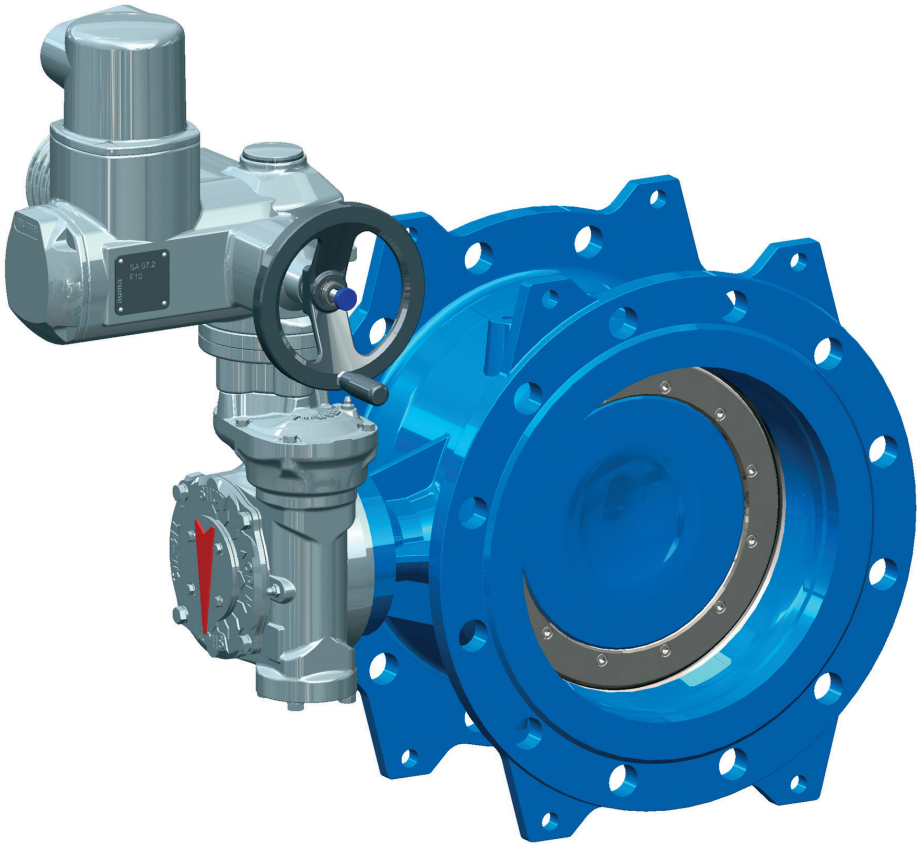
DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVE



Double flanged double eccentric butterfly valve T.I.S. Type is designed to be installed in the pipeline in order to shut off the flow or limit it partially (indeed within certain limits double flange double eccentric butterfly valve could be also used as a control valve). During closing operation, the disc is perpendicular to the flow direction, consequently, to open the valve the disc should be rotated by 90°. The tightness of the valve is guaranteed by an automatic sealing system in the seat: in closed position the operating pressure supports the tight effect pressing the soft sealing ring against the conical seat surface in the valve body in both flow directions.

The double offset design of the valve allows to get two important advantages:
- when the valve is open, the profile sealing ring is completely unstressed
- during opening/closing operations, the disc sealing ring does not apply any friction on the body seat: the operating torque is in this way reduced, and the sealing life is extended.

The valve is suitable for drinking water application: the fusion bonded epoxy process (FBE), with certified resin powders used for internal and external surfaces, guarantees a heavy corrosion protection.

NUOVAL LINE

D14 • DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVE PN10 - PN16 - PN25 - PN40

DESIGN FEATURES

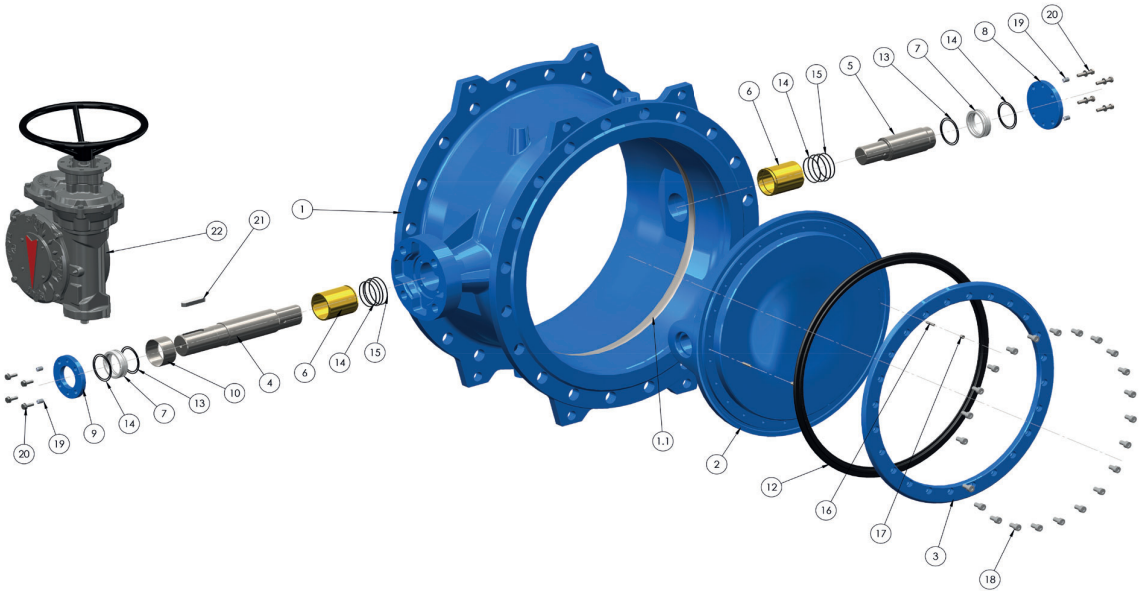
- Soft sealing according to EN 593;
- Face to face dimension according to EN 558 series 14 (F4) and series 13 (BS);
- All materials, including lubricants, in contact with water approved for human consumption according to EN 1074-1 and EN 1074-2;
- One-piece body made of ductile iron EN GJS 400-15 according to EN 1563;
- Flange dimensions according to EN 1092-2;
- Screws, washers made of stainless steel A2-70 EN ISO3506-1;
- Body seat ring welded on the body, made of stainless steel;
- Shaft and disc polygon coupling “P3G” type according to DIN 32711;
- Main disc sealing ring made of EPDM according to EN 681-1 WA, WB;
- Shaft supported by solid and maintenance-free bronze bearings (PN25 - PN40, from DN600 and above, with additional PTFE low friction lining);
- Internal and external surface protection made of epoxy resin powder (FBE), blue colour RAL 5015 and thickness of 250µm;
- Hydraulic test according to EN 12266-1;
- Tight in both flow directions, rate A according to EN 12266-1 (zero drops);
- Working temperature Min. -10°C (excluded frost) Max. + 70°C;
- Gearbox with self-locking worm gear including mechanical position indicator;
- Gearbox suitable for coupling with actuator according to ISO 5210 top flange.

HIGH CORROSION-RESISTANT MATERIALS

Upon request, some parts can be produced with high corrosion-resistant materials such as:

- Retaining ring made of stainless steel EN 1.4301 (AISI 304), 1.4571 EN 10088-3 (AISI 316Ti) or DUPLEX 1.4462 EN 10088-3;
- Shaft made of stainless steel 1.4301 EN 10088-3 (AISI 304), 1.4401 EN 10088-3 (AISI 316) or DUPLEX 1.4462 EN 10088-3;
- Screws and washers made of stainless steel A4-70 EN ISO 3506-1, DUPLEX or SUPERDUPLEX.

COMPONENTS AND MATERIALS

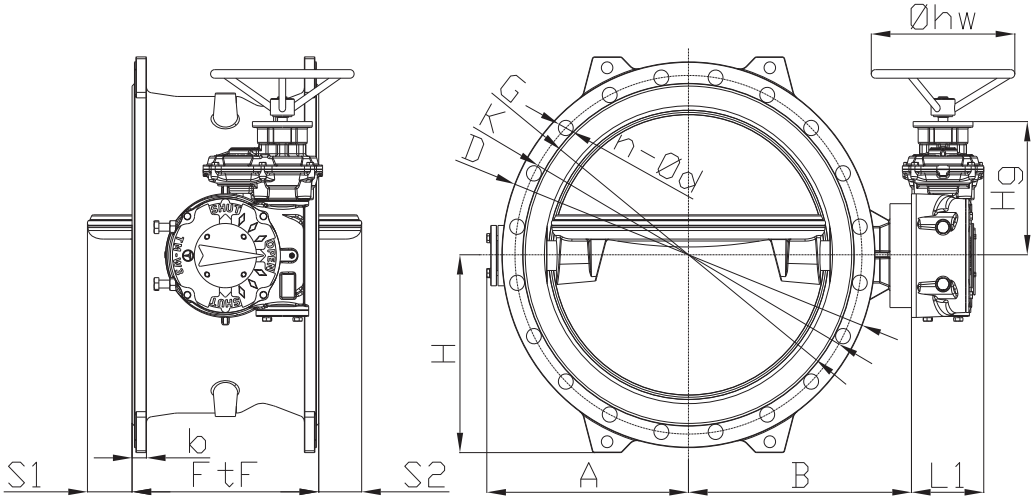


ITEM	COMPONENT	MATERIAL	NOTE
1	Body	Ductile iron EN GJS 400-15	Epoxy coating 250 µm
1.1	Body seat ring	Stainless steel	Welded and microfinished
2	Disc	Ductile iron EN GJS 400-15	Epoxy coating 250 µm
3	Retaining seal ring	Carbon steel S355J2+N	Epoxy coating 250 µm
4	Driven shaft	Stainless steel EN 1.4021 (AISI 420)	
5	Shaft (free end)	Stainless steel EN 1.4021 (AISI 420)	
6	Bearing bush	Aluminum bronze*	
7	Sealing bush	POM	
8	Cover	Carbon steel S355J2+N	Epoxy coating 250 µm
9	Sealing bush flange	Carbon steel S355J2+N	Epoxy coating 250 µm
10	Spacer	Stainless steel EN 1.4301 (AISI 304)	
12	Disc sealing ring	EPDM rubber	
13	O-ring	EPDM rubber	
14	O-ring	EPDM rubber	
15	O-ring	EPDM rubber	
16	Anti-blow out for shaft	Stainless steel	
17	Grub screw	Stainless steel A2-70	
18	Retaining ring screw	Stainless steel A2-70	
19	Grub screw	Stainless steel A2-70	
20	Screw and washer	Stainless steel A2-70	
21	Parallel key	Steel	
22	Gearbox	According to data sheet	

* PN25-PN40, from DN600 and above, with additional PTFE low friction lining.

NUOVAL LINE

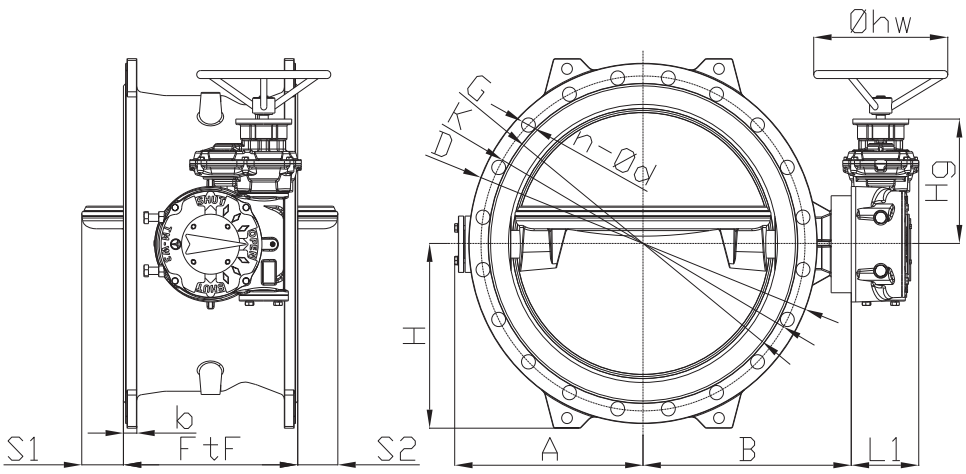
DIMENSIONS AND WEIGHTS SERIES 14 (PN10)



PN10															
DN	G	K	D	n-ød	b	FtF S14	A	B	L1	H	Hg	S1/S2	øhw	Bareshaft weight (kg)	With gear weight (kg)
150	211	240	285	8-23	19.0	210	155	172	103.5	147.5	133.0	-	300	28.5	37.5
200	266	295	340	8-23	20.0	230	185	218	103.5	180	133.0	-	300	42.0	51.0
250	319	350	400	12-23	22.0	250	210	245	103.5	210	133.0	-	300	54.5	63.5
300	370	400	445	12-23	24.5	270	240	270	123.5	235	210.5	15	300	75.5	97.5
350	429	460	505	16-23	24.5	290	265	295	123.5	262	210.5	30	300	97.5	119.5
400	480	515	565	16-28	24.5	310	300	340	123.5	290	210.5	40	300	130	152
450	530	565	615	20-28	25.5	330	325	365	145.5	312	251.0	55	300	156	191
500	582	620	670	20-28	26.5	350	350	390	145.5	342	251.0	70	300	187	222
600	682	725	780	20-31	30.0	390	425	470	151.0	400	263.5	95	300	288	335
700	794	840	895	24-31	32.5	430	485	530	188.0	460	315.0	130	400	424	503
800	901	950	1015	24-34	35.0	470	545	620	197.0	520	347.5	160	400	580	695
900	1001	1050	1115	28-34	37.5	510	615	675	197.0	570	347.5	190	400	822	937
1000	1112	1160	1230	28-37	40.0	550	675	725	197.0	625	347.5	215	400	1050	1165
1100	1218	1270	1340	32-37	42.5	590	755	825	267.5	695	412.0	250	400	1392	1585
1200	1328	1380	1455	32-41	45.0	630	800	870	267.5	740	412.0	275	400	1705	1899
1400	1530	1590	1675	36-44	46.0	710	950	960	279.5	855	464.5	330	630	2590	2844
1600	1750	1820	1915	40-50	49.0	790	1075	1085	279.5	980	464.5	390	630	3686	4153
1800	1950	2020	2115	44-50	52.0	870	1235	1245	330.0	1075	535.5	450	1000	4969	5494
2000	2150	2230	2325	48-50	55.0	950	1325	1335	356.5	1180	575.0	510	1000	6533	7203
2200	2370	2440	2550	52-56	74.0	1030	1415	1425	356.5	1290	624.0	545	1000	8342	9012
2400	2574	2650	2760	56-57	68.0	1110	1565	1580	356.5	1390	624.0	605	1000	10463	11333

NUOVAL LINE

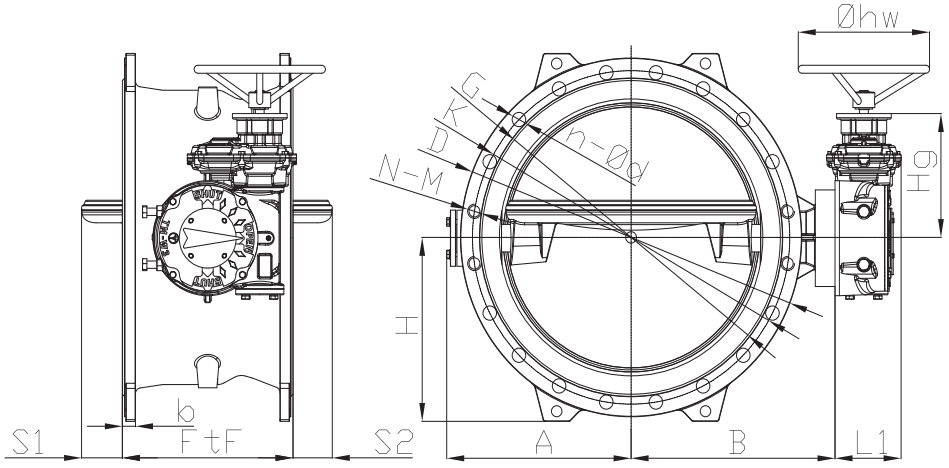
DIMENSIONS AND WEIGHTS SERIES 14 (PN16)



PN16															
DN	G	K	D	n-ød	b	FtF S14	A	B	L1	H	Hg	S1/S2	øhw	Bareshaft weight (kg)	With gear weight (kg)
150	211	240	285	8-23	19.0	210	155	172	103.5	147.5	133.0	-	300	28.5	37.5
200	266	295	340	12-23	20.0	230	185	218	103.5	180	133.0	-	300	42.0	51.0
250	319	355	400	12-28	22.0	250	210	245	118.5	210	186.0	-	300	54.5	71.0
300	370	410	460	12-28	24.5	270	240	268	123.5	242	210.5	15	300	78.5	101
350	429	470	520	16-28	26.5	290	275	315	145.5	270	251.0	30	300	113	148
400	480	525	580	16-31	28.0	310	300	340	145.5	295	251.0	40	300	143	178
450	548	585	640	20-31	30.0	330	340	390	151.0	325	263.5	55	300	188	235
500	609	650	715	20-34	31.5	350	375	420	151.0	370	263.5	70	300	248	295
600	720	770	840	20-37	36.0	390	430	495	188.0	432	315.0	95	400	386	464
700	794	840	910	24-37	39.5	430	500	680	197.0	470	347.5	130	400	482	596
800	901	950	1025	24-41	43.0	470	585	630	197.0	525	347.5	160	400	685	800
900	1001	1050	1125	28-41	46.5	510	645	690	267.5	575	412.0	190	400	928	1121
1000	1112	1170	1255	28-44	50.0	550	705	770	267.5	640	412.0	215	400	1241	1435
1100	1218	1270	1355	32-44	53.5	590	790	825	279.5	695	464.5	250	630	1597	1850
1200	1328	1390	1485	32-50	57.0	630	850	890	279.5	755	464.5	275	630	2012	2266
1400	1530	1590	1685	36-50	60.0	710	965	975	279.5	860	535.5	330	630	3012	3479
1600	1750	1820	1930	40-57	65.0	790	1135	1140	279.5	980	535.5	390	1000	4261	4728
1800	1950	2020	2130	44-57	70.0	870	1225	1235	330.0	1080	575.0	450	1000	5525	6050
2000	2150	2230	2345	48-62	75.0	950	1390	1400	356.5	1200	624.0	510	1000	7561	8231
2200	2350	2440	2550	52-62	80.0	1030	1465	1480	395.0	1290	730.0	545	1000	9373	10415
2400	2545	2650	2765	56-62	100	1110	1565	1580	-	1400	-	605	1000	12316	12316

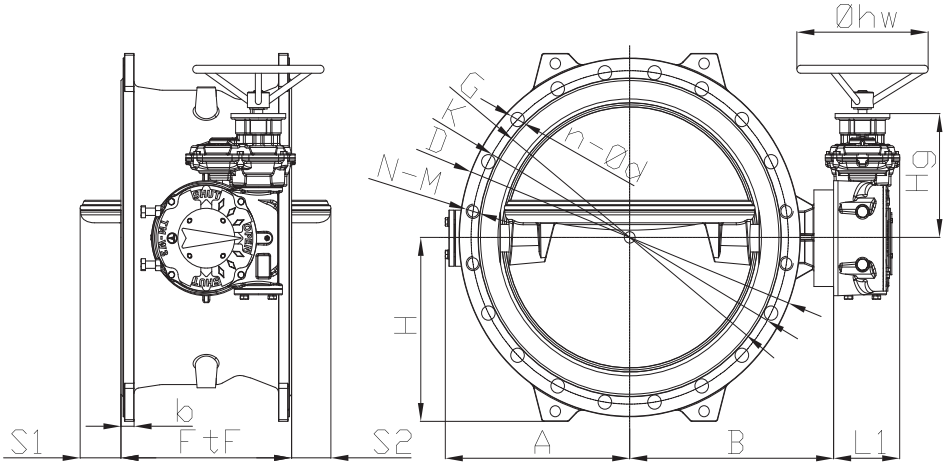
NUOVAL LINE

DIMENSIONS AND WEIGHTS SERIES 14 (PN25)



PN25																
DN	G	K	D	n-ød	N-M	b	FtF S14	A	B	L1	H	Hg	S1/S2	øhw	Bareshaft weight (kg)	With gear weight (kg)
150	211	250	300	8-28	-	20.0	210	155	172	103.5	155	133.0	-	300	32.0	41
200	274	310	360	12-28	-	22.0	230	192	220	123.5	195	210.5	-	300	52.5	75
250	330	370	425	12-31	-	24.5	250	230	265	123.5	225	210.5	-	300	79.5	102
300	389	430	485	16-31	-	27.5	270	252	290	145.5	255	251.0	15	300	113	148
350	448	490	555	16-34	-	30.0	290	290	340	151.0	290	263.5	30	300	160	208
400	503	550	620	16-37	-	32.0	310	330	375	151.0	312	263.5	40	300	204	251
450	548	600	670	20-37	-	34.5	330	370	435	188.0	345	315.0	55	400	270	349
500	609	660	730	20-37	-	36.5	350	395	470	188.0	375	315.0	70	400	328	406
600	720	770	845	20-41	-	42.0	390	460	520	197.0	433	347.5	95	400	482	597
700	820	875	960	24-44	-	46.5	430	545	590	197.0	490	347.5	130	400	715	830
800	928	990	1085	24-50	-	51.0	470	640	680	267.5	560	412.0	160	400	953	1147
900	1028	1090	1185	28-50	-	55.5	510	685	725	279.5	605	464.5	190	630	1235	1489
1000	1140	1210	1320	28-57	-	60.0	550	760	780	279.5	675	464.5	215	630	1637	1891
1200	1350	1420	1530	32-57	-	69.0	630	875	905	279.5	775	535.5	275	630	2537	3004
1400	1560	1640	1755	36-62	-	74.0	710	1020	1030	330.0	895	575.0	330	1000	3836	4361

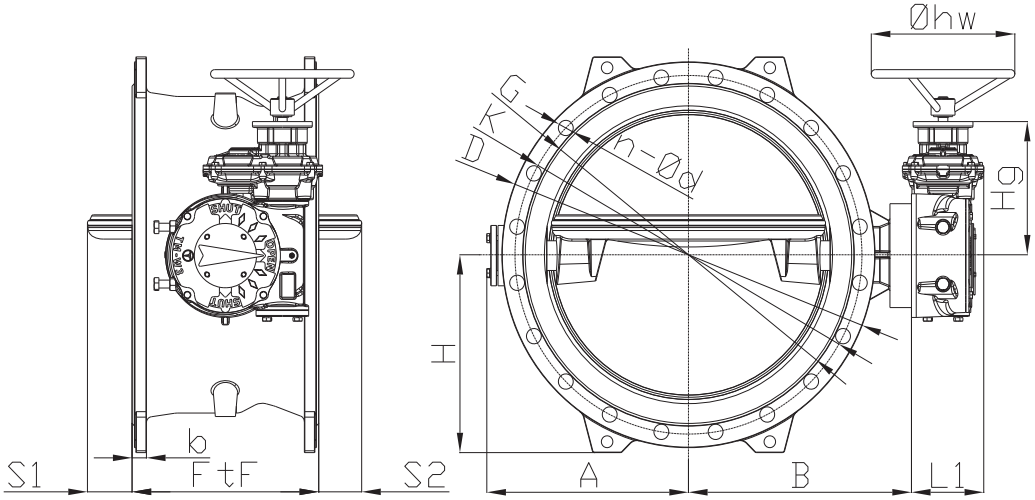
DIMENSIONS AND WEIGHTS SERIES 14 (PN40)



PN40																
DN	G	K	D	n-ød	N-M	b	FtF S14	A	B	L1	H	Hg	S1/S2	øhw	Bareshaft weight (kg)	With gear weight (kg)
150	211	250	300	8-28	-	26.0	210	155	172	103.5	155	133.0	-	300	36	45
200	284	320	375	12-31	-	30.0	230	192	220	123.5	203	210.5	-	300	63	85
250	345	385	450	12-34	-	34.5	250	246	270	145.5	240	251.0	-	300	105	140
300	409	450	515	16-34	-	39.5	270	265	315	151.0	270	263.5	15	300	150	197
350	465	510	580	16-37	-	44.0	290	325	360	188.0	305	315.0	30	400	240	319
400	535	585	660	16-41	-	48.0	310	345	420	188.0	340	315.0	40	400	300	379
450	560	610	685	20-41	-	49.0	330	390	420	197.0	353	347.5	55	400	337	452
500	615	670	755	20-44	-	51.0	350	425	480	197.0	390	347.5	70	400	433	548
600	735	795	890	20-50	-	58.0	390	495	540	267.5	455	412.0	95	400	643	837
700	840	900	995	24-50	-	64.0	430	585	625	279.5	510	464.5	130	630	951	1205
800	960	1030	1140	20-58	4-M52	65.0	470	665	675	279.5	585	464.5	160	630	1307	1561
900	1070	1140	1250	20-58	4-M52	76.0	510	725	765	279.5	640	535.5	190	630	1783	2250
1000	1180	1250	1360	28-58	-	80.0	550	770	805	279.5	690	535.5	215	630	2140	2607
1200	1380	1460	1575	28-63	4-M56	88.0	630	925	940	330	800	575	250	1000	3322	3846
1400	1600	1680	1795	36-63	-	85.0	710	1090	1100	356.5	910	624.0	275	1000	4691	5361

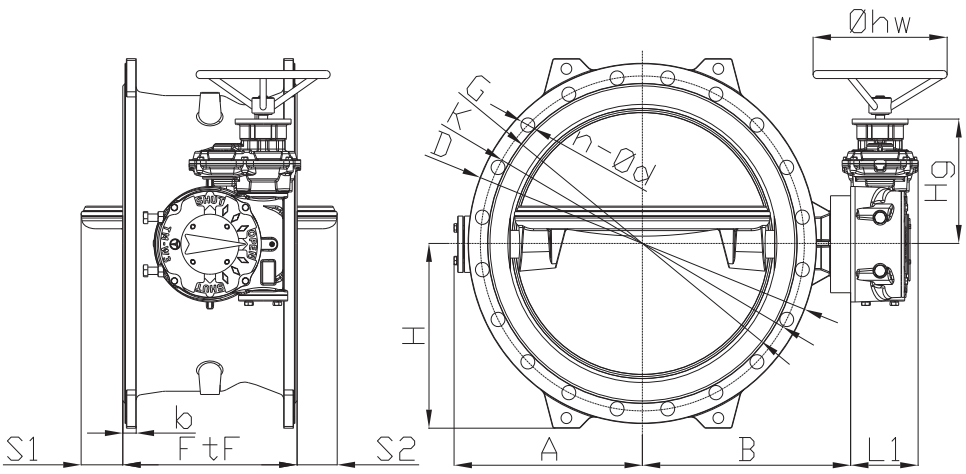
NUOVAL LINE

DIMENSIONS AND WEIGHTS "BS" STANDARD (PN10)



PN10															
DN	G	K	D	n-ød	b	FTF BS*	A	B	L1	H	Hg	S1/S2	øhw	Bareshaft weight (kg)	With gear weight (kg)
150	211	240	285	8-23	19.0	140	155	172	103.5	147.5	133.0	-	300	26	35
200	266	295	340	8-23	20.0	152	185	218	103.5	180	133.0	23	300	36	45
250	319	350	400	12-23	22.0	165	210	245	103.5	210	133.0	41	300	48	57
300	370	400	445	12-23	24.5	178	240	270	123.5	235	210.5	58	300	66	88
350	429	460	505	16-23	24.5	190	265	295	123.5	262	210.5	76	300	85	107
400	480	515	565	16-28	24.5	216	300	340	123.5	290	210.5	85	300	119	141
450	530	565	615	20-28	25.5	222	325	365	145.5	312	251.0	109	300	137	172
500	582	620	670	20-28	26.5	229	350	390	145.5	342	251.0	129	300	164	199
600	682	725	780	20-31	30.0	267	425	470	151.0	400	263.5	153	300	257	304
700	794	840	895	24-31	32.5	292	485	530	188.0	460	315.0	197	400	382	461
800	901	950	1015	24-34	35.0	318	545	620	197.0	520	347.5	233	400	526	641
900	1001	1050	1115	28-34	37.5	330	615	675	197.0	570	347.5	278	400	736	851
1000	1112	1160	1230	28-37	40.0	410	675	725	197.0	625	347.5	282	400	955	1070
1200	1328	1380	1455	32-41	45.0	470	800	870	267.5	740	412.0	350	400	1569	1763
1400	1530	1590	1675	36-44	46.0	530	950	960	279.5	855	464.5	415	630	2380	2634

DIMENSIONS AND WEIGHTS "BS" VERSION (PN16)



PN16															
DN	G	K	D	n-ød	b	FTF BS*	A	B	L1	H	Hg	S1/S2	øhw	Bareshaft weight (kg)	With gear weight (kg)
150	211	240	285	8-23	19.0	140	155	172	103.5	147.5	133.0	-	300	26	35
200	266	295	340	12-23	20.0	152	185	218	103.5	180	133.0	23	300	37	46
250	319	355	400	12-28	22.0	165	210	245	118.5	210	186.0	41	300	48	64
300	370	410	460	12-28	24.5	178	240	268	123.5	242	210.5	58	300	69	92
350	429	470	520	16-28	26.5	190	275	315	145.5	270	251.0	76	300	101	136
400	480	525	580	16-31	28.0	216	300	340	145.5	295	251.0	85	300	130	165
450	548	585	640	20-31	30.0	222	340	390	151.0	325	263.5	109	300	179	226
500	609	650	715	20-34	31.5	229	375	420	151.0	370	263.5	129	300	224	271
600	720	770	840	20-37	36.0	267	430	495	188.0	432	315.0	153	400	350	428
700	794	840	910	24-37	39.5	292	500	680	197.0	470	347.5	197	400	436	550
800	901	950	1025	24-41	43.0	318	585	630	197.0	525	347.5	233	400	621	736
900	1001	1050	1125	28-41	46.5	330	645	690	267.5	575	412.0	278	400	836	1029
1000	1112	1170	1255	28-44	50.0	410	705	770	267.5	640	412.0	282	400	1136	1330
1200	1328	1390	1485	32-50	57.0	470	850	890	279.5	755	464.5	350	630	1858	2112
1400	1530	1590	1685	36-50	60.0	530	965	975	279.5	860	535.5	415	630	2771	3238

NUOVAL LINE

PRESSURE DROP OF PN10-PN16 VALVES

Pressure drop of double flange double eccentric butterfly valves can be calculated using below equation:

$$\Delta P = (Q / K_V)^2 \text{ [bar]}$$

Where:

- ΔP = pressure drop [bar]
- Q = flow rate [m^3/h]
- Kv = flow coefficient [m^3/h] (see table below)

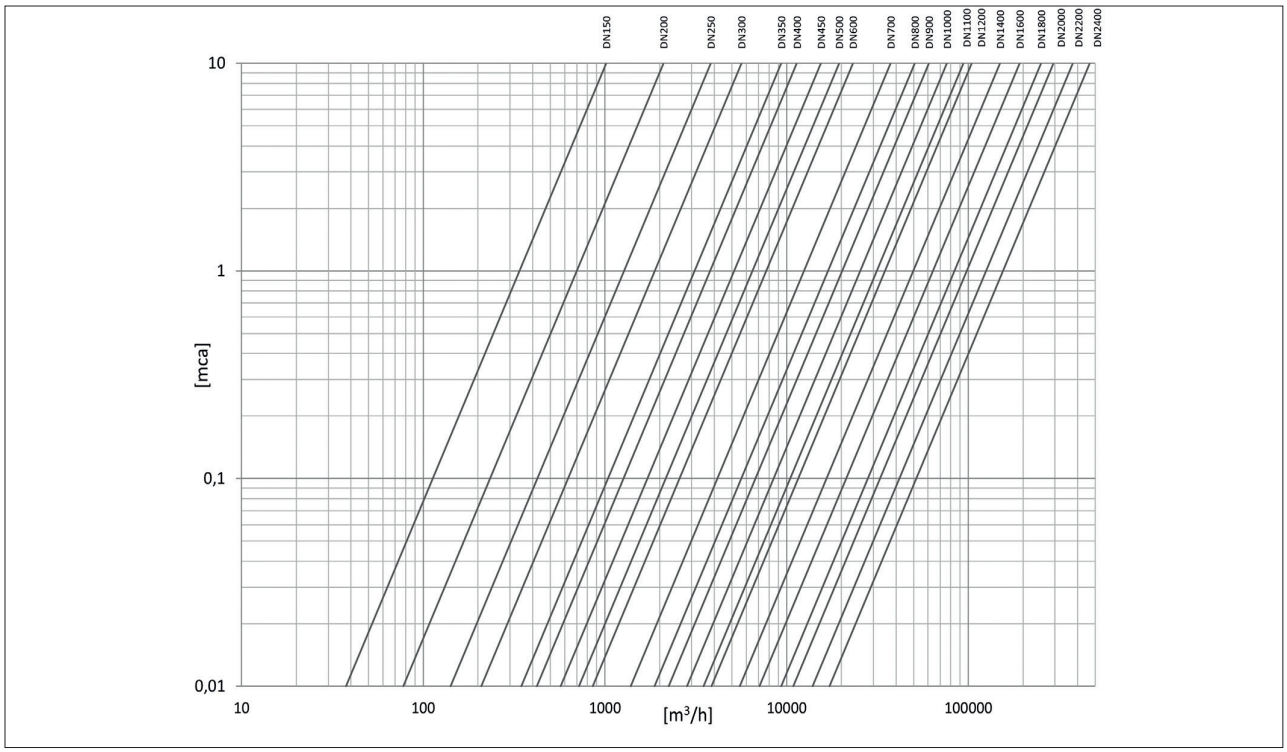
FLOW COEFFICIENT PN10-PN16

DN	150	200	250	300	350	400	450	500	600	700	800
Kvs [m³/h]	1015	2098	3819	5635	9336	11380	15433	19415	23127	37343	50688

DN	900	1000	1100	1200	1400	1600	1800	2000	2200	2400
Kvs [m³/h]	60618	76210	93971	104111	149372	191582	251625	294141	375884	465599

Pressure drop of double flange double eccentric butterfly valves can be also evaluated by using below diagram:

PRESSURE DROP DIAGRAM PN10-PN16



PRESSURE DROP OF PN25-PN40 VALVES

Pressure drop of double flange double eccentric butterfly valves can be calculated using below equation:

$$\Delta P = (Q / K_V)^2 \text{ [bar]}$$

Where:

- ΔP = pressure drop [bar]
- Q = flow rate [m^3/h]
- Kv = flow coefficient [m^3/h] (see table below)

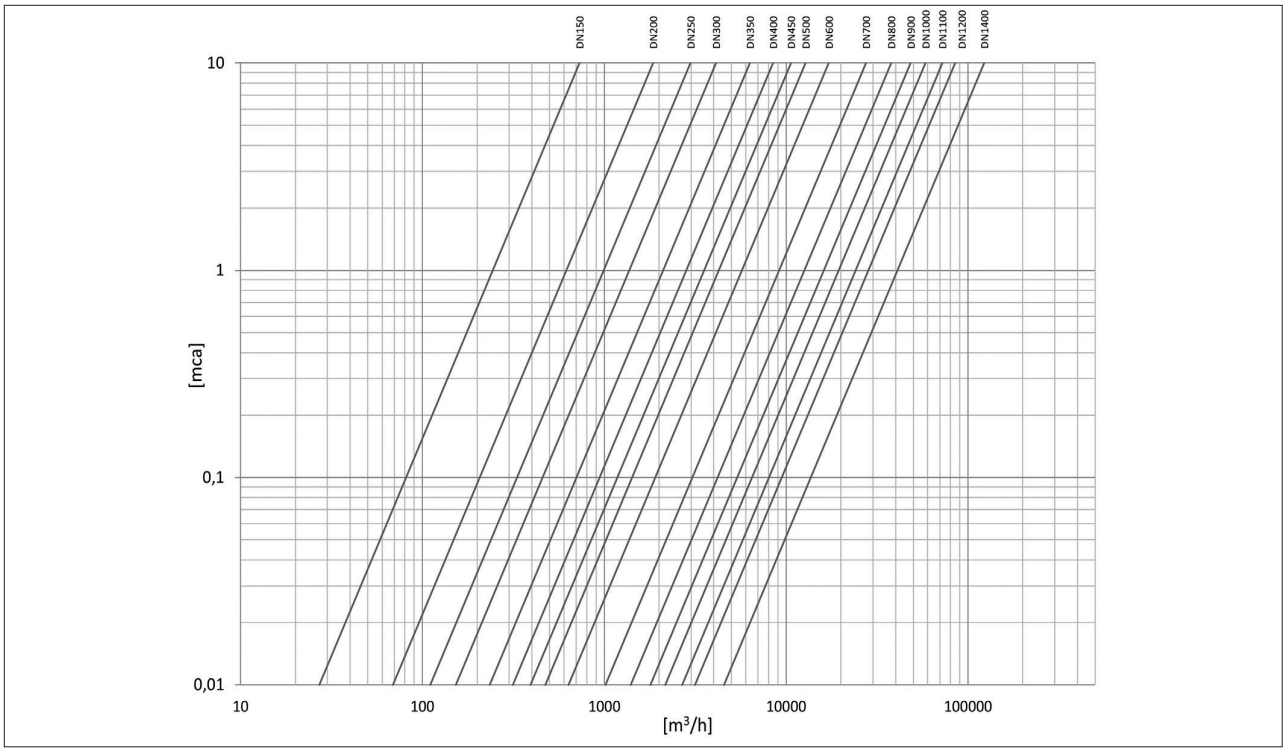
FLOW COEFFICIENT PN25-PN40

DN	150	200	250	300	350	400	450	500	600	700	800
Kvs [m³/h]	730	1854	2980	4115	6315	8467	10621	12781	17162	27441	37781

DN	900	1000	1100	1200	1400
Kvs [m³/h]	48357	58387	72236	85006	122722

Pressure drop of double flange double eccentric butterfly valves can be also evaluated by using below diagram:

PRESSURE DROP DIAGRAM PN25-PN40



CAVITATION

Cavitation is a physical phenomenon which occurs when the pressure of a fluid, due to a sudden change in flow rate, drops below the evaporation pressure (at water 3.5kPa). It takes the form of small bubbles which implode instantly when they reach the area of higher pressure, causing tiny, extremely high-pressure jets. When these cavitation bubbles collapse, they are extremely noisy and cause shock waves, i.e. pressure waves which can be very intense, and they sound like rolling stones through pipeline. Measurements have shown that during the cavitation bubble burst, the pressure can rise up to 689 MPa and produce a sound of 100 decibels. If the bubbles implode near a solid wall, the micro-jet of fluid generated (known as an 'impinging jet') erodes the material of which the walls are formed and small craters (erosive pits) gradually develop. In practice, cavitation can occur when there are areas exposed to high head or sudden pressure losses. If it occurs continuously, it reduces the useful life of the components proportionally to its intensity, resulting in loss of efficiency first of all, and then going on to cause serious damage and breakage.
Cavitation is also a cause of friction and turbulence in the liquid, which leads to further reductions in efficiency.

CAVITATION LIMITS

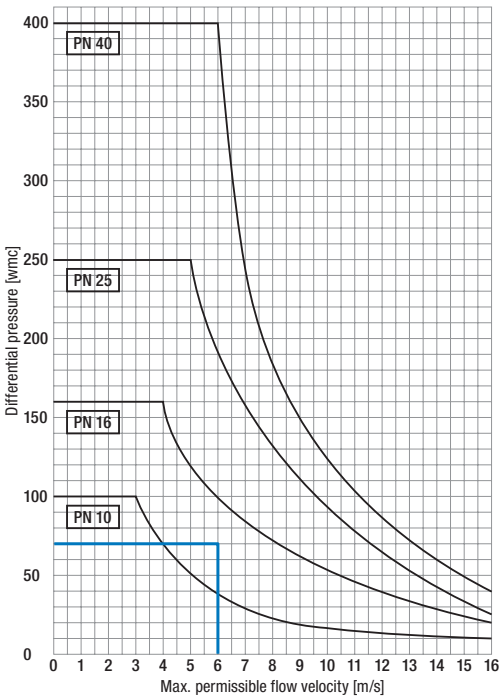
The cavitation number is helpful when exploring flow dynamics problems in fluids in which cavitation can occur.
The cavitation number can be expressed as follows:

$$\sigma = \frac{P_2 + P_A - P_V}{(P_1 - P_2) + \frac{v^2}{2_g}}$$

Where: P_1 = Inlet pressure (mca) P_A = Atmospheric pressure (mca) v = Flow velocity (m/s)
P_2 = outlet pressure (mca) P_V = Evaporation pressure (mca) g = Gravitational acceleration (m/s^2)

If the T.I.S. double flanged double eccentric butterfly valves are installed in the correct operating conditions, the calculated σ value should be above the K limit curve (the K limit curve is provided by T.I.S.).
Double flanged double eccentric butterfly valve are designed to intercept the flow. If a valve is used to control flow, the operating limits (maximum flow rate and cavitation) must be complied with. The recommended control range is between 20-70% of the degree of opening, above which reasonable control cannot be guaranteed since it practically no longer affects the flow through the valve. In the event of noise or vibrations during valve commissioning/operation, the actual operating conditions must be checked. If the operating conditions change, the equipment may need to be resized. If the calculated σ value is below the σK limit curves, cavitation may occur.
To address this problem, we recommend you:
• alter the back pressure;
• change the installation location.
If the σ value is above the σK limit curves, the noise may be caused by other factors and the pipeline must be checked.

LIMIT CURVE OF T.I.S. DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVES



MAXIMUM PERMISSIBLE FLOW VELOCITY

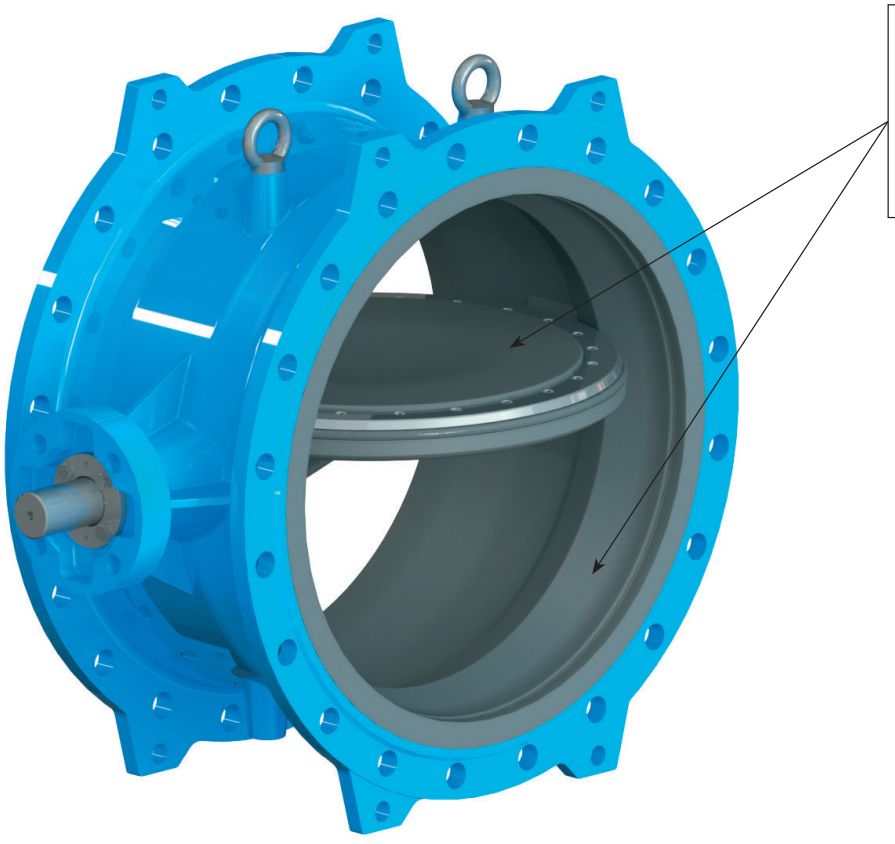
When the fluid flows along the surface of the valve disk, the disk is exposed to flow forces determined by the flow velocity of the fluid in the pipeline. These forces act as torque on the axis of the disk.
According to standard UNI EN593, table 1, double flanged double eccentric butterfly valves are designed to withstand maximum flow velocity as stated below:

PN10: 3 m/s PN16: 4 m/s PN25: 5 m/s PN40: 6 m/s

The table on the right, which shows the maximum flow velocity allowed according to the differential pressure, allow the correct valve pressure value to be calculated based on the pipeline pressure (bar) and the flow velocity inside it (m/s). For example, with a differential pressure of 7 bar and a flow velocity of 6 m/s, the hydraulic moment of the flow around the disk is so high that a PN16 double flanged double eccentric butterfly valve.

D14 RL • DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVE WITH VULCANIZED HARD RUBBER LINING

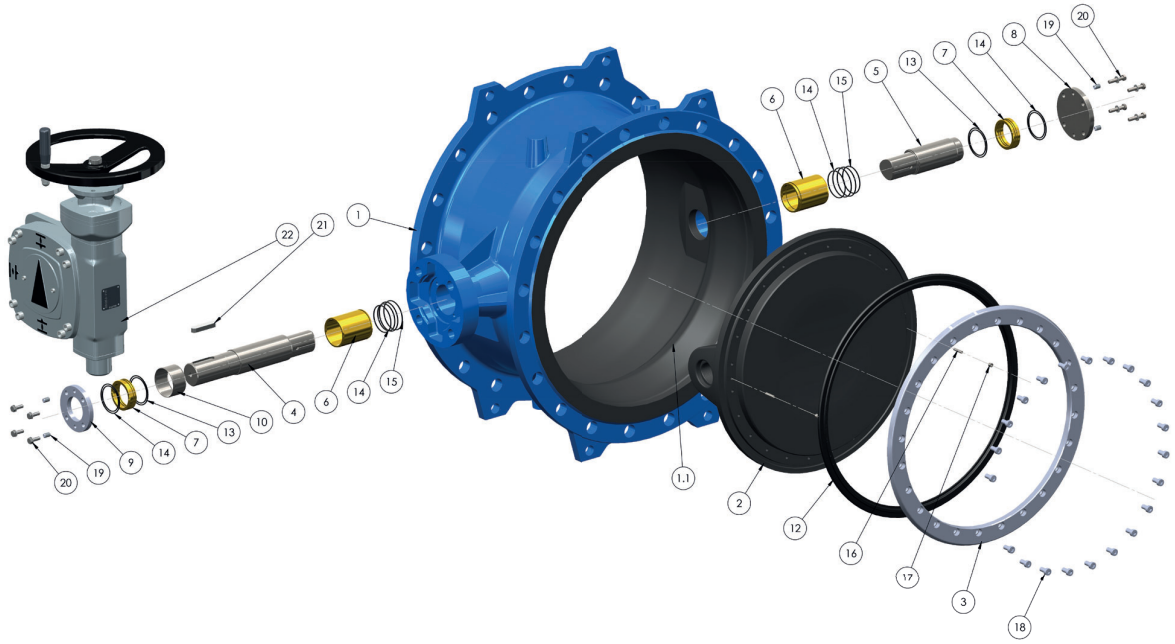
TIS double flanged double eccentric butterfly valve with vulcanized hard rubber lining for saline media (seawater or well-desalination) or corrosive media is designed to withstand the chemical attack of chloride ions.
Due to the fluid aggressivity, standard epoxy coated valve surfaces will be rapidly abraded or corroded. The best possible solution, in order to guarantee valves longevity and safe operation of the plants, is to protect the inner surface of the valve with 3 mm of hard rubber lining: in this way, the disc and the internal surface of the body are protected from the aggressive fluids.
Other parts of the valve in contact with water (shaft and retaining seal ring) are made of duplex stainless steel, with high resistance to corrosion.
Typical applications of double flanged double eccentric butterfly valves with vulcanized hard rubber lining are: water treatment plants, desalination plants, mines, industrial water and treatment plants in minerals.



Body and disc surface, in contact with the fluid, is completely lined with a rubber layer which allows additional protection to the corrosion due to brackish waters and significantly increases lifespan of the valve.

NUOVAL LINE

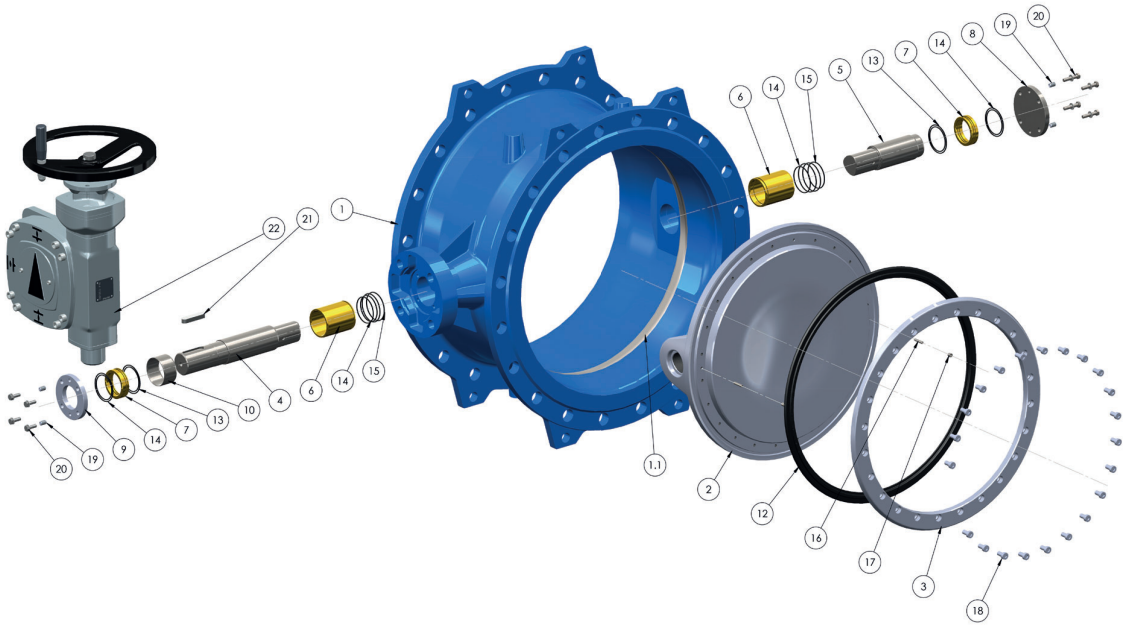
COMPONENTS AND MATERIALS



ITEM	COMPONENT	MATERIAL	NOTE
1	Body	Ductile iron EN GJS 400-15	Internal coating made by vulcanized hard rubber, external coating epoxy powder 300 µm
2	Disc	Ductile iron EN GJS 400-15	Coating made by vulcanized hard rubber
3	Retaining seal ring	Stainless steel EN 1.4571 (AISI 316Ti)	
4	Driven shaft	Stainless steel EN 1.4462 (DUPLEX)	
5	Shaft (free end)	Stainless steel EN 1.4462 (DUPLEX)	
6	Bearing bushing	Aluminum bronze*	
7	Sealing bushing	Aluminum bronze	
8	Cover	Stainless steel EN 1.4301 (AISI 304)	
9	Sealing bush flange	Stainless steel EN 1.4301 (AISI 304)	
10	Spacer	Stainless steel EN 1.4301 (AISI 304)	
12	Disc sealing ring	EPDM rubber	
13	O-ring	EPDM rubber	
14	O-ring	EPDM rubber	
15	O-ring	EPDM rubber	
16	Anti-blow out for shaft	Stainless steel	
17	Grub screw	Stainless steel A4-70	
18	Retaining ring screw	Stainless steel A4-70	
19	Grub screw	Stainless steel A4-70	
20	Screw and washer	Stainless steel A4-70	
21	Parallel key	Steel	
22	Gearbox	According to data sheet	

* PN25 - PN40, from DN600 and above, with additional PTFE low friction lining.

DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVE WITH HIGH CORROSION-RESISTANT MATERIALS

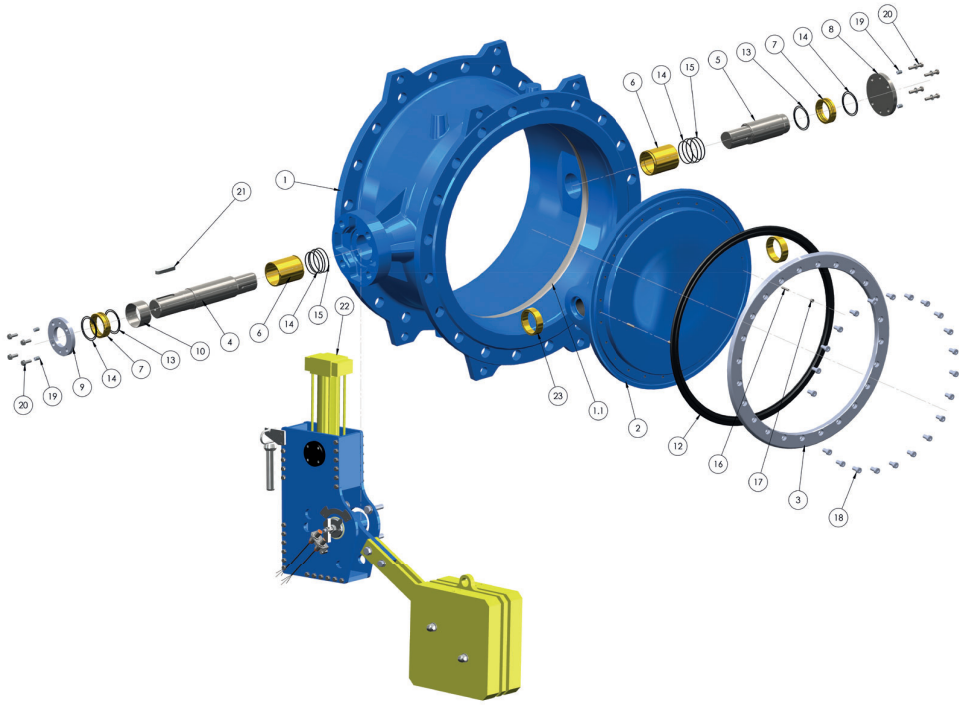


ITEM	COMPONENT	MATERIAL	NOTE
1	Body	Ductile iron EN GJS 400-15	Epoxy coating 300 µm
1.1	Body seat ring	Stainless steel EN 1.4404 (AISI 316L)	
2	Disc	Stainless steel EN 1.4408 (AISI 316)	
3	Retaining seal ring	Stainless steel EN 1.4571 (AISI 316Ti)	
4	Driven shaft	Stainless steel EN 1.4462 (DUPLEX)	
5	Shaft (free end)	Stainless steel EN 1.4462 (DUPLEX)	
6	Bearing bush	Aluminum bronze*	
7	Sealing bush	Aluminum bronze	
8	Cover	Stainless steel EN 1.4401 (AISI 316)	
9	Sealing bush flange	Stainless steel EN 1.4401 (AISI 316)	
10	Spacer	Stainless steel EN 1.4401 (AISI 316)	
12	Disc sealing ring	EPDM rubber	
13	O-ring	EPDM rubber	
14	O-ring	EPDM rubber	
15	O-ring	EPDM rubber	
16	Anti-blow out for shaft	Stainless steel	
17	Grub screw	Stainless steel A4-70	
18	Retaining ring screw	Stainless steel A4-70	
19	Grub screw	Stainless steel A4-70	
20	Screw and washer	Stainless steel A4-70	
21	Parallel key	Steel	
22	Gearbox	According to data sheet	

* PN25-PN40, from DN600 and above, with additional PTFE low friction lining.

NUOVAL LINE

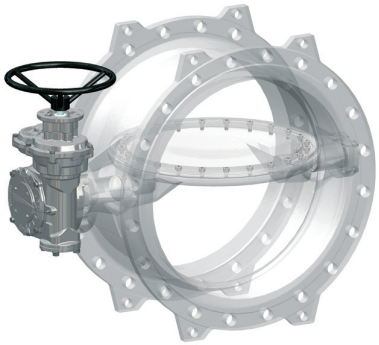
DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVE WITH COUNTERWEIGHT AND HYDRAULIC CYLINDER FOR RESET



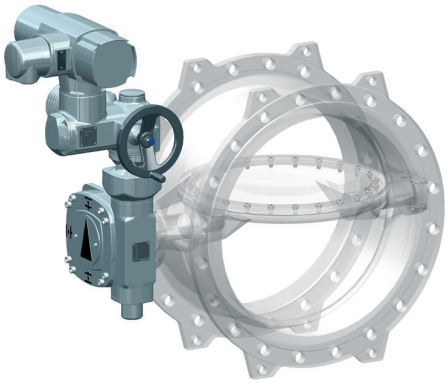
ITEM	COMPONENT	MATERIAL	NOTE
1	Body	Ductile iron EN GJS 400-15	Epoxy coating 250 µm
1.1	Body seat ring	Stainless steel	Welded and microfinished
2	Disc	Ductile iron EN GJS 400-15	Epoxy coating 250 µm
3	Retaining seal ring	Stainless steel EN 1.4301 (AISI 304)	
4	Driven shaft	Stainless steel EN 1.4021 (AISI 420)	
5	Shaft (free end)	Stainless steel EN 1.4021 (AISI 420)	
6	Bearing bush	Aluminum bronze	PTFE low friction lining.
7	Sealing bush	Aluminum bronze	
8	Cover	Stainless steel EN 1.4301 (AISI 304)	
9	Sealing bush flange	Stainless steel EN 1.4301 (AISI 304)	
10	Spacer	Stainless steel EN 1.4301 (AISI 304)	
12	Disc sealing ring	EPDM rubber	
13	O-ring	EPDM rubber	
14	O-ring	EPDM rubber	
15	O-ring	EPDM rubber	
16	Anti-blow out for shaft	Stainless steel	
17	Grub screw	Stainless steel A2-70	
18	Retaining ring screw	Stainless steel A2-70	
19	Grub screw	Stainless steel A2-70	
20	Screw and washer	Stainless steel A2-70	
21	Parallel key	Steel	
22	Actuator	According to data sheet	
23	Distant bush	Aluminum bronze	

OPERATING DEVICES

BURIED SERVICE

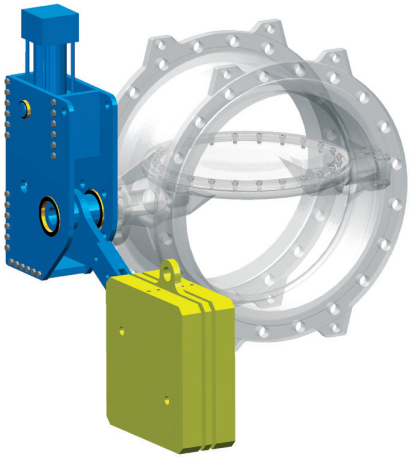


WORM GEARBOX
AND HANDWHEEL

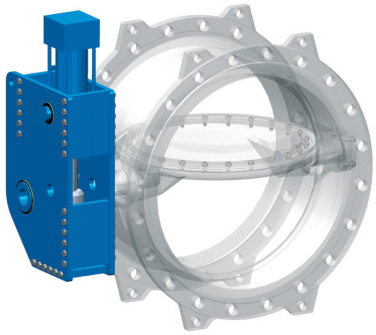


ELECTRIC ACTUATOR

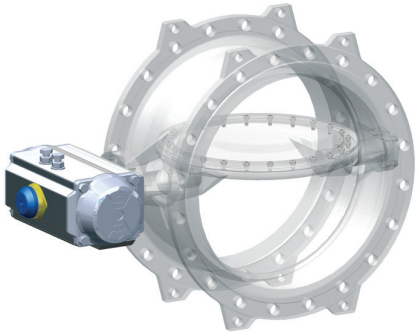
BARESHAFT
VALVE



HYDRAULIC CYLINDER
AND COUNTERWEIGHT



DOUBLE ACTING
HYDRAULIC CYLINDER

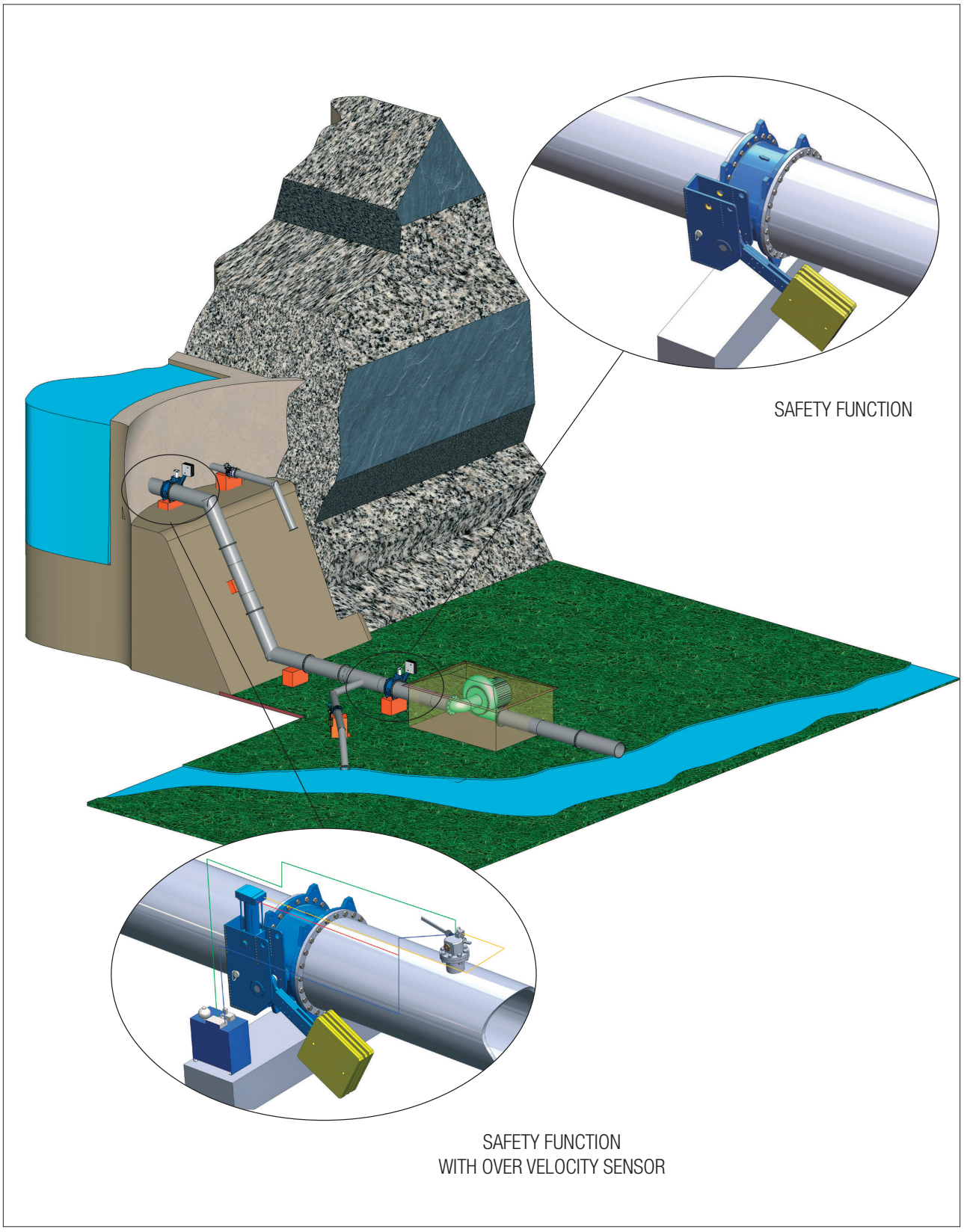


PNEUMATIC ACTUATOR

NUOVAL LINE

MAIN APPLICATION

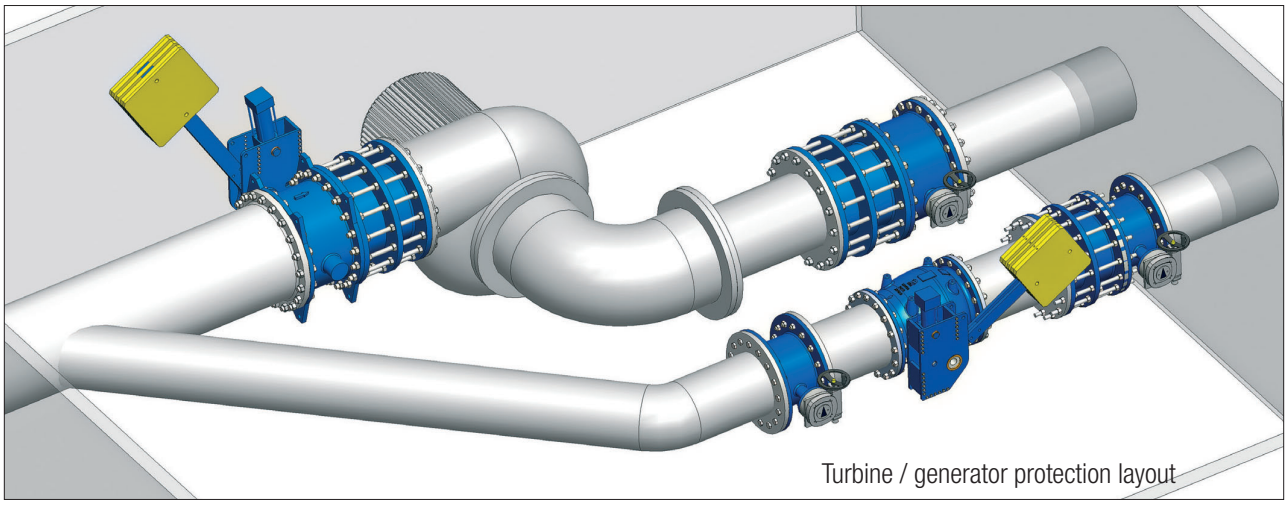
HYDRO POWER PLANTS APPLICATION



SAFETY FUNCTION

Safety hydraulic cylinder and counterweight butterfly valves are generally used in hydroelectric power plants (see figure below), water supply, irrigation. The main functions are:

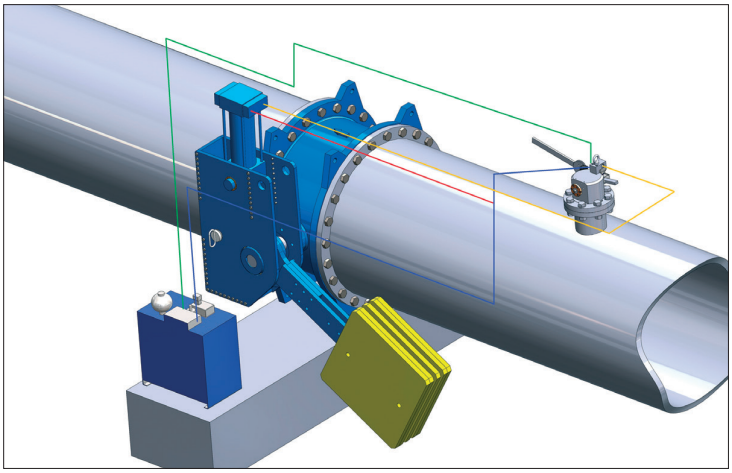
- to protect turbines/generators;
- to prevent damage caused by pipeline failure;
- to shut off the supply line in case of power failure;
- as a check valve in case of pipe backflow.



Turbine / generator protection layout

SAFETY FUNCTION WITH PADDLE FLOW DETECTION SYSTEM

The butterfly valve with hydraulic cylinder and counterweight is equipped with a mechanical device for fluid speed detection in case of applications as turbine (or generator) protection or to prevent possible leakage of fluid due to pipeline breakage.
The paddle system detects the fluid speed in the pipeline: if the pre-set limit speed exceeds, the paddle triggers the hydraulic cylinder, which will operate the valve (opening or closing the valve according to the safety function).



A typical application of hydraulic cylinder (provided with the hydraulic unit) and the counterweight butterfly valve with paddle flow detection system.

ON - OFF FUNCTION

Double flanged double eccentric butterfly valves are generally used in the pipelines to shut off fluids. The valves can be manually, electric, pneumatic or hydraulic actuated.