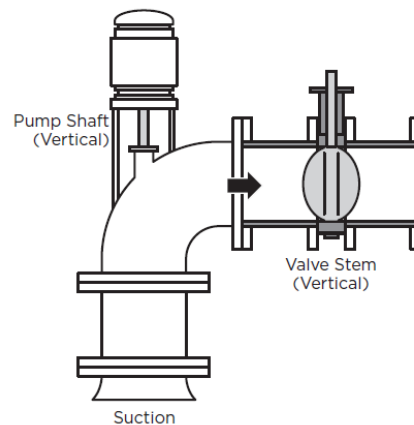
INCORRECT

Valve stem horizontal.



CORRECT

Valve stem vertical.



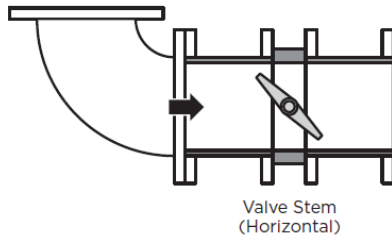
TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

Figure 06: Bend.



INCORRECT

Valve stem horizontal.



CORRECT

Valve stem vertical.

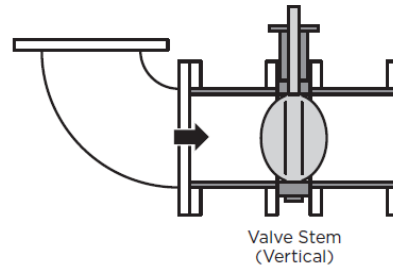
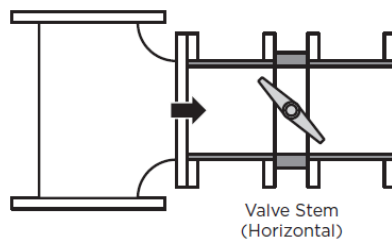


Figure 07: Tee.



INCORRECT

Valve stem horizontal.



CORRECT

Valve stem vertical.

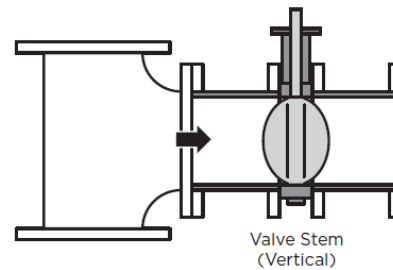
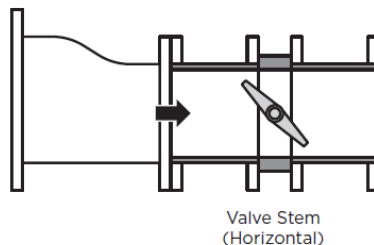


Figure 08: Reducer.



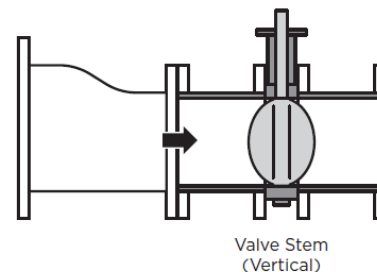
INCORRECT

Valve stem horizontal.



CORRECT

Valve stem vertical.



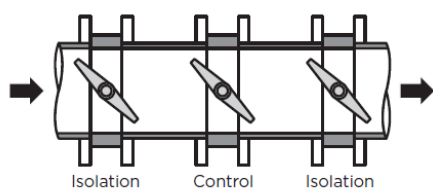
TTV Butterfly Valve type Wafer, lug and flanged DN32-DN1600 with concentric design and interchangeable soft seat

Figure 09: Control/Isolation combination.



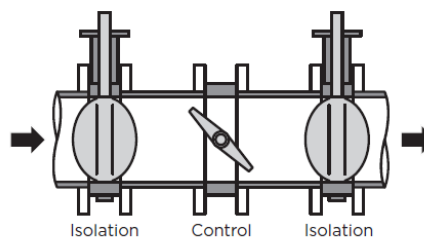
INCORRECT

Combination with all valve stems in the same direction accelerates possible noise, vibration, and erosion problems.



CORRECT

Combination with the stem of the control valve at right angle to those of other valves tends to cancel the drift of the fluid, and reduces noise, vibration, and erosion.



The valve should not be installed too close to other valves, pumps, elbows, etc., since its operation may be affected. It is recommended to have a minimum of six pipe diameters upstream and four pipe diameters downstream between it and other valves, pumps, elbows, etc.

These distances are mandatory for valves used in control (regulating) service and may be reduced to three times the pipe diameter in pipelines operating at a maximum working pressure of 6 bar and a maximum flow velocity of 1.5 m/s.

