VTB 300 Butterfly valves

vapo

own the flow

SIRCA

INTERNATIONAL S.P.A.

Main features and benefits

Corrosion and abrasion resistant, only the seat & disc in contact with the medium.

Self cleaning and bi-directional (therefore valve can be mounted in both directions of medium).

Maximum ease of assembly and maintenance no additional seals are required for mounting between the flanges, nor lubrication.

ISO 5211 mountingflange, adaptability to any type of pneumatic or electric actuator.

Disc of special design in order to ensure ample full flow, low pressure drops, and minimum turbulence.

Good adjustment characteristic.

Protection on the valve outer parts against corrosion by epoxy or polyurethane coating.

1. The upper stem is locked by manual or motorized control while the o-ring assures a life time lubrication. The stem has a marking at the end wich gives the right position of the disc after the valve is placed between flanges in the pipeline.

2. The one piece valve body casting ensures high strength with minimum weight. It can be supplied in a wide choice of materials, for both wafertype and lug models, to meet all possible installation requirements.

3. Thanks to special internal profile of the surface of contact between disc – seat, the reciprocal back pressures ensure tight shutt off.

4. The stem has a square end which fits directly in the disc hence no fastening elements are needed. This allows the disc to float on the stem and to be self centering inside the seal so as to form a continous tight off line with the latter. Thanks to the special shape of the disc,pressure drops and forces of rotation are appreciably reduced.

5. The resilient seat is vulcanized on a rigid phenolic resin or aluminium support ring. Thanks to its straight forward design it is easily replaceable without use of special tools.

6. Thanks to the special profile of the seat, no seal is required when installing between the flanges.

a. Indication position of the disc.
b. Disc.
c. Upper stem.

Tight shut off with pressure drop up to 21.5 bar.

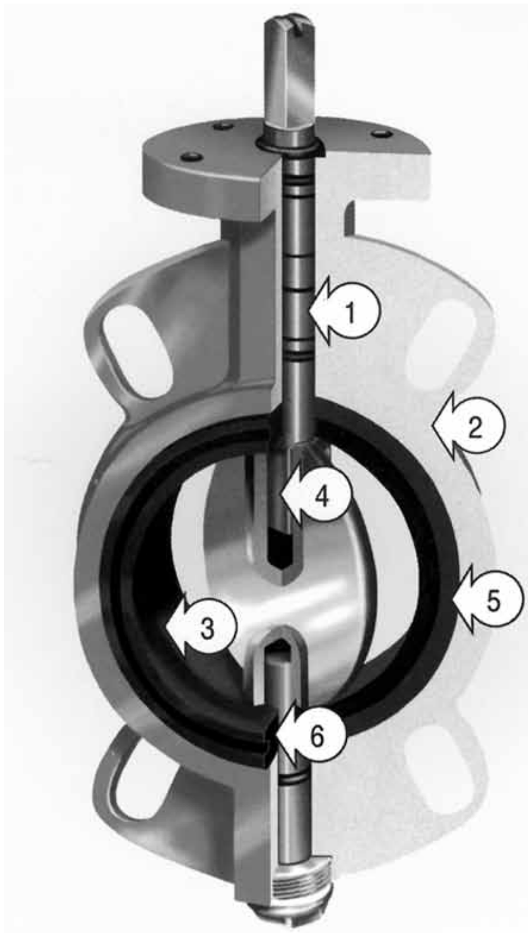
Seat with phenolic resin or aluminium reinforcement to ensure geometric and dimensional stability.

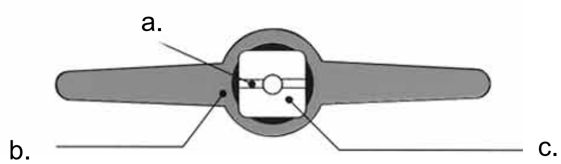
Stem – disc coupling without use of fastening elements (screw, bolts, etc.) which could be sources of corrosion and failures.

Disc self centering inside the seat thanks to the floating coupling between stem – disc.

Very compact size and light weight.

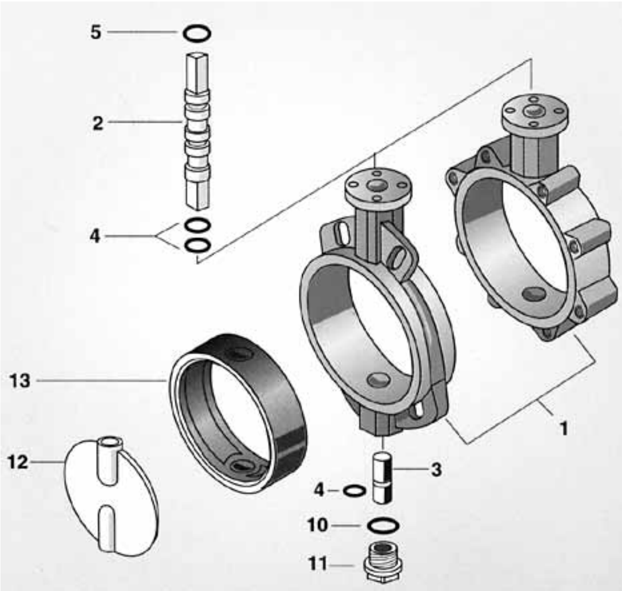
Valves are according to:
ISO 5752 – BS 5155.
DIN 3202 – 3 - K1.
MSS SP 67 - API 609.



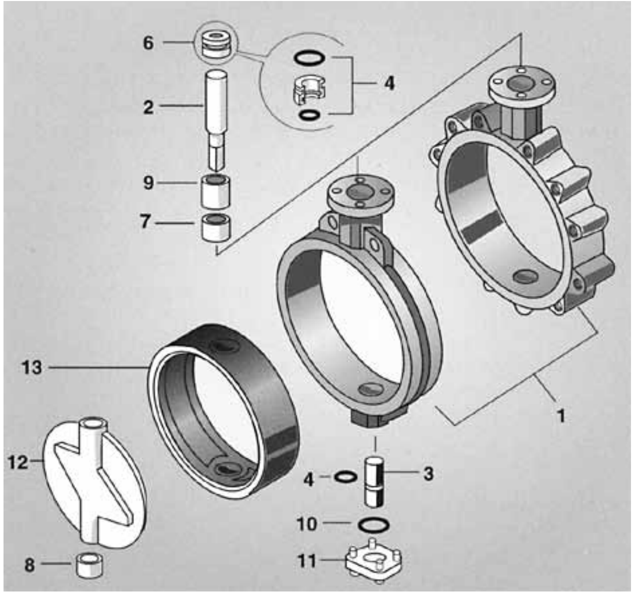


Materials of construction

DN 40 - DN 300 (1$^1/_2$" – 12") VTB 301



DN 350 - DN 600 (14" – 24") VTB 302

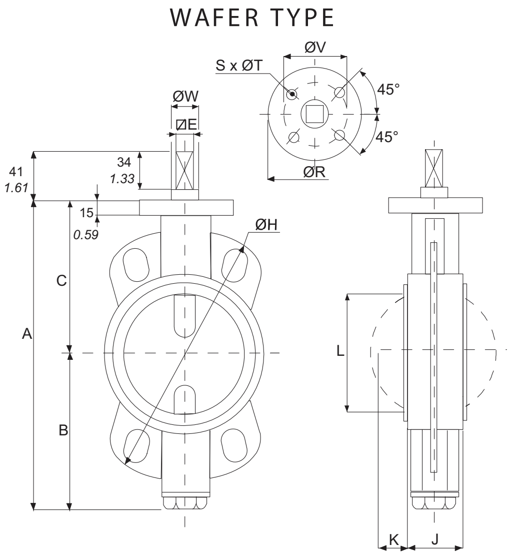


Item	Description	Material	Standard	ASTM
1	Body	Cast iron Ductile cast iron Carbon steel Stainless Steel Alu-Bronze	GG 25 GGG 40 GS-C 25 X5 CrNiMo 1713 G-CU A1 11 Fe 4 Ni 4	A 48-40B A 536 Gr. 65-45-12 A 216 WCB A 351 CF-8M B 148 Gr. 955
2 + 3	Upper and Lower Stem	Stainless Steel Stainless Steel Stainless Steel Hastelloy C Monel K Titanium	X 12 Cr S 13 X5 Cr Ni Mo 1712 17-4 PH	416 SS A 479 Type 316 A 564 Type 630 B 574 B 164 – 58 B 348 Gr. 5
4 + 5	O-ring	Buna-N or Viton	-	-
6 + 7 + 8	Bushing	Bronze	-	-
9	Spacer	Steel	-	-
10	Seal	Buna N or Viton	-	-
11	Plug	Steel	-	-
12	Disc	Ductile cast iron (K.C.) Carbon steel Stainless Steel Alu-Bronze Hastelloy C Monel K Titanium Coatings Niploy process (K.C.)	GGG 40 GS C 25 C 22.8 X5 Cr Ni Mo 17 12 G-Cu Al 11 Fe 4 Ni 4 Hastelloy C Titanium Rubber – EPDM, Buna, etc. Powder -Rilsan, Halar, etc	A 536 Gr. 65-45-12 A 216 WCB A 105 A 351 CF-8M A 182 F316 B 148 Gr. 955 A 484 B 348 Gr. 5
13	Seatring	Buna N EPDM H.T. Natural Rubber Neoprene Hypalon Viton Silicone Teflon	Buna N EPDM H.T. Natural Rubber Neoprene Hypalon Viton Silicone Teflon	D - 2000 D - 2000 D - 2000 D - 2000 D - 2000 D - 2000 D - 2000 D 1437-73

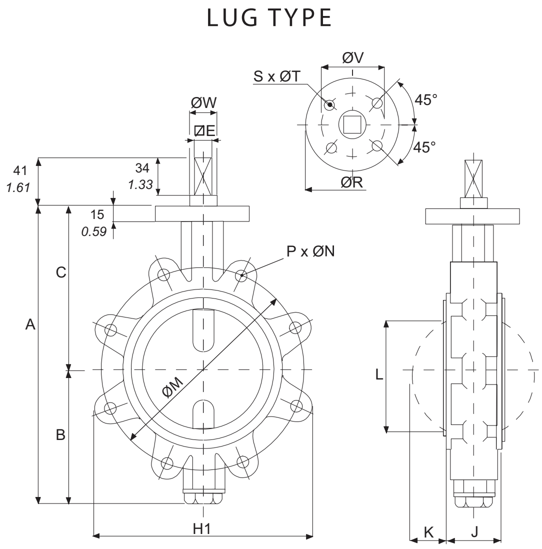
Other materials upon request.

Dimensions

Wafer type VTB 301



Lug type VTB 301



DN mm inch	A	B	C	E	H	H1	J**	K	L	ØM PN 6	ØM PN 10	ØM PN 16	ØM ANSI 150	ØN PN 6	ØN PN 10	ØN PN 16	ØN ANSI 150***	P PN 6	P PN 10	P PN 16	P ANSI 150	ØR	S	T Ø	V St.c Ø	ØW
40	188	90	98	12	145	111	34	6,6	31	100	110	110	98,5	M12	M16	M16	1/2"	4	4	4	4	90	4	8,5	F07	16
50	205	96	109	12	160	120	43,5	7.2	36	110	125	125	120,5	M12	M16	M16	5/8"	4	4	4	4	90	4	8.5	F07	16
65	230	108	122	12	180	138	46	12,9	53	130	145	145	149.5	M12	M16	M16	5/8"	4	4	4	4	90	4	8,5	F07	16
80	250	118	132	12	198	150	46	19,3	69	150	160	160	152.5	M16	M16	M16	5/8"	4	8	8	4	90	4	8.5	F07	16
100	285	132	152	12	230	213	52	27.15	90	170	180	180	190.5	M16	M16	M16	5/8"	4*	8	8	8	90	4	8.5	F07	16
125	327	150	177	16	256	243	56,5	36,4	115	200	210	210	216	M16	M16	M16	3/4"	8	8	8	8	90	4	8.5	F07	19,5
150	359	165	194	16	286	267	56,5	48,6	142	225	240	240	241.5	M16	M20	M20	3/4"	8	8	8	8	90	4	8.5	F07	19,5
200	419	194	225	16	348	320	60	69.8	199	280	295	295	298.5	M16	M20	M20	3/4"	8	8	12	8	90	4	8.5	F07	19,5
250	495	220	275	18	414	402	68	90	238	335	350	355	362	M16	M20	M24	7/8"	12	12	12	12	125	4	11	F10	24
300	559	262	297	22	490	473	78	111.1	289	395	400	410	432	M20	M20	M24	7/8"	12	12	12	12	125	4	11	F10	29

- All dimensions in mm / inch.
- * according DIN3202 – K1.
- ** for ANSI 150 thread according ANSI B 1.1 UNC.

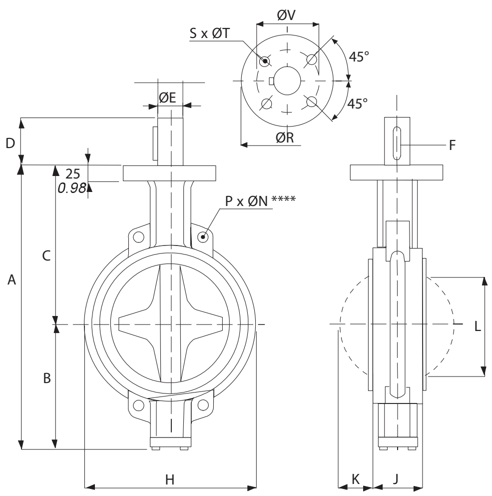
Weights

Size	DN	40	50	65	80	100	125	150	200	250	300
Wafer	kg	2.2	2.9	3	3.9	5	7.4	8.5	11.8	18.5	29.8
Lug	kg	2.6	3.5	4.5	4.9	7	10	11.1	17	27.4	40.4

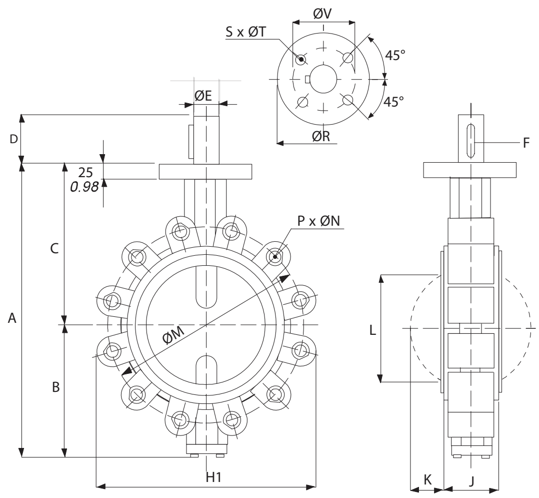
Dimensions

Wafer type – VTB 302 **Lug type - VTB 302**

WAFER TYPE



LUG TYPE



DN mm inch	A	B	C	D	E	F*	H	H1	J**	K	L	ØM PN 6	ØM PN 10	ØM PN 16	ØM ANSI 150	ØN PN 6	ØN PN 10	ØN PN 16	ØN ANSI 150	P PN 6	P PN 10	P PN 16	P ANSI 150	ØR	S	Ø T	V ISO St.c Ø
350 14	632	281	351	41	44.5	14x 9x 45	436	516	78	126	324	445	460	470	476	M20	M20	M24	1”	12	16	16	12	175	4	17	F14
400 16	681	305,5	375,5	41	44,5		483	590	102	138	367	495	515	525	540	M20	M24	M27	1”	16	16	16	16	175	4	17	F14
450 18	749	349	400	41	44,5		540	644	114	157	417	550	565	585	578	M20	M24	M27	1 1/8” 8-UN	16	20	20	20	175	4	17	F14
500 20	798	373	425	41	44.5		580	715	127	179	468	600	620	650	635	M20	M24	M30	1 1/8” 8-UN_8	20	20	20	20	175	4	7	F14
600 24	936	445	491	120	63	18x 9x 45	710	830	153	218	572	705	725	770	750	M24	M27	M33	1 1/4” 8-UN_4	20	20	20	20	210	4	22	F16
700 28	1120	540	580	90	75	no2 22x 14x 80	792	910	165	261	666	810	840	840	863.6	M24	M27	M33	1 1/4” 8-UN	24	24	24	28	300	8	18	F25
750 30	1195	585	610	90	75		860	970	190	279	719	-	-	-	914.4	-	-	-	1 1/4” 8-UN_4	-	-	-	28	300	8	17	F25
800 32	1242	612	630	90	75		925	1040	190	304	774	920	950	950	977.9	M27	M30	M36	1 1/2” 8-UN_8	24	24	24	28	360	8	18	F25
900 36	1350	660	690	120	95	no2 25x 14x 110	1008	1150	203	339	858	1020	1050	1050	1085.9	M27	M30	M36	1 1/2” 8-UN	24	28	28	32	360	8	21	F30
1000 40	1500	740	760	120	95		1135	1260	216	383	957	1120	1160	1170	1200.2	M27	M33	M39	1 1/2” 8-UN	28	28	28	36	415	8	21	F30

- All dimensions in mm/inch.
- Woodruff key coupling conform UNI 6606/69 standards: 8x11; for size DN 600(24”) UNI 6604/69: 8x11x80.

** According DIN 3202-3-K1.
*** ANSI 150 Thread according ANSI B1.1 Type UNC.

Weights

Dimension	DN	350	400	450	500	600	700	750	800	900	1000
Wafer	kg	50	70	90	110	210	250	315	365	440	575
Lug	kg	60	90	110	150	270	350	415	465	530	672

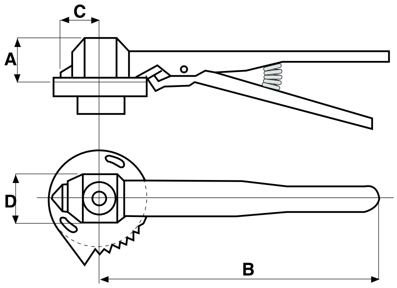
Manual operation / Stemextensions

Leverlock operator

Aluminium or cast iron epoxy coated with steel epoxy coated toothplate with 10 positions.

Dimensions	A	B	C	D	kg
DN 40 – 200	40	313	41	45	0.8
DN250 – 300	40	407	41	45	1.0

Stainless Steel or Cast iron lever upon request.

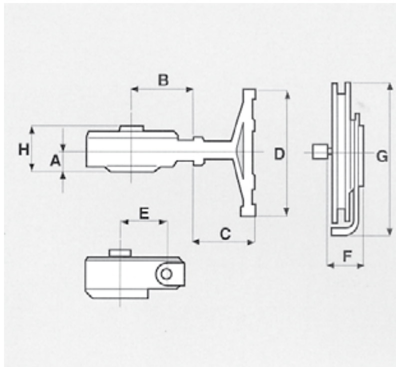


Gearbox with handwheel

Weatherproof gearbox with handwheel.
The body in ductile iron or aluminium with two adjustable mechanical endstops for open and closed position.
Greased for lifetime.

Dimensions	A	B	C	D	E	F	G	H	kg
DN40-300	45	92	122	200	67	88	234	81	7,5
Type RV1	ratio 39:1 (max. 650 Nm)								
DN350-500	45	127	216	300	97	88	234	84	14,5
Type RV2	ratio 60:1 (max. 2000 Nm)								

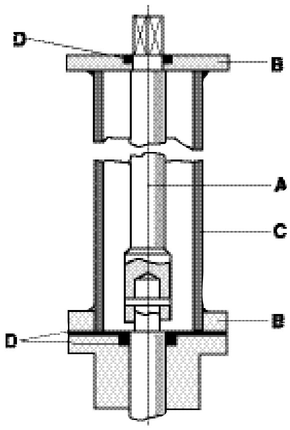
Larger gearboxes upon request.



Stem extension

The valve extension stem is normally made of carbon steel (Stainless steel upon request) and is contained in a weatherproof tubolar housing. Three seals are inserted between the valve/extension stem mounting flanges as well as in the top part of the extension stem, in order to ensure full protection against the outside. Upon request , the stem extension can be suppliedin stainless steel varying from 100 mm up to 5000 mm.

A Stem extension.
B Flange.
C Tubolar housing.
D Optional seals.



Application and characteristics of the seat ring

Seat ring	Technical name	General applications	Temperature limits	Not recommended for
BUNA-N* (Perbunan-NBR)	Copolymer of butadieen en acrylonitrile	Hydrocarbons with less than 40% aromatics, natural gas, helium, kerosine, ammonium sulphate, air, water, milk, alcohols, glycols, brine	-20°C to +100°C	Solvents Benzene Xylene
EPDM	Terpolymer of ethylene and propylene	Water, steam up to 120°C, seawater, mineralwater,esters, ketones, Alkali food compunds, liquids and solids, dilute inorganic acids, caustic soda	-35°C to +120°C	Hydrocarbons Oils Fats Dry Air
EPDM-HT (Hoge tempera-tuur)	Terpolymer of ethylene and propylene	Water, steam up to 150°C, seawater, mineralwater,esters, ketones, Alkali food compunds, liquids and solids, dilute inorganic acids, caustic soda	-35°C to +150°C	Hydrocarbons Oils Fats Dry Air
Hypalon* (CSM)	Gechlorosylphonated-polyethylene	Oxidizing acids, chromic acids, hydroflouric acid, sulphur based acids, sodium hypochlorite, ozone	-18°C to +100°C	Steam Hot Air Ketones Nitric acid
Silicone (Q)	Methylvinyl Silicone	Beverages, Foodstuff	-30°C to +150°C	Hydrocarbons Solvents Steam
Viton* (FPM)	Copolymer of exafluoro pro-pylene and fluorvinyldene	Hydrocarbons with high concentration of aroma-tics minerals and halogenated acids, phoric acid aliphated and aromatics ethers	-10°C to 160°C	Steam Ketones Amines Esters/Alkali
Neoprene* (CR)	Polychloro preen	Oils,diluted mineral acids, alkali, fats	-18°C to +90°C	Concentrated acids Ketones Solvents for paints
Natural-Rubber (NR)	Latex	Abrasive products	-35°C to +65°C	Steam Hydrocarbons Oils
Teflon* (P.T.F.E)	Polytetrafluoro ethylene	Corrosive products, Solvents	-40°C to +150°C	Abrasive products

* Dupont – trademark

Remark: The above table is given as a guide only.Many factors can influence the extent of corrosion (type of solution - concentration – temperature – presence of impurities, etc) Hence it is up to the customer to make the final assesment depending on the application and equipment characteristics.

Pressure ratings - DIN

The butterfly valves can be supplied in the following pressure class: PN 2.5, PN 6, PN 10 en PN16.

Hydrostatic test
Body: 1.5 x the nominal pressure.

Leak test
Seat test: 1.1 x the nominal pressure with water at ambient temperature with air at 7 barg.

Materialcertificate
Body and Disc EN 10204.3.1 upon request.

Pressure class - ANSI 150#

The butterfly valves can be supplied in pressure class ANSI 150.

Hydrostatic test
Body: 28.9 barg.

Leak test
Seat test 19,3 barg with water at ambient temperature with air at 5.6 barg.

Vacuum seat test

The butterfly valves can be installed in vacuum systems equal to 10-3 Torr. Shut off under vacuum is limited only by the molecular permeability of the elastomer forming the seat.

Technical data

Torque values (Nm)

Afmeting	40	50	65_2	80	100	125	150	200	250	300	350	400	450	500	600	700	750	800	900	1000
Δp - 0 bar	11	12	28	35	38	64	70	85	180	325	400	515	840	1150	2130					
Δp - 3 bar	12	13	29	42	45	78	80	110	190	400	460	680	925	1355	2300					
Δp - 7,5 bar	13	14	30	48	51	82	84	125	260	472	600	775	1100	1490	2685	2880	3430	4100	6240	8000
Δp - 11.5 bar	14	18	34	50	54	94	100	140	300	570	750	920	1320	1690	3200	4800	5720	6940	10400	14450
Δp - 17.5 bar	17	23	38	59	60	108	119	200	370	715	900	1114	1545	1815	5420	6300	7600	9100	13600	18980
Δp - 21.5 bar	10	15	22	35	70	95	128	195	280	400	895	1185	1450	1800	3460	2300	2300	2300	2300	2300

Remark: The above table gives the recommended maximum torque values applied to the butterfly valves. They represent the sum of of the amounts of mechanical friction by opening and closing the valve in relation on the various pressure drops. These torques values apply to any type of application.

Kv - Values

Nominal valve diameter is determined by calculating the Kv-coefficient with the formula given below on the basis of actual fluid operational conditions. Determine the valve size in the table below so that the Kv calculated by the formula is about 80% of the Kv in the table.

mm	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	750	800	900	1000
90°	69	112	173	259	475	970	1700	2800	4300	6500	8600	10800	15100	19000	24200	29100	33300	37880	47950	59200
80°	61	91	138	208	410	865	1430	2360	3700	5200	7000	9300	12100	15100	20800					
75°	47.6	78	112	177	346	720	1170	1900	3100	4300	5800	7800	10400	13000	17800					
70°	38.9	61	91	138	264	540	890	1500	2400	3500	4400	5600	7900	9900	14300					
60°	22.5	45.8	72	108	203	424	690	1120	1900	2700	3500	4400	6100	7500	10200					
50°	15.6	23.4	36.3	54	104	216	355	605	1000	1380	1900	2300	3200	4000	5300					
40°	9.5	14.7	22.5	32.9	63	134	216	360	580	860	1120	1470	2000	2400	3300					
30°	4.3	7.8	13	19	36.3	76	125	216	340	470	650	780	1080	1400	1900					
25°	2.6	5.2	8.6	13	24.2	52	85	147	220	330	430	560	780	970	1300					

Kv is the metric standard for the flow rate of water in cubic meters per hour through a valve creating a pressure drop of 1 bar at a temperature between 5° and 40º Celcius.
In the Anglo Saxon standard is the Cv value the flow rate in US gallons water per minute through a valve at a pressure drop of 1 psi at a temperature of 60° F.
The relation between Kv and Cv: Kv = 0.865 Cv..

KV calculation liquids

The following formula is applicable to liquids which do not exhibit evaporation phenomena.

$$Kv = Qx\sqrt{\frac{SG}{\Delta p}}$$

Where:
Q = flow rate in m^3/hour.
SG = specific gravity of the liquid in kg/dm^3 at operating temperature (Water=1.0 at 15°C).
Δp = pressure drop in kg/cm^2.

orrection factor, applicable to the calculated Kv-value for viscous liquids

2° E = Factor 1.06
5° E = Factor 1.18
10° E = Factor 1.28
15° E = Factor 1.32
30° E = Factor 1.38
50° E = Factor 1.47
100° E = Factor 1.60
150° E = Factor 1.68

Cv calculation gases

1. For gases where the absolute pressure downstream is more than 50% of the absolute pressure at the valve inlet:

$$Cv = \frac{Q}{380}\sqrt{\frac{SG \times T}{\Delta p \times P2}}$$

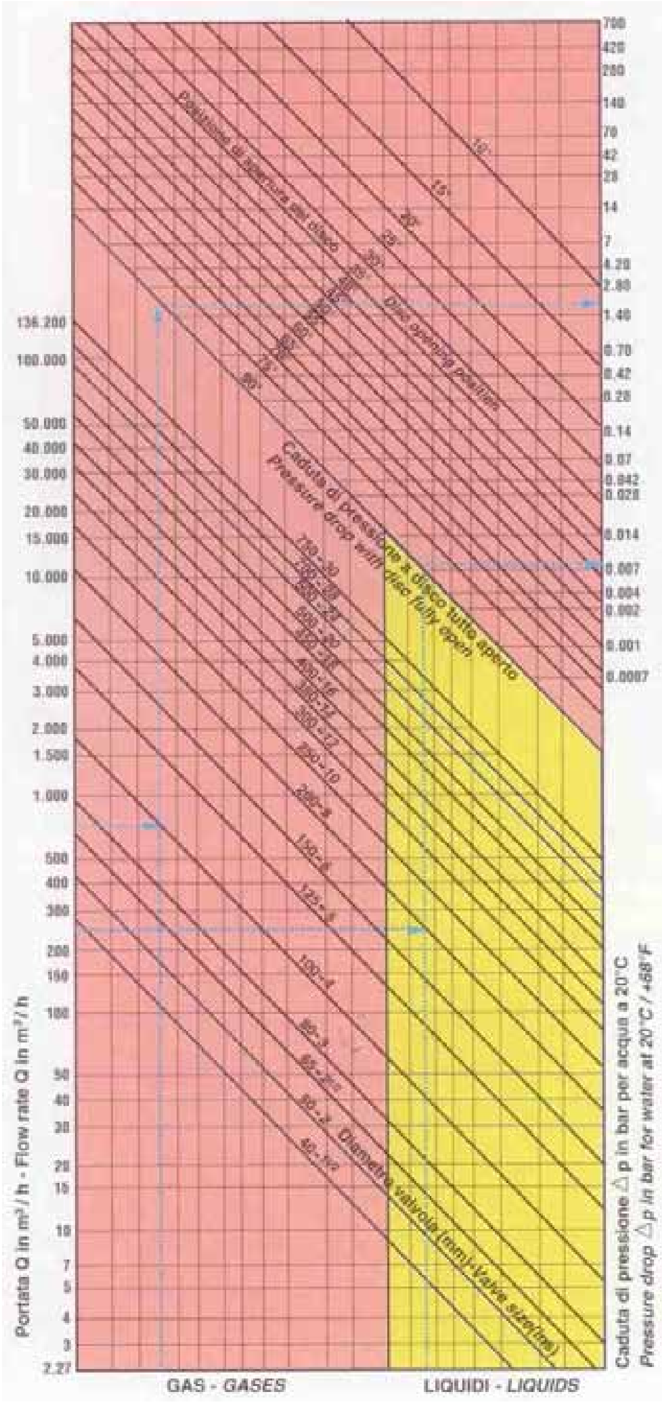
Q = flow rate in m3/hour.
Δp = pressure drop in kg/cm2.
P1 = absolute gas pressure in kg/cm2 at valve inlet.
P2 = absolute gas pressure in kg/cm2 at valve outlet.
SG = specific gravity of the gas referred to air 1.0. (e.g. Methane = 0.5545)
T = absolute temperature (t + 273) in °C.

2. For gases when the downstream absolute pressure is under 50% of the absolute pressure at the valve inlet (critical flow):

$$Cv = \frac{Q}{205 \times P1}\sqrt{d \times T}$$

Pressure drop- Nomograph

This nomograph can be used replacingthe fomula for calculating the Kv-value, it is simple to use and precise enough.
The nomograph can be used for gases with velocities exceeding 4.5 m/s as well as for liquids by plotting the flow rates (the yellow part).
Displayed is the flow rate Q (m3/uur), the size in mm or inch, the openings angle (°) and the pressure drop (bar) for water.
The economic advantages of the adjustment system with butterfly valves should be considered as good adjustment can be obtained for disc opening angles from 25° to 70°.



Calculation example for water

(use of the nomograph)

Data: water specific gravity d = 1.0 kg/dm3
flow rate Q = 250 m3/hour
butterfly valve size DN200 (8”)

To determine:
The pressure drop across the valve under the conditions of maximum opening (90°) and at a angle of opening from 75°.
From point Q = 250 m3/hour horizontally to the line of butterfly valve size DN200 (8”), from this point verticaly until intersecting the line corresponding to maximum opening 90°, then horizontally to the right gives an pressure drop in bar.

1. at 90° opening: 0.00827 bar
2. at 75° opening: 0.01650 bar

Calculation example for air

Data: Air specific gravity 3.48 kg/m3
flow rate Q = 750 m3/h
butterfly valve size DN100 (4”)

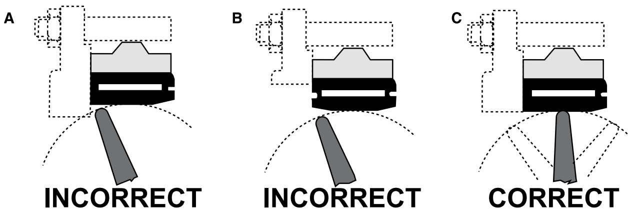
To determine:
The pressure drop across the valve under conditions of maximum opening (90°). Proceed as described above for the liquid, to deduce that the pressure drop across the valve is 2.16 bar. However this value is referred to water. The relative pressure drop is:
2.16 x 3.48/1000 = 0.0075168 bar

General:
To determine the pressure drop for any liquid, multiply the value obtained from the nomograph by the density of the liquid (kg/m3) and divided by 1000.

Installation instructions and maintenance

The butterfly valves are two – way which means they can be mounted with the flow on either side.
The valves are designed for installation between DIN or ANSI flanges. They are seated between these flanges without need for seals of any kind.
They can be mounted in any position in the piping if necessary with the small and medium sized valves, the actuators can face downwards without alterating the interference between disc and seat.
Before mounting the valve between the flanges, it is advisable to apply a film of silicone grease on the outer surfaces of the seat in contact with the flanges. This is to avoid seizing up with the mounting flanges and risk of tearing or breakage when disassembling.
After placing the valve with disc half open (wafer type) between the flanges, proceed to center it between the latter. Next insert the tie – rods which extend right along the outside of the valve body.
Then thread the nuts on the tie –rods and tighten them uniformly In case of the lug type valves, the bodies are fitted on the outside with lugs having tapped or through holes corresponding to the holes on the flanges, therefore installation with bolts is quicker and easier. After assembly it is advisable to open and close the valve several times in order to make sure everything is okay. It is good practice not to install the valve close to elbow fittings or branches in the piping, especially upstream, in order not to impair the hydraulic behaviour of the fluid or to cause needless stress on the valve.

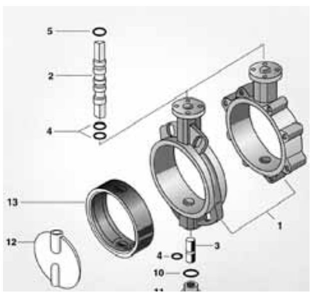
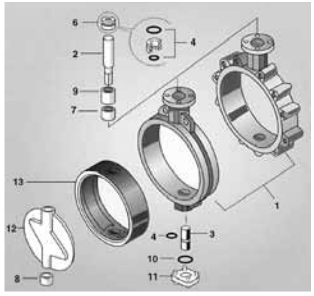
The flanges (better still if with neck or socket) should be perfectly parallel with well machined surfaces; the inner and outer diameter should correspond to those given in the table on page 12. If the flanges are not parallel or not well machined, they would cause abnormal stress on the tie – rods thereby causing poor tighting with the seat. Consequently the disc movements would cause rapid wear of the seat. More over correct inner and outer diameters of the flanges are very important for correct valve operation.
If the diameters are too small (see fig. a.) they could prevent valve movement. Too large diameters, instead (fig. B) would not allow sufficient tighting of the seat, therefore a non-perfect shut-off to the outside. The ideal solution is illustrated in fig. C where the flange inner diameter is equal to the valve port.



Maintenance

No maintenance and/or periodic lubrication is required. The various component parts of the valve can be inspected or removed quickly using normal tools. To do so, close the valve; then remove the tierods or bolts from the flanges and slip the valve off the piping.

Disassembly and reassembly

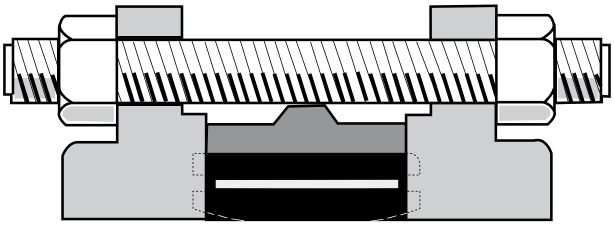
First fully open the valve. Remove the lever system or operating mechanisme fitted on the valve. Then screw out plug (11) remove the seal (10). Lift out the top stem (12) followed by the lower stem (3). Force the disc (12)out from the seat (13). Then seat together with the stem o-rings (4). Inspect and/or replace the parts where necessary, then reassemble all items in the reverse order to assembly. Reassembly is greatly helped by smearing small amounts of silicone grease inside the valve body and on the two stems. Lastly make quite sure of perfect alignment of the square end of the upper stem with the broaching on the disc. There is risk of damage if repeated use of force is made when inserting the stems in the case of holes on the seat not being properly aligned with those on the valve body and disc.

Spare parts

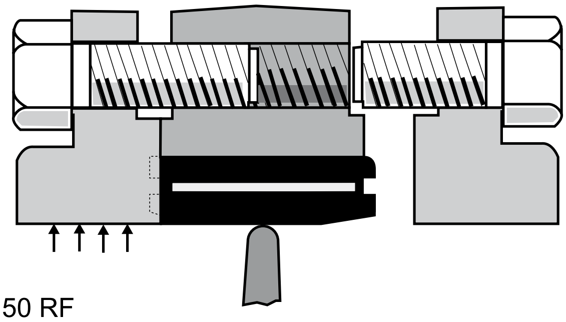
If the butterfly is installed corrrectly, it can operate for very long period without requiring inspection or spare parts. The only recommended spare parts for the VTB butterfly valve are the rubber ones, the seat on the valve body (13) and the stem o-rings (4-5).

Recommended tie-rod and bolt dimensions

Wafer type



Lug type



Installation between DIN PN10 and PN16 flanges and ANSI 150 RF

Flange	mm inch	40 1/2	50 2	65 2 /2	80 3	100 4	125 5	150 6	200 8	250 10	300 12	350 14	400 16	450 18	500 20	600 24

Wafer type

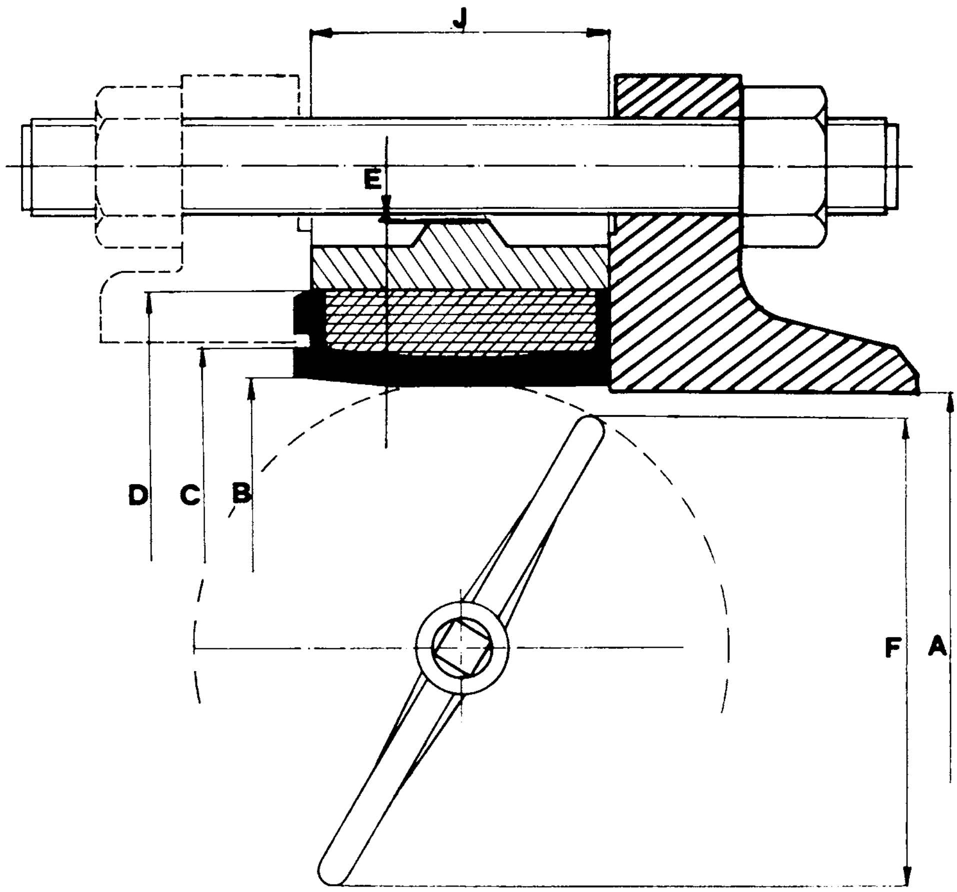
PN10	Tie-rod length mm number	M12 x 100 4	M12 x 120 4	M12 x 120 4	M16 x 130 4	M16 x 140 4	M16 x 150 4	M16 x 160 8	M16 x 180 8	M16 x 200 8	M16 x 200 12	M16 x 250 12	M20 x 250 16	M20 x 250 16	M20 x 250 20	M22 x 280 20
PN10	Tie-rod length mm number	M16 x 110 4	M16 x 130 4	M16 x 130 4	M16 x 140 4	M16 x 150 8	M16 x 150 8	M20 x 160 8	M20 x 170 8	M20 x 190 12	M20 x 190 12	M20 x 190 16	M22 x 230 16	M22 x 230 20	M22 x 250 20	M27 x 300 20
PN16	Tie-rod length mm number	M16 x 110 4	M16 x 130 4	M16 x 130 4	M16 x 140 4	M16 x 150 8	M16 x 150 8	M20 x 160 8	M20 x 170 12	M22 x 190 12	M22 x 200 12	M22 x 220 16	M27 x 240 16	M27 x 250 20	M30 x 280 20	M33 x 325 20
#150	Tie-rod length mm number	1/2 x 4 5/16 4	5/8 x 5 1/8 4	5/8 x 5 1/8 4	5/8 x 5 1/2 4	5/8 x 5 1/2 8	3/4 x 6 3/8 8	3/4 x 6 3/8 8	3/4 x 6 1/4 8	7/8 x 7 1/2 12	7/8 x 8 3/8 12	1 x 8 3/4 12	1 x 10 16	1 1/8 x 11 1/8 16	1 1/8 x 12 20	1 1/4 x 13 13/16 20

Lug type

PN6	Bolt length mm number	M12 x 25 8	M12 x 30 8	M12 x 30 8	M16 x 35 8	M16 x 40 8	M16 x 40 16	M16 x 40 16	M16 x 40 16	M16 x 50 24	M16 x 55 24	M16 x 55 24	M16 x 65 32	M16 x 65 32	M20 x 80 40	M20 x 80 40
PN10	Bolt length mm number	M16 x 30 8	M16 x 35 8	M16 x 35 8	M16 x 35 8	M16 x 40 16	M16 x 45 16	M20 x 45 16	M20 x 50 16	M20 x 55 24	M20 x 60 24	M20 x 60 32	M22 x 70 32	M22 x 80 40	M2 2 x 80 40	M27 x 90 40
PN16	Bolt length mm number	M16 x 30 8	M16 x 35 8	M16 x 35 8	M16 x 35 16	M16 x 40 16	M16 x 45 16	M20 x 45 16	M20 x 50 24	M22 x 55 24	M22 x 60 24	M22 x 60 32	M27 x 70 32	M27 x 80 40	M30 x 80 40	M33 x 90 40
#150	Bolt length mm number	1/2 x 1 3/16 8	5/8 x 1 1/2 8	5/8 x 1 1/2 8	5/8 x 1 1/2 8	5/8 x 1 3/4 16	3/4 x 1 3/4 16	3/4 x 2 16	3/4 x 2 1/4 16	7/8 x 2 1/4 24	7/8 x 2 1/4 24	1 x 2 1/2 24	1 x 3 1/4 32	1 1/8 x 3 1/4 32	1 1/8 x 3 1/4 40	1 11/4 x 3 1/2 40

The lug type butterfly valves have the advantage over the wafer type in that they can be installed at the end of the piping; just on one flange. Such function also offers the advantage in that there is no difficulty in removing the piping on the downstream side when maintenance is required. For this application, we suggest using a welding neck flange and/or socket welding. When the butterflyvalve is expressly used as a foot valve, be careful that the fluid pressure is not higher than 50% of the valve nominal pressure. Furthermore this application should not be used for gas or air lines otherwise the valve should always be protected with a blind flange.

Mounting flanges

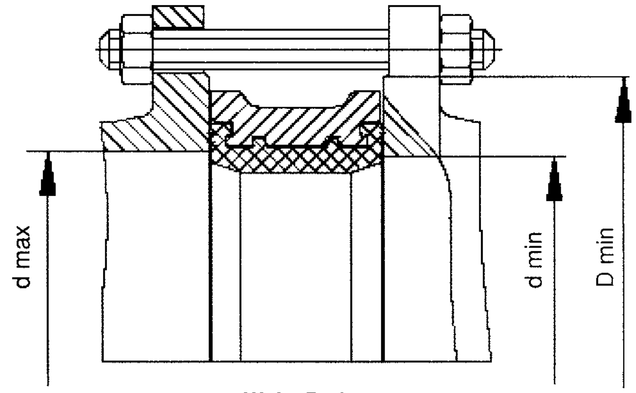


Dimension	mm inch	40 1 1/2	50 2	65 2 1/2	80 3	100 4	125 5	150 6	200 8	250 10	300 12	350 14	400 16	450 18	500 20	600 24
A - Ø int. Welding neck flanges DIN 2631 – 2632 – 2633/75	DIN ISO 	39.5 1.56 43.5 1.71	51 2.0 54.5 2.15	70 2.76 70 2.76	82.6 3.25 82.6 3.25	101.6 4.0 108.1 4.26	126 4.96 133 5.24	151 5.94 160,5 6.32	211 8.30 211 8.30	258 10.16 264 10.39	314 12.36 314 12.36	357.2 14.06 344.7 13.57	407 16.02 394.5 15.53	444.4 17.5 470 18.5	495.4 19.5 495.4 19.5	596.9 23.5 596.9 23.5
A - Ø int. Soldering flanges DIN 2566/75	DIN ISO 	45 1.77 49 1.93	58 2.28 61.5 2.42	77 3.03 77 3.03	90 3.54 90 3.54	109 4.29 115.5 4.55	134.5 5.30 141 5.55	160.5 6.32 170 6.69	221 8.70 221 8.70	269 10.59 275 10.83	326 12.83 326 12.83	370,5 14.59 358 14.09	422 16.61 409 16.61	470 18.5 460,2 18.11	521 20.51 511 20.12	622 24.49 612.9 24.13
A - Ø int. Screwed flanges DIN 2566/75	DIN ISO 	45 1.77 49 1.93	58 2.28 62 2.44	77 3.03 77 3.03	90 3.54 90 3.54	109 4.29 115.5 4.55	134.5 5.30 141 5.55	160.5 6.32 170 6.69	221 8.70 221 8.70	275 10.83 269 10.59	326 12.83 326 12.83	370,5 14.59 358 14.09	422 16.61 409 16.61	470 18.5 460,2 18.11	521 20.51 511 20.12	622 24.49 612.9 24.13
A - Ø int. Lapped joint short stubs and flanges DIN2673/62		- -	54.4 2.15	70 2.76	82.6 3.25	108.1 4.26	133 5.24	160.5 6.32	211 8.30	264 10.39	314 12.36	344.7 13.57	394.5 15.53	444.4 17.50	495.4 19.5	596.0 23.50
A - Ø int. Welding neck and Socket welding flanges ANSI 150 B16.5/73		40.9 1.61	52.6 2.07	62.7 2.47	78 3.07	102.4 4.03	128.3 5.05	154,2 6.07	202,7 7.98	254,5 10.02	304,8 12	336.5 13.25	387,3 15.25	438,1 17.25	488,9 20.20	590.5 23.25
A - Ø int. Slip-on flanges ANSI 150 B16.5/73		49.5 1.95	62 2.44	74.7 2.94	9.7 3.57	116.1 4.57	143.8 5.66	170.7 6.72	221.5 8.72	276.3 10.88	327.1 12.88	359.1 14.14	410.5 16.16	461.8 18.18	513.1 19.25	615,9 4.25
A - Ø int. Lap-joint flanges ANSI 150 B16.5/73		50 1.97	62.5 2.46	75.4 2.97	91.4 3.60	116.8 4.60	144.5 5.69	171.4 6.75	222.2 8.75	277.4 10.92	328.1 12.92	360.2 14.18	411.2 16.19	462.3 18.20	514.3 20.25	615.9 24.25
B - Ø int Seat ring		47 1.85	57,6 2.27	71,7 2.82	85,3 3.36	106 4.17	134,4 5.29	160,8 6.33	207,5 8.17	255 10.04	302,5 11.91	340,5 13.41	401 15.79	452 17.80	495 19.49	603 23.74
C - Ø Seat ring O-ring		53.7 2.11	65.5 2.58	79 3.11	94.1 3.70	116.4 4.58	147.1 5.79	166.8 6.57	219 8.62	271 10.67	319 12.56	376 14.80	425 16.73	467 18.39	507 19.96	628 24.72
D - Ø ext Seat ring		66.5 2.62	79.3 3.12	92,3 3.63	107,6 4.24	133.8 5.27	160.4 6.31	190.2 7.49	237.5 9.35	293 11.54	344.5 13.56	397.5 15.65	446.6 17.58	501 19.72	550.5 21.67	648 25.51
E - Ø Body		90 3.54	102 4.02	122 4.80	135 5.31	162 6.38	194 7.64	220 8.66	274 10.79	330 12.99	386 15.2	447 17.60	510 20.08	546 21.50	612 24.09	696 27.40
F - Disc		25 0.98	38 1.50	55 2.17	70 2.76	91 3.58	117 4.61	143 5.63	190 7.48	237 9.33	288 11.34	323 12.72	370 14.57	420 16.54	470 18.50	570 22.44
J - Face to face		33 1.3	43 1.69	46 1.81	46 1.81	52 2.05	56 2.20	56 2.20	60 2.36	68 2.68	78 3.07	78 3.07	102 4.02	114 4.49	127 5	154 6.10

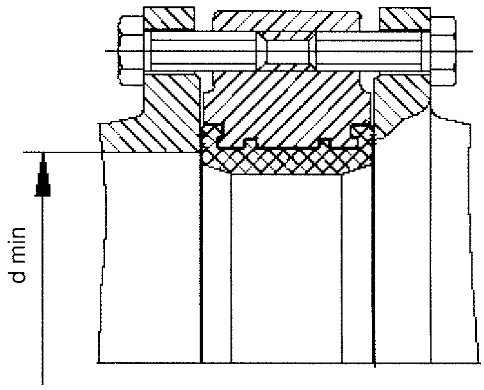
Installation instructions

Installing the valves in existing pipelines:

1. In order to make mounting easier open the flanges completely with the most applicable tools.
2. Disc must be in a 95% closed position.
3. Centre the valve between the flanges and tighten the bolts.
4. Open the valve completely and remove the flange separator.
5. Tighten the bolts using the nuts by hand only
6. Test the valve by opening and closing ensuring free movement.
7. Tighten the bolts until the flanges touch the valve body.



Wafer Body



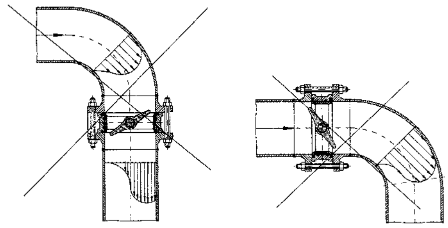
Lug Body

Installing the valve in a new pipeline:

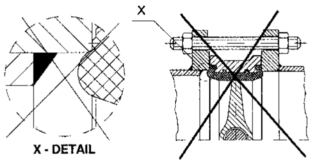
1. Connect the valve with bolts and nuts between the two flanges while the disc is in a 95% closed position.
2. Weld the flange of the line only at two points.
3. Loosen the bolts and remove the valve to make sure that the seat ring wil not be damaged.
4. Carefully weld the flange on the line and wait for cooling. To avoid heat damage to the rubber seat never weld the flange while the valve is still connected to the line.
5. Using welding gauge apparatus is advised for valves with sizes over DN 200
6. Replace the valve (95% closed) between the flanges and place the nuts and bolts.
7. Tighten the bolts using the nuts by hand only.
8. Test the valve by opening and closing ensuring free movement. Tighten the bolts until the flanges touch the valve body.

Additional installation information

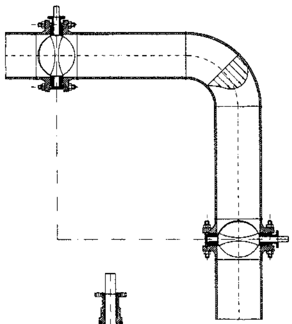
Installing the valves near the curves (see diagram) shall cause turbulence and should be avoided.n.



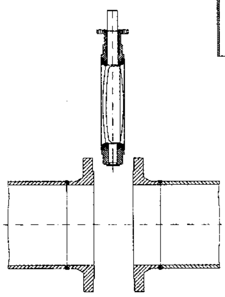
Welded neck type flanges are advised. Otherwise the valves must be centred between the flanges.



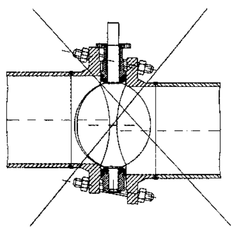
Always install the valves further from the curve equally 3 to 5 times the diameter of the line. The axis of the stem should be parallel to the line extended from the opposite side of the curve.



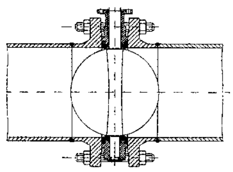
Surrounding space must be provided between the flanges to insert the valve. The disc must be at 95% closed position prior to installing the valve.



Using scrap pipes is not recommended. The pipes must not be welded to each other at short intervals. The lines connected to the two sides of the valve must be on the same axis to prevent leakage.



- lines connected to the valves must be centred with each other.
- movement of the disc must be completely open.
- line and stem axis must be centred.
- the bolts must be tigtened until the flanges touch the valve body.



If the stem must be installed parallel to the ground to accommodate dense flowing materials, lower part of the disc should open in the same direction of the flow.