

# V106

## DOUBLE ECCENTRIC BUTTERFLY VALVE



### Product Description

TVN V106 Double Eccentric Resilient Seated Butterfly Valve is the mainstream product type preferred in water networks. Through its disc design where the center is shifted in two axis, this leads to a big improvement on decreasing operation torque values, lowering the friction on disc sealing area and extended service life.



Technical Data	
Size range	DN100 - DN2400
Pressure range	PN 10 - 16 - 25
Temperature	EPDM : -10°C to +130 °C NBR - 10°C to +100 °C VITON -10°C to +180 °C
Design	EN 593
Face to face	EN 558 Series 14
Flange drilling	EN 1092 - 2 ISO 7005 - 2 Flanged
Coating	Thermoplastic Powder Epoxy
Testing	EN 12266-1
Marking	EN 19
Operation	Manual gearbox with handweel
	Electrical actuators

### Application Range

- Water treatment and distribution systems
- Mining industry
- Shipbuilding and drilling facilities
- Chemical and petrochemical plants
- Food and chemical enterprises
- Oil and gas processes
- Fire extinguishing systems
- HVAC systems

### Related Products

- VG202 Tilting Check Valve
- V251 Dismantling Joint
- V852 Basket Type Strainer



WASTE WATER



IRRIGATION



POTABLE WATER

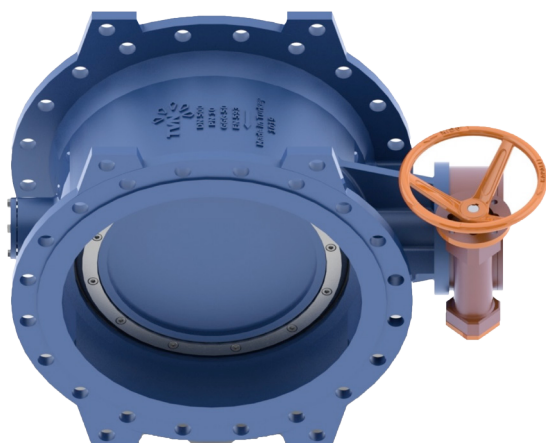
# V106

## DOUBLE ECCENTRIC BUTTERFLY VALVE



### Product Features

- GGG40/50 Ductile Iron Body & Disc allows high impact and stretching resistance
- Double Eccentric / Double Offset Disc Design
- Resilient Seated Type
- Disc sealing ring EPDM as default. NBR or VITON options are available
- Block moulded solid/one-piece T-shaped disc sealing ring extends drop-tight sealing life time
- Easy to replace disc sealing ring without dismantling the valve from the pipeline and without dismantling the disc from the valve itself just by taking out the retaining ring through its bolts. It is easy to replace the disc sealing ring without any additional equipments
- SS308/316 grade stainless steel welding seat on the body is manufactured through automatic welding machines and microfinished precise milling operation. When disc is fully closed, disc sealing ring applies equal pressure on every point on the welding seat.
- Drop-tight closure
- Double O-ring feature on both shafts ensures high sealing
- Shafts are equipped with bronze bushings having high corrosion resistance
- Ensures minimized pressure loss and increased energy efficiency with double shaft design
- With the o-rings on the bearing bushings, disc pin holes are protected against corrosion. Dry shaft up to request.
- Easy to operate with self locking gearbox equipped with mechanical indicator
- Low torque requirements during operation
- Easy to install on the line, light weight and occupies less space
- Full coating on the body and disc internally & externally with an average of 250 microns. Higher coating thicknesses are available when required.
- WRAS approved coating available upon request which meets hygienic requirements for potable water applications
- Maintenance free design for the valve and gearbox
- Default operation is gearbox with ISO top flange ready to connect electrical actuator. Pneumatic actuators can be installed directly on the top flange of the valve itself.
- V106 Double Eccentric Butterfly valves are designed bi-directional according to EN1074-2. For proper installation, direction arrow on the body should be considered.
- Operation with extended spindle version is also available
- Balanced positioned lifting holes on the body ease transportation and installation.
- Hydrostatic test pressure for seat: PN x 1.1 , for shell: PN x 1.5 according to EN 12266-1.

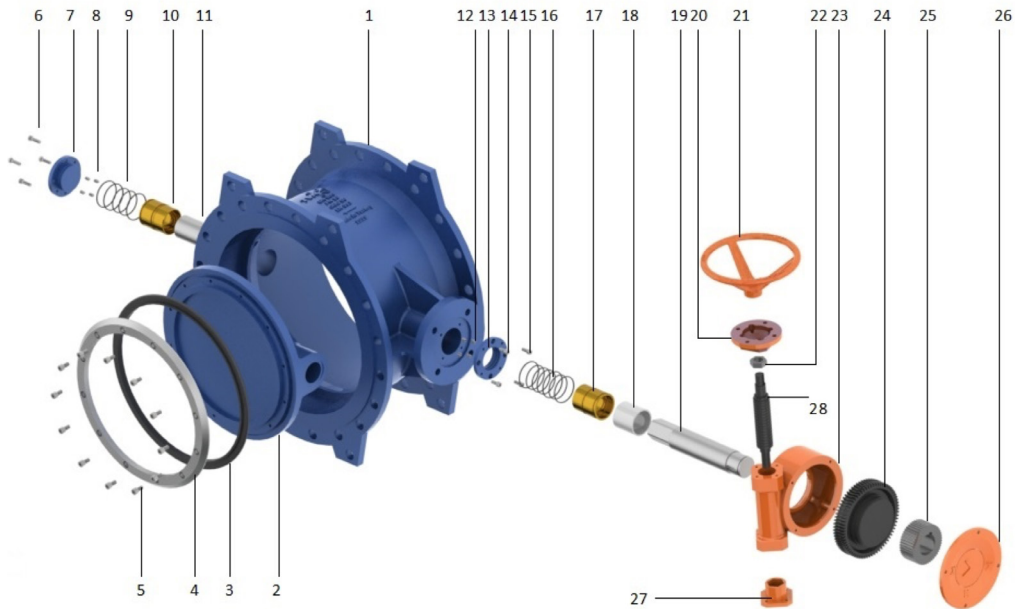


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## DOUBLE ECCENTRIC BUTTERFLY VALVE



### Material List



No	Part	Material
1	Body	GGG50 Ductile Iron
2	Disc	GGG50 Ductile Iron
3	Disc Sealing	EPDM
4	Retaining Ring	ST37 / SS304 / SS316
5	Retaining Ring Bolts	A2-70 (AISI 304) / A4 AISI 316 Stainless Steel
6	Bolts	8.8 / A2 / A4
7	Lower Shaft Cover	GGG50 Ductile Iron
8	Bolts	8.8 / A2 / A4
9	Spring	AISI 304 Stainless Steel
10	Bushing	Bronze
11	Lower Shaft	AISI 420 / 304 / 316 Stainless Steel
12	Bolts	8.8 / A2 / A4
13	Main Shaft Cover	ST37 Steel / AISI304 / AISI316 Stainless Steel
14	Bolts	8.8 / A2 / A4
15	Bolts	8.8 / A2 / A4

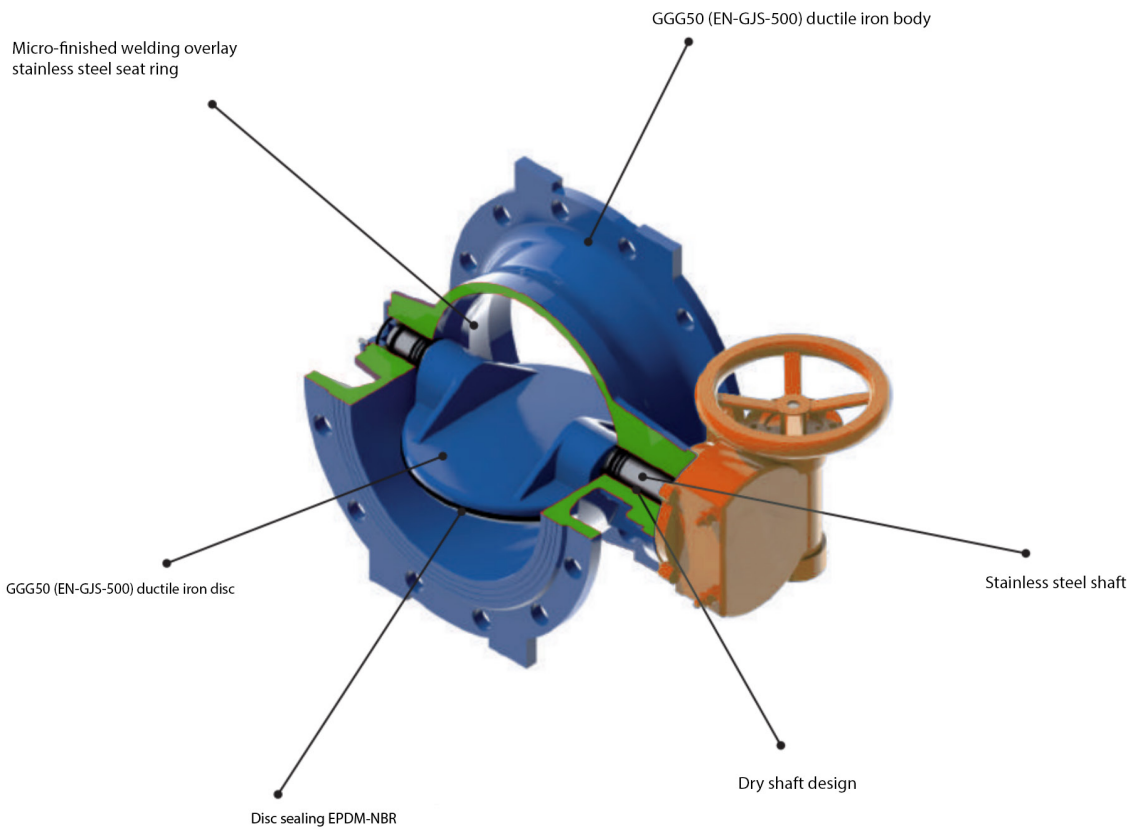
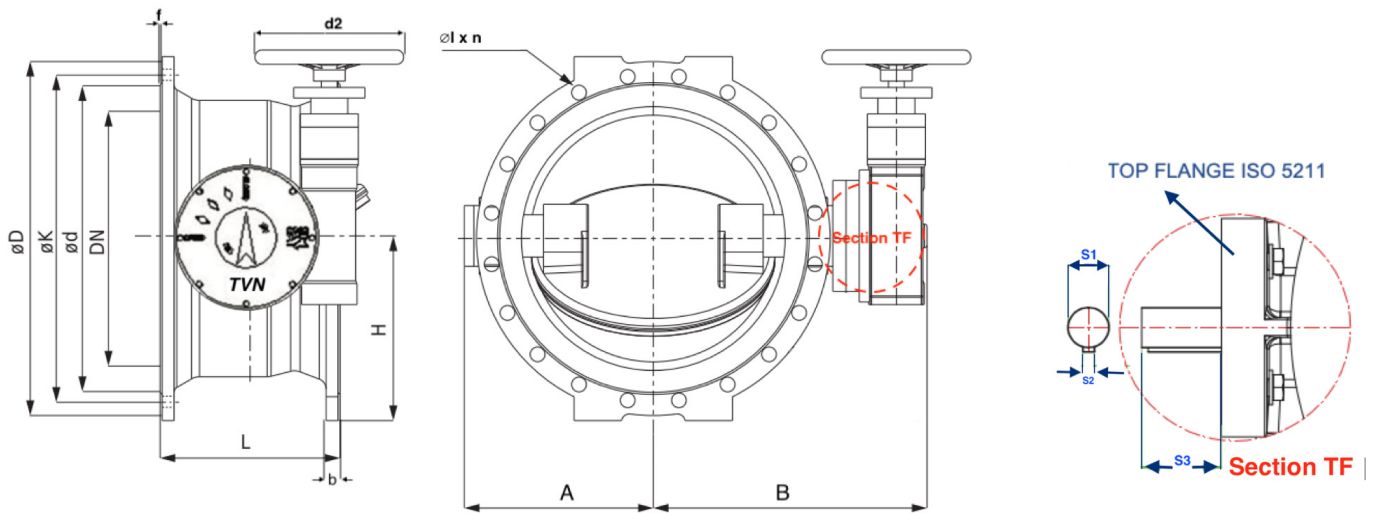
No	Part	Material
16	Spring	AISI 304 Stainless Steel
17	Bushing	Bronze
18	Main Shaft Bearing	Delrin
19	Main Shaft	AISI 420 / 304 / 316 Stainless Steel
20	Gearbox ISO Top Flange	GGG50 Ductile Iron / ST37 Steel
21	Hand Wheel	GGG50 Ductile Iron
22	Hexagon Nut	ST37 Steel
23	Gearbox Body	GGG50 Ductile Iron
24	Gear	GGG50 Ductile Iron
25	Inner Gear Shaft Connection	GGG50 Ductile Iron
26	Gearbox Cover	GGG50 Ductile Iron
27	Gearbox Shaft Cover	GGG50 Ductile Iron / ST37 Steel
28	Gearbox Shaft	C40 Steel

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## DOUBLE ECCENTRIC BUTTERFLY VALVE



### Dimensions Table



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## DOUBLE ECCENTRIC BUTTERFLY VALVE



### Dimensions Table

Nominal Diameter		PN 10																
DN	L	f	ØD	ØK	Ød	b	Ølxn	B	A	H	d2	S1	S2	S3	Body Top Flange	Gear-box Top Flange	Auma Actuator Selection	Weight (kg)
100	190	3	220	180	156	19	19x8	185	125	110	250	20	7	53.5	F10	F10	SA07.6 - 60Nm	35
125	200	3	250	210	184	19	19x8	230	130	130	250	20	7	53.5	F10	F10	SA07.6 - 60Nm	40
150	210	3	285	240	211	19	23x8	275	135	150	250	20	7	53.5	F10	F10	SA07.6 - 60Nm	45
200	230	3	340	295	266	20	23x8	320	170	175	250	30	8	51	F10	F10	SA07.6 - 60Nm	57
250	250	3	400	350	319	22	23x12	350	200	210	250	30	8	58	F16	F10	SA07.6 - 60Nm	70
300	270	4	455	400	370	24-5	23x12	400	235	235	250	30	8	45	F16	F10	SA07.6 - 60Nm	120
350	290	4	505	460	429	24-5	23x16	430	265	265	250	40	12	52	F16	F10	SA07.6 - 60Nm	150
400	310	4	565	515	480	24-5	28x16	465	295	295	250	40	12	48	F16	F10	SA07.6 - 60Nm	190
450	330	4	615	565	530	26-5	28x20	515	340	325	250	40	12	45.5	F16	F10	SA07.6 - 60Nm	210
500	350	4	670	620	582	26-5	28x20	550	360	365	250	60	18	68	F16	F10	SA07.6 - 60Nm	240
600	390	5	780	725	682	30	31x20	610	430	425	250	60	18	107	F25	F10	SA07.6 - 60Nm	380
700	430	5	895	840	794	32.5	31x24	640	475	455	250	65	18	104	F25	F10	SA10.2 - 120Nm	450
800	470	5	1015	950	901	35	34x24	865	550	515	250	80	22	101	F25	F10	SA10.2 - 120Nm	665
900	510	5	1115	1050	1001	37.5	34x28	910	615	565	250	90	26	98	F25	F10	SA10.2 - 120Nm	880
1000	550	5	1230	1160	1112	40	37x28	970	675	620	250	100	28	98	F25	F10	SA10.2 - 120Nm	1130
1100	590	5	1340	1270	1218	43	37x32	1049	760	720	250	110	30	123	F25	F10	SA10.2 - 120Nm	1350
1200	630	5	1455	1380	1328	45	41x32	1170	805	735	250	120	32	148	F30	F10	SA10.2 - 120Nm	1625
1300	670	5	1585	1490	1432	45	42x32	1235	850	800	250	140	36	166	F30	F14	SA14.2 - 250Nm	2000
1400	710	5	1675	1590	1530	46	44x36	1235	920	845	250	160	42	184.5	F30	F14	SA14.2 - 250Nm	2400
1500	750	5	1785	1700	1640	49	44x36	1307	975	915	320	170	44	205	F30	F14	SA14.2 - 250Nm	3.050
1600	790	5	1915	1820	1750	49	50x40	1420	1075	975	320	180	48	228	F40	F14	SA14.2 - 250Nm	3.800
1800	870	5	2115	2020	1950	52	50x44	1535	1195	1065	320	200	54	253	F40	F14	SA16.2 - 500Nm	5100
2000	950	5	2325	2230	2150	55	50x48	1725	1290	1170	340	200	54	280	F40	F14	SA16.2 - 500Nm	6200
2200	1030	6	2555	2440	2370	58	56x52	1920	1560	1310	340	220	60	309	F40	F14	SA16.2 - 500Nm	7500
2400	1110	6	2760	2650	2555	65	56x52	1920	1481	1379	340	220	60	341	F40	F14	SA16.2 - 500Nm	9200

\*The dimensions might be indicative. TVN Company has the right to change the design of the valves without any notification.

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## DOUBLE ECCENTRIC BUTTERFLY VALVE



### Dimensions Table

Nominal Diameter		PN 16																
DN	L	f	ØD	ØK	Ød	b	Ølxn	B	A	H	d2	S1	S2	S3	Body Top Flange	Gear-box Top Flange	Auma Actuator Selection	Weight (kg)
100	190	3	220	180	156	19	19x8	185	125	110	250	20	7	53.5	F10	F10	SA07.6 - 60Nm	35
125	200	3	250	210	184	19	19x8	230	130	130	250	20	7	53.5	F10	F10	SA07.6 - 60Nm	40
150	210	3	285	240	211	19	23x8	275	135	150	250	20	7	53.5	F10	F10	SA07.6 - 60Nm	45
200	230	3	340	295	266	20	23x12	320	170	175	250	30	8	51	F10	F10	SA07.6 - 60Nm	57
250	250	3	405	355	319	22	28x12	350	200	210	250	30	8	58	F16	F10	SA07.6 - 60Nm	70
300	270	4	460	410	370	24-5	28x12	400	235	235	250	30	8	45	F16	F10	SA07.6 - 60Nm	130
350	290	4	520	470	429	26-5	28x16	430	265	265	250	40	12	52	F16	F10	SA07.6 - 60Nm	165
400	310	4	580	525	480	28	31x16	465	295	295	250	40	12	48	F16	F10	SA07.6 - 60Nm	200
450	330	4	640	585	548	30	31x20	515	340	325	250	40	12	45.5	F16	F10	SA07.6 - 60Nm	225
500	350	4	715	650	609	31-5	34x20	550	360	365	250	60	18	68	F16	F10	SA07.6 - 60Nm	270
600	390	5	840	770	720	36	37x20	610	430	425	250	60	18	107	F25	F10	SA07.6 - 60Nm	430
700	430	5	910	840	794	39.5	37x24	640	475	460	250	65	18	104	F25	F10	SA10.2 - 120Nm	490
800	470	5	1025	950	901	43	41x24	865	550	520	250	80	22	101	F25	F10	SA10.2 - 120Nm	705
900	510	5	1125	1050	1001	46.5	41x28	945	625	575	250	90	26	98	F25	F10	SA10.2 - 120Nm	957
1000	550	5	1255	1170	1112	50	44x28	1070	705	635	250	100	28	98	F25	F10	SA10.2 - 120Nm	1200
1100	590	5	1355	1270	1218	53.5	44x32	1122	765	720	250	110	30	123	F25	F10	SA10.2 - 120Nm	1410
1200	630	5	1485	1390	1328	57	50x32	1177	835	750	250	120	32	148	F30	F10	SA10.2 - 120Nm	1725
1300	670	5	1585	1490	1432	59	50x32	1232	885	800	250	140	36	166	F30	F14	SA14.2 - 250Nm	2200
1400	710	5	1685	1590	1530	60	50x36	1320	970	850	250	160	42	184.5	F30	F14	SA14.2 - 250Nm	2600
1500	750	5	1820	1710	1640	62.5	57x36	1370	1025	920	320	170	44	205	F30	F14	SA14.2 - 250Nm	3813
1600	790	5	1930	1820	1750	65	57x40	1530	1100	970	320	180	48	228	F40	F14	SA14.2 - 250Nm	4750
1800	870	5	2130	2020	1950	70	57x44	1680	1250	1075	320	200	54	253	F40	F14	SA16.2 - 500Nm	6100
2000	950	5	2345	2230	2150	75	62x48	1812	1385	1180	340	200	54	280	F40	F14	SA16.2 - 500Nm	7300
2200	1030	6	2550	2440	2360	80	62x52	1920	1560	1310	340	220	60	309	F40	F14	SA16.2 - 500Nm	8200
2400	1110	6	2760	2650	2555	80	62x56	2750	1875	1400	340	220	60	341	F40	F14	SA16.2 - 500Nm	9400

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## DOUBLE ECCENTRIC BUTTERFLY VALVE



### Dimensions Table

Nominal Diameter	PN 25														Weight (kg)
	DN	L	f	ØD	ØK	Ød	b	Ølxn	B	A	H	d2	S1	S2	
100	190	3	235	190	156	19	23x8	185	125	110	250	30	8	53.5	39
125	200	3	270	220	184	19	28x8	230	130	130	250	30	8	51	44
150	210	3	300	250	211	20	28x8	275	135	150	250	40	12	58	50
200	230	3	380	310	274	22	28x12	320	170	175	250	40	12	45	63
250	250	3	425	370	330	24.5	28x16	350	200	210	250	40	12	52	77
300	270	4	485	430	389	27.5	31x16	430	240	235	250	60	18	48	144
350	290	4	555	490	448	30	34x16	440	275	265	250	60	18	45.5	183
400	310	4	620	550	503	32	37x16	410	320	295	250	65	18	68	222
450	330	4	670	600	548	34.5	37x20	420	355	325	250	80	22	107	249
500	350	4	730	660	609	36.5	37x20	700	380	365	250	90	26	104	300
600	390	5	845	770	720	42	41x20	763	453	425	250	100	28	101	477
700	430	5	960	875	820	46.5	44x24	825	530	455	250	110	30	98	543
800	470	5	1085	990	928	51	50x24	895	583	515	250	120	32	98	782
900	510	5	1165	1090	1028	55.5	50x28	1022	660	565	250	140	36	123	1062
1000	550	5	1320	1210	1140	60	57x28	1097	715	620	250	160	42	148	1332
1100	590	5	1420	1310	1240	64.5	57x32	1175	770	720	250	170	44	166	1565
1200	630	5	1530	1420	1350	69	57x32	1225	880	735	250	180	48	184.5	1914
1300	670	5	1640	1530	1455	72	60x32	1268	935	800	250	200	54	205	2442
1400	710	5	1755	1640	1560	74	62x36	1485	1050	845	250	200	54	228	2886
1500	750	5	1865	1750	1678	77.5	62x36	1555	1100	915	320	220	60	253	4232
1600	790	5	1975	1860	1780	81	622x40	1617	1190	975	320	220	60	280	5272
1800	870	5	2195	2070	1985	88	70x44	1713	1285	1065	320	240	66	309	6771
2000	950	5	2425	2300	2210	95	70x48	2100	1400	1170	340	240	66	341	8103

\*The dimensions might be indicative. TVN Company has the right to change the design of the valves without any notification.

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## DOUBLE ECCENTRIC BUTTERFLY VALVE



### Dimensions Table

Nominal Diameter	PN 40														
DN	L	f	ØD	ØK	Ød	b	Ølxn	B	A	H	d2	S1	S2	S3	Weight (kg)
100	190	3	235	190	156	19	23x8	185	125	110	250	40	12	58	43
125	200	3	270	220	184	23.5	28x8	230	130	130	250	60	18	45	49
150	210	3	300	250	211	26	28x8	275	135	150	250	60	18	52	56
200	230	3	375	320	284	30	31x12	320	170	175	250	65	18	48	70
250	250	3	450	385	345	34.5	34x12	350	200	210	250	80	22	45.5	85
300	270	4	515	450	409	39.5	34x16	430	240	235	250	90	26	68	160
350	290	4	580	510	465	44	37x16	440	275	265	250	100	28	107	203
400	310	4	660	585	535	48	41x16	410	320	295	250	110	30	104	246
450	330	4	685	610	560	49	41x20	420	355	325	250	120	32	101	276
500	350	4	755	670	615	52	44x20	700	380	365	250	140	36	98	333
600	390	5	890	795	735	58	50x20	763	453	425	250	160	42	98	529
700	430	5	995	900	840	64	50x24	825	530	455	250	170	44	123	603
800	470	5	1140	1030	960	72	57x24	895	583	515	250	180	48	148	868
900	510	5	1250	1140	1070	80	57x28	1022	660	565	250	200	54	166	1179
1000	550	5	1360	1250	1180	95	57x28	1097	715	620	250	200	54	184.5	1478
1100	590	5	1470	1180	1110	95	62x32	1175	770	720	250	220	60	205	1737
1200	630	5	1575	1460	1380	95	62x32	1225	880	735	250	220	60	228	2124
1300	670	5	1685	1570	1490	100	62x36	1268	935	800	250	240	66	253	2710
1400	710	5	1795	1680	1600	105	62x36	1485	1050	845	250	240	66	280	3200
1500	750	5	1910	1790	1711	110	70x40	1555	1100	915	320	260	72	309	4700
1600	790	5	2025	1900	1815	120	70x40	1617	1190	975	320	260	72	341	5850
1800	870	5	2240	2110	2010	165	70x48	1713	1285	1065	320	280	78	376	7515

\*The dimensions might be indicative. TVN Company has the right to change the design of the valves without any notification.



# V106

## DOUBLE ECCENTRIC BUTTERFLY VALVE



### Body

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The valve body consists basically of a shell of the same interior diameter as the duct where it is installed, with a flange on each side. These flanges have a machined recess throughout the diameter in order to position the O-ring.

There is a ring inside the shell in order to make the seal; this ring is always stainless steel, regardless of the material of the body. This ring is then machined for efficient sealing and minimum disturbances in the flow.

In order to house the shafts, hubs are positioned on the body shell, with reinforcements and ribs on the outside to join the housings for the shafts, shell and flanges. This achieves a highly robust single-piece body which can withstand any level of tension.

The standard manufacturing material is EN-GJS-500 (GGG50). However, other alloys and materials are available on request. As standard, ductile iron bodies are painted with an anti-corrosive epoxy protection (WRAS approved coating is available up to request). Other types of anti-corrosive protections are available to order.

### Disc

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The disc consists basically of a thick, flat circular disc. This disc has two lugs in order to couple the shafts and transmit the movement of the actuator. The clapper is sized in line with working pressure. TVN discs are always moved by cotters and not by pins.

The standard manufacturing material is EN-GJS-500 (GGG50) ductile iron. Other materials or combinations can be supplied to order.

The disc has a machined recess throughout the perimeter of the main disc, housing the seal tight joint which is secured by way of the flange. As standard, ductile iron discs are painted with an anti-corrosive epoxy protection. Other types of anti-corrosive protections are available to order.

### Seat

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TVN double eccentric butterfly valves make the seal by pressing the special elastomer profile against a stainless steel ring. The special elastomer profile is located in the outer recess of the perimeter of the disc and is secured by way of a flange with stainless steel screws. The stainless steel ring is located inside the body shell, and has been machined in order to ensure correct sealing and minimize disturbances in the flow.

Seal tightness is usually achieved with an EPDM seal, although other types of elastomers are available. The seal can be changed without removing the valve from the pipeline.

### Seal tight materials

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**EPDM** This is the standard resilient seal fitted on TVN valves. It can be used in many applications, although it is generally used for water and products diluted in water at temperatures no higher than 90°C. It can also be used with abrasive products and provides the valve with 100% seal-tightness.

**NITRILE** It is used in fluids containing fats or oils at temperatures no higher than 90°C. It provides the valve with 100% seal-tightness.

**VITON** Suitable for corrosive applications and high temperatures up to 190°C continuously and peaks of 210°C. It provides the valve with 100% seal-tightness.

**SILICONE** Used mainly in the food industry and for pharmaceutical products with temperatures no higher than 200°C. It provides the valve with seal-tightness of 100%.

# V106

## DOUBLE ECCENTRIC RESILIENT SEATED BUTTERFLY VALVE



### Shafts

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The shafts of TVN's V106 butterfly valves are made from AISI420, AISI304, AISI316, AISI316L, etc stainless steel, making them highly resistant with excellent properties in preventing corrosion. Parallel cotters are used to transmit the movement of the actuator to the clapper, meaning both the clapper and the shafts have several machined cotter holes. Self-lubricating bronze bushing is placed in the body hubs in order for the shafts to turn easily.

### O-Ring Seals

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O-rings are used to guarantee seal tightness between the duct and the outside. The only points in which there may be leakages from the body are between the shafts and the hubs, meaning seal tightness is achieved by placing O-rings in a bronze flange. The O-rings used in the TVN valves are usually EPDM, nitrile, although other types of elastomers are available.

### Actuators

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All types of actuators can be supplied, whether manual or automatic. The most suitable type of actuator will be chosen in each case in accordance with the working conditions and characteristics of the facility. Sometimes it is the customer who specifies what type of actuator is required for the project.

### INSPECTION ON RECEIPT AND HANDLING

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- a. At receipt of the product, ensure that there are no transit damages to the product received, especially on valve flanges, operating actuators etc.
- b. Also ensure that Parts and Accessories are received as per ordered scope of supply.
- c. Special operators (if any), like Electric Actuators / Pneumatic Actuators / Hydraulic Actuators & their accessories (if any) are sent loose along with the product for their safe transportation. Examine them for freedom from damages. Also ensure that adequate numbers of fasteners for mounting accessories are received.
- d. While unloading the product, please use the provision of lifting made on the valve (e.g. Lifting Lugs, Lifting eye bolts).
- e. Use the safe lifting devices (e.g. slings, hoists, hooks etc.) of dequate capacity.

### STORAGE & PRESERVATION

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If the valve has to be stored at site before installation,

- a. Store it on horizontal level surface in dry and clean atmosphere.
- b. Store the products in well-covered sheds, protected from sun, rain and dust.
- c. In the instance if the valve is required to be stored for long duration, ensure that rust preventive should be applied on the corroding surfaces.
- d. It is advisable to give a coat of silicone grease on rubber seals during the storage period and keep the valves in partly open position so that the seals remain in un-stressed condition. Keep the seal away from direct sunlight and dusty atmosphere.
- e. Gear Box, Electrical / Hydraulic / Pneumatic actuators & accessories should also be stored away from dust, dirt or any rainfall or water.

### CHECKS ON THE VALVE ASSEMBLY BEFORE INSTALLATION

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- a. Before taking the Butterfly Valve for pipe installation, make sure that it is cleaned from inside and outside and there are no foreign or metallic objects sticking on to its sealing elements. Also clean the valve interior passages to remove any foreign matter & rust preventive on machined surfaces.
- b. While installing the operating element, make sure that the Butterfly Valve is in fully closed position.
- c. Do not attempt to force Electric actuator assembly on the Gear Box connecting shaft. In case of any difficulty in proper fitment of the key ways, please de-burr the bore, key ways & keys with polish paper. In any case, do not hammer the actuator surface to drive it in. If difficulty persists, contact TVN.
- d. Ensure that the entire rust preventive on the machined surface in the flow area is removed, before the valve is put in pipe-line.
- e. Do not tighten or loosen the rubber seal for any reason. The rubber seal is factory set.
- f. Note the name plate details and arrow flow mark on valve body and install the valve in right orientation with respect to pressure gradient. Arrow on valve body should point from high pressure side to low pressure side of the pipeline. Recheck valve pressure rating adequacy with respect to operating pressure.
- g. Valves should be installed in the pipeline, only after verifying the sealing ability of rubber seal. This can be done by examination of the seals for freedom from surface damages, cracks / dent marks, embedded foreign particles as well as uniform clearance between the seal & body ring. If abnormalities of this type are observed, replace the seal.
- h. Butterfly Valves are designed to operate with Valve Shafts in HORIZONTAL orientation, unless otherwise specified at the time of ordering. In any case, do not install the Butterfly Valve with vertical orientation of the shafts, unless that was originally specified in order and accepted by TVN for such design. Valves required to operate with shafts in vertical orientation have different design.
- i. Operate the Butterfly Valve manually from Full Close to Full Open and Full Open to Full Close, with the operator hand wheel. Ensure that there is no undue resistance / friction in the operation. Ensure that the factory setting of Limiting Stopper Bolts in the Gear Box is not disturbed, for the respective limit positions. If so, adjust the same.
- j. Before connecting valve & pipeline flanges, ensure that they do not have parallel, angular and radial gaps. While fitting the valve in pipeline, ensure that diagonally opposite bolts are simultaneously & uniformly tightened.
- k. Butterfly Valves should not be used at end of pipeline open to atmosphere. In this location, the pressure gets suddenly dropped to atmospheric level and consequently velocities created due to throttling are very high. This further leads to two unfavorable phenomena. Torque requirement of the valve to move the disc becomes unstable and high velocities lead to cavitation and erosion damage of valve interiors.

### CHECKS FOR THE PIPE-LINE BEFORE INSTALLATION

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- a. Clean the pipeline thoroughly so that it does not contain any solid matters which may damage the valve internals.
- b. Avoid parallel, radial and angular mismatch between connecting flanges of valve and the pipeline.
- c. Upstream and downstream piping should be adequately supported and anchored (if required) in such a way that the piping system does not impose any forces & moments on the valve body and the hydraulic thrust arising due to valve closure is carried & sustained by valve supports. Valve flanges are not designed to carry any external loads and moments arising due to pipe expansions / contractions. It is advisable to use Flange Adapter Assembly, after the valve to facilitate valve dismantling and to prevent any loads being transmitted to valve flange.
- d. For the valves having integral foot, provide suitable concrete block with foundation bolts for supporting the valves.
- e. Where the valve does not have integral foot, it is advisable to install a support for the valve at bottom to prevent any sagging to be caused by weight of the valve.
- f. Ensure that pipeline flanges are parallel and are mating the valve flange without leaving any parallel or oblique gap between the flanges. Do not over-tighten the flange bolts / nuts to make the flanges parallel forcefully. That may develop undue stresses in the valve flanges & body leading their deformation & malfunctioning.
- g. If the Butterfly Valves are supplied with By-pass arrangement (against specific order requirement), mount the by-pass arrangement on the pipe-line, across the valve.
- h. Butterfly should not be located immediately before or after a pipe bend. Due to flow disturbances in a bent pipeline, the flow characteristics of the valve are affected.
- i. Butterfly valve should be located in a straight length pipe, at least 1.5 D to 2 D lengths of the pipe downstream of any fitting and at least 3 D lengths upstream of pipe fitting, where D is the nominal diameter of the valve.
- j. For the valve sizes 900mm and above, it is good engineering practice to provide accessibility to valve interiors for inspection / repairs by installing an expansion joint or pipe piece with oblique joint on clamping ring side of the valve.
- k. Butterfly Valve disc, in fully open position projects beyond the flange faces. It is necessary to ensure that pipe coatings and reducers used, if any, do not interfere with swept volume of the disc.
- l. Maximum flow velocity in the pipe-line should not exceed 4 m/s. m. The valves are mainly designed for handling clear water with maximum impurities of 5000 PPM.

### PRE-COMMISSIONING CHECKS

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- a. Ensure manually that the valve operates smoothly.
- b. The entire pipe flange bolting is properly tightened.
- c. Direction indicated on the valve matches with the pressure gradient convention.
- e. Counter weight & Lever (in case of Hydraulic operated valve), Cylinder & its linkages (in case of pneumatic operated valves) are properly assembled / duly bolted and protective guard cage is provided for them.
- f. Surge protection devices (if any) are operative.
- g. Butterfly valves should be operated when both upstream & downstream pipes are filled with water. In commissioning stage, filling of water could be done by use of by-pass (if provided) and / or keeping the disc crack opened and venting-off air by suitable devices provided in the pipeline.

# V106

## DOUBLE ECCENTRIC RESILIENT SEATED BUTTERFLY VALVE



### COMMISSIONING

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- a. Open the By-pass Valve across the valve (if provided).
- b. Charge the pipe-line with water.
- c. Ensure that there is no leakage through flange gaskets and shaft seals.
- d. After charging the pipeline, operate the valve gradually from Full Close to Full Open. Allow the flow stabilize for 10 to 15 minutes. Operate the valve from Full Open to Full close. Ensure that there is no any abnormal noise and vibrations during full travel of the disc. Now the valve is commissioned for its Operation.

### OPERATION

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- a. By-pass valve (if provided) keep it open while every opening / closing cycle of the Butterfly Valve.
- b. Once the Butterfly Valve is closed, the By-pass valve may be kept closed till next operation of the butterfly valve.
- c. In case the manually operated Butterfly Valve demands excessive force to operate, ensure that there is no mechanical obstruction in pipeline or in the operating mechanism.
- d. Do not use means like levers on hand wheel to exert addition force. These hand wheels are designed to be weak links to protect other expensive parts in operators.

TVN V106 Butterfly Valves require very little maintenance if maintenance check point are attended to during periodic inspection & during overhaul. However valves could malfunction in unusual conditions of usage, water contamination and may require maintenance as below:

### TROUBLESHOOTING

FAULT	POSSIBLE CAUSE	CORRECTING MEASURES
No Flow - Not enough Flow	Flange covers or protection not removed	Clear valve entrances
	Valve closed or almost closed	Check valve position
	Piping clogged	Check piping system
Valve is impossible or difficult to open or close	Service conditions (e.g. medium, temperature) may be outside the specified limits	Replace the valve Consult the supplier or manufacturer
	Power failure	Check the power supply
	Actuator fault	Overhaul the actuator or replace it
	Wrong direction of rotation	Turn in the correct direction (anti-clockwise for opening)
	Solid matter is blocking the valve disc	Rinse or clean the valve
	The parallel key on the stem has sheered off	Determine the cause and replace the parallel key
	Liquid has solidified between the bearings	If possible, Åush the bearings and the stem via the Åushing connections
Valve is leaking at closing	The disc is not completely closed	Put the disc into the closed position
	Dirt trapped at closing	Move the disc and flush the valve in the open position
	Mechanical stop of the worm gear at closing not well adjusted.	Adjust the gearbox
	The disc sealing or seat is damaged	Replace the disc sealing or repair the seat
Stem leakage	Stem seals or stem damaged or worn down	Revise and replace if needed
	Excessive pressure or temperature, fluid not compatible	Revise working conditions
Body or flanges break	Assembly bolts with counterflanges has been wrongly tightened or counterflanges are misaligned or with too much gap. Weight not properly supported	Revise installation and tightening according to this Manual
	Working parameters beyond allowable limits	Replace by suitable valve



All these procedures require emptying the upstream and downstream piping and removal of the valve from the pipeline. If the piping system provides access to clamping ring side of the valve (e.g. by dismantling of expansion joint), removal of valve from piping is not necessary.

### Re-setting the Disc Seal

After setting the limiting stopper bolts, it is always advisable to check the seal ring for any wear which will impair its sealing function. If the seal ring touches the body seat ring without any discontinuity (checked with feeler gauge of 0.05mm, which should just pass the joint with little force), then its readjustment is not necessary.

If there is more clearance or discontinuity of contact, re-adjust the seal ring as follows. Bring the disc to "Closed" position. Loosen all the setting grub screws on clamping ring. Tighten the bolts on clamping ring to compress and expand the seal ring in the areas where clearances exceed the requirement of passing of 0.05mm feeler with light force.

After the seal ring makes satisfactory contact all over its periphery with body seat rings, tighten all the setting grub screws. This completes re-setting of the disc seal.

### Replacement of deformed or damaged Disc Seal

If there are visual cracks, permanent deformations or embedded solids in the disc seal ring, an attempt to re-set it should not be done. The seal ring should be replaced.

Bring the disc to "Closed" position. Remove the clamping ring / clamping ring segments after loosening the setting grub screws and removing bolts on the clamping ring.

The match marking is to be used for re-fitment of clamping ring / clamping ring segments at the same location & with the same orientation as before. After removal of the clamping ring, take out the damaged / deformed disc seal from the disc.

Clean the groove provided on the disc for fitting the disc seal, the periphery of the disc where the new seal is to be fitted.

### Recommended Spares for Butterfly Valves

Product Cross Sectional and General Assembly Drawing attached with this manual indicates the components of the respective valves, along with the recommended spares.

We strongly recommend keeping the spares handy all the time to be able to eliminate delays in attending the operation troubles and scheduled replacements / overhauls.

# V106

## DOUBLE ECCENTRIC RESILIENT SEATED BUTTERFLY VALVE



### GENERAL INFORMATION & SAFETY REQUIREMENTS

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1. The Products supplied by TVN have been designed with safety in mind. Where hazards cannot be eliminated, the risk has been minimized by the use of guards and other design features. Some hazards can not be guarded against and the instructions below **MUST BE COMPLIED WITH** for safe operations. These instructions can not cover all circumstances; USER of the product is responsible for using safe-working practices at all times.
2. TVN product are designed for installation in designated area, which are to be kept clean and free of obstructions that may restrict safe access to the controls and maintenance access points. 3. Access to the equipment should be kept restricted to the personnel responsible for installation, operation and maintenance and they must be trained, adequately qualified and supplied with adequate tools for their respective tasks.
4. TVN requires that, all personnel that are responsible for installation, operation or maintenance of the equipment, have access to study the product instruction manual **BEFORE** any work is done and they will comply with all local and industry based safety instructions and regulations.
5. Personnel protection safety equipment must be worn where local rules apply.
6. Read the instruction manual before installation, operation and maintenance of the equipment.
7. Note that the limit of product application and permissible use of the product is according to the respective product design & testing standard and product pressure rating. Operation of the equipment beyond these limits will increase risk from hazards and may lead to premature and hazardous failure of the valve / accessories.
8. Clear and easy access to all controls etc. must be maintained at all times. Hazardous or flammable materials must not be stored near valves unless safe areas or racking and suitable containers have been provided.
9. Improper installation, operation or maintenance of the TVN product could result in injury.





### SAFETY INSTRUCTIONS WHILE HANDLING, STORAGE AND USAGE

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1. For handling / lifting the valves, use devices of adequate capacities certified by competent authorities. Use lifting provisions e.g. lifting eyebolts, lifting lugs etc. wherever provided on the valves.
2. Before fitting the valve in pipeline, ensure that Pressure Rating of the valve is suitable for maximum working pressure / surge pressure that may arise in the pipeline.
3. Non Return Valves / Reflux Valves with Dash-pot arrangement & Counter weight arrangement: Safety Guard for the counter weight & cylinder arrangement shall be provided by the customer to avoid accidents, as the lever with counterweight falls down rapidly during valve closure. It may come down without warning in case of power failure.
4. Electrically Operated Valves! It is to be ensured before operation that proper earthing connection is provided to the actuators. While wiring the actuator in circuit, ensure that direction of actuator rotation which 'Opens' / 'Closes' the valve is according to 'Open' / 'Close' switch.
5. User is solely responsible to refer to and follow Instructions stated in Manuals. This Manual is supplied along with the operator(s), wherever applicable.
6. Open type Gear Arrangement: Due care shall be taken by user while operating valves with Open type Gear Arrangement. The user shall ensure that no part of body or clothing gets caught between pair of Open type gears.
7. In case of manual operated valves, avoid excessive torquing at valve hand wheel / hand lever. Do not use extra leverage to Open / Close the valves.
8. User shall prevent any unauthorized person to mount, dismantle or remount, operate and repair the valves.
9. During using the valve, ensure that approved technical rules & regulations e.g. trading regulations, regulations for prevention of accidents, steam boiler regulations, regulations of gas mains under high pressure, regulations for combustible fluids, local safety regulations etc. are followed.
10. During repairs / maintenance of the valve at site, the user shall take minimum following precautions: a) Provide adequate working platform near the valve. b) Make pipelines pressureless and harmless i.e. switch off the pumps, empty the pipelines, remove and switch-off all electric connections (in case of electric operated valves). c) If work is carried-out in vicinity of the valve, which leads to dusty atmosphere (e.g. concrete work, masonry, painting, sandblasting etc.) the valve / valve components must be covered effectively.