TECHNICAL CATALOGUE – VALVES

ELECTROSTEEL

T.I.S.
AN ELECTROSTEEL ENTERPRISE

CARRYING LIFE TO PEOPLE,
SAFE DRINKING WATER FOR ALL !

WE PROVIDE SOLUTIONS FOR
THE EFFICIENCY OF THE WATER NETWORK

INDEX

ELECTROSTEEL CASTINGS LIMITED

INTEGRATED WATER INFRASTRUCTURE SOLUTIONS

Trusted by water engineers across 130 countries for over seven decades

ABOUT ELECTROSTEEL

Electrosteel Castings Limited is India's foremost manufacturer of Ductile Iron (DI) pipeline systems. As the pioneer that established India's first Ductile Iron Spun Pipe Plant in 1994, Electrosteel has built an unrivalled reputation for delivering reliable, durable, and technically superior infrastructure solutions to water engineers worldwide.

Today, Electrosteel exports its products to 130 countries across five continents, upholding the highest international quality benchmarks. The company's continued leadership is underpinned by relentless innovation, advanced manufacturing processes, rigorous R&D, and an unwavering commitment to customer-centric service.

Founded	1955
Industry Pioneer	1994 - First DI Spun Pipe Plant in India
Products	Ductile Iron Pipes, Fittings, Valves, Rubber Products and Paint
Global Reach	130 countries across 5 continents
Quality Ethos	"Quality right the first time"
Workforce	Dedicated teams with extensive networks

QUALITY CERTIFICATIONS & APPROVALS

Electrosteel's quality systems and products are validated by leading international bodies:

ISO 9001	**ISO 14001**	**ISO 45000**
ISO 50000	**SA 8000**	**IS**
EN	**DVGW (Germany)**	**KITEMARK (BSI)**
NSF (USA)	**UL (USA)**	**FM (USA)**
WRAS (UK)	**NF (France)**	**DWI (UK)**

WHY CHOOSE ELECTROSTEEL

- 30+ years of proven expertise in Ductile Iron pipeline manufacturing
- First mover advantage - established India's first DI Spun Pipe Plant (1994)
- Consistent compliance with global standards across all product lines
- Extensive R&D investment driving product innovation and performance
- Dedicated after-sales service and technical support teams
- Reliable supply chain serving 130 countries without compromise

Strengthening Our Portfolio Through Strategic Acquisition

In addition to our world-class DI pipe and fitting manufacturing capabilities, Electrosteel has expanded its product ecosystem with the acquisition of T.I.S. Service S.p.A., now operating as "T.I.S. – An Electrosteel Enterprise" bringing Italian engineering excellence into the Electrosteel family.

ABOUT T.I.S. – AN ELECTROSTEEL ENTERPRISE

T.I.S. Valves is a premier Italian manufacturer renowned for the design and production of high-performance valves engineered for demanding water and hydroelectric systems. Combining advanced engineering with exceptional durability, T.I.S. sets the benchmark for sustainable water service solutions.

T.I.S. is an industry pioneer introducing a revolutionary concept: reducing water pressure while simultaneously generating clean energy - a paradigm shift in how water networks are managed for efficiency and sustainability.

OUR GLOBAL COMMITMENT

Electrosteel is dedicated to supporting sustainable water infrastructure worldwide. Together, Electrosteel and T.I.S. offer an unmatched end-to-end pipeline solution from ductile iron pipe manufacturing to intelligent valve management and energy recovery. Our diversified product range, international certifications, and customer-first philosophy make us the partner of choice for municipalities, utilities, and engineering contractors across the globe.

Your Trusted One-Stop Destination for Complete Water Solutions

Our deep industry knowledge and hands-on approach ensure that clients receive tailored, effective solutions that meet their specific needs. This end-to-end service makes us a trusted partner delivering reliability, efficiency, throughout the entire lifecycle of your project.

Contact our regional Electrosteel representative or visit www.electrosteel.com

VALVES
An Overview

30+	3	2	100%
Years of DI Experience	Manufacturing Facilities	Global R&D Centres	Potable Water Approved

APPLICATIONS
Engineered for Every Water Challenge

Valves are purpose-built for the world's most demanding water infrastructure environments. From municipal networks to high-pressure hydroelectric systems, each valve is designed to deliver precise, reliable performance across a broad spectrum of applications.

❑ Water Infrastructure
Flow control for intake lines, treatment plants, pump houses & distribution networks

❑ Wastewater
Sewerage, industrial effluents and process fluid management

❑ Irrigation Systems
Precision water flow control for efficient field distribution

❑ Desalination
High-pressure sea water, brine and chemicals

❑ Industrial Applications
Steel plants, power plants, chemical, pharmaceutical and food processing

❑ Dams & Hydroelectric
High-pressure flow control and emergency shutoff for hydroelectric systems

MANUFACTURING
Global Production. Local Responsiveness.

With three state-of-the-art manufacturing facilities strategically located across the world, we efficiently cater to increasing global demand. These sites enable streamlined production and faster delivery, ensuring consistent quality and responsiveness across international markets.

Our global footprint reflects our commitment to serving diverse infrastructure needs with precision and reliability wherever in the world your project is located.

MANUFACTURING STRENGTHS

- 3 global production sites
- Streamlined, high-capacity output
- Consistent quality across all facilities
- Faster international delivery
- Certified to global standards

STANDARDS & COMPLIANCE
International Standards. Uncompromising Quality.

Our valves are manufactured in full compliance with international standards. Customised solutions are engineered to meet specific project requirements while upholding globally recognised quality benchmarks.

BS	EN	IS	ISO
DVGW	NSF	WRAS	DWI

Every valve solution is tailored to meet specific project requirements while maintaining compliance with BS, EN, IS, ISO and other applicable international manufacturing standards, delivering reliability and performance across diverse water infrastructure applications.

ELECTROSTEEL

DESIGN & SAFETY

Designed to Perform. Built to Last.

DESIGN ADVANTAGES

- World-class infrastructure & robust design
- Safety-engineered for critical applications
- Cost-effective lifecycle value
- Operational efficiency by design
- Vital component in sustainable water management

POTABLE WATER COMPLIANCE

- All components fully approved for potable water contact
- Paint, rubber, metallic parts & lubricants certified
- Compliant with global safety regulations
- Suitable for human consumption
- Meeting international health & safety standards

RESEARCH & DEVELOPMENT

Innovation at the Heart of Everything We Do

Two Dedicated R&D Centres - Italy & India

Our company operates two dedicated Research and Development centres at Nuoval, Italy and West Bengal, India focused on creating new technologies and upgrading existing products and processes. Innovation drives our progress and maintains our competitive edge in the global market.

OUR PROMISE

One Source. Complete Solutions.

With over 30 years of experience in the Ductile Iron industry, our skilled team offers comprehensive solutions for even the most demanding applications from initial planning to post-delivery support.

END-TO-END SERVICE

- Initial project planning & engineering
- Product customisation & specification
- Manufacturing & quality assurance
- Logistics & on-time delivery
- Commissioning & installation support
- After-sales & lifecycle support

COMPLETE PRODUCT PORTFOLIO

- Ductile Iron Pipes
- DI Fittings & Specials
- Valves
- Actuators & controls
- Joints & couplings
- Accessories

T.i.S.

AN ELECTROSTEEL ENTERPRISE

PLUNGER FLOW CONTROL VALVE

PLUNGER FLOW CONTROL VALVE

The plunger flow control valve is mainly designed to regulate flow rate and pressure in water pipelines. This regulation is achieved by the axial movement of a plunger, operated by a shaft - rod - crank mechanism.

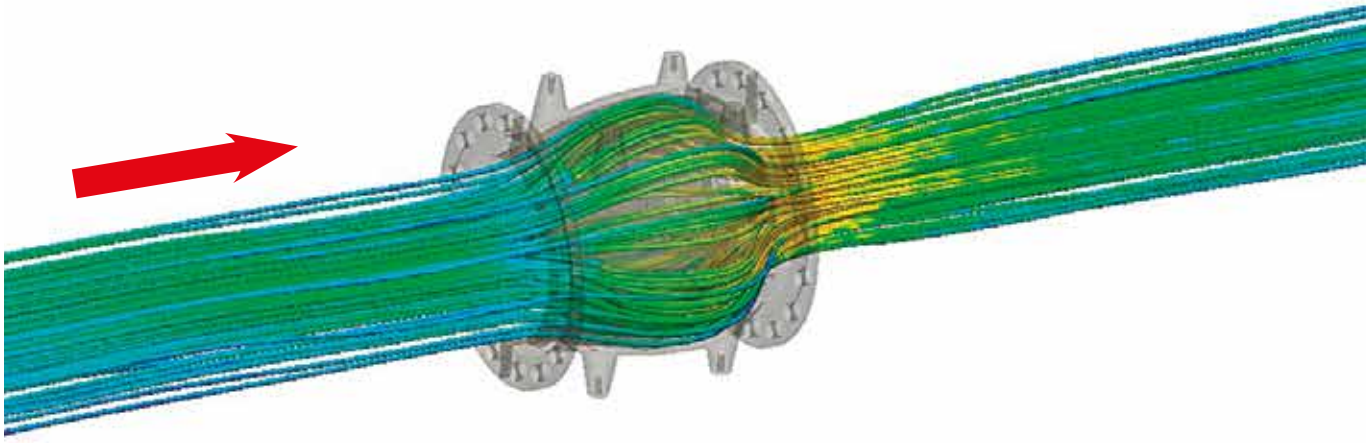
The plunger is positioned in the center of the valve, in a chamber specially shaped to protect it from the water flow and avoid noise and cavitation damage, while also ensuring vibrations-free operations.

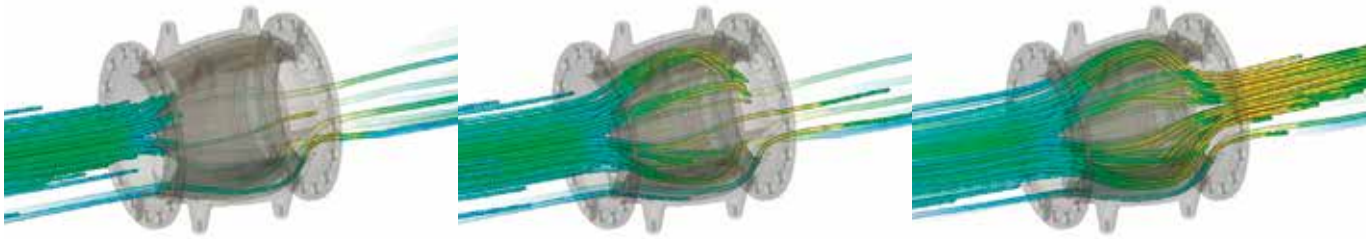
The water flow is channelled through a ring-shaped chamber around the central body of the valve. The cross section of this chamber reduces constantly from the inlet to the outlet of the valve, causing rise in the flow velocity and drop of the pressure.

This ideal geometric shape protects the pipe from cavitation bubbles, which are directed towards the center of the down-stream outlet flange.

PLUNGER FLOW CONTROL VALVE

A perfect balance between the upstream and downstream chambers allows the plunger valve to be operated under low torque levels.
The operating mechanism consists of a link, shaft, and connecting rod made of stainless steel. All the moving parts are supported by marine bronze bushings.
The plunger's sliding surface is entirely in stainless steel and is guided by sliding blocks which ensure stability in all operating conditions. The sliding blocks are screwed to the valve body for very easy maintenance.
A stainless steel seating ring is screwed onto the valve body. It is designed to ensure a perfect seal and easy maintenance of the interior valve components.
The seals are made of polyurethane rubber, with the main seal inserted directly into the top of the piston and the lip seal, with a special anti-extrusion profile, inserted into a matching seat formed in the valve body.





The special design directs the fluid towards the axis of the valve where the outflow collides, dissipating energy and protecting the walls of the down-stream pipe.

PLUNGER FLOW CONTROL VALVE

DN80-DN1800 | PN10-PN16-PN25-PN40-PN64-PN100

DESIGN FEATURES

- Compliant with EN 1074-5 and EN 1074-1;
- Hydraulic test according to EN 12266-1;
- One-piece body with annual section made of Ductile Cast Iron according to EN 1563 / IS 1865:
    - DN80 – DN 150: EN GJS 400-15 (SG 400/15) EN 1563 / IS 1865; (Upto PN25);
    - DN200 – DN 1800 : EN GJS 500-7 (SG 500/7) EN 1563 / IS 1865 (Upto PN25);
    - DN80 – DN 1800: EN GJS 400-15 (SG 400/15) EN 1563 / IS 1865; (For >= PN40);
- Face to face dimension according to EN 558 Series 15;
- Flange dimensions according to EN 1092-2;
- Pressure-balanced piston movable with minimal torque of Stainless Steel 1.4301 EN 10088-3 (AISI 304) or 1.4306 EN 10088-3 (AISI 304L);
- Corrosion and friction resistant bronze-aluminum piston guides, screwed to the body for easy maintenance (For >= DN200);
- Seat ring (For >= DN200) made of Stainless Steel 1.4301 EN 10088-3 (AISI 304) or Seating Box (For DN80-DN150) 1.4408+AT EN 10283 (AISI 316);
- Seal retaining ring made of Stainless Steel 1.4301 EN 10088-3 (AISI 304);
- Rod-link mechanism:
    - From DN 80 to DN700 made of Stainless Steel 1.4028 EN 10088-3 (AISI 420B);
    - From DN800 made of FBE coated structural steel;
- Expulsion-safe shaft made of Stainless Steel 1.4028 EN 10088-3 (AISI 420B);
- Connecting rod made of Stainless Steel 1.4028 EN 10088-3 (AISI 420B);
- All rotating parts of the rod-link mechanism are supported by solid maintenance-free bronze bearings;
- Main seal protected from the water stream, made of polyurethane elastomer PU;
- Piston seal obtained with a low friction lip-type seal made of polyurethane elastomer PU;
- Actuator coupling flange according to ISO 5211;
- Internal and external coated with fusion bonded epoxy, having thickness of minimum 250µm as per EN 14901;
- The parts in contact with the fluid comply with Ministerial Decree 174 of 6/04/2004, suitable for use with drinking water and WRAS certified;
- Gearbox with body in cast iron, gears in ductile cast iron, ATEX execution, inlet shaft in steel. Painting KS average thickness 140 µm suitable for corrosive environments acc. to C5-I EN15714-2;
- Working temperature Max. + 70°C.

ACCESSORIES

- Depending on the operating conditions, dissipating cylinders made of 1.4301 EN 10088-3 (AISI 304) or 1.4306 EN 10088-3 (AISI 304L) can be supplied
- Depending on the operating conditions, an air-intake device made of stainless steel 1.4301 EN 10088-3 (AISI 304) can be supplied.

APPLICATIONS

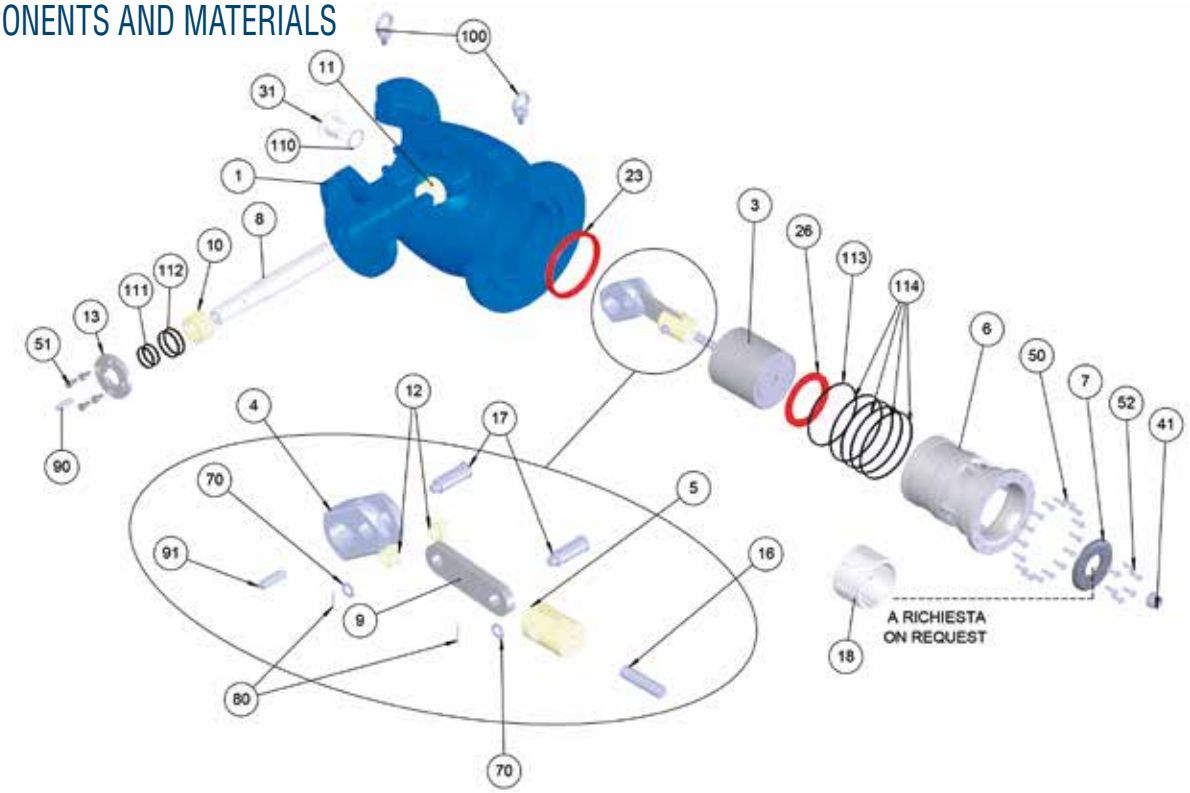
- Supply, collection and distribution of drinking water
- Hydroelectric power plants
- Desalination plants *

* suitable with valves materials

TIS LINE

F560 • DN80 - DN150

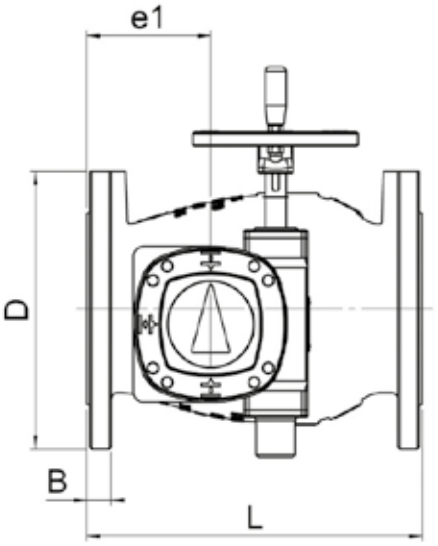
COMPONENTS AND MATERIALS

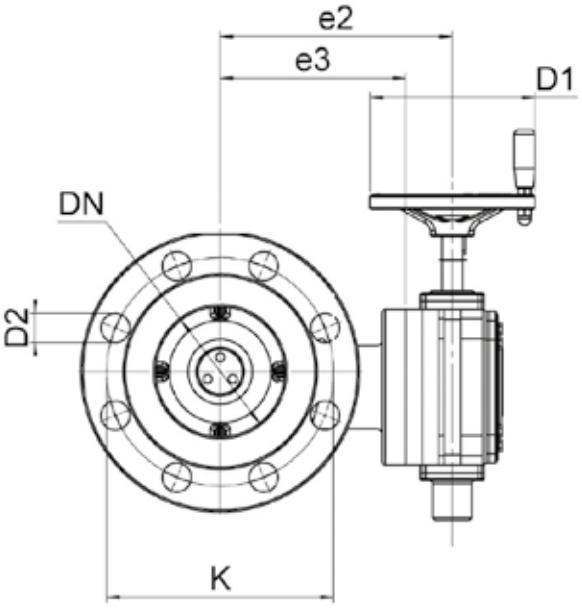


ITEM	COMPONENT	MATERIALS (STANDARD)	MATERIALS (HQ)
1	Body	EN-GJS 400-15 EN 1563 (GS 400 - 15)*	EN-GJS 400-15 EN1563 (GS 400 - 15)*
3	Obturator	1.4301 EN 10088-3 (AISI 304)	1.4401 EN10088-3 (AISI 316)
4	Link	1.4028 EN 10088-3 QT850 (AISI 420 B)	1.4462 EN10088-3 (DUPLEX)
5	Fork	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)
6	Seating box	1.4408+AT EN 10283 (AISI 316)	1.4408+AT EN10283 (AISI 316)
7	Seal retaining ring	1.4301 EN 10088-3 (AISI 304)	1.4401 EN10088-3 (AISI316)
8	Shaft	1.4028 EN 10088-3 QT850 (AISI 420 B)	1.4462 EN10088-3 (DUPLEX)
9	Piston rod	1.4301 EN 10088-3 (AISI 304)	1.4401 EN10088-3 (AISI316)
10	Outer bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)
11	Inner bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)
12	Link bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)
13	Actuator coupling disk	1.4301 EN 10088-3 (AISI 304)	1.4401 EN10088-3 (AISI316)
16	Screw fork	1.4301 EN 10088-3 (AISI 304)	1.4401 EN10088-3 (AISI316)
17	Connecting pins	1.4028 EN 10088-3 QT850 (AISI 420 B)	1.4462 EN10088-3 (DUPLEX)
18	Dissipating cylinder (on request)	1.4301 EN 10088-3 (AISI 304) / 1.4306 EN 10088-3 (AISI 304L)	1.4401 EN10088-3 (AISI316) / 1.4404 EN10088-3 (AISI316L)
23	Lip seal	PU polyurethane elastomer	PU polyurethane elastomer
26	Main seal	PU polyurethane elastomer	PU polyurethane elastomer (EPDM on request)
31	Nose cone	1.4301 EN 10088-3 (AISI 304)	1.4401 EN10088-3 (AISI316)
41	Nuts	1.4301 EN 10088-3 (AISI 304)	1.4401 EN10088-3 (AISI316)
50	Bolts	A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
51	Bolts	A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
52	Bolts	A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
70	Washers	A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
80	Cotter pins	A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
90	Tongue	1.0511 EN 10083-2 + QT (C40B)	1.4462 EN10088-3 (DUPLEX)
91	Tongue (internal)	1.4028 EN 10088-3 QT850 (AISI 420 B)	1.4462 EN10088-3 (DUPLEX)
100	Eyebolt	Galvanized steel	A4-70 EN ISO3506-1
110 - 114	O-ring	EPDM rubber	EPDM rubber

* Epoxy coating 300 µm

DIMENSIONS AND WEIGHTS





PN10

DN	80	100	125	150
D [mm]	200	220	250	285
D1 [mm]	175	175	200	200
D2 [mm]	19	19	19	23
B[3] [mm]	19	19	19	19
e1 [mm]	109	120	120	127
e2 [mm]	170	185	225	237
e3 [mm]	130	145	180	195
K [mm]	160	180	210	240
L[1] [mm]	280	300	325	350
Holes [nr]	8	8	8	8
Weight[2] [kg]	31	38	41	78

PN16

DN	80	100	125	150
D [mm]	200	220	250	285
D1 [mm]	175	175	200	200
D2 [mm]	19	19	19	23
B[3] [mm]	19	19	19	19
e1 [mm]	109	120	120	127
e2 [mm]	170	185	225	237
e3 [mm]	130	145	180	195
K [mm]	160	180	210	240
L[1] [mm]	280	300	325	350
Holes [nr]	8	8	8	8
Weight[2] [kg]	31	38	41	78

PN25

DN	80	100	125	150
D [mm]	200	235	270	300
D1 [mm]	175	175	200	200
D2 [mm]	19	23	28	28
B[3] [mm]	19	19	19	26
e1 [mm]	109	120	120	127
e2 [mm]	170	185	225	237
e3 [mm]	130	145	180	195
K [mm]	160	190	220	250
L[1] [mm]	280	300	325	350
Holes [nr]	8	8	8	8
Weight[2] [kg]	30,5	38	46	82

PN40

DN	80	100	125	150
D [mm]	200	235	270	300
D1 [mm]	175	200	200	200
D2 [mm]	19	23	28	28
B[3] [mm]	19	19	23,5	26
e1 [mm]	109	120	120	127
e2 [mm]	170	185	225	237
e3 [mm]	130	145	180	195
K [mm]	160	190	220	250
L[1] [mm]	280	300	325	350
Holes [nr]	8	8	8	8
Weight[2] [kg]	31	43	46	82

PN64

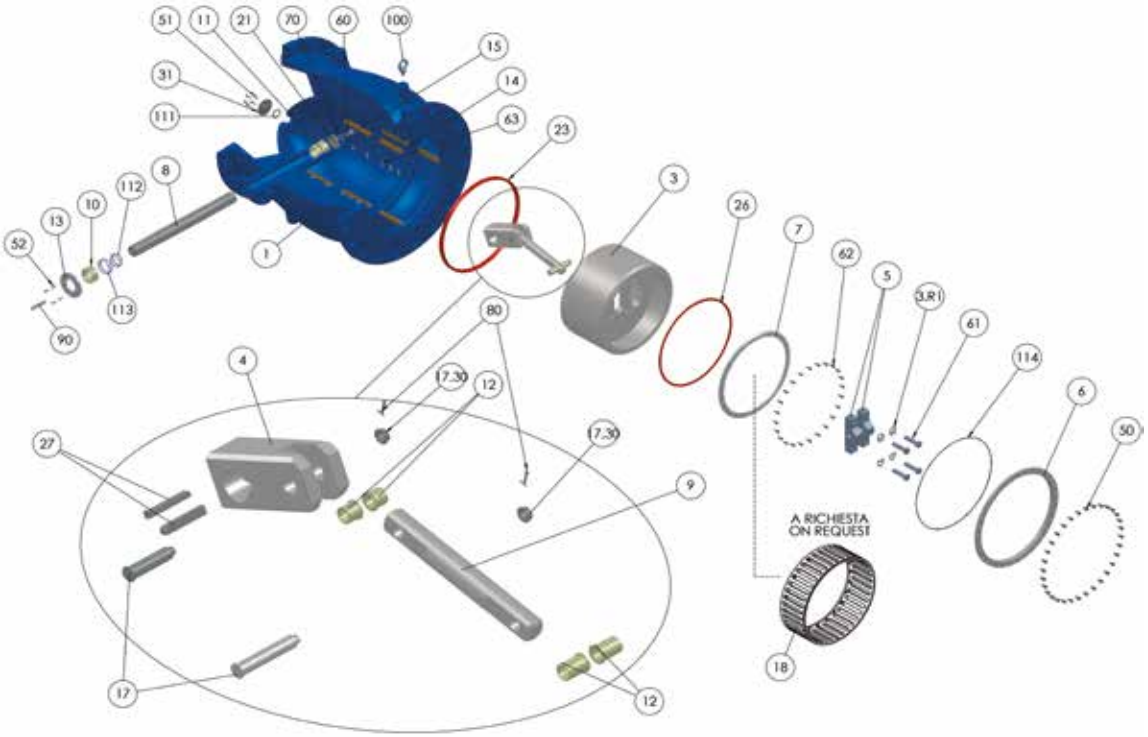
DN	80	100	125	150
D [mm]	215	250	295	345
D1 [mm]	175	200	200	200
D2 [mm]	23	28	31	34
B[3] [mm]	31	33	37	39
e1 [mm]	109	120	120	127
e2 [mm]	175	190	237	262
e3 [mm]	130	145	180	205
K [mm]	170	200	240	280
L[1] [mm]	280	300	325	350
Holes [nr]	8	8	8	8
Weight[2] [kg]	35	55	80	108

[1] face to face dimension according to EN 558 series 15
[2] gearbox included
[3] DN80 PN10-16-25-40 seal surface type B (raised face); PN64 seal surface type A (flat); DN100 / DN125 / DN150: PN10-16 seal surface type B (raised face); PN25-40-64 seal surface type A (flat);

TIS LINE

F500 • DN200 - DN1400

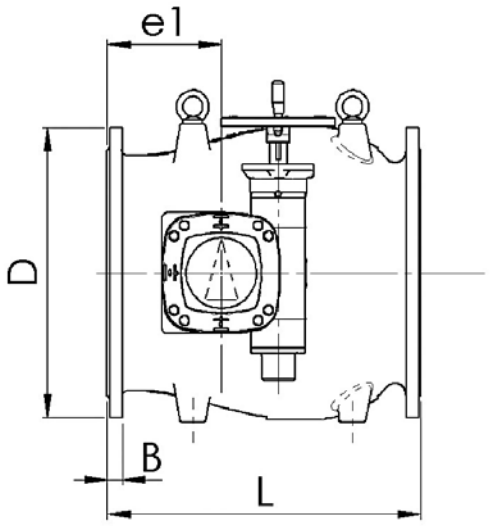
COMPONENTS AND MATERIALS

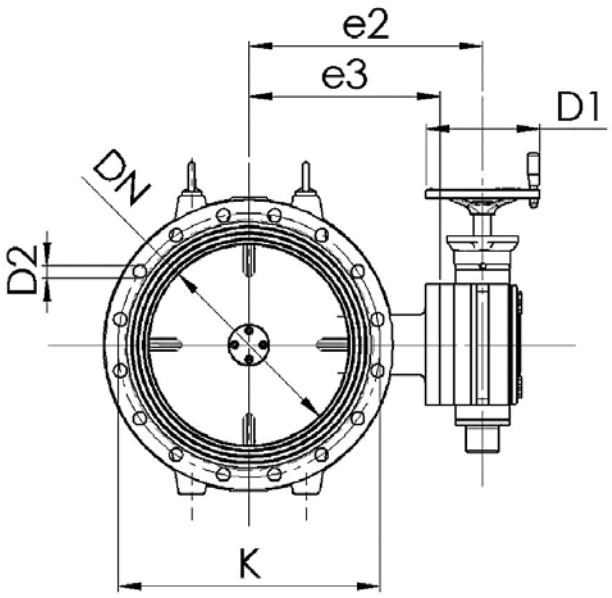


ITEM	COMPONENT	MATERIALS (STANDARD)	MATERIALS (HQ)
1	Body	EN-GJS 500 - 7 EN 1563 (GS 500 - 7)*	EN-GJS 500 - 7 EN 1563 (GS 500 - 7)*
	Body (for PN ≥ 40)	EN-GJS 400 - 15 EN 1563 (GS 400 - 15)*	EN-GJS 400 - 15 EN 1563 (GS 400 - 15)*
3	Obturator	1.4301 EN 10088-3 (AISI 304) / 1.4306 EN 10088-3 (AISI 304L)	1.4401 EN 10088-3 (AISI316) / 1.4404 EN 10088-3 (AISI316L)
3.R1	Locking washer	1.4401 EN 10088-3 (AISI 316)	1.4401 EN 10088-3 (AISI 316)
4	Link (DN200 - DN700)	1.4028 EN 10088-3 (AISI 420 B)	1.4462 EN 10088-3 (DUPLEX)
	Link (DN800 - DN1400)	S275JR EN 1025-2 (Fe430B)*	1.4462 EN 10088-3 (DUPLEX)
5	Fork (DN200 - DN300)	1.4028 EN 10088-3 (AISI 420 B)	1.4462 EN 10088-3 (DUPLEX)
	Bracket-fork (DN350 - DN1400)	1.4028 EN 10088-3 (AISI 420 B) / 1.4462 EN 10088-3 (DUPLEX 2205)	1.4462 EN 10088-3 (DUPLEX)
6	Seating ring	1.4301 EN 10088-3 (AISI 304)	1.4401 EN 10088-3 (AISI316)
7	Seal retaining ring	1.4301 EN 10088-3 (AISI 304)	1.4401 EN 10088-3 (AISI316)
8	Shaft	1.4028 EN 10088-3 (AISI 420 B)	1.4462 EN 10088-3 (DUPLEX)
9	Connecting rod	1.4028 EN 10088-3 (AISI 420 B)	1.4462 EN 10088-3 (DUPLEX)
10 - 12	Outer/Inner bearing/Link bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)
13	Actuator coupling disk	1.4301 EN 10088-3 (AISI 304)	1.4401 EN 10088-3 (AISI316)
14/15	Sliding blocks	CW 307 G M EN 12165 (Bronze)	CW307G M EN 12165 Bronze
17	Connecting pins	1.4028 EN 10088-3 (AISI 420 B)	1.4462 EN 10088-3 (DUPLEX)
17.30	Washer for connecting pins	1.4401 EN 10088-3 (AISI 316)	1.4401 EN 10088-3 (AISI 316)
18	Dissipating cylinder (on request)	1.4301 EN 10088-3 (AISI 304) / 1.4306 EN 10088-3 (AISI 304L)	1.4301 EN 10088-3 (AISI 304) / 1.4306 EN 10088-3 (AISI 304L)
21	Stop washer	1.4301 EN 10088-3 (AISI 304)	1.4401 EN 10088-3 (AISI316)
23	Lip Seal	PU polyurethane elastomer	PU polyurethane elastomer
26	Main Seal	PU polyurethane elastomer	PU polyurethane elastomer (EPDM on request)
27	Tongue (internal)	1.4028 EN 10088-3 (AISI 420 B)	1.4462 EN 10088-3 (DUPLEX)
31	Nose cone (DN200 - DN800)	1.4301 EN 10088-3 (AISI 304)	1.4401 EN 10088-3 (AISI316)
	Nose cone (DN900 - DN1400)	Polymer POM	1.4401 EN 10088-3 (AISI316)
50 - 52/ 60 - 63	Screws	A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
70	Locking washer	A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
80	Cotter pins	A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
90	Tongue	1.0511 EN 10083-2 + QT (C40B)	1.4462 EN10088-3 (DUPLEX)
100	Eyebolt	Galvanized steel	A4-70 EN ISO3506-1
110 -114	O-Ring	EPDM rubber	EPDM rubber

* Epoxy coating 300 µm

DIMENSIONS AND WEIGHTS





PN10

DN	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400
D [mm]	340	395	445	505	565	615	670	780	895	1015	1115	1230	1455	1675
D1 [mm]	200	200	200	250	250	250	250	250	250	250	250	250	250	250
D2 [mm]	23	23	23	23	28	28	28	31	31	34	34	37	41	44
B[3] [mm]	20	22	24,5	24,5	24,5	25,5	26,5	30	32,5	35	37,5	40	45	46
e1 [mm]	160	164	185	200	230	235	245	318	310	325	350	360	425	475
e2 [mm]	273	300	352	410	440	470	500	563	647	700	753	815	1015	1128
e3 [mm]	228	255	295	335	365	395	425	488	572	625	678	740	900	1013
K [mm]	295	350	400	460	515	565	620	725	840	950	1050	1160	1380	1590
L[1] [mm]	400	450	500	550	600	650	700	800	900	1000	1100	1200	1400	1600
Holes [nr]	8	12	12	16	16	20	20	20	24	24	28	28	32	36
Weight[2] [kg]	106	145	195	290	335	495	470	700	1000	1330	1725	2265	3530	5020

PN16

DN	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400
D [mm]	340	405	460	520	580	640	715	840	910	1025	1125	1255	1485	1685
D1 [mm]	200	200	200	250	250	250	250	250	250	250	250	250	250	250
D2 [mm]	23	28	28	28	31	31	34	37	37	41	41	44	50	50
B[3] [mm]	20	22	24,5	26,5	28	30	31,5	36	39,5	43	46,5	50	57	60
e1 [mm]	160	164	185	200	230	235	245	318	310	325	350	360	425	475
e2 [mm]	273	300	352	410	440	470	500	563	647	700	753	815	1015	1128
e3 [mm]	228	255	295	335	365	395	425	488	572	625	678	740	900	1013
K [mm]	295	355	410	470	525	585	650	770	840	950	1050	1170	1390	1590
L[1] [mm]	400	450	500	550	600	650	700	800	900	1000	1100	1200	1400	1600
Holes [nr]	12	12	12	16	16	20	20	20	24	24	28	28	32	36
Weight[2] [kg]	106	145	195	290	335	495	510	750	1005	1330	1770	2290	3575	5030

PN25

DN	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400
D [mm]	360	425	485	555	620	670	730	845	960	1085	1185	1320	1530	1755
D1 [mm]	200	200	250	250	250	250	250	250	250	250	315	315	400	400
D2 [mm]	28	31	31	34	37	37	37	41	44	50	50	57	57	62
B[3] [mm]	22	24,5	27,5	30	32	34,5	36,5	42	46,5	51	55,5	60	69	74
e1 [mm]	160	164	185	200	230	235	245	275	310	325	350	360	425	475
e2 [mm]	273	300	370	410	440	470	500	563	682	735	778	840	1122	1270
e3 [mm]	228	255	295	335	365	395	425	488	607	660	703	725	900	1070
K [mm]	310	370	430	490	550	600	660	770	875	990	1090	1210	1420	1640
L[1] [mm]	400	450	500	550	600	650	700	800	900	1000	1100	1200	1400	1600
Holes [nr]	12	12	16	16	16	20	20	20	24	24	28	28	32	36
Weight[2] [kg]	113	152	248	324	404	501	593	768	1190	1575	2160	2850	4090	6610

PN40

DN	200	250	300	350	400	500	600	700	800	900	1000	1200	1400
D [mm]	375	450	515	580	660	755	890	995	1140	1250	1360	1575	1795
D1 [mm]	250	250	250	250	250	250	250	315	315	400	400	400	400
D2 [mm]	31	34	34	37	41	44	50	48	56	56	56	62	62
B[3] [mm]	30	34,5	39,5	43,5	48	52	58	64	72	76	80	88	98
e1 [mm]	160	164	185	200	200	245	275	320	350	380	400	425	500
e2 [mm]	262	287	345	440	470	555	610	720	845	860	999	1169	1265
e3 [mm]	205	240	270	390	420	480	535	605	705	720	854	990	1120
K [mm]	320	385	450	510	585	670	795	900	1030	1140	1250	1460	1680
L[1] [mm]	400	450	500	550	600	700	800	1000	1100	1200	1300	1500	1700
Holes [nr]	12	12	16	16	16	20	20	24	24	28	28	32	36
Weight[2] [kg]	122	165	265	350	435	880	1090	1825	2710	3360	4260	6230	9530

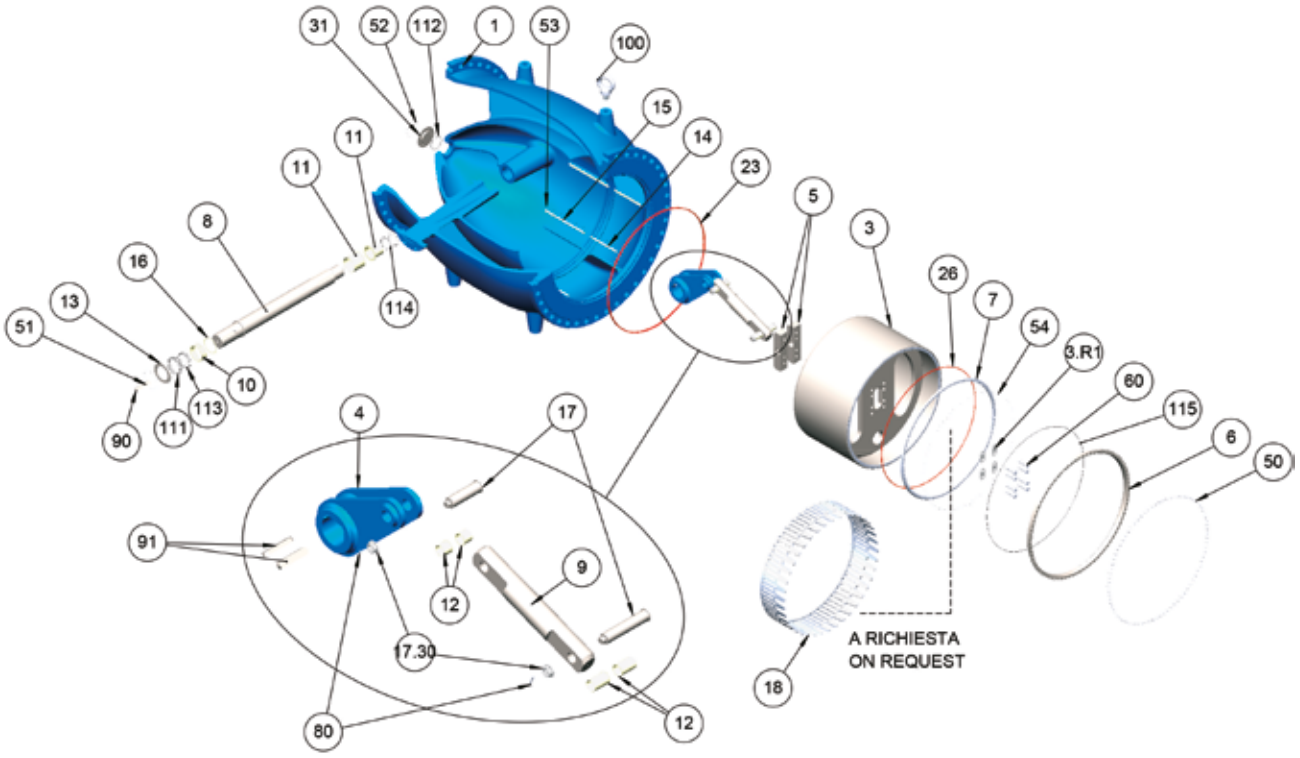
PN64

DN	200	250	300	350	400
D [mm]	415	470	530	600	670
D1 [mm]	250	250	250	250	250
D2 [mm]	37	37	37	41	44
B[3] [mm]	46	50	57	61	65
e1 [mm]	160	164	185	218	238
e2 [mm]	280	315	345	465	495
e3 [mm]	205	240	270	390	420
K [mm]	345	400	460	525	585
L[1] [mm]	400	450	500	585	636
Holes [nr]	12	12	16	16	16
Weight[2] [kg]	150	195	285	490	640

[1] Face to face dimension according to EN 558 series 15 (DN350 and DN400 PN64, DN700, DN800, DN900 and DN1000 PN40 excluded)
[2] Gearbox included
[3] Inlet/outlet flange: PN10-16-25 seal surface type B (raised face), PN40-64 seal surface type A (flat face)

F500 • DN1600 - DN1800

COMPONENTS AND MATERIALS

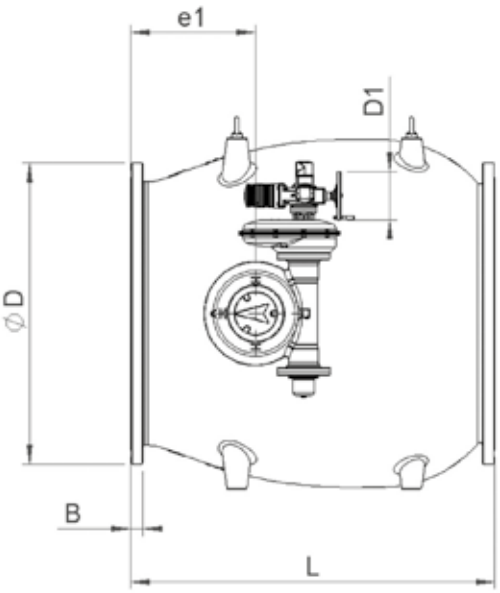


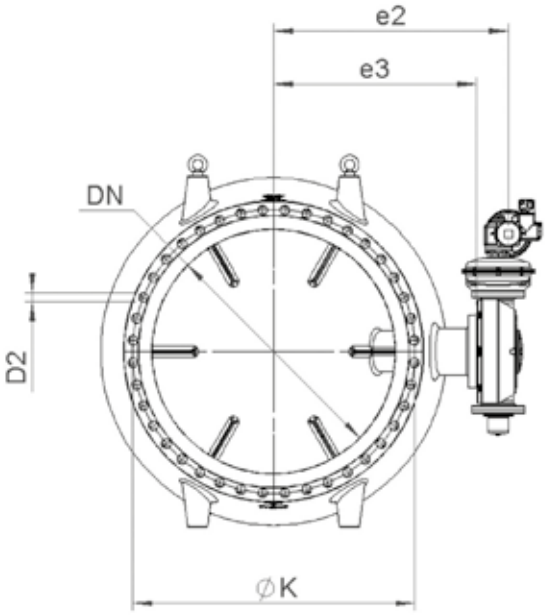
ITEM	COMPONENT	MATERIALS (STANDARD)	MATERIALS (HQ)
1	Body	EN-GJS 500-7 EN 1563 (GS500-7)*	EN-GJS 500-7 EN1563 (GS500-7)*
3	Obturator	1.4306 EN 10088-3 (AISI 304L)	1.4404 EN10088-3 (AISI 316L)
3.R1	Locking washer	1.4401 EN 10088-3 (AISI 316)	1.4401 EN10088-3 (AISI316)
4	Link	S275JR EN 1025-2 (Fe430B)*	1.4462 EN10088-3 (DUPLEX)
5	Bracket-fork	1.4301 EN 10088-3 (AISI 304)	1.4462 EN10088-3 (DUPLEX)
6	Seating ring	1.4301 EN 10088-3 (AISI 304)	1.4401 EN10088-3 (AISI316)
7	Seal retaining ring	1.4301 EN10088-3 (AISI304)	1.4401 EN10088-3 (AISI316)
8	Shaft	1.4028 EN 10088-3 QT850 (AISI 420 B)	1.4462 EN10088-3 (DUPLEX)
9	Connecting rod	1.4028 EN 10088-3 QT850 (AISI 420B)	1.4462 EN10088-3 (DUPLEX)
10	Outer bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)
11	Inner bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)
12	Bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)
13	Actuator coupling disk	1.4301 EN 10088-3 (AISI 304)	1.4401 EN10088-3 (AISI316)
14	Sliding blocks	CW 307 G M EN 12165 (Bronze)	CW307G M EN12165 (Bronze)
15	Sliding blocks	CW 307 G M EN 12165 (Bronze)	CW307G M EN12165 (Bronze)
16	Axial bearing	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)	CC 333 G EN 1982 CuAl10Fe5Ni5-C (Bronze)
17	Connecting rod	1.4028 EN 10088-3 QT850 (AISI 420B)	1.4462 EN10088-3 (DUPLEX)
17.30	Connecting rod washer	1.4401 EN 10088-3 (AISI 316)	1.4401 EN10088-3 (AISI316)
18	Dissipating cylinder (on request)	1.4301 EN 10088-3 (AISI 304) / 1.4306 EN 10088-3 (AISI 304L)	1.4404 EN10088-3 (AISI316L)
23	Lip seal	PU polyurethane elastomer	PU polyurethane elastomer
26	Main seal	PU polyurethane elastomer	PU polyurethane elastomer (EPDM on request)
31	Nose cone	1.4301 EN 10088-3 (AISI 304)	1.4401 EN10088-3 (AISI316)
50 - 54/ 60	Bolts	A2-70 EN ISO 3506-1	A4-70 EN ISO3506-1
80	Cotter pins	A2-70 EN ISO 3506-1	A4-70 EN ISO3506-1
90	Tongue	1.0511 EN 10083-2 +QT (C40B)	1.4462 EN10088-3 (DUPLEX)
91	Tongue (internal)	1.4028 EN 10088-3 QT850 (AISI 420 B)	1.4462 EN10088-3 (DUPLEX)
100	Eyebolt	Galvanized steel	A4-70 EN ISO3506-1
111- 115	O-ring	EPDM rubber	EPDM rubber

* Epoxy coating 300 µm

TIS LINE

DIMENSIONS AND WEIGHTS





PN10

DN	1600	1800
D [mm]	1915	2115
D1 [mm]	320	500
D2 [mm]	50	50
B[2] [mm]	49	52
e1 [mm]	855	855
e2 [mm]	1610	1740
e3 [mm]	1365	1410
K [mm]	1820	2020
L [mm]	2300	2600
Holes [nr]	40	44
Weight[1] [kg]	10480	13850

PN16

DN	1600	1800
D [mm]	1930	2130
D1 [mm]	320	500
D2 [mm]	57	57
B[2] [mm]	65	70
e1 [mm]	855	855
e2 [mm]	1610	1740
e3 [mm]	1365	1410
K [mm]	1820	2020
L [mm]	2300	2600
Holes [nr]	40	44
Weight[1] [kg]	10500	14000

PN25

DN	1600	1800
D [mm]	1975	2195
D1 [mm]	320	500
D2 [mm]	62	70
B[2] [mm]	81	88
e1 [mm]	855	855
e2 [mm]	1610	1740
e3 [mm]	1365	1410
K [mm]	1860	2070
L [mm]	2300	2600
Holes [nr]	40	44
Weight[1] [kg]	11000	16000

[1]: gearbox included
Inlet/outlet flange: Type B seal surface (raised face)

PRESSURE DROP

Pressure drop in plunger flow control valves can be evaluated using equation (1.a) or equation (1.b):

$$\Delta P = \xi \times V^2 / (2\ g)\ [mhw] \qquad (1.a)$$
$$\Delta P = (Q / Kv)^2\ [bar] \qquad (1.b)$$

Where:

- ΔP = pressure drop [unit: see formula above]
- ξ = pressure drop coefficient
- v = fluid speed referred to valve's DN [m/s]
- Kv = flow coefficient [m^3/h]
- g = 9.81 [m/s^2]
- Q = flow rate [m^3/h]

The pressure drop coefficient ξ can be calculated using (2.a) and the flow coefficient Kv can be calculated using (2.b):

$$\xi = \xi^* \times \xi_{100} \qquad (2.a)$$
$$Kv = Kv\% \times Kvs \qquad (2.b)$$

Where:

- ξ_{100} is the pressure drop coefficient of the fully open valve. It is listed in Table_1 for standard valves (no dissipating cylinder). For valves equipped with dissipating cylinders, ξ_{100} is the distinctive value of the cylinder (e.g.: for a valve equipped with a K20 dissipating cylinder, it will be $\xi_{100} = 20$).
- ξ^* expresses the percentage change in the pressure drop as the degree of valve aperture varies ($\xi^* = \xi / \xi_{100}$). ξ^* is shown in Diagram_1.
- Kvs is the flow coefficient of the fully open valve and is listed in Table_1.
- Kv% expresses the percentage change of Kv as the degree of valve aperture varies. Kv% = Kv / Kvs x Kv% is shown in Diagram_2.

PLUNGER FLOW CONTROL VALVES - HYDRAULIC SPECIFICATIONS																				
	F560				F500															
DN	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400	1600	1800
Kvs [m^3/h]	145	203	310	430	678	1070	1550	2120	2785	3540	4395	6380	8750	11480	14580	18010	26020	35430	64100	81200
ξ_{100}	3,1	3,8	4,0	4,3	5,5	5,4	5,3	5,2	5,2	5,1	5,1	5,0	4,9	4,9	4,8	4,8	4,8	4,8	2,5	2,5

Table 1

DIAGRAM 1

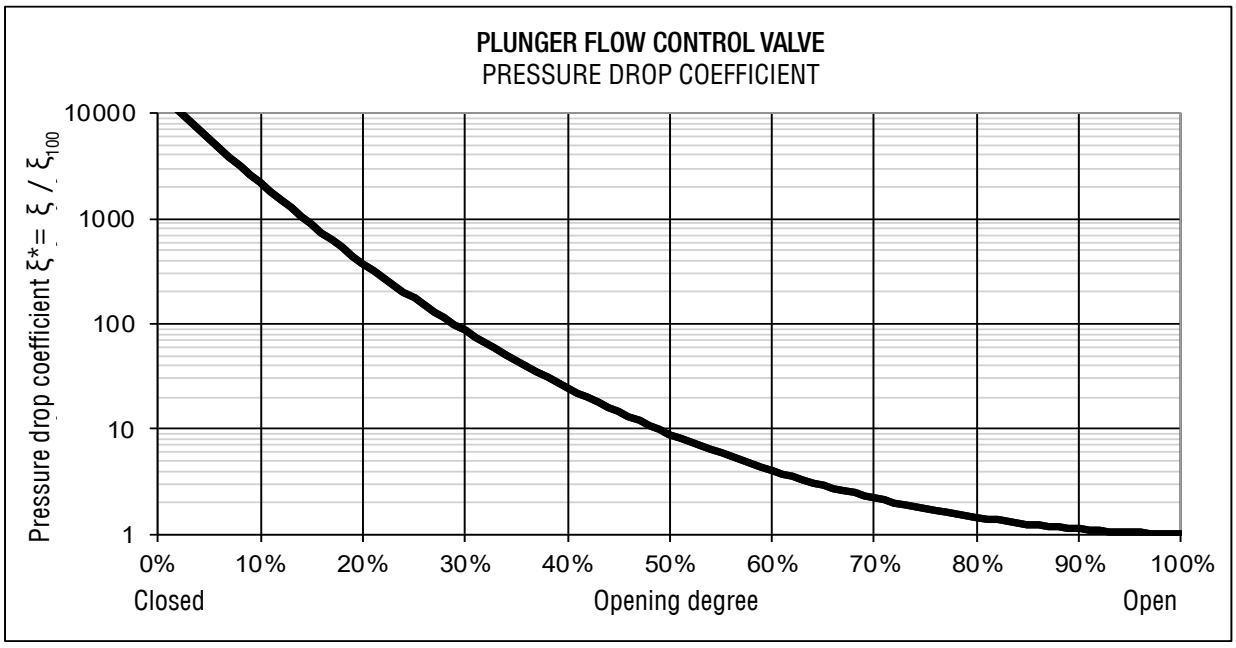
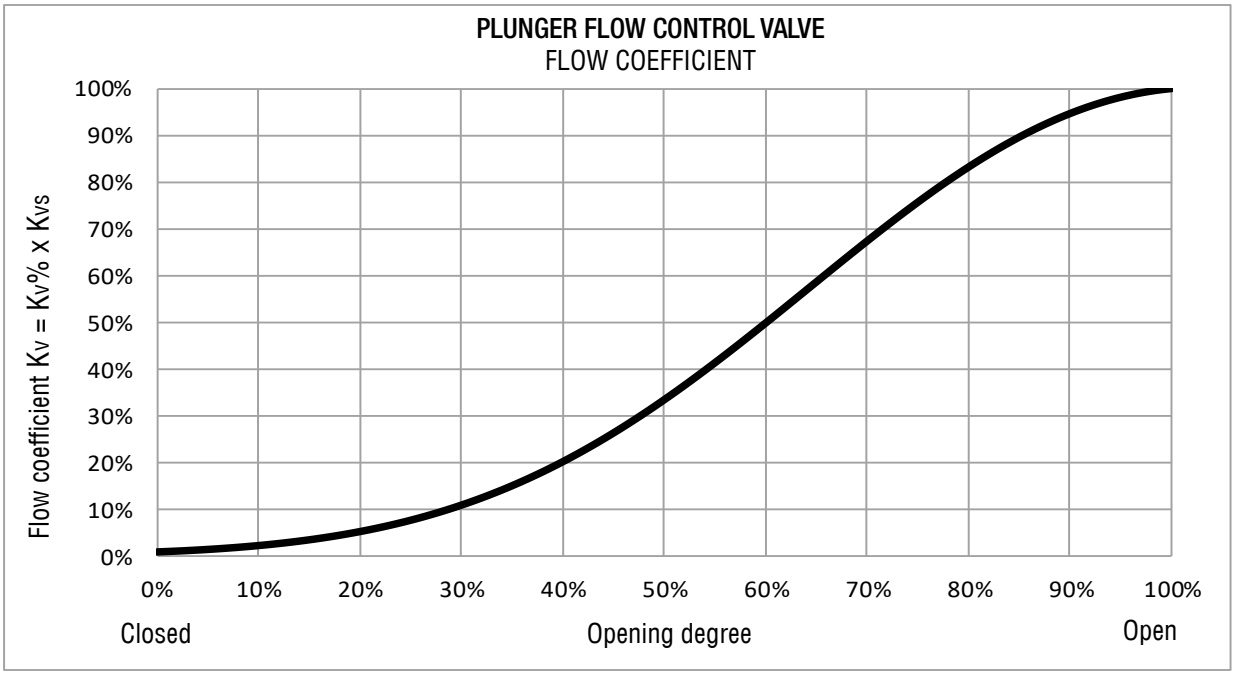


DIAGRAM 2



CAVITATION

Cavitation risk in plunger valves can be evaluated by using equation (3):

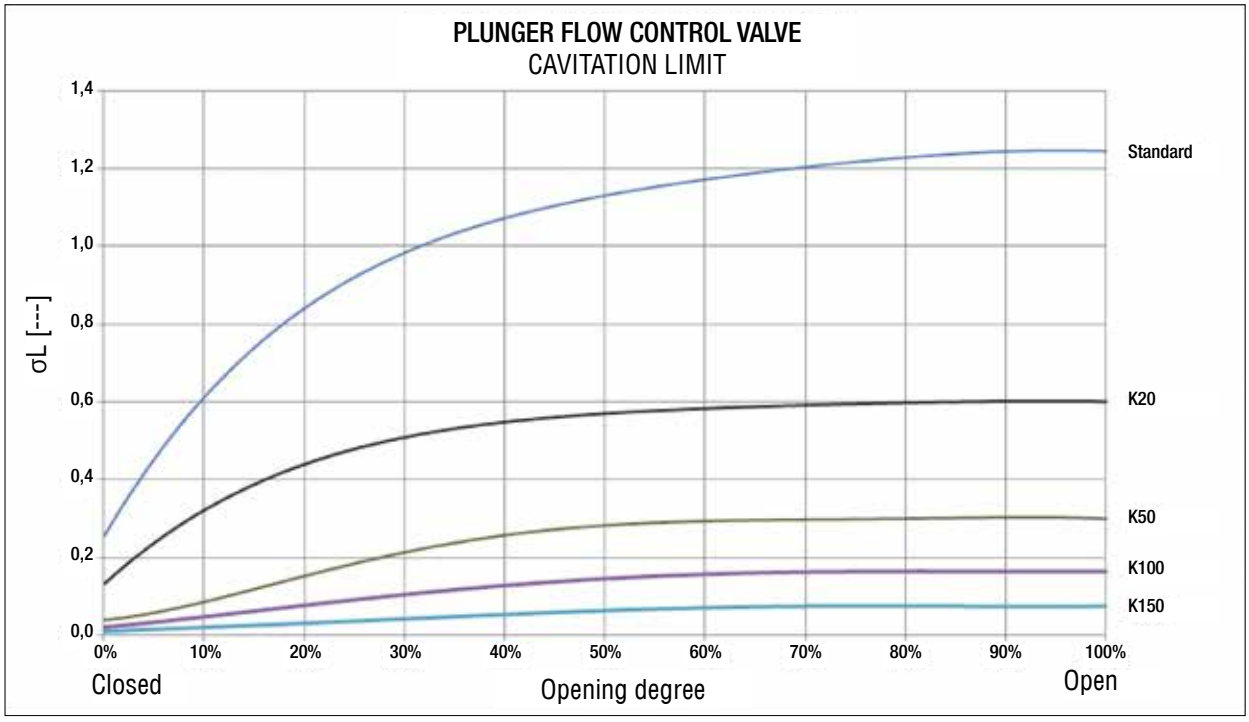
$$\sigma > \sigma L \qquad (3)$$

Where:

- Cavitation number $\sigma = P_{out} / (\Delta P + v^2/2g)$ (4)
- Cavitation limit σL is given in the diagram below
- ΔP = pressure drop [mhw]
- P_{out} = valve outlet pressure
- v = fluid velocity referred to valve's DN [m/s]
- g = 9.81 [m/s²]

The valve will not cavitate as long as σ > σL.

DIAGRAM 3



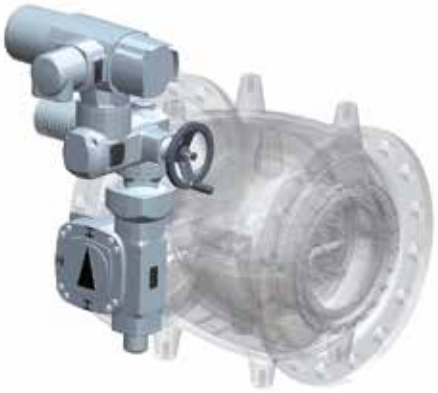
TIS LINE

OPERATING DEVICES

PNEUMATIC ACTUATOR

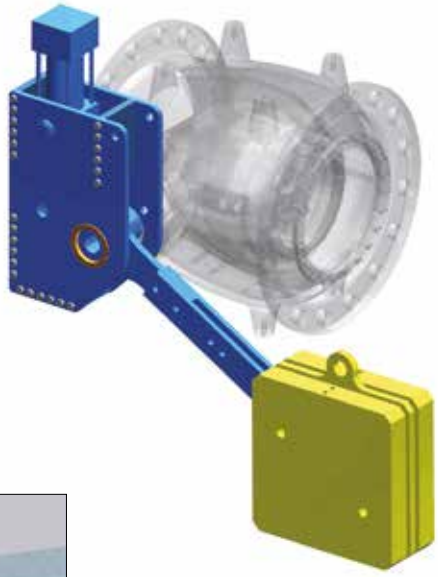
WORM GEARBOX
AND HANDWHEEL

ELECTRIC ACTUATOR



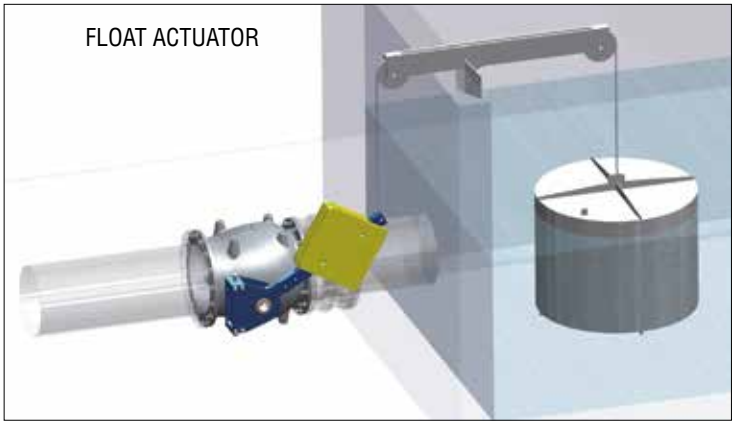
MAIN VALVE

DOUBLE-ACTING
HYDRAULIC
ACTUATOR



HYDRAULIC CYLINDER
AND COUNTERWEIGHT

FLOAT ACTUATOR



ACCESSORIES

DISSIPATING CYLINDER

AIR INTAKE DEVICE

MAIN VALVE

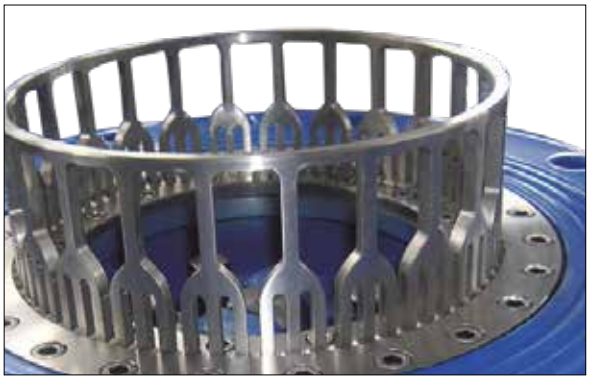
DISSIPATING PLATE

DISSIPATING CYLINDERS

The valve can be equipped with a stainless steel dissipating cylinder specially slotted to divide the outlet flow into radial fluid jets that collide at the valve centre axis. This device offers an energy dissipation curve adjusted to the real operating conditions of the valve and based on the plant's effective requirements. Standard slotted cylinders are available for progressively greater resistance to cavitation and increasing pressure drop. Special slotted cylinders can be fitted with the dimension, shape, and aperture calculated on the basis of the valve's effective operating conditions. For example, it is possible to limit headloss at higher valve apertures, and ensure high cavitation resistance at small apertures.

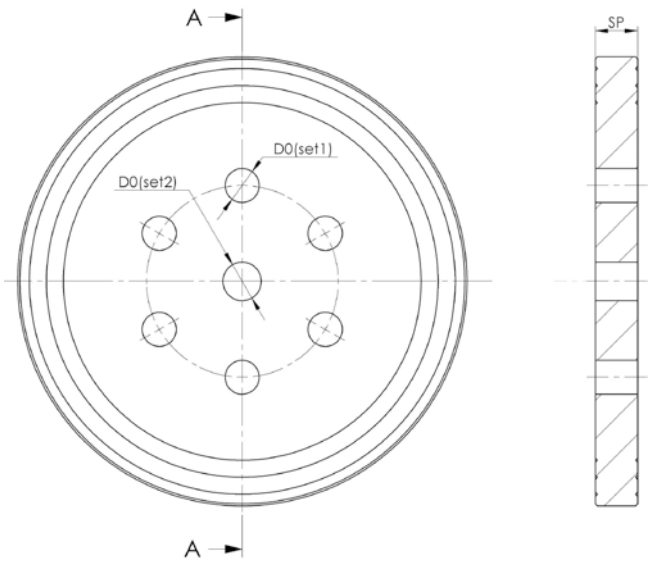
DIFFERENT TYPES OF DISSIPATING CYLINDERS

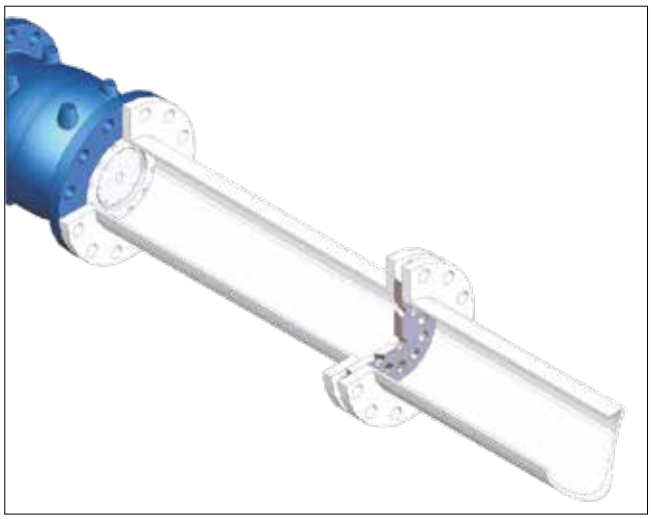
SPECIAL DISSIPATING CYLINDERS



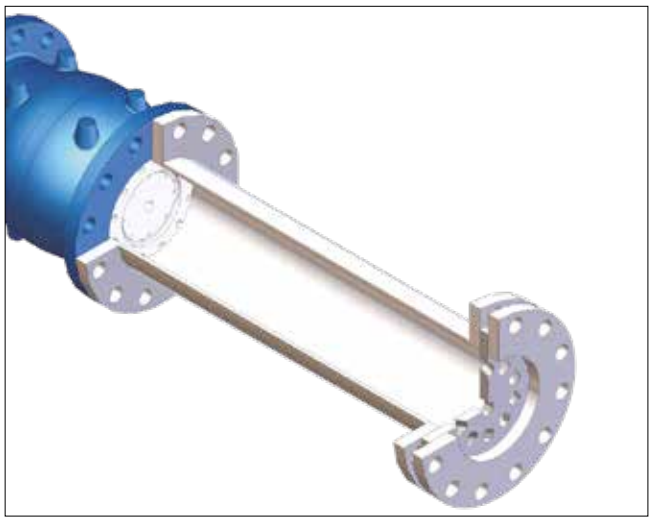
DISSIPATING PLATE

In the case of high hydraulic heads, when a dissipating cylinder is not enough to ensure adequate dissipation it should be combined with a perforated dissipating plate mounted downstream of the valve. A suitably designed plate will reduce the hydraulic head and support the dissipating action of the dissipating cylinder.
Depending on the number, size, and inclination of the holes, a dissipating plate provides different load dissipation values, improving the overall performance of the valve.
The recommended minimum pipe length upstream of a dissipating plate is $L_{PIPE} \geq 3$ X Valve DN. The outside diameter of a dissipating plate is suitable for connection using a flange according to EN 1092-2. The recommended seal is flat type (on request, a dissipating plate can be made with O-ring seats).





DISSIPATING PLATE DUCTED



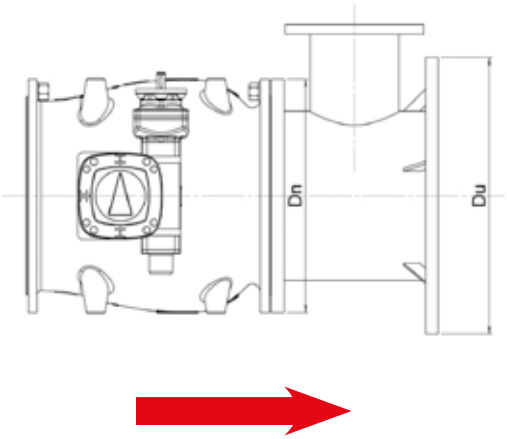
DISSIPATING PLATE - FREE DISCHARGE

AIR INTAKE DEVICE

Cavitation can occur due to depression in proximity to a flange or pipe downstream of a valve. This can be avoided by fitting the valve with an adequate air intake device to intake air and compensate the fluid depression, thus reducing the risk of cavitation, ensuring extended safe operation of the valve, and protecting the downstream section of the plant.
ATTENTION: The maximum working static pressure allowed for an air intake is 2 bar.
When an air intake is fitted, the Silencer AS accessory can be useful to limit noise emissions.
The Silencer AS is fitted directly onto the air intake:

- Low noise emission, Silences AS is able to reduce noise down up to 30 decibels;
- Easy to install;
- Cost saving, no need for piping to connect the air intake to the exterior.

We recommend providing the maneuver chamber with a ventilation opening to avoid occurrence of under pressure.



AIR INTAKE STANDARD DIMENSIONS

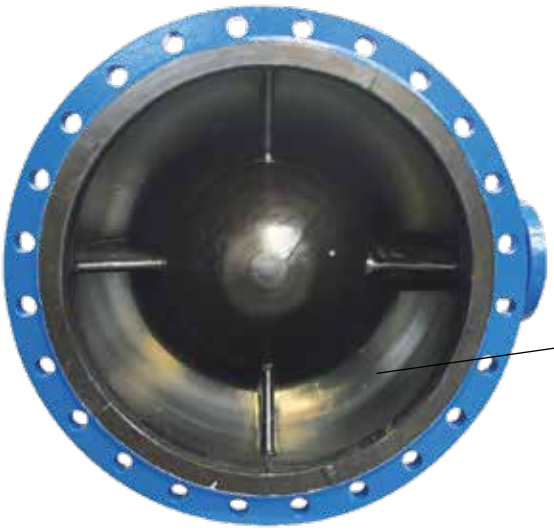
DN valve	Dn	Du	DN air inlet	Face to face			Weight [kg]
				PN10/16	PN25	PN40	PN10/16
80	DN80	DN100	G 1" 1/4	180	180	180	10
100	DN100	DN125	DN50	250	250	250	16
125	DN125	DN150	DN50	250	250	250	26
150	DN150	DN200	DN65	280	290	300	30
200	DN200	DN250	DN80	350	350	350	35
250	DN250	DN300	DN125	400	400	400	80
300	DN300	DN400	DN125	450	450	450	100
350	DN350	DN450	DN150	470	470	470	140
400	DN400	DN500	DN200	460	485	550	170
450	DN450	DN600	DN200	550	550	570	205
500	DN500	DN600	DN200	600	600	620	245
600	DN600	DN700	DN250	680	680	765	340
700	DN700	DN800	DN300	750	750	/	350
800	DN800	DN900	DN300	800	800	/	490
900	DN900	DN1000	DN350	850	850	/	650
1000	DN1000	DN1200	DN400	1000	1050	/	905
1200*	DN1200	DN1400	DN400	950	1000 (**)	/	1200

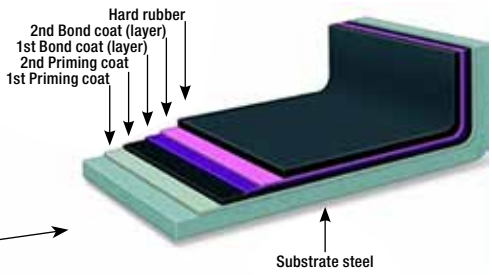
*= DOUBLE AIR INLET / **= TO BE CONFIRMED

PLUNGER FLOW CONTROL VALVE WITH AIR INTAKE DEVICE AND SILENCER "AS"

F500 RL • PLUNGER FLOW CONTROL VALVE WITH VULCANIZED HARD RUBBER LINING

Valves for saline media (seawater or well-desalination) or corrosive media have to resist chemical attack from chloride ions. Standard epoxy coated valve surfaces will be rapidly abraded due to the fluid aggressivity. The best possible solution to ensure extended valve life and safe operation of plants, is to entirely protect the internal valve surfaces with a hard rubber lining of 3 mm which ensures no metal parts come into contact with the aggressive fluids. The linings are applied by heating the elements to around 135°-145° C and vulcanizing rubber sheets onto the surfaces at a pressure of about 4.5 bar.
Other parts of the valve in contact with the fluids are made in duplex and AISI 316 stainless steel, offering high resistance to corrosion in the presence of ions dissolved in water.
Typical applications for these valves are: water treatment plants, desalination plants, mines, industrial water handling, mineral treatment plants.





The valve body is internally covered with a rubber layer which provides additional protection to corrosion from brackish water and significantly increases the life of the valve.

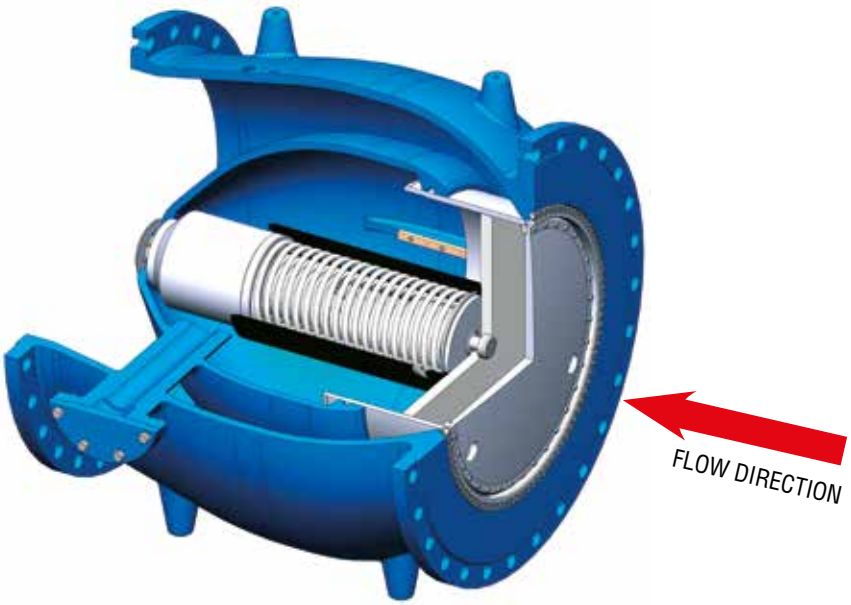
TIS LINE

F600 - F650 • PLUNGER FLOW CONTROL VALVE
FABRICATED WELDED STEEL

In high pressure applications the valve body is made of fabricated welded steel P355N (DN500 and above forged steel), material with high mechanical strength and good weldability (PN100 - PN64 for big diameters)
Typical applications include: hydroelectric power plants with high hydraulic heads, snowmaking systems, testing systems, and systems subject to high pressure testing.

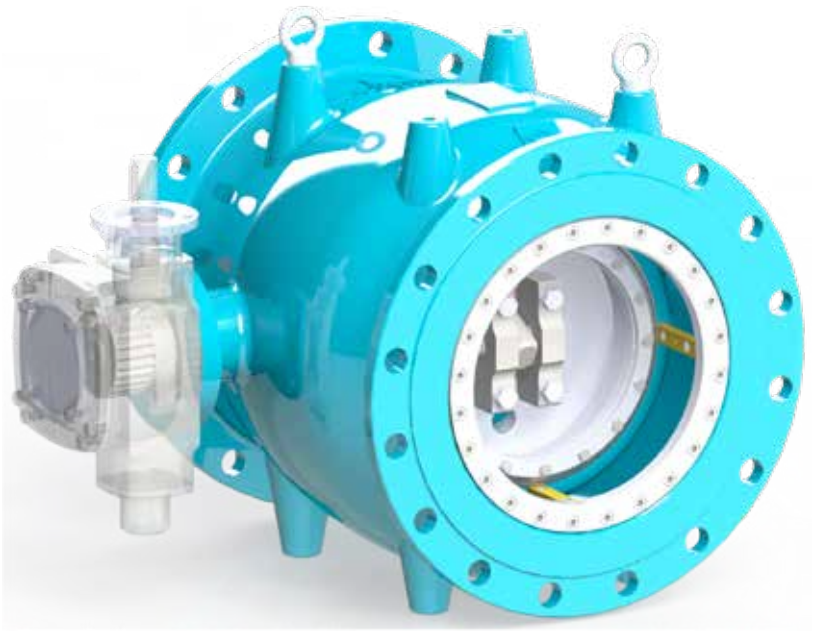
F600 PN100
HYDRAULIC TEST
(PRESSURE TEST = 150 BAR)

PLUNGER CHECK VALVE



Check valves are designed to perform a retaining function, typically downstream of pumping stations.
In the case of pump stoppage, a check valve provides rapid closure of the plunger by a spring system before the flow can reverse into the pump with a risk of damage. The seal is secured by the pressure generated in the inner barrel under backflow pressure, augmenting the action of the springs. The valve plunger is supported by four external self-lubricating guides, which guarantee a smooth sliding action. These features ensure the check valve high strength and reliability.

F500-AIR • PLUNGER FLOW CONTROL VALVE FOR AIR APPLICATIONS



Plunger flow control valve for air application is usually installed downstream of blowers in water treatment plants to blow air into tanks (of oxidation, primary treatments, ...).
They can be used with gases such as: air, nitrogen, carbon dioxide. They cannot be used with flammable, hazardous, or corrosive gases.

ADVANTAGES

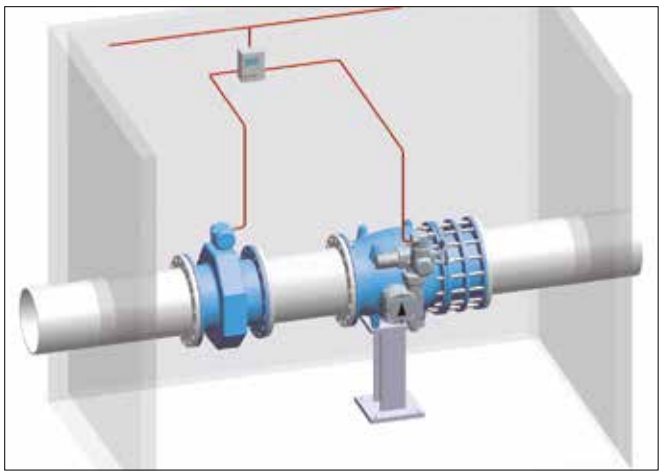
- Fine-tuning to control air flow according to the concentration levels of dissolved oxygen in the tank
- Optimisation of blower functioning resulting in overall energy savings for the system
- Lower maintenance costs as the reduced power surges on the blowers allows – in combination with and adequate scheduled maintenance – to extends the life of the blowers.

In air applications, use of a dissipating cylinders (or slotted cylinders) optimises valve operation by modifying the adjustment curve according to actual needs. In this way, the obturator stroke can be adjusted according to the change in the flow rate.
There are dissipating cylinders available which feature gradually increasing pressure drop.

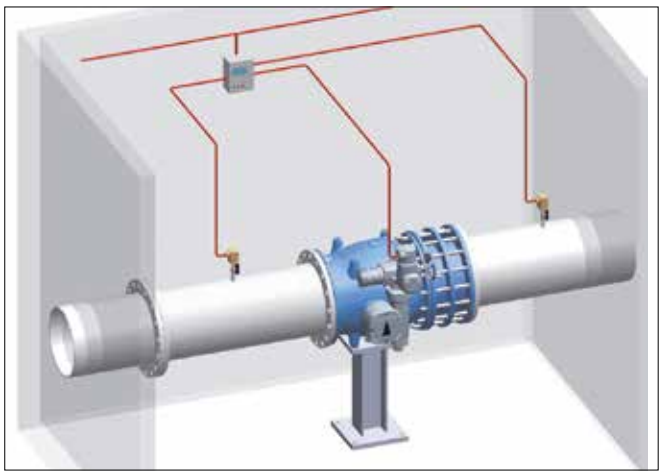
MAIN APPLICATIONS

FLOW AND PRESSURE CONTROL

The most frequently used valves for pressure reduction or flow control are diaphragm valves, but these have limitations as regards hydraulic behaviour and size.Plunger valves are also perfectly suited for precise and reliable control of pressure and flow, and they have the advantage of nominal diameters ranging from DN 80 to DN 1800. Unlike diaphragm valves (only operated hydraulically), plunger valves require an external actuator, which can be operated manually, electrically, pneumatically, hydraulically, by float devices, or by gravity (cylinder with counterweight). Pressure or flow can be controlled using external actuators to reduce or increase the inner cross-section of the valve, commanded by an external unit (PLC) connected to pressure gauges (fitted upstream and downstream of the plunger valve) or a flow meter (mounted upstream of the plunger valve).



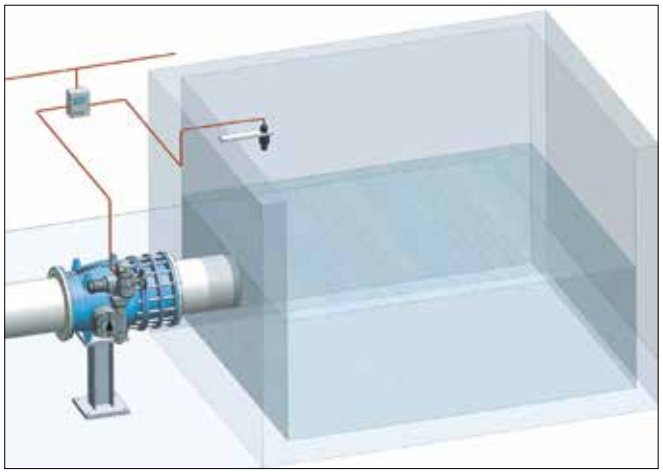
FLOW CONTROL CONFIGURATION



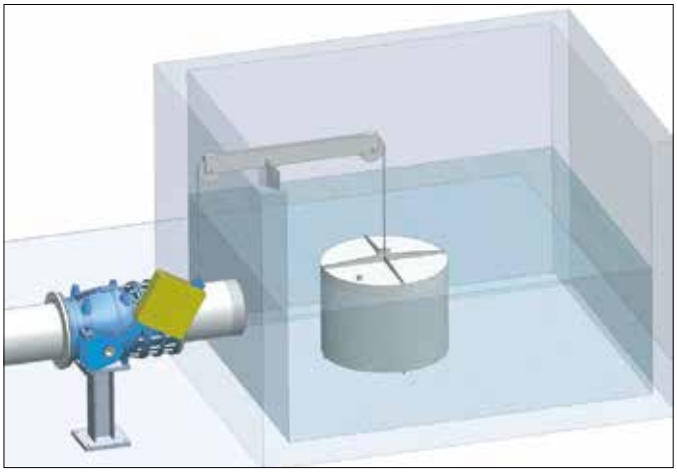
PRESSURE CONTROL CONFIGURATION

LEVEL CONTROL

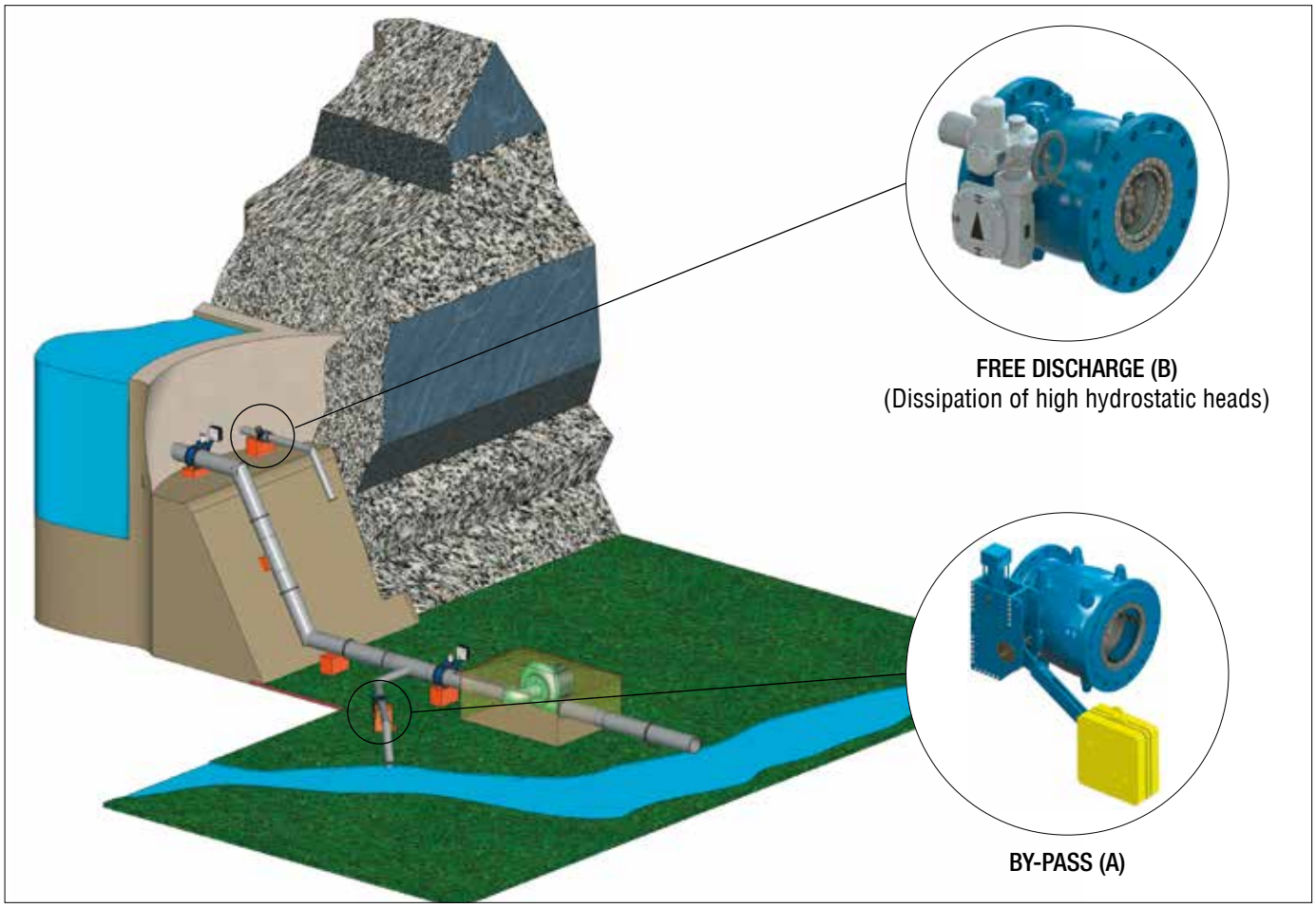
Plunger valves can control reservoir filling to maintain a constant water level regardless water demand.
It is important to carefully select the valve diameter according to the system's hydraulic parameters: if the valve is oversized, there could be fluctuations in tank level or the time needed to reach the desired level may be too long.



WITH ELECTRIC TYPE ACTUATOR AND LEVEL SENSOR

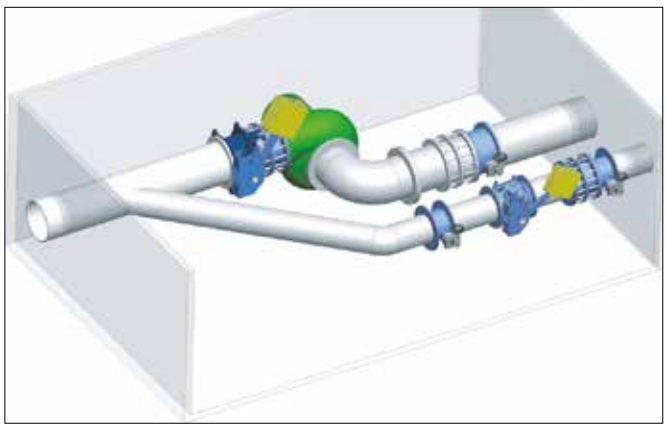


WITH COUNTERWEIGHT SYSTEM AND FLOAT

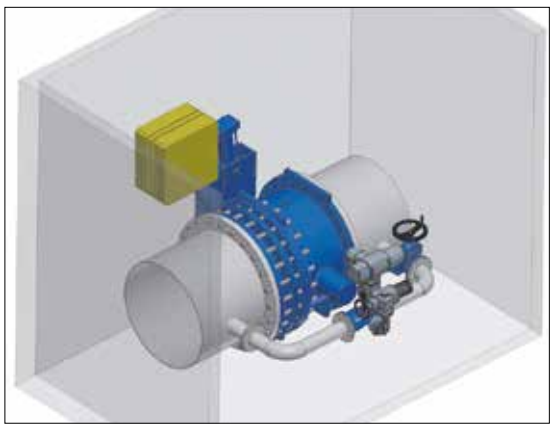


A • BY-PASS VALVE

A plunger valve can be used as a:
- By-pass valve for hydroelectric installations for the protection of the turbine-generator or when servicing the turbine;
- By-pass valve for filling large pipelines.



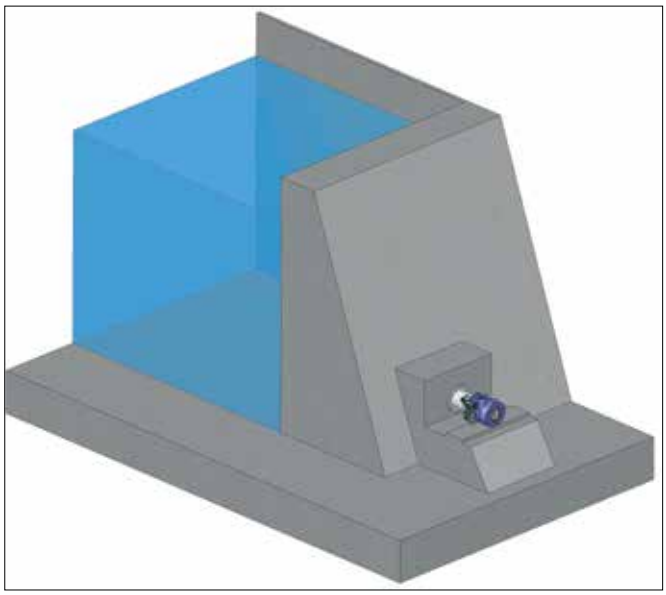
BY-PASS FOR TURBINE-GENERATOR

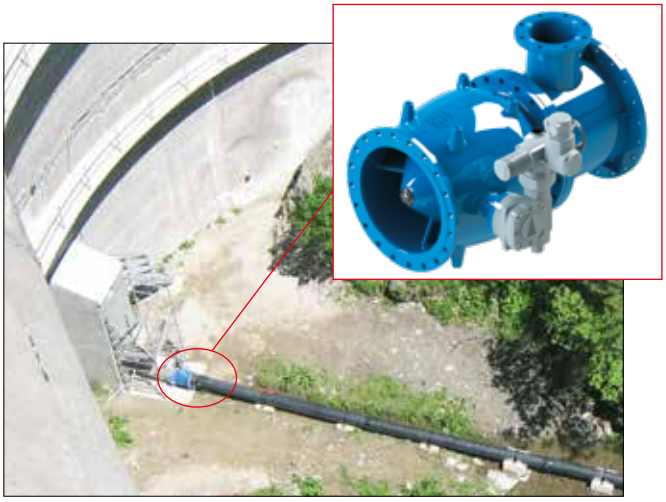


BY-PASS FOR FILLING LARGE PIPELINES

B • DISSIPATION OF HIGH HYDROSTATIC HEADS

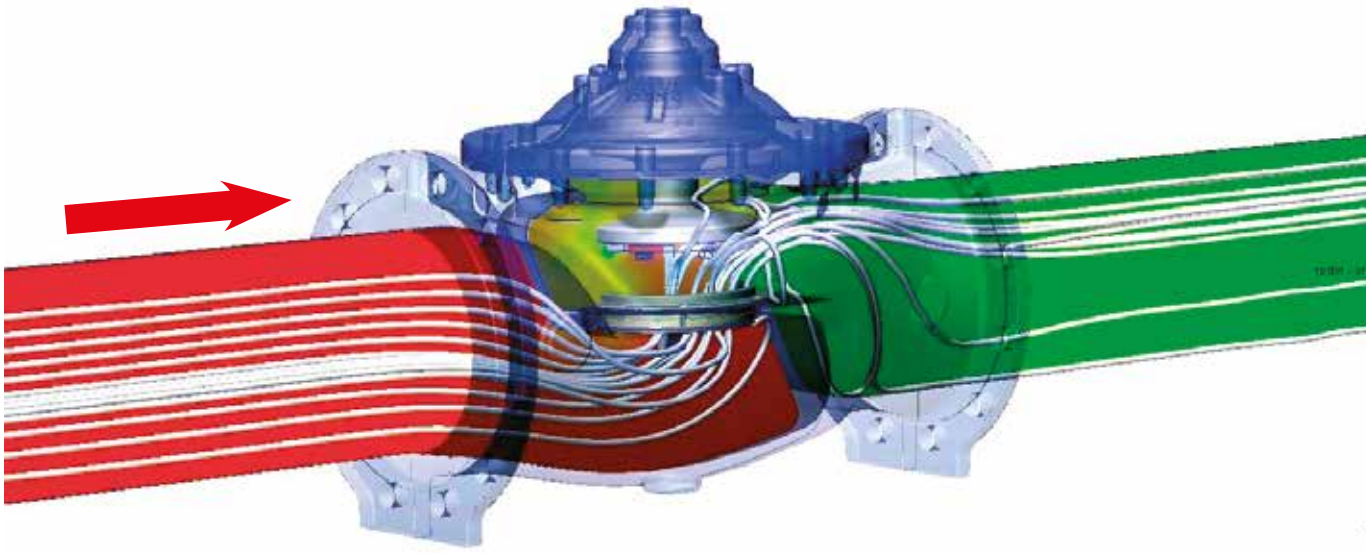
Plunger valves are used for free discharge outlets. A typical example is a dam base discharge valve.





AUTOMATIC CONTROL VALVE

DIAPHRAGM ACTUATED AUTOMATIC CONTROL VALVE

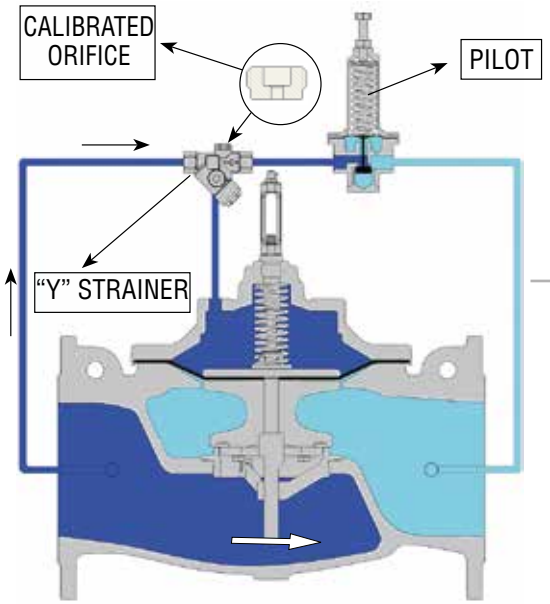


Automatic control valves, as defined by EN1074-5 standard: “have the integral capacity to control the function using energy from the conveyed water by adjusting the position of the shutter. They can be directly operated, i.e. the force is applied (via a spring or diaphragm) directly to the shutter.” Alternatively, “They can be pilot operated i.e. the force is applied through an adjustable pilot valve”.

This type of T-pattern flow valve is the result of years of study, design, and development by T.I.S. . These valves are available in sizes from DN50 to DN1200 flanged according to EN 1092-2, with nominal pressures of PN10 - PN16 - PN25. The valves are hydraulically actuated, with a metal shutter released by the action of pressure on a diaphragm. The use of a particularly high-performance sealing gasket developed by T.I.S. Nuoval ensures an excellent seal and extended duration even under very demanding operating conditions.

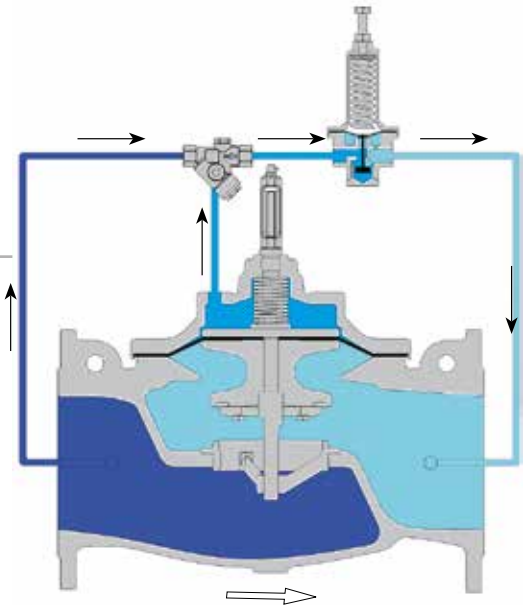
The M3000 series valves are standard passage (seat size smaller than the nominal diameter of the valve). This offers intrinsically superior regulation and dissipation capacity. The M2000 series valves are full passage (seat size equal to the nominal diameter of the valve). This generates a very limited pressure drop with the shutter fully open.

CONTROL VALVE CONFIGURATION (E.G. DOWNSTREAM PRESSURE REDUCER)



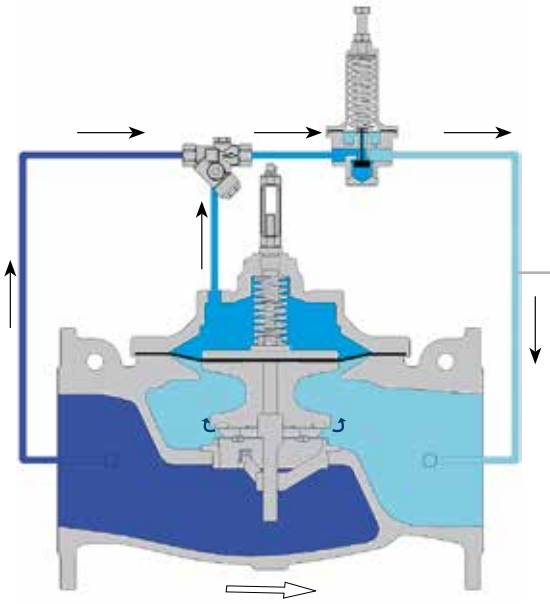
CLOSED POSITION

The pilot deviates upstream pressure into valve control chamber. The resulting pressure on the diaphragm moves the shutter to the closed position.



OPEN POSITION

The pilot opens, increasing the pressure drop of the orifice and so releasing the pressure in the control chamber. The resulting force on the diaphragm moves the shutter to the open position.



REGULATION

The state of balance between the flow capacity of the calibrated orifice (located in the "Y" filter) and the flow rate controlled by the pilot, keeps the valve shutter in the position it has reached.

AUTOMATIC CONTROL VALVE - DIAPHRAGM

DN50-DN1200 | PN10-PN16-PN25

DESIGN FEATURES

- Hydraulic testing according to EN1074-5;
- Compliance with EN 1074-5 and EN 1074-1;
- Parts in contact with the water comply with DM 174 of 06/04/2004 and KTW, DVGW W270, WRAS;
- One-piece body in ductile cast iron EN GJS 400-15 EN 1563 (GS 400-15);
- Face to face according to EN 558 Series 1;
- Flanges dimensioned and drilled according to EN 1092-2;
- Stem in Stainless steel 1.4301 EN10088-3 (AISI304) and guided at both ends;
- Seat ring in Stainless steel 1.4408 EN10283 (AISI316);
- Seal retaining ring in Stainless steel 1.4301 EN10088-3 (AISI304);
- Main seal in EPDM rubber according to EN681-1 WA;
- Spring in Stainless Steel 1.4310 EN10270-3 (AISI302);
- Obturator in in Stainless steel 1.4401 EN10088-3 (AISI316) stainless steel, ductile cast iron EN GJS 400-15 and coated steel (according to DN and PN of the valve);
- Diaphragm in EPDM with nylon reinforcement;
- All screws, washers and nuts in stainless steel A2-70 EN ISO3506-1 (inside);
- Internal/external FBE coating protection (Fusion Bonded Epoxy), blue RAL5015, 250 µm thickness.
- Working temperature: (water temp.) min.+0°C (excluding frost) max. + 70°C (on request up to 90°C).

MAIN VALVE ACCESSORIES

- Depending on the operating conditions, a V-PORT (see dedicated page) can be supplied in 1.4301 EN10088-3 (AISI304) or 1.4306 EN10088-3 (AISI304L) can be supplied;
- Depending on the operating conditions, a DOUBLE SLOTTED CYLINDER (see dedicated page) can be supplied in 1.4301 EN10088-3 (AISI304) and 1.4401 EN10088-3 (AISI316) can be supplied.

PILOT CIRCUIT ACCESSORIES

- Pipes in 1.4401 EN10088-3 (AISI316), fittings made in 1.4401 EN10088-3 (AISI316);
- Compression fittings in brass / 1.4401 EN10088-3 (AISI316);
- Strainers and speed regulators in 1.4401 EN10088-3 (AISI316) and brass;
- Isolating ball valves made in Nickel-plated brass;
- Pilots made in 1.4401 EN10088-3 (AISI316) and brass;
- Position indicator in hardened glass and brass;
- Pressure gauges case in 1.4301 EN10088-3 (AISI304) and glycerin;
- Gauge holder with drainage in Nickel-plated brass;
- Floaters in 1.4306 EN10088-3 (AISI304L).

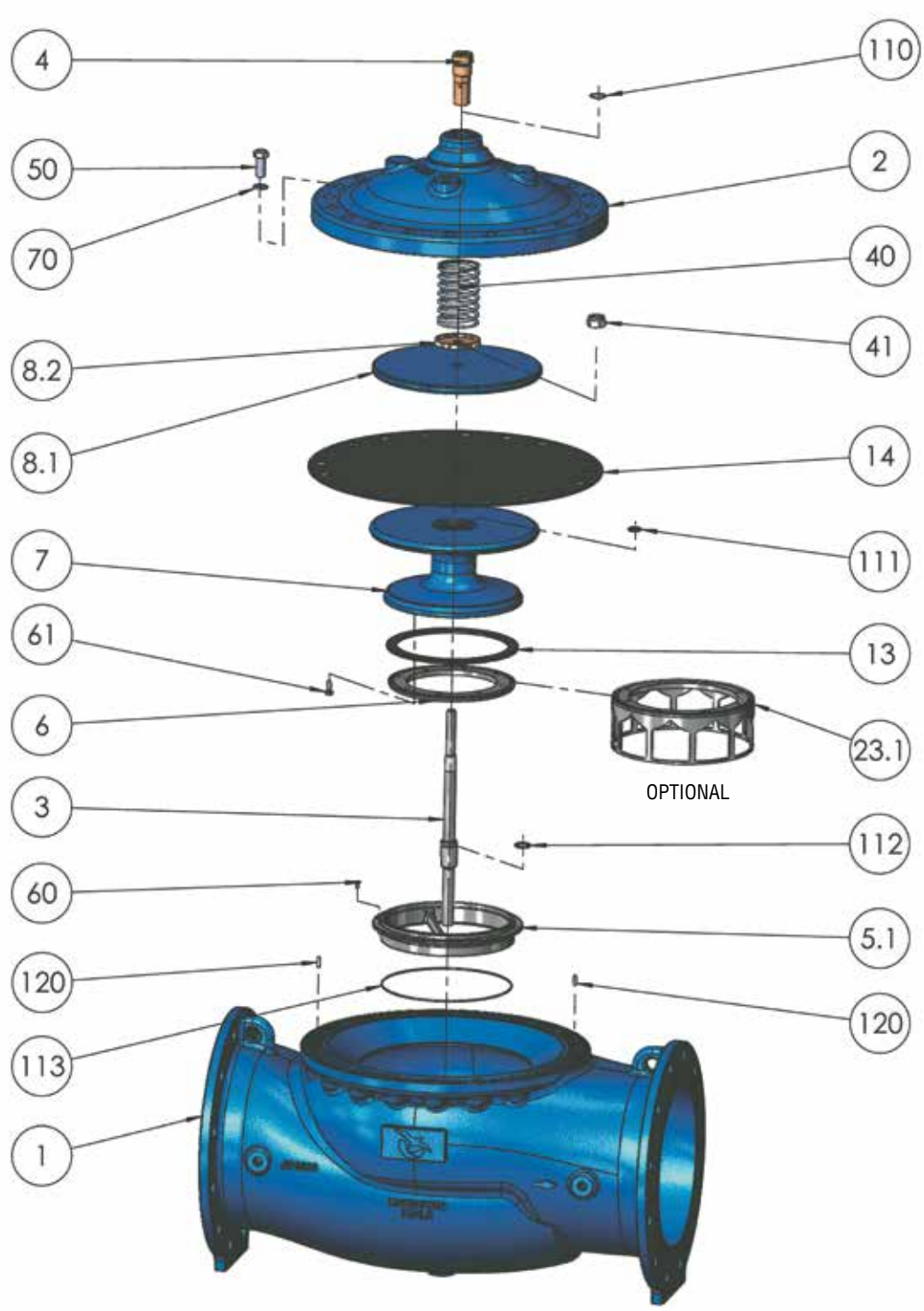
OTHER VARIANTS

- P2000 / P2100 / P2100P – Piston operated Automatic Control Valve (DN50-DN1200, PN10-PN25)

APPLICATIONS

- Supply, collection and distribution of drinking water

COMPONENTS


4
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23.1
OPTIONAL
112
5.1
120

MATERIALS

M3000

ITEM	DESCRIPTION	DN	PN	MATERIALS (STANDARD)	MATERIALS (HQ)
1	Body			EN-GJS 400-15 EN1563 (GS400)	EN-GJS 400-15 EN1563 (GS400)
2	Cover			EN-GJS 400-15 EN1563 (GS400)	EN-GJS 400-15 EN1563 (GS400)
3	Stem			1.4301 EN10088-3 (AISI304)	1.4401 EN10088-3 (AISI316)
4	Cover bearing			CC333G CuAl10Fe5Ni5-C EN1982	1.4462 EN10088-3 (DUPLEX)
5.1	Seat Ring			1.4408 EN10283 (AISI316)	1.4408 EN10283 (AISI316)
-	V-Port Seat Ring			1.4301 EN10088-3 (AISI304)	1.4401 EN10088-3 (AISI316)
6	Seal Retaining Ring			1.4301 EN10088-3 (AISI304)	1.4401 EN10088-3 (AISI316)
7	Obturator	From 50 to 150	10 - 16 - 25	1.4401 EN10088-3 (AISI316)	1.4401 EN10088-3 (AISI316)
		From 200 to 1000	10 - 16 - 25	EN-GJS 400-15 EN1563 (GS400)	EN-GJS 400-15 EN1563 (GS400)
		From 500 to 800	25	S275JR EN10025-2 (Fe430B)	S275JR EN10025-2 (Fe430B)
8.1	Diaphragm disc	From 50 to 100	10 - 16 - 25	1.4401 EN10088-3 (AISI316)	1.4401 EN10088-3 (AISI316)
		From 125 to 1000	10 - 16 - 25	S275JR EN10025-2 (Fe430B)	S275JR EN10025-2 (Fe430B)
8.2	Spring Washer			1.4401 EN10088-3 (AISI316)	1.4401 EN10088-3 (AISI316)
13	Main Seal			EPDM (85Sh A)	EPDM (85Sh A)
14	Diaphragm			NYLON-reinforced EPDM	NYLON-reinforced EPDM
23.1	V-Port			1.4301 EN10088-3 (AISI304)	1.4401 EN10088-3 (AISI316)
40	Spring	50 - 600	10 - 16 - 25	1.4310 EN10270-3 (AISI302)	1.4310 EN10270-3 (AISI302)
41	Self-Locking nut			A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
50	Cover Bolts			A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
60	Seat Ring Bolts	200 - 1000	10 - 16 - 25	A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
61	Retaining ring bolts			A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
70	Cover washers			A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
111 112 - 113	O-ring			EPDM	EPDM
120	Pin			A2-70 EN ISO3506-1	A4-70 EN ISO3506-1

All parts subject to corrosion are protected by epoxy powder coating with a minimum thickness of 250 micron

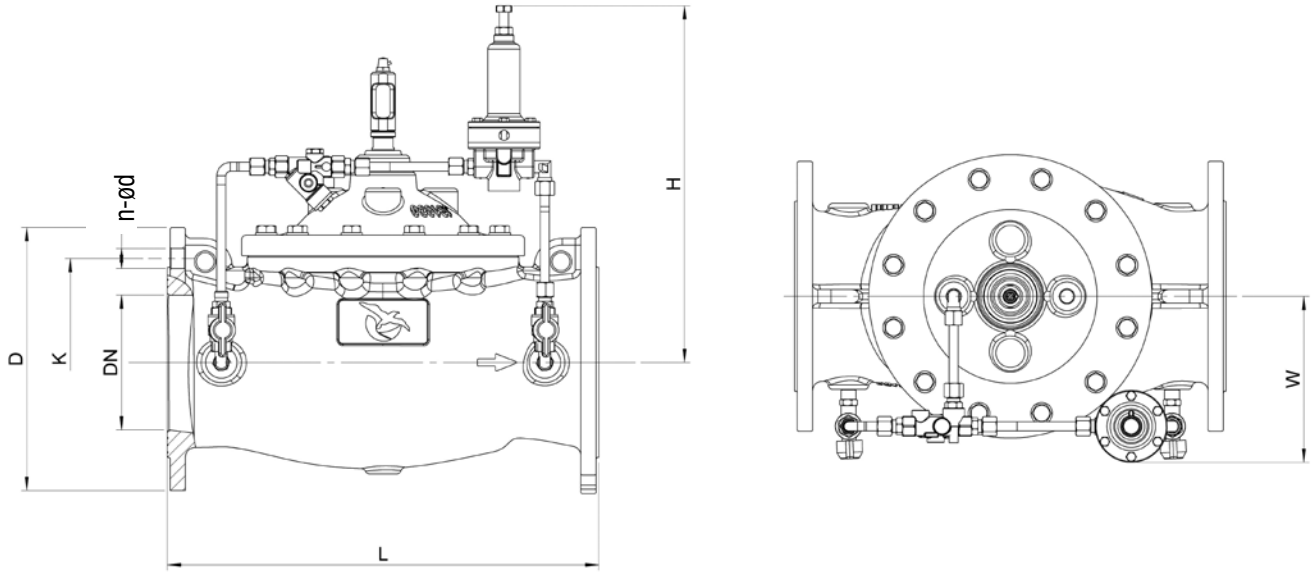
M2000

ITEM	DESCRIPTION	DN	PN	MATERIALS (STANDARD)	MATERIALS (HQ)
1	Body			EN-GJS 400-15 EN1563 (GS400)	EN-GJS 400-15 EN1563 (GS400)
2	Cover			EN-GJS 400-15 EN1563 (GS400)	EN-GJS 400-15 EN1563 (GS400)
3	Stem			1.4301 EN10088-3 (AISI304)	1.4401 EN10088-3 (AISI316)
4	Cover bearing			CC333G CuAl10Fe5Ni5-C EN1982	1.4462 EN10088-3 (DUPLEX)
5.1	Seat Ring			1.4408 EN10283 (AISI316)	1.4408 EN10283 (AISI316)
-	V-Port Seat Ring			1.4301 EN10088-3 (AISI304)	1.4401 EN10088-3 (AISI316)
6	Seal Retaining Ring			1.4301 EN10088-3 (AISI304)	1.4401 EN10088-3 (AISI316)
7	Obturator	From 50 to 100	10 - 16 - 25	1.4301 EN10088-3 (AISI304)	1.4401 EN10088-3 (AISI316)
		From 150 to 200	10 - 16 - 25	S275JR EN10025-2 (Fe430B)	S275JR EN10025-2 (Fe430B)
8.1	Diaphragm disc	From 50 to 100	10 - 16 - 25	1.4408 EN10283 (AISI316)	1.4401 EN10088-3 (AISI316)
		From 150 to 200	10 - 16 - 25	S275JR EN10025-2 (Fe430B)	S275JR EN10025-2 (Fe430B)
8.2	Spring Washer			1.4401 EN10088-3 (AISI316)	1.4401 EN10088-3 (AISI316)
13	Main Seal			EPDM (85Sh A)	EPDM (85Sh A)
14	Diaphragm			NYLON-reinforced EPDM	NYLON-reinforced EPDM
23.1	V-Port			1.4301 EN10088-3 (AISI304)	1.4401 EN10088-3 (AISI316)
40	Spring			1.4310 EN10270-3 (AISI302)	1.4310 EN10270-3 (AISI302)
41	Self-Locking nut			A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
50	Cover Bolts			A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
60	Seat Ring Bolts	150 - 200	10 - 16 - 25	A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
61	Retaining ring bolts			A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
70	Cover washers			A2-70 EN ISO3506-1	A4-70 EN ISO3506-1
111 112 - 113	O-Ring			EPDM	EPDM

All parts subject to corrosion are protected by epoxy powder coating with a minimum thickness of 250 micron

TIS LINE

DIMENSIONS AND WEIGHTS



M2000

DN	K			D			n-ød			L	L (FLOW CONTROL FUNCTION)	H	W	WEIGHT (KG*)
	PN10	PN16	PN25	PN10	PN16	PN25	PN10	PN16	PN25					
50	125	125	125	165	165	165	4-19	4-19	4-19	230	250	220	170	20
65	145	145	145	185	185	185	4-19	4-19	8-19	290	310	250	180	24
80	160	160	160	200	200	200	8-19	8-19	8-19	310	330	280	200	30
100	180	180	190	220	220	235	8-19	8-19	8-23	350	370	310	210	43
150	240	240	250	285	285	300	8-23	8-23	8-28	480	500	420	250	90
200	295	295	310	340	340	360	8-23	12-23	12-28	600	620	520	280	142

M3000

DN	K			D			n-ød			L	L (FLOW CONTROL FUNCTION)	H	W	WEIGHT (KG*)
	PN10	PN16	PN25	PN10	PN16	PN25	PN10	PN16	PN25					
50	125	125	125	165	165	165	4-19	4-19	4-19	230	250	220	170	20
65	145	145	145	185	185	185	4-19	4-19	8-19	290	310	250	180	24
80	160	160	160	200	200	200	8-19	8-19	8-19	310	330	280	200	30
100	180	180	190	220	220	235	8-19	8-19	8-23	350	370	310	210	43
125	210	210	220	250	250	270	8-19	8-19	8-28	400	420	380	230	48
150	240	240	250	285	285	300	8-23	8-23	8-28	480	500	420	250	70
200	295	295	310	340	340	360	8-23	12-23	12-28	600	620	520	280	118
250	350	355	370	405	405	425	12-23	12-28	12-31	730	750	600	300	173
300	400	410	430	460	460	485	12-23	12-28	16-31	850	870	740	340	280
350	515	470	490	520	520	555	16-23	16-28	16-34	980	1000	800	380	510
400	515	525	550	565	580	620	16-28	16-31	16-37	1100	1130	810	390	550
500	620	650	660	670	715	730	20-28	20-34	20-37	1250	1270	890	460	873
600	725	770	770	780	840	845	20-31	20-37	20-41	1450	1480	970	540	1400
700	840	840	875	895	910	960	24-31	24-37	24-44	1650	1680	1250	730	2400
800	950	950	/	1015	1025	/	24-34	24-41	/	1850	1880	1250	730	2600
900	1050	1050	/	1115	1125	/	28-34	28-41	/	2050	2080	1250	730	2900
1000	1160	1170	/	1230	1255	/	28-37	28-44	/	2250	2290	1360	820	4500
1200	1380	1390	/	1455	1485	/	32-41	32-44	/	2250	2290	1360	820	4900

*indicative weight (related to face to face of the STD valve "L") related to PN25 up to DN600 and to PN16 for larger sizes

M3000 PRESSURE DROP

Pressure drop of automatic control valves can be evaluated by using below equation:

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

Where:

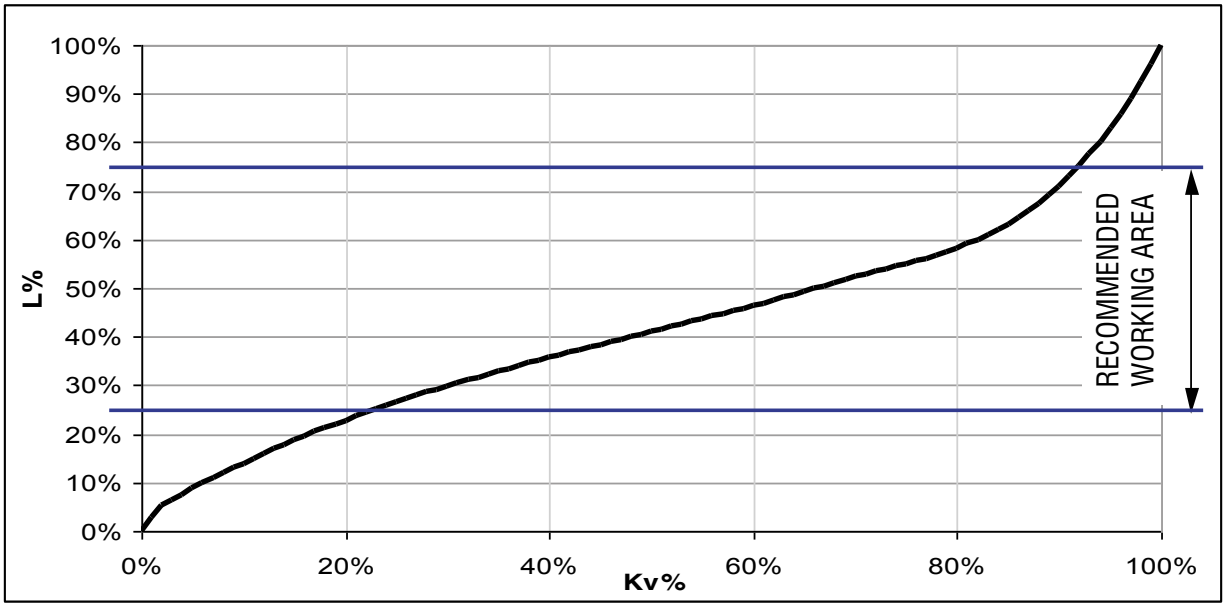
- ΔP = pressure drop [bar]
- K_{VS} = flow coefficient [m³/h]
- Q = flow rate [m³/h]

K_{VS} flow coefficient indicates 20°C water flow rate [m³/h], through the fully open valve, that induces 1bar pressure drop.

M3000 HYDRAULIC SPECIFICATIONS

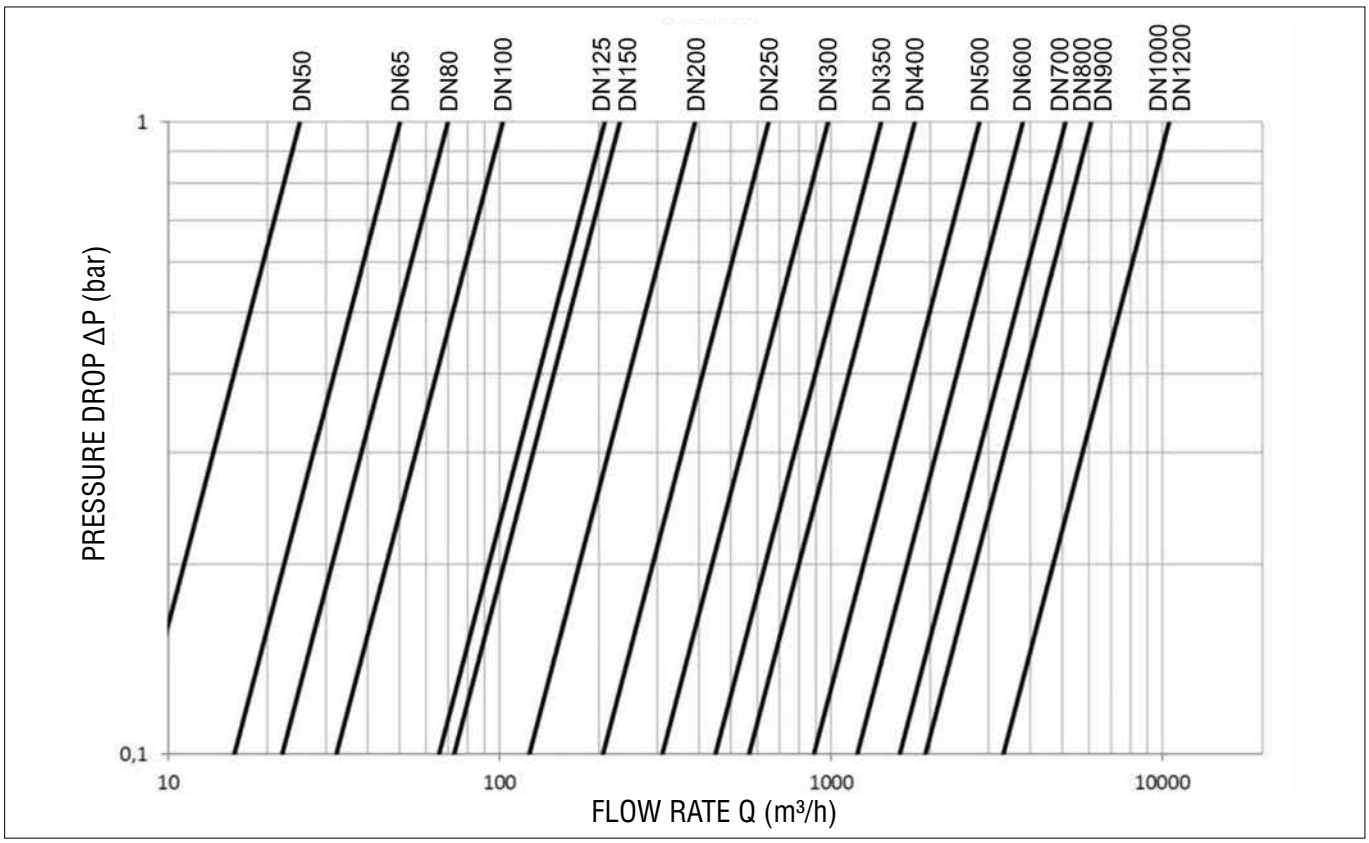
DN	50	65	80	100	150	200
Kvs [m³/h]	44	68	94	160	350	590
Lift [mm]	15	18	20	25	39	50

LIFT-KV DIAGRAM



Flow coefficient at L% opening	Kv = Kv% * Kvs
Flow coefficient at 100% open valve	Kvs
Kv%	From the above diagram: Kv% - L%

M3000 PRESSURE DROP DIAGRAM (VALVE 100% OPEN)



M3000 RECOMMENDED FLOW RATE

DN	ADVISABLE		IRRIGATION FIRE PROTECTION		MAX ALLOWED	
	l/s	m³/h	l/s	m³/h	l/s	m³/h
50	4,4	15,8	5,6	20,4	8,8	31,7
65	10,5	37,6	13,4	48,4	20,9	75,3
80	11,6	41,8	14,9	53,8	23,2	83,6
100	17,6	63,3	22,6	81,4	35,2	126,7
125	35	128,6	45,9	165	71,4	257
150	43	155	55,2	199	86	309
200	62	223	80	286	125	445
250	172	619	220	795	345	1237
300	247	891	318	1145	495	1781
350	340	1212	433	1559	675	2425
400	440	1583	565	2036	880	3167
500	687	2474	885	3181	1374	4948
600	990	3563	1272	4580	1979	7125
700	1347	4849	1730	6250	2700	9700
800 - 900	1759	6333	2260	8143	3520	12667
1000 - 1200	2750	9900	3534	12723	5498	19792

The tables can be used for preliminary selection of the nominal valve diameter. The appropriate DN will be calculated using the sizing software developed by T.I.S. Please contact us with the required operating conditions of the valve. Above data are valid for valves with standard plug (without V-port).

M2000 PRESSURE DROP

Pressure drop of automatic control valves can be evaluated by using below equation:

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

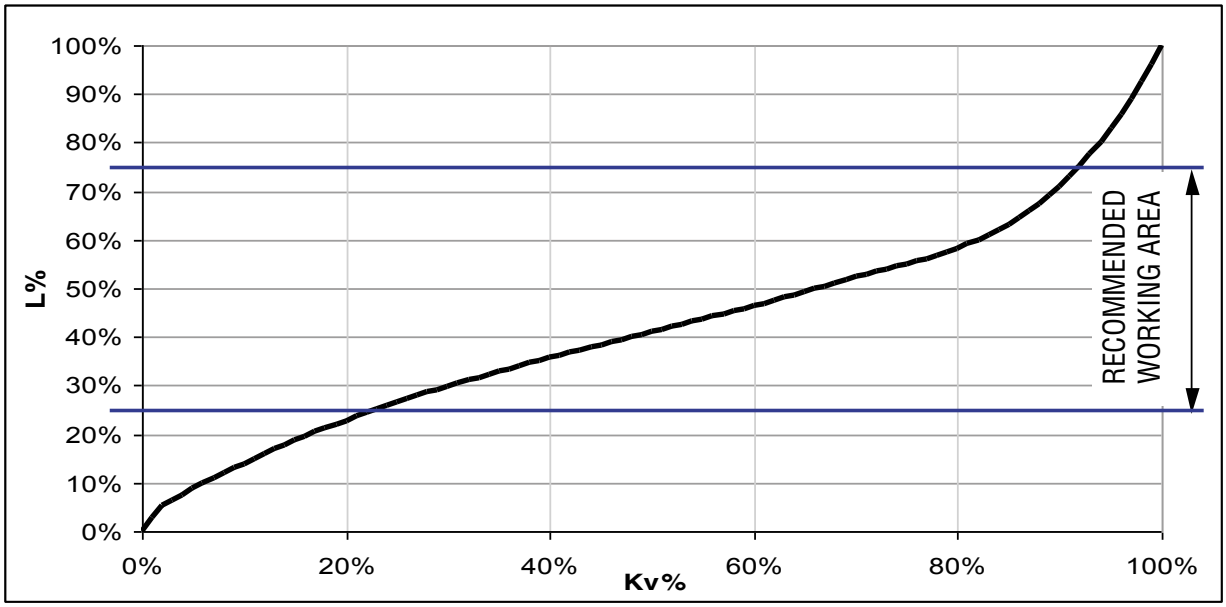
Where:
- ΔP = pressure drop [bar]
- K_{VS} = flow coefficient [m³/h]
- Q = flow rate [m³/h]

K_{VS} flow coefficient indicates 20°C water flow rate [m³/h], through the fully open valve, that induces 1bar pressure drop.

M2000 HYDRAULIC SPECIFICATIONS

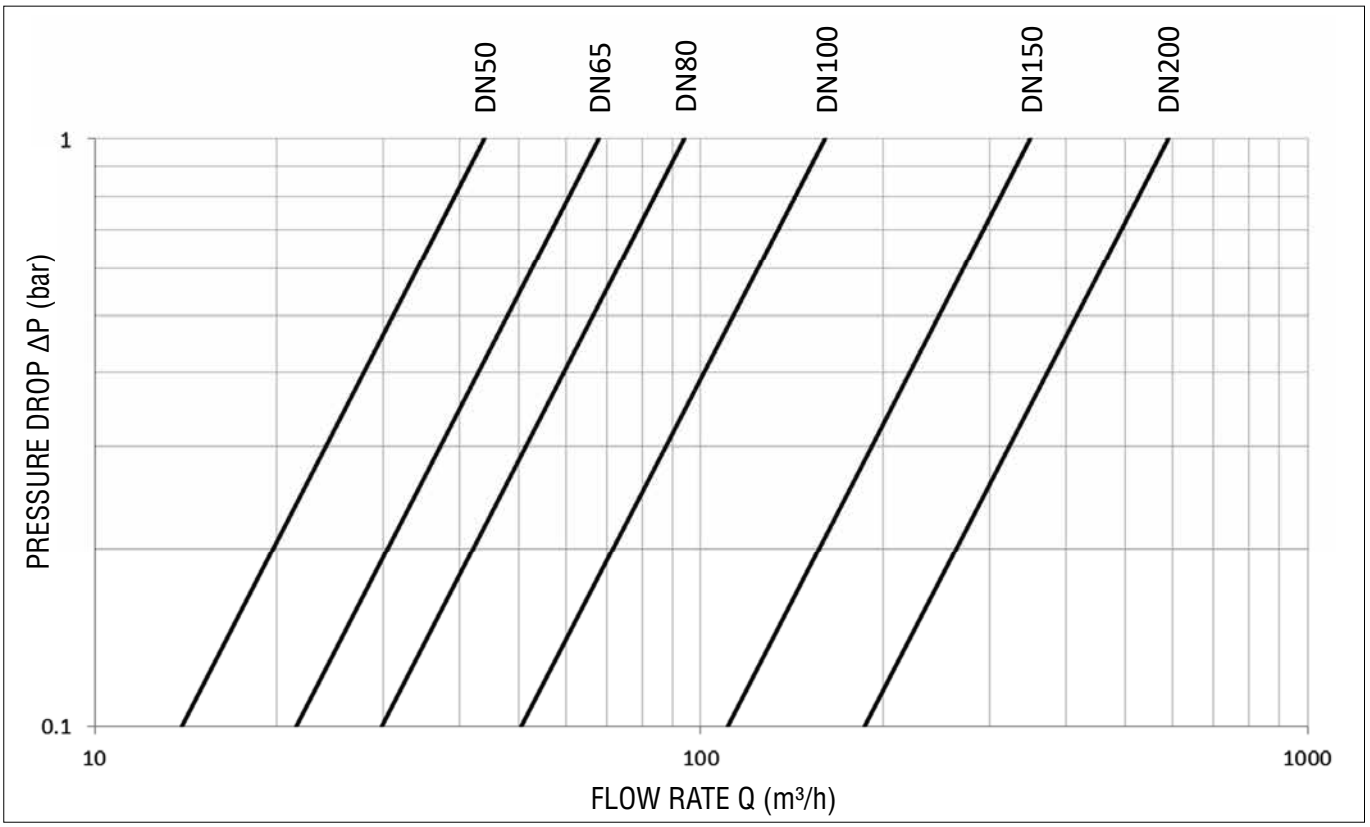
DN	50	65	80	100	150	200
Kvs [m³/h]	44	68	94	160	350	590
Lift [mm]	15	18	20	25	39	50

LIFT-KV DIAGRAM



Flow coefficient at L% opening	$K_V = K_V\% * K_{VS}$
Flow coefficient at 100% open valve	K_{VS}
$K_V\%$	From the above diagram: $K_V\%$ - L%

M2000 PRESSURE DROP DIAGRAM (VALVE 100% OPEN)



M2000 RECOMMENDED FLOW RATE

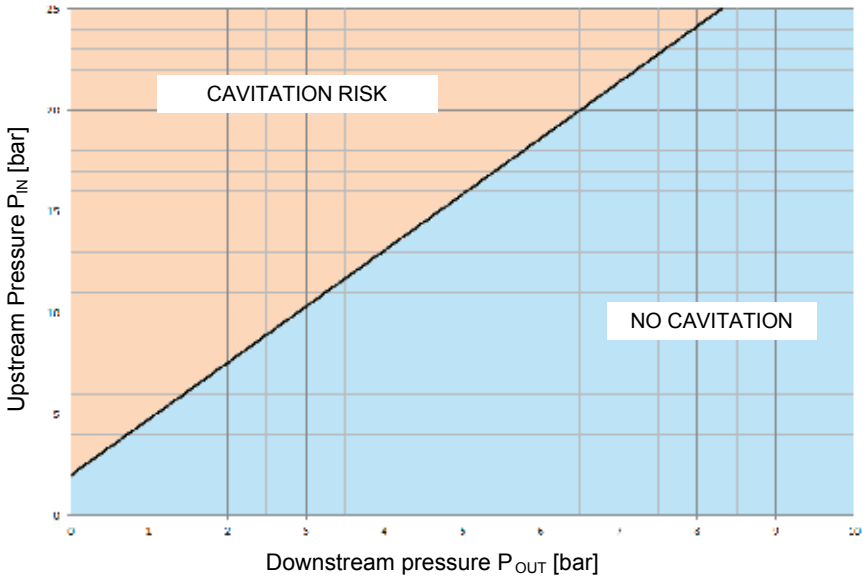
DN	ADVISABLE		IRRIGATION FIRE PROTECTION		ALLOWED MAX	
	l/s	m³/h	l/s	m³/h	l/s	m³/h
50	6,9	24,7	8,8	31,8	13,7	49,5
65	11,6	41,8	14,9	53,8	23,2	83,6
80	17,6	63,3	22,6	81,4	35,2	126,7
100	27,5	99,0	35,3	127	55,0	198
150	61,9	223	79,5	286	123,7	445
200	110,0	396	141,4	509	219,9	792

The tables can be used for preliminary selection of the nominal valve diameter. The appropriate DN will be calculated using the sizing software developed by T.I.S Nuoval. Please contact us with the required operating conditions of the valve. Above data are valid for valves with standard plug (without V-port).

CAVITATION

The stream velocity is not constant through the valve and reaches the higher values close to the valve seat (vena contracta). This produces a significant local reduction of the pressure. The higher the valve pressure drop ΔP, the higher the local stream velocity, the lower the local pressure. If, due to high valve pressure drop, the pressure in the vena contracta pressure is reduced down to the vapor pressure, small bubbles of vapour develop. Downstream the vena contracta, the pressure increases again and the steam bubbles rapidly implode, dissipating high rates of energy and generating strong pressure waves. Pressure waves produce intense surficial stress on the valve. Pressure drop must therefore be contained in order to avoid noise and erosion of the valve.
The valve operating conditions can be preliminary checked by using the cavitation diagram below. The valve shall not continuously operate under cavitation risk.
It can be accepted that the valve operates under light cavitation conditions for short periods.

CAVITATION RISK



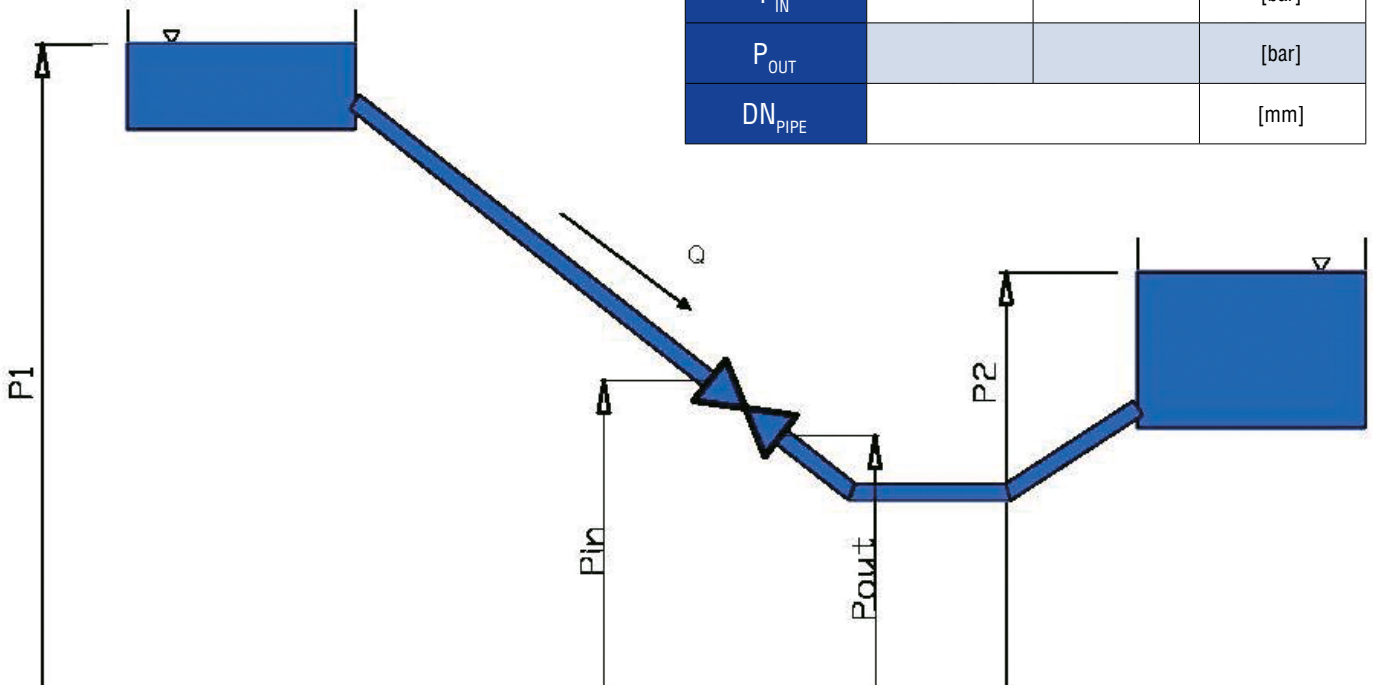
Cavitation diagram refers to 40% open valves. When the opening degrees of the valve significantly differs from this value, we recommend to verify the actual cavitation conditions by using the software specifically developed by T.I.S. Please contact us providing valve's required operating conditions.

M3000 and M2000 automatic control valves shall operate within the following limits. Should deviations occur, please, contact the manufacturer.

Valve min pressure drop	0.3 [bar]
Valve max pressure drop	See above cavitation diagram
Min inlet pressure	0.5 [bar]
Recommended opening degree for modulating valves: Recommended opening degree for on-off valves:	M3000: 15% ≤ L% ≤ 75% M2000: 20% ≤ L% ≤ 75% L% = 0-100%

VALVE SIZING DATA

DATA TABLE FOR VALVE SIZING			
	Qmax	Qmin	
Q			[m³/h]
P_{IN}			[bar]
P_{OUT}			[bar]
DN_{PIPE}			[mm]



Q = Flow rate (maximum & minimum).
P_{IN} = The pressure at minimum / maximum flow measured at the valve upstream flange.
P_{OUT} = The pressure at minimum / maximum flow measured at the valve downstream flange.

For adequate valve analysis, T.I.S. use a special sizing software developed in our hydraulic laboratory (see example on the next pages). For this purpose, please contact us and provide the operating conditions of the valve. See the sizing data table above.

AUTOMATIC CONTROL VALVE SIZING EXAMPLE

Fill in “DATA TABLE FOR VALVE SIZING”(PAGE 46) :

DATA TABLE FOR VALVE SIZING			
	Qmax	Qmin	
Q	**65**	**36**	m³/h
P_{IN}	**6**	**8**	bar
P_{OUT}	**3**	**3**	bar
DN_{PIPE}	**100**		mm

EXAMPLE

Red data are an example of sizing.

WATERWORKS APPLICATION

Preliminary selection of the valve DN.

From the table “M3000 RECOMMENDED FLOW RATE” (PAGE 42), in correspondence of the advisable flow column, can be seen that the appropriate diameter for the maximum flow rate of 65 m3/h is DN100.

M3000 RECOMMENDED FLOW RATE

DN	ADVISABLE		IRRIGATION FIRE PROTECTION	
	l/s	m³/h	l/s	m³/h
50	4,4	15,8	5,6	20,4
65	10,5	37,6	13,4	48,4
80	11,6	41,8	14,9	53,8
100	17,6	63,3	22,6	81,4
125	35,7	128,6	45,9	165

From the table M3000 “HYDRAULIC SPECIFICATIONS” (PAGE 41) can be seen that this valve has a flow coefficient, with fully open obturator, Kvs=102 m³/h.

M3000 HYDRAULIC SPECIFICATIONS

DN	50	65	80	100	125	150	200	250	300	350
Kvs [m³/h]	28	50	70	102	208	230	390	650	980	1420
Lift [mm]	12	19,5	20,5	23,5	38	38	45	58	63	73

Minimum and maximum opening degree calculation.

Kv = Q / √(PIN-POUT)

Kv_{Qmax} = 65 / √(6-3) = 37.5 m³/h (at MAX flow rate “Q_{max}”) which corresponds to

Kv% = K_V/K_{VS} = 37.5 / 102 = 0.36 (36%)

Kv_{Qmin} = 36 / √(8-3) = 16 m³/h (at MIN flow rate “Q_{min}”) which corresponds to

Kv% = K_V/K_{VS} = 16 / 102 = 0.15 (15%)

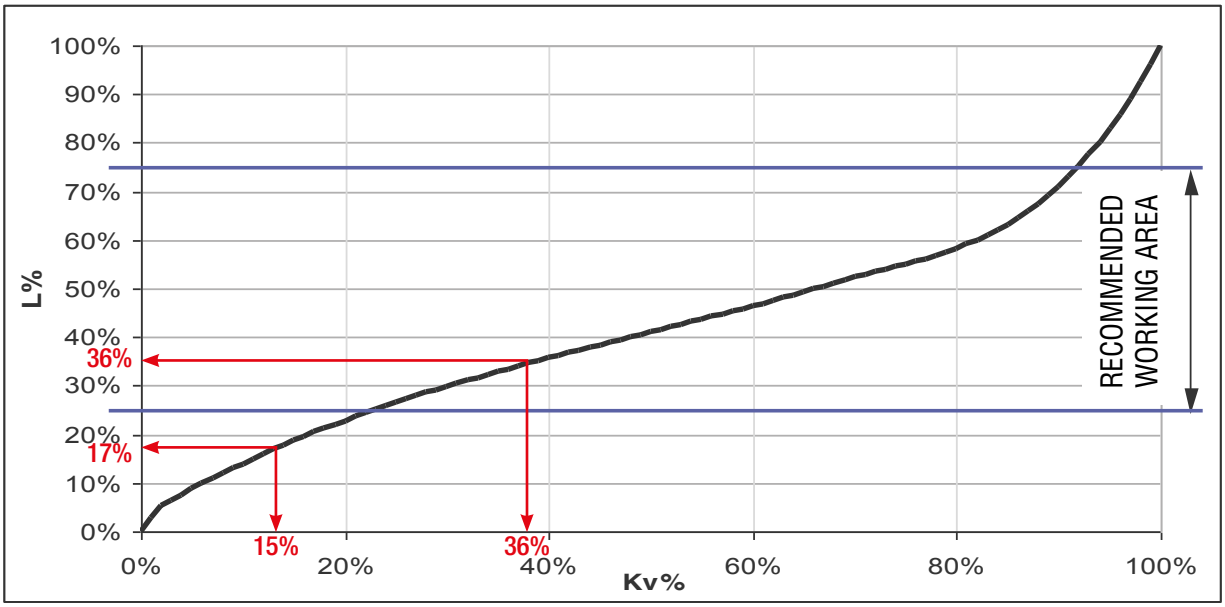
VALVE OPERATING LIMITS

From “LIFT-KV DIAGRAM” it can be seen that the degree of shutter opening at maximum and minimum flow rate is respectively:

$L\%(Q_{MAX}) = 36\%$

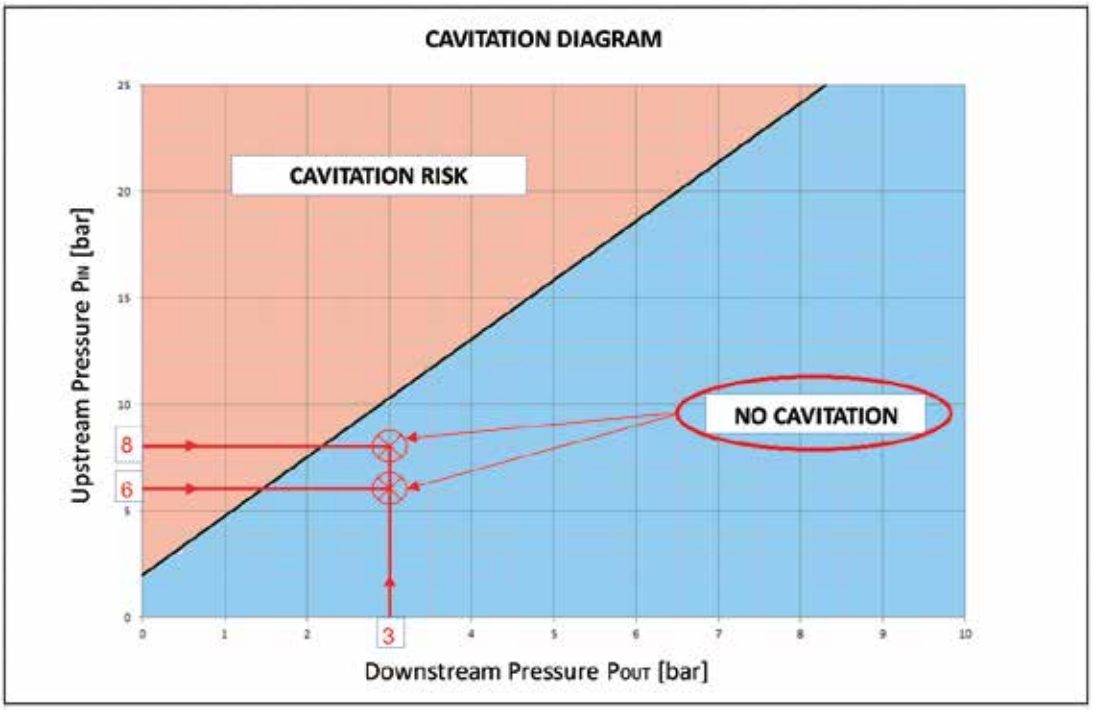
$L\%(Q_{MIN}) = 17\%$

The valve operates between 17% and 36% of opening degree.



CAVITATION CHECK

The “CAVITATION DIAGRAM” shows that the valve operates outside the cavitation zone.



AUTOMATIC CONTROL VALVES SIZING SOFTWARE

A dedicated software provides accurate sizing of automatic valves according to the relevant conditions.
The cavitation analysis is calculated according the real range opening of the valve's shutter.
Before the order, please provide operating conditions to carry out specific analysis of valve performance.

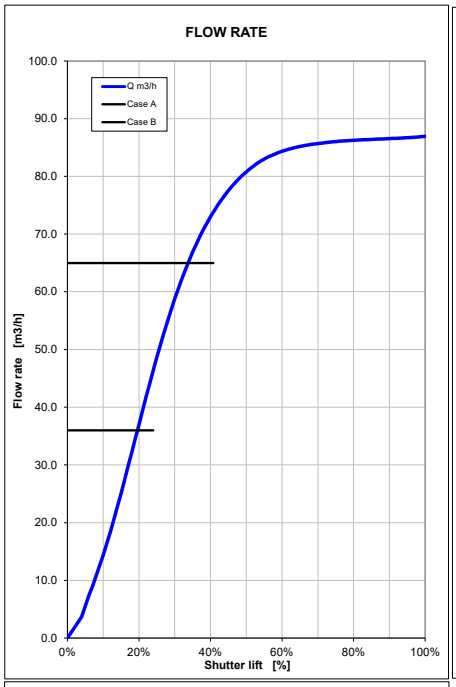
AUTOMATIC CONTROL VALVE serie 2000 - 3000: flow analysis and cavitation control
MODULATING VALVE
Upstream-downstream reservoirs at constant level

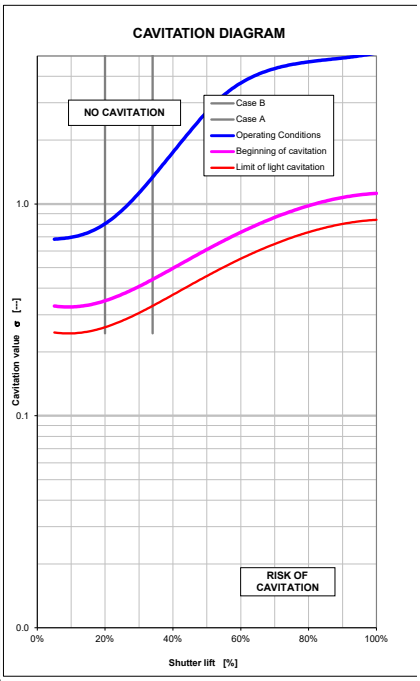
Rev 3.6

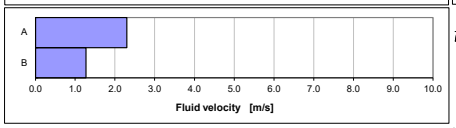
Description		SIZING			
Valve specifications		M1000			
Valve size		300			(C)
Obturator		Standard			
Shutter max stroke	L100%	23.6		[mm]	
PN		16		OK	
Valve description		PRESSURE REDUCING V. STANDARD DISK			
Static pressures		A	B		
Flow rate	Q	65.0	36.0	m3/h	
		65.0	36.0	[m3/h]	
Upstream press. (dynamic)	Pin	60.0	80.00	[m]	
Downstream press. (dynamic)	Pout	30.0	30.00	[m]	
Flow velocity	v	2.30	1.27	[m/s]	
Flow coefficient (%)	Kv%	36%	15%	[%]	
Approx. valve opening	L%	**36%**	**17%**	[%]	
	L	8.0	4.7	[mm]	
Valve pressure drops (valve 100% open)					
Flow coeff.	Kvs	102.0		[m3/h]	
P drop coeff. (100% open)	ξ_v100%	15.08		[---]	
Valve P. drop (100% open)	ΔP100%	4.06	1.25	[m]	
Upstream pipe	ζin	107.1	OK	[--]	
Downstream pipe	ζout	0.0	OK	[--]	

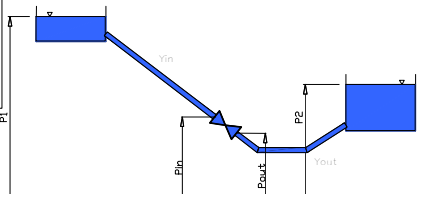
Calibrated orifice (ISO 5167)	-->	***NO***	
Internal valve diameter	D	100.0	[mm]
Orifice diameter	d	78.0	[mm]
Diameter ratio	b = d/D	0.780	[--] OK
Reynolds	Re	1.53E+05	8.49E+04 [---]
Flow rate factor	C	0.00	0.000 [--]
Orifice pressure head	DH	0.000	0.000 [bar]
Flow coefficient	Cq	0.00	0.00 [---]
Orifice flow coeff.	csi_di	0.00	[--]

Drilled plate	-->	NO	
Internal valve diameter	D	100.0	[mm]
Number of holes	Nh	1	[mm]
Hole diameter	d	43.0	[mm]
Area ratio	f	0.185	[--]
Drilled plate Pdrop coeff.	csi_di	0.00	
Drilled plate flow coeff.	DP_di	0.00	0.00 [bar]









Note:
Pressure drop ΔP = (Q/Kvs)^2
Pressure drop in bar; Flow rate in m3/h

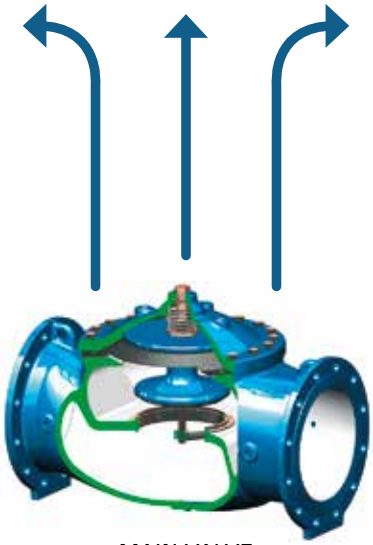
MAIN FUNCTIONS

M3200
PRESSURE SUSTAINING / RELIEF VALVE

M3100
PRESSURE REDUCING VALVE

M3400
FLOW CONTROL VALVE

M3500
MODULATING FLOAT CONTROLLED
CONSTANT LEVEL VALVE



MAIN VALVE

M3700 / M3701
SOLENOID CONTROLLED
ON-OFF VALVE

M3800
ALTITUDE VALVE ONE-WAY FLOW

M3900
EXCESS FLOW VALVE

M3770 / M3771
SOLENOID CONTROLLED / ELECTRICALLY
OPERATED “STEP BY STEP”

ACCESSORIES

V-PORT

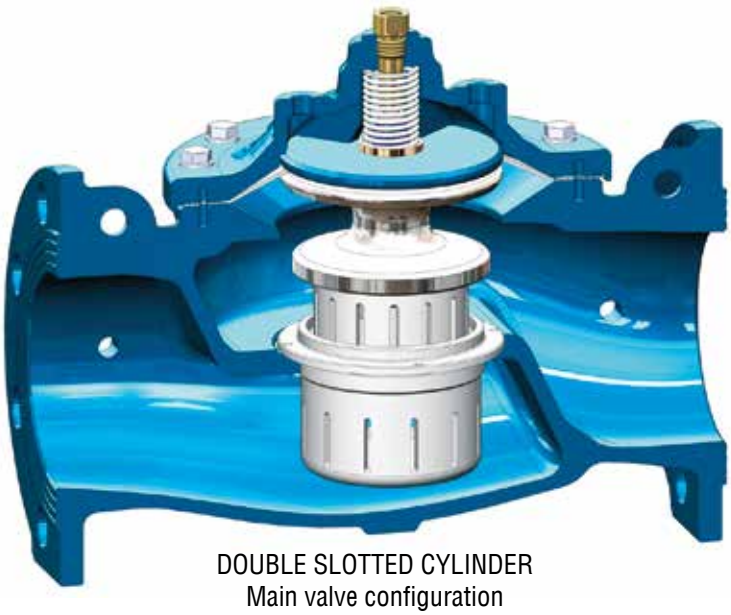
Many applications of automatic control valves are used in distribution networks, or in tourist facilities (e.g. camping, hotels, resorts), where an high range of flow rate is required due to the presence of elevated number of guests. In cases like this, the valve can be equipped with a V-PORT device, avoiding the use of a bypass valve to manage low flow rate demands.

V-PORT
Main valve configuration

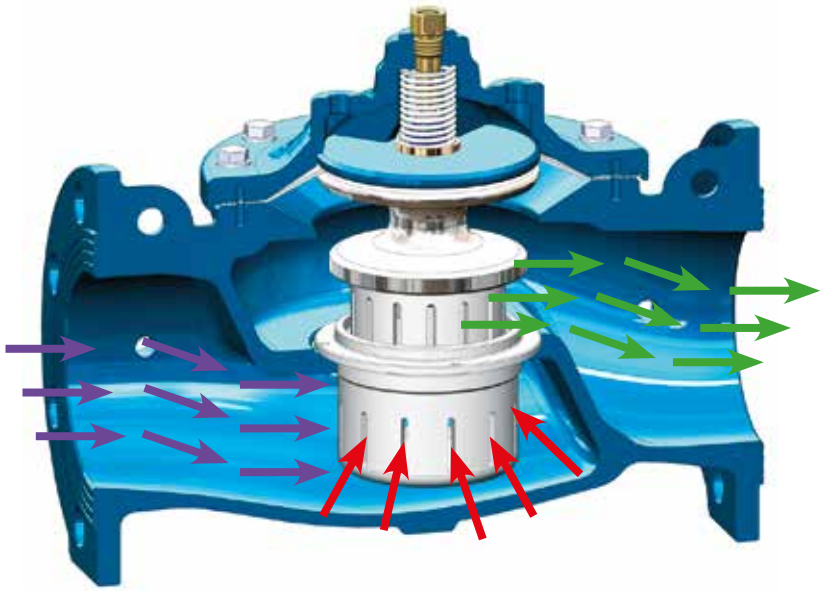
DOUBLE SLOTTED CYLINDER (DSC)

In the presence of high loads to be dissipated and in situations where the main valve with standard parabolic obturator is subjected to cavitation, it is possible to equip the valve itself, in its interior, with a double stain-less steel slotted cylinder where, through the specially designed slots, the flow is divided into radial flow jets, colliding with each other at the center of the valve, thus allowing to dissipate this energy. This accessory allows to obtain a curve of dissipation of energy which is adjusted to the actual working conditions of the val-ve, according to the actual needs of plant. This accessory allows to achieve an energy dissipation curve which is adjusted to the real working conditions of the valve, according to the plant's effective requirements.

A significant noise reduction is achieved with the use of the DSC.

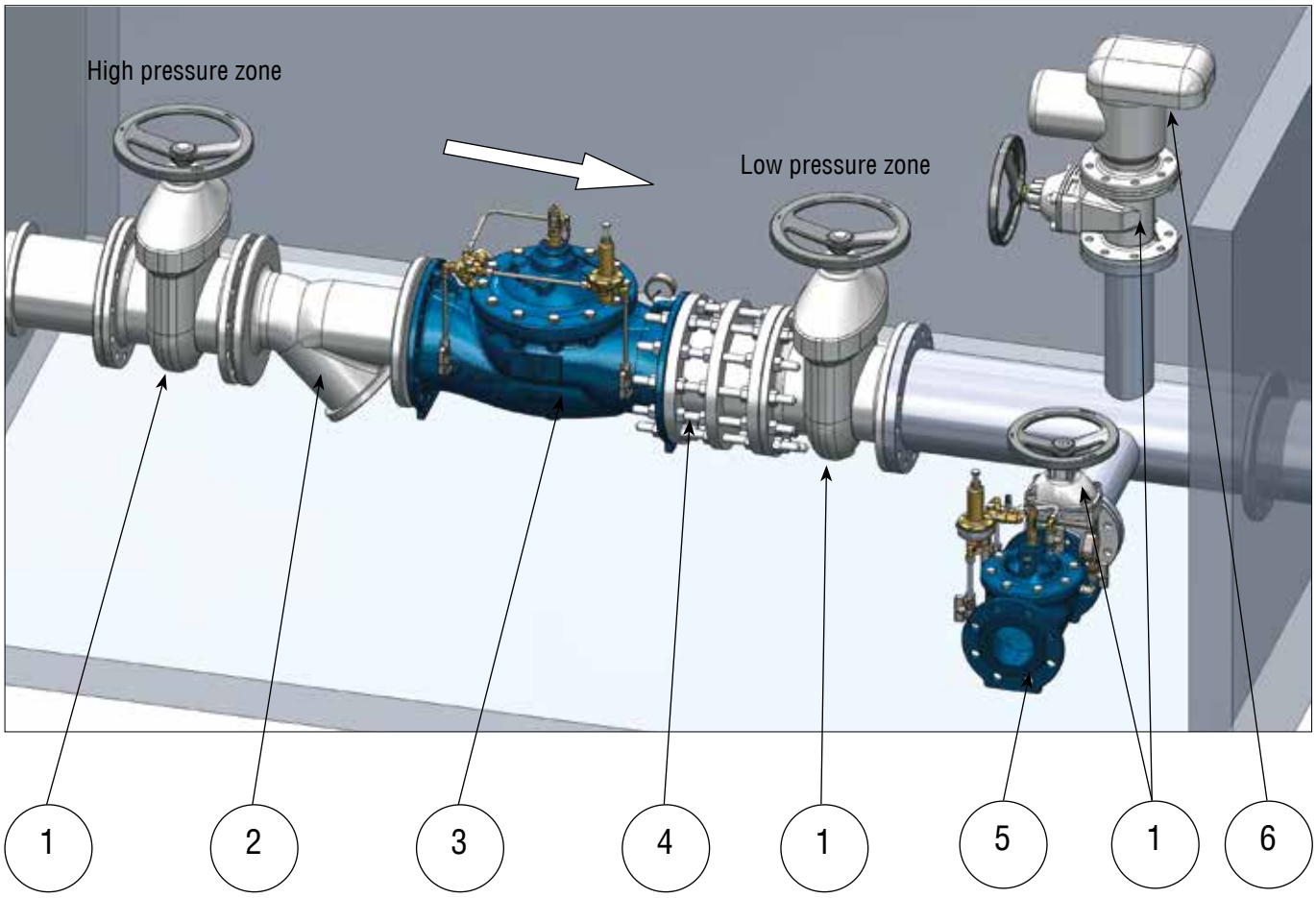


DOUBLE SLOTTED CYLINDER
Main valve configuration



INSTALLATION LAYOUT

Below an example of installation with a control valve. This ensures extended operating life and correct operation of the valve, reducing the probability of damage or operating faults.



1 ISOLATING GATE VALVE;

2 “Y” STRAINER;

3 AUTOMATIC CONTROL VALVE (PRESSURE REDUCING VALVE);

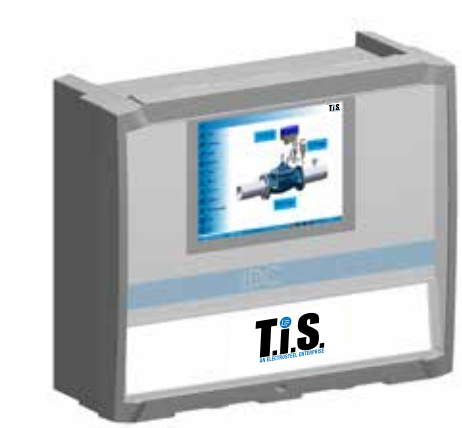
4 DISMANTLING JOINT;

5 AUTOMATIC CONTROL VALVE (PRESSURE RELIEF VALVE);

6 AIR RELEASE VALVE (TRIPLE FUNCTIONS)

It remains at the customer’s discretion to create a by-pass line to the valve to ensure water service even in the event of maintenance or failure of the main line valve. By-pass installation is strongly recommended.

IDC • SMART AND COMPACT MICROCONTROLLER



T.I.S. IDC is the compact, smart and flexible microcontroller, available with integrated cloud connectivity: controlling and viewing the application just got easier.

T.I.S. IDC is designed to manage automatic diaphragm/piston control valves and needle (plunger) valves, with an open, modular system and with pre-loaded applications for the main control functions which can be customized by the end user.

The range of applications that can be created with T.I.S. IDC becomes more versatile than ever. The VPN connection for remote desktop/webserver and debug/program update is integrated via pre-installed software service.

T.I.S. IDC allows to send alarms via email or SMS, such as flood signals, threshold exceedances, etc. The functions can be various and configurable according to needs.

Valve control is finally open and based on curves or set-points that can be configured in a simple and intuitive way. The multiple PID type regulators with self-tuning allow accurate positioning of the actuators and digital outputs (controls on solenoid valves).

The operating logic is created with intuitive IEC 61131-3 standard languages:
“Function Block Diagram” (FBD) or “Ladder Diagram” (LAD).
The availability of multiple analog and digital inputs allows for maximum adaptability of T.I.S. IDC to various regulation applications.

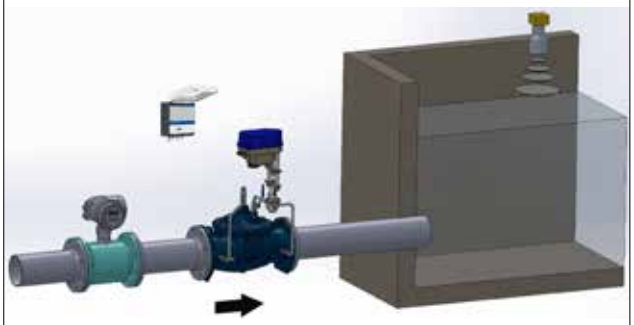
The microcontroller is contained within a sturdy ABS box for wall installation, IP68 certified for immersion at 1.2m (2h), NEMA 3 and it can be available in two versions:

- STANDARD VERSION. The controller is powered by the mains electricity supply;

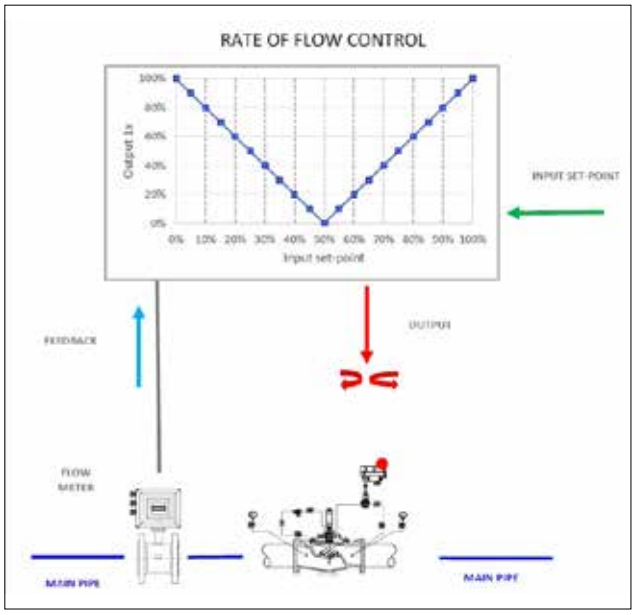
- SELF-POWERED VERSION. The power supply is made by a battery pack (with a capacity of 9-45Ah) which is charged by a miniturbine usually installed in the pipe or in the automatic valves circuit.

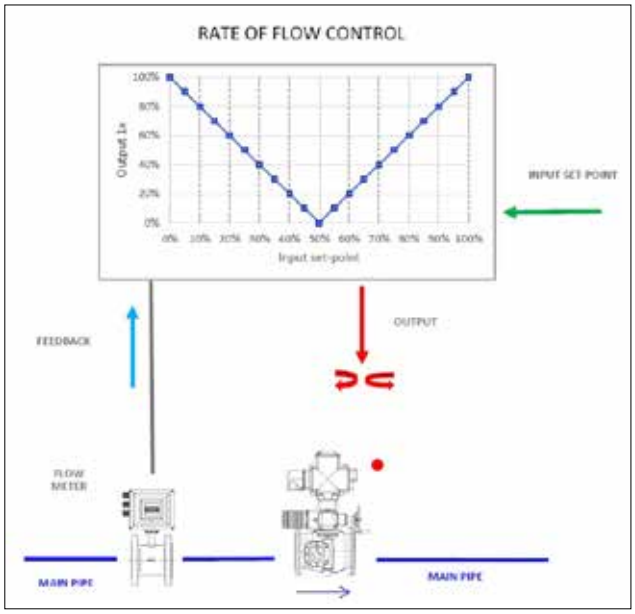
INSTALLATION EXAMPLE

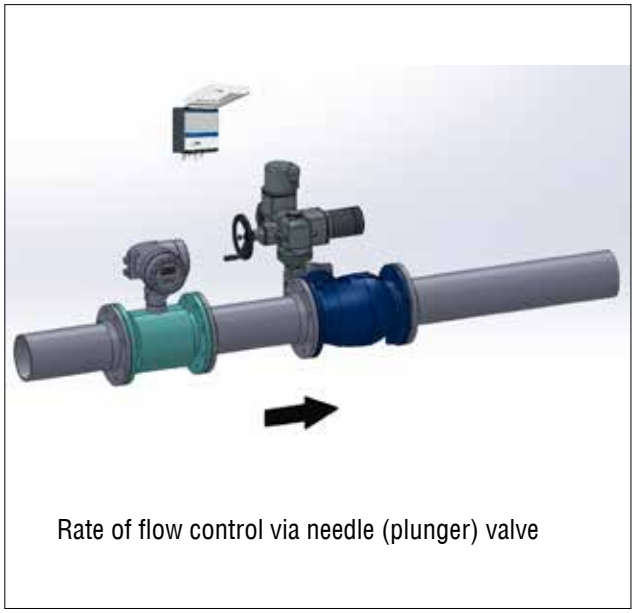
- RATE OF FLOW CONTROL;
- RATE OF FLOW CONTROL BASED ON SUPPLIED TANK LEVEL;
- BLENDING;
- PRESSURE CONTROL;
- PRESSURE CONTROL BASED ON SUPPLIED TANK LEVEL;
- OPENING DEGREE REGULATION.



Rate of flow control according to tank level
via automatic control valve.





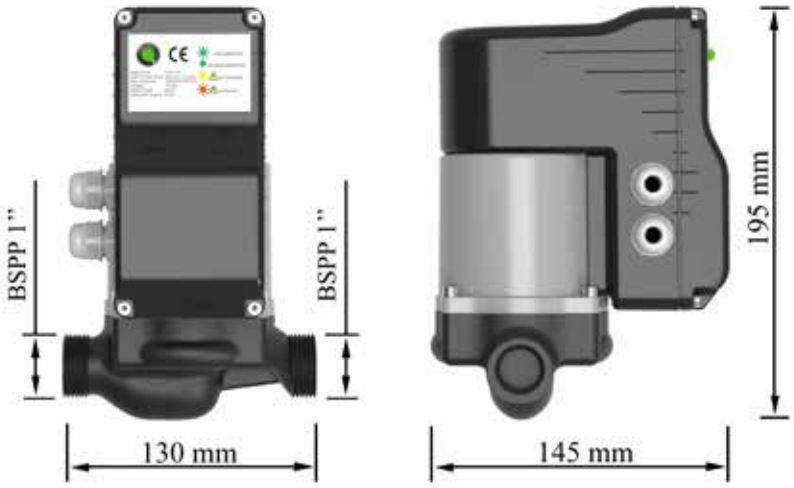


Rate of flow control via needle (plunger) valve

TECHNICAL SPECIFICATIONS

Power supply	12-24 VDC ±15% - galvanic isolation 2.5kV Consumption 7.5 Watt/VA (HMI) - 6.5 Watt/VA (Router) 3V lithium battery for BIOS and system clock
Display	4.3" TFT touch screen LCD display, resolution 480x272 pixels - 16:9 format, 260k colours (16 bit), 280 cd/m2, typical lighting duration 20000h @ 25°C, integrated 4-wire resistive touch
Environmental conditions	Enclosure protection rating IP68 Temperature range 0 .. 50°C
Digital Inputs/Outputs	8 configurable and expandable digital inputs 8 relay outputs x 6 A each, extractable and individually replaceable
Analog Inputs/Outputs	4 universal analog inputs RTD/4..20mA/0..10V configurable and expandable 2 configurable and expandable analogue outputs 4..20mA/0..10V
Memory	eMMC 2 GB / RAM 512 MB DDR3
Main features	HMI Embedded Compact Real-Time clock with Back-up battery Configurable data logging from 1s and log files Portal VPN - Remote Control and Assistance tool Freely programmable alarms or actions on events Unlimited number of control curves Configurable unit with multiple decimal points Analogue outputs with adjustable ramp Input signal filtering Input for totalizer Configuration curves Manoeuvring auxiliaries for emergency manual controls (optional)
Control parameters	PI(D) regulators with configurable control parameters Freely configurable control ramps Password protected multi-user access
Communication	1 x Industrial Ethernet Port 10 / 100 Mbit/s 1x RS485 / CAN opto isolated 1 x USB 2.0 Integrated VPN/WEB Server 1 Industrial WiFi Router – GSM/GPRS 4G LTE (cat.4), 3G, 2G (optional) 1 4G GSM antenna (optional) 1 WiFi antenna (optional) Cloud communication via optional 4G network (optional)
Safety certifications and standards	HMI UL 61010-1, 3rd Edition, May 11, 2012, Revised April 29 2016, CAN/CSA-C22.2 No. 61010-1-12, 3rd Edition, Revision dated April 29 2016 Routers - EN IEC 62311:2020, EN 50665:2017, EN IEC 62368-1:2020+A11:2020, IEC 62368-1:2018

SELF-POWERED VERSION ACCESSORY: MINI-TURBINE FOR BATTERY PACK CHARGING



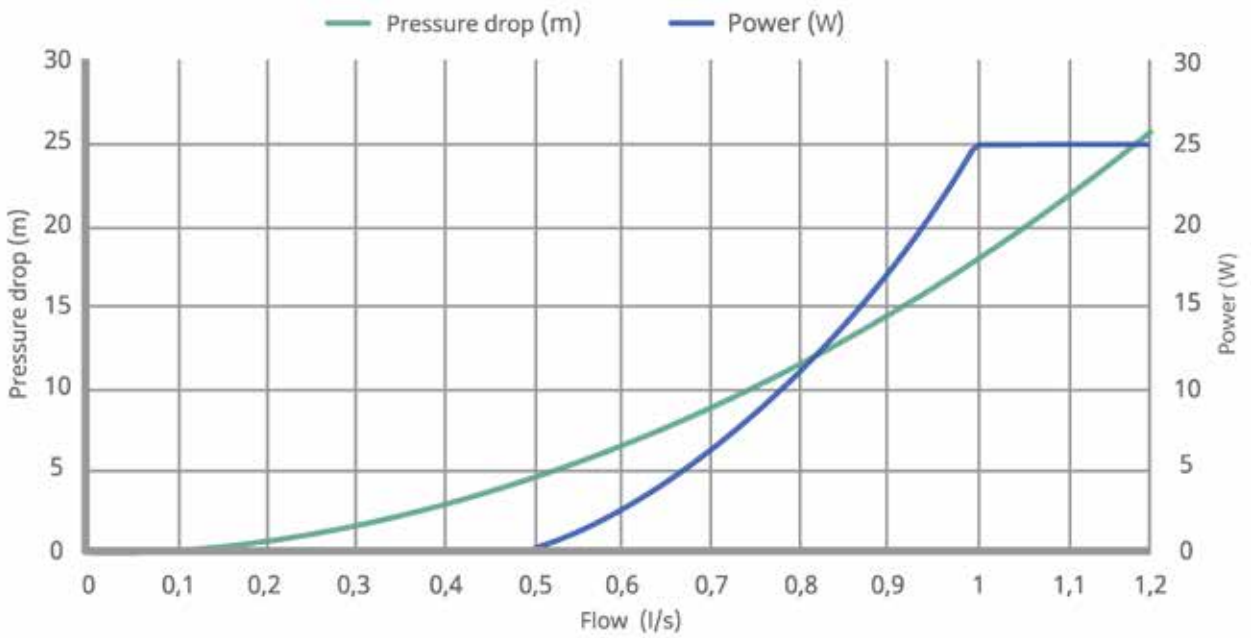
ELECTRICAL SPECIFICATIONS

Generator type	Brushless
Nominal output voltage	12 V
Maximum output current	2 A
Maximum output power	25 W
Allowed batteries	Lead-acid Sealed
Allowed batteries capacity	9-45 Ah
Output control	Output for EV control latch type of 2 wires
Status signalling	Built in status led light. Status digital output (1), free potential transistor output (suitabie for PLC or datalogger inputs)
Minimum voltage of battery V1	10,5 V
Timed ignition voltage V2	12,5 V
Instant ignition voltage V3	12,3 V
Minimum full-charged voltage V4min	14,6 V
Minimum full-charged voltage V4max	15,0 V
Minimum operation timing T1	20 minutes
Security timing T2 (timed ignition)	5 minutes

HYDRAULIC SPECIFICATIONS

Nominal pressure	10 bar (PN10)
Minimum Δ pressure inlet-outlet	0,45 bar
Maximum Δ pressure inlet-outlet	1,8 bar
Δ absolute maximum pressure inlet-outlet ΔPmax	2,0 bar
Minimum flow	0,50 litres/second
Maximum flow	0,95 litres/second
Absolute maximum flow Qmax	1,00 litres/second

MINI-TURBINE OPERATING RANGE CURVES



MECHANIC SPECIFICATIONS

Enclosure protection	IP68
Nominal pressure	10bar (PN10)
Inlet / outlet diameter and thread	15mm, BSPP 1"
Free passage of solids	Maximum 1 mm
Net weight	2,7 kg
Dimensions	130 x 145 x 195 mm

COMPONENTS MATERIALS

Hydraulic body	Cast steel
Impeller	Noryl
Rotor	AISI 316 Stainless steel
Gasket	EPDM
Shafts	Ceramic
Bearing	Fluid refrigerated ceramic

PROTECTIONS

Battery cut off (low battery protection)	10,5 V
Overvoltage	Electronic protection
Generation overload	Fuse #1 of 0,5 A
Overcurrent, short-circuit electrovalve	Fuse #2 of 2,5 A
Overcurrent, battery short-circuit	Fuse #3 of 3,0 A
Reduction of power due to heating	Depending on battery voltage and ambient temperature

ENVIRONMENT CONDITIONS

Working temperature	-20 °C to +60 °C (power reduction from 50°C)
Working humidity	10 % ~ 90 % non-condensation

216/42/CEE, 2004/108/CEE, 2011/65/CEE, EN 12100-1/2, EN 14121-1/2007

TILTING TYPE CHECK VALVE

DN200-DN1400 | PN10-PN16-PN25

DESIGN FEATURES

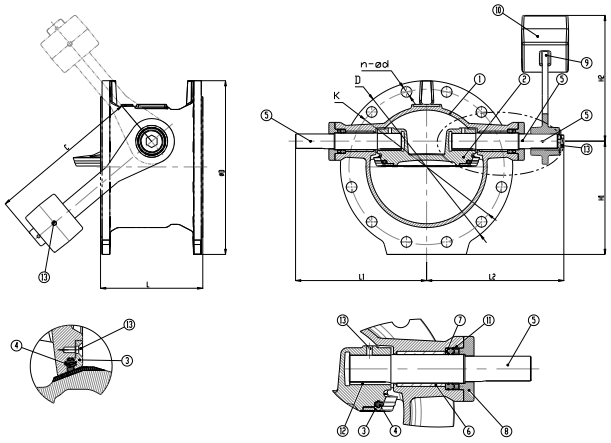
- According to EN 16767, EN 1074-3,
- Face to face dimension according to EN 558 series 14,
- Flange dimensions according to EN 1092-2;
- Body & DISC made of Ductile Iron EN GJS 400-15 according to EN 1563;
- Body seat ring welded on the body, made of stainless steel;
- Main disc sealing ring made of EPDM according to EN 681-1 WA;
- Shaft made of Stainless steel 1.4021 EN 10088-3 (AISI 420);
- Shaft supported by solid and maintenance-free bronze bearings
- Lever made of Ductile Iron EN GJS 400-15 according to EN 1563;
- All materials, including lubricants, in contact with water approved for human consumption according to EN 1074-1;
- Internal and external coated with fusion bonded epoxy, having thickness of minimum 250µm as per EN 14901;
- Hydraulic test according to EN 12266-1, IS 5312;
- Working temperature Min. 0°C (excluded frost) Max. + 70°C;

APPLICATIONS

- Supply, collection and distribution of drinking water
- Networks for collection and discharge of waste water and sewage systems *

* suitable with valves materials

COMPONENTS AND MATERIALS



	PART	MATERIALS
1	Body	Ductile Iron EN GJS400-15
1.1	Body Sealing Ring	Stainless Steel
2	Disc	Ductile Iron EN GJS 400-15
3	Retaining Ring	FBE Coated Steel S235JR
4	Sealing Ring	EPDM Rubber
5	Shaft	Stainless Steel AISI 420 (EN 1.4021)
6	Bearing Bush	Bronze
7	Seal Bush	Delrin
8	Cap	Ductile Iron EN-GJS 400-15
9	Lever	Ductile Iron EN-GJS 400-15
10	Weight	Cast Iron EN-GJL 250
11	O-Ring	EPDM Rubber
12	Key	Steel
13	Bolts And Setscrews	Stainless Steel A2-70

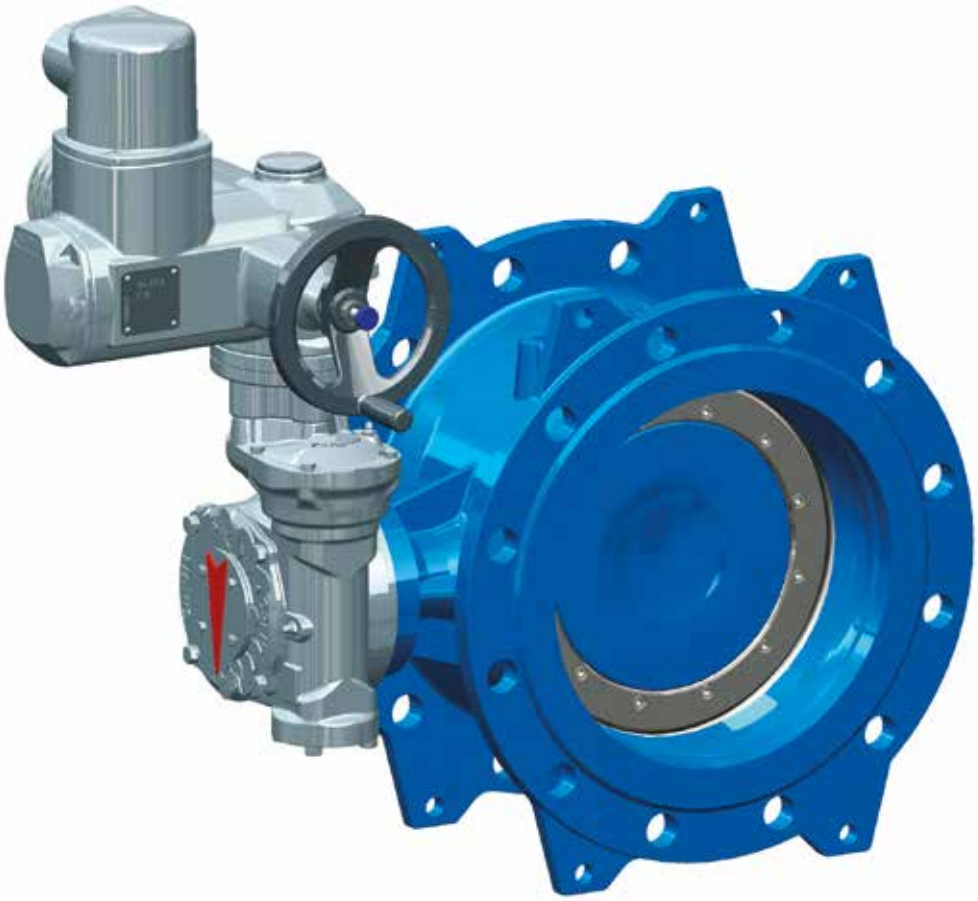
DIMENSIONS AND WEIGHTS

DN	K			D			n-ød			L	L1	L2	H1	H2	C	Weight (kg)
	PN10	PN16	PN25	PN10	PN16	PN25	PN10	PN16	PN25							
200	295	295	310	340	340	360	340	340	360	230	270	252	220	190	200	55
250	350	355	370	405	405	450	405	405	450	250	330	305	265	280	300	100
300	400	410	430	455	460	485	460	460	485	270	345	317	305	280	300	125
350	460	470	490	505	520	555	505	520	555	290	415	382	360	370	400	155
400	515	525	550	565	580	620	565	580	620	310	440	415	400	370	400	185
450	565	585	600	640	640	670	640	640	670	330	470	443	440	420	450	235
500	620	650	660	670	715	730	670	715	730	350	500	490	495	450	500	320
600	725	770	770	780	840	845	780	840	845	390	595	585	575	555	600	400
700	840	840	875	895	910	960	895	910	960	430	705	661	640	650	700	610
800	950	950	990	1015	1025	1085	1015	1025	1085	470	721	705	725	630	700	750
900	1050	1050	1090	1115	1125	1185	1115	1125	1185	510	820	830	795	830	800	980
1000	1160	1170	1210	1230	1255	1320	1230	1255	1320	550	855	830	890	755	850	1200
1200	1380	1390	1420	1455	1485	1530	1455	1485	1530	630	960	938	1055	1110	950	2170
1400	1590	1590	1640	1675	1685	1755	1675	1685	1755	710	1240	1210	1210	1295	1050	2950

ELECTROSTEEL

DOUBLE FLANGED DOUBLE ECCENTRIC BUTTERFLY VALVE

DOUBLE ECCENTRIC BUTTERFLY VALVE



Double flanged double eccentric butterfly valve is designed to be installed in the pipeline in order to shut off the flow. 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.

DOUBLE ECCENTRIC BUTTERFLY VALVE

DN200-DN2400 | PN10-PN16-PN25-PN40

DESIGN FEATURES

- Soft sealing according to EN 593, IS 13095;
- Face to face dimension according to EN 558 series 13 & 14;
- All materials, including lubricants, in contact with water approved for human consumption according to EN 1074-1;
- One-piece body & Disc made of Ductile Iron EN GJS 400-15 according to EN 1563 / IS 1865;
- Flange dimensions according to EN 1092-2, IS 9523;
- Screws, washers made of Stainless Steel A2-70 EN ISO3506-1 (AISI 304);
- Body seat ring welded on the body, made of stainless steel;
- Retainer ring is made of Stainless steel 1.4301 EN 10088-3 (AISI 304);
- Shaft and disc polygon coupling “P3G” type according to DIN 32711; Shaft made of AISI 420.
- Main disc sealing ring made of EPDM according to EN 681-1 WA / IS 638;
- Shaft supported by solid and maintenance-free BRASS bearings bush;
- Internal and external coated with fusion bonded epoxy, having thickness of minimum 250µm as per EN 14901;
- Hydraulic test according to EN 12266-1 / IS 13095;
- Tight in both flow directions, rate A according to EN 12266-1 (zero leakage);
- Gearbox with self-locking worm gear including mechanical position indicator;
- Gearbox suitable for coupling with actuator according to ISO 5210 top flange.
- Working temperature Min. 0°C (excluded frost) Max. + 70°C.

HIGH CORROSION-RESISTANT MATERIALS

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

- Retaining ring made of stainless steel 1.4401 EN 10088-3 (AISI 316) 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 (AISI 316), DUPLEX or SUPERDUPLEX;

OTHER VARIANTS

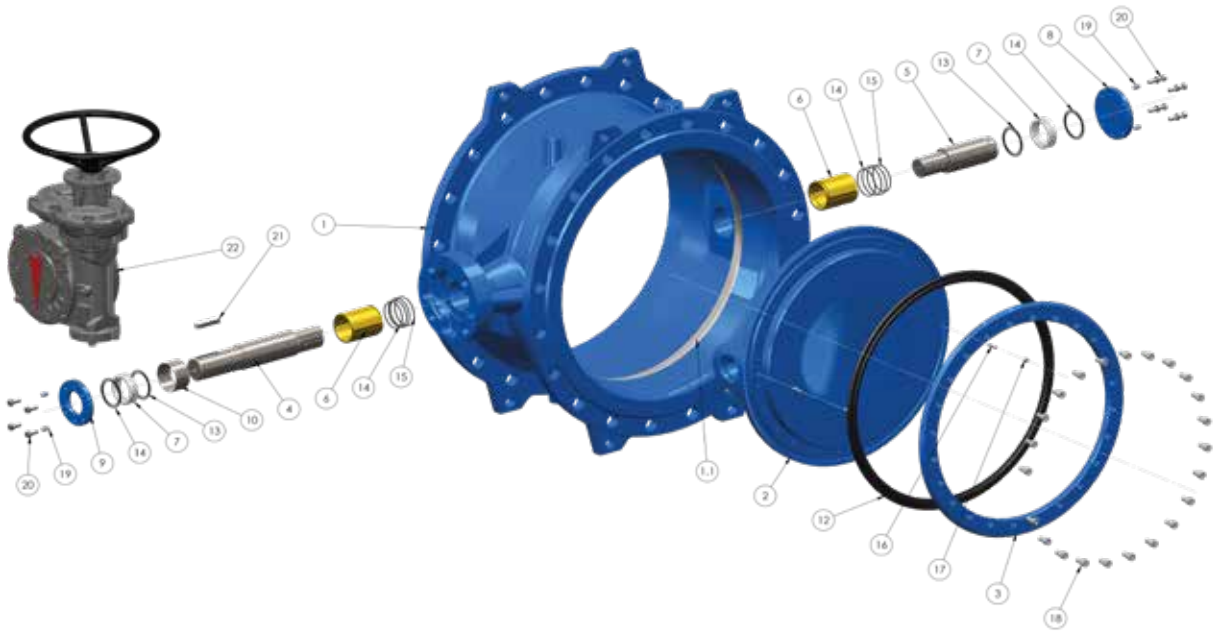
- D132/D139 With PN25 & PN40 Pressure Rating

APPLICATIONS

- Supply, collection and distribution of drinking water
- Networks for collection and discharge of waste water and sewage systems *
- Other non-hazardous liquids for industrial systems *
- Desalination plants *

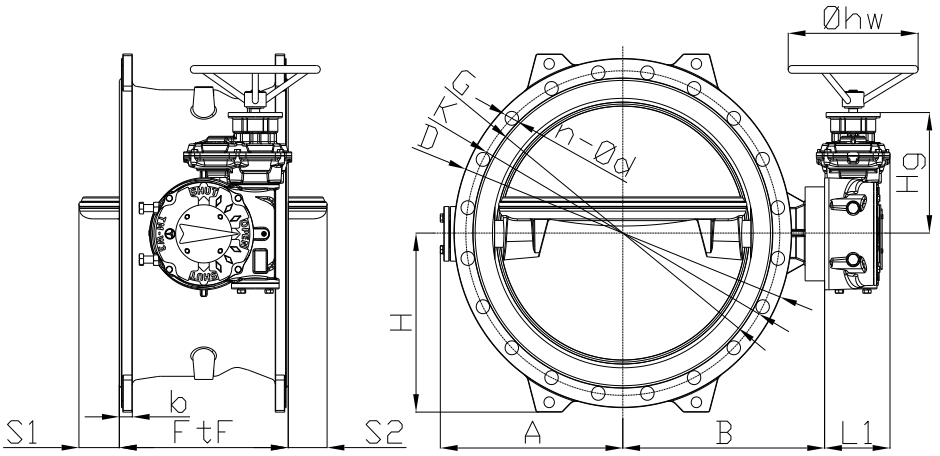
* suitable with valves materials

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	Brass*	
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	

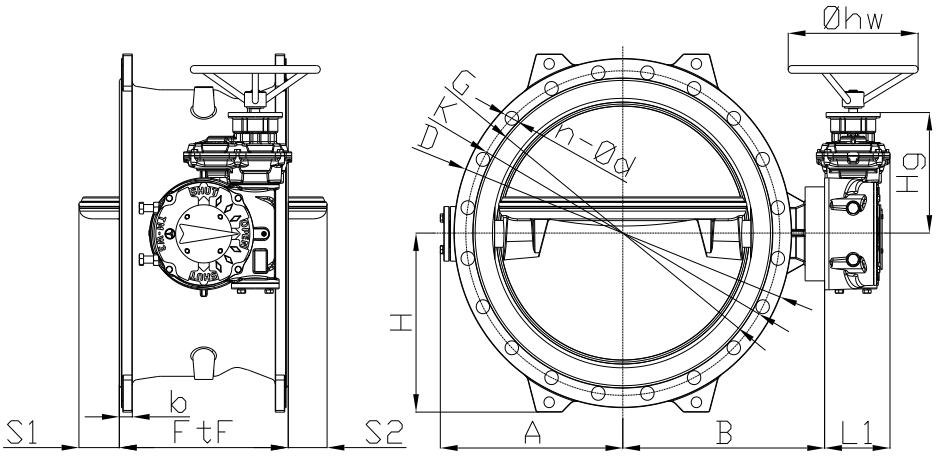
DIMENSIONS AND WEIGHTS (PN 10)



PN10																
DN	G	K	D	n-ød	b	FtF		A	B	L1	H	Hg	S1/S2	øhw	Weight(kg)	
						S13	S14								S13	S14
200	266	295	340	8-23	20.0	152	230	185	218	103.5	180	133.0	-	300	35	51
250	319	350	400	12-23	22.0	165	250	210	245	103.5	210	133.0	-	300	42	64
300	370	400	445	12-23	24.5	178	270	240	270	123.5	235	210.5	15	300	65	98
350	429	460	505	16-23	24.5	190	290	265	295	123.5	262	210.5	30	300	82	120
400	480	515	565	16-28	24.5	216	310	300	340	123.5	290	210.5	40	300	110	152
450	530	565	615	20-28	25.5	222	330	325	365	145.5	312	251.0	55	300	133	191
500	582	620	670	20-28	26.5	229	350	350	390	145.5	342	251.0	70	300	174	222
600	682	725	780	20-31	30.0	267	390	425	470	151.0	400	263.5	95	300	268	335
700	794	840	895	24-31	32.5	292	430	485	530	188.0	460	315.0	130	400	368	503
800	901	950	1015	24-34	35.0	318	470	545	620	197.0	520	347.5	160	400	538	695
900	1001	1050	1115	28-34	37.5	330	510	615	675	197.0	570	347.5	190	400	715	937
1000	1112	1160	1230	28-37	40.0	410	550	675	725	197.0	625	347.5	215	400	939	1165
1100	1218	1270	1340	32-37	42.5	-	590	755	825	267.5	695	412.0	250	400	-	1585
1200	1328	1380	1455	32-41	45.0	470	630	800	870	267.5	740	412.0	275	400	1563	1899
1400	1530	1590	1675	36-44	46.0	530	710	950	960	279.5	855	464.5	330	630	2344	2844

* Sizes available upto DN2400 on request

DIMENSIONS AND WEIGHTS (PN 16)



PN16																
DN	G	K	D	n-ød	b	FtF		A	B	L1	H	Hg	S1/S2	øhw	Weight(kg)	
						S13	S14								S13	S14
200	266	295	340	12-23	20.0	152	230	185	218	103.5	180	133.0	-	300	35	51
250	319	355	400	12-28	22.0	165	250	210	245	118.5	210	186.0	-	300	46	71
300	370	410	460	12-28	24.5	178	270	240	268	123.5	242	210.5	15	300	67	101
350	429	470	520	16-28	26.5	190	290	275	315	145.5	270	251.0	30	300	98	148
400	480	525	580	16-31	28.0	216	310	300	340	145.5	295	251.0	40	300	126	178
450	548	585	640	20-31	30.0	222	330	340	390	151.0	325	263.5	55	300	164	235
500	609	650	715	20-34	31.5	229	350	375	420	151.0	370	263.5	70	300	217	295
600	720	770	840	20-37	36.0	267	390	430	495	188.0	432	315.0	95	400	342	464
700	794	840	910	24-37	39.5	292	430	500	680	197.0	470	347.5	130	400	425	596
800	901	950	1025	24-41	43.0	318	470	585	630	197.0	525	347.5	160	400	609	800
900	1001	1050	1125	28-41	46.5	330	510	645	690	267.5	575	412.0	190	400	815	1121
1000	1112	1170	1255	28-44	50.0	410	550	705	770	267.5	640	412.0	215	400	1116	1435
1100	1218	1270	1355	32-44	53.5	-	590	790	825	279.5	695	464.5	250	630	-	1850
1200	1328	1390	1485	32-50	57.0	470	630	850	890	279.5	755	464.5	275	630	1816	2266
1400	1530	1590	1685	36-50	60.0	530	710	965	975	279.5	860	535.5	330	630	2778	3479

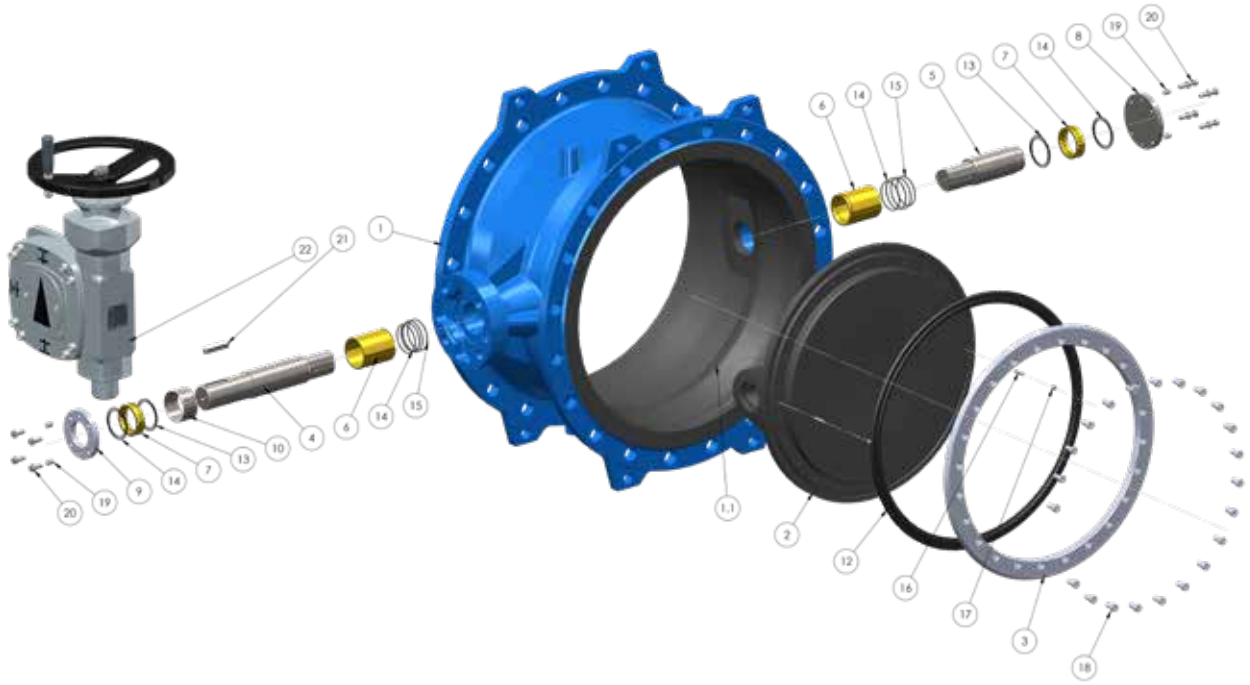
* Sizes available upto DN2400 on request

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.

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	Brass*	
7	Sealing bushing	Brass*	
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	

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 [m³/h]
- Kv = flow coefficient [m³/h] (see table below)

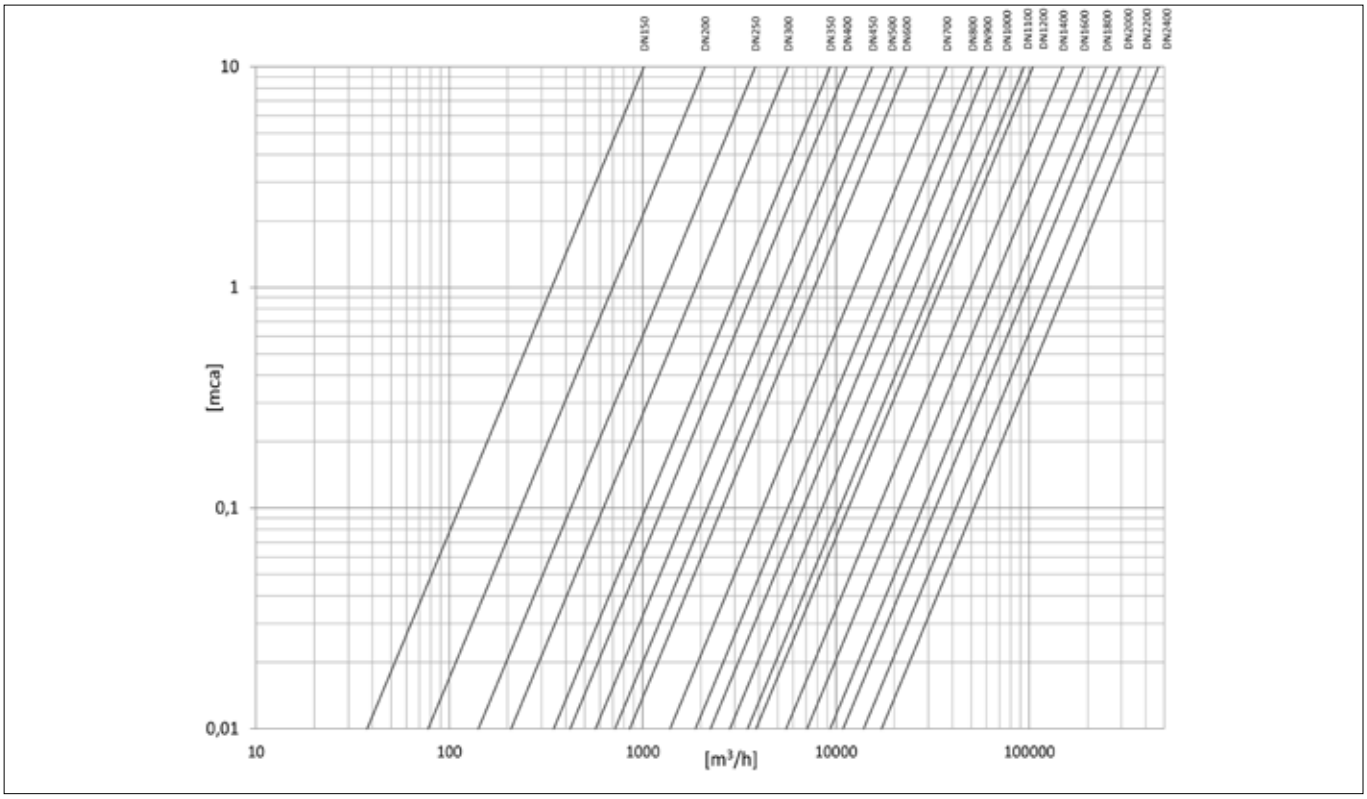
FLOW COEFFICIENT PN10-PN16

DN	150	200	250	300	350	400	450	500
Kvs [m³/h]	1015	2098	3819	5635	9336	11380	15433	19415

DN	600	700	800	900	1000	1100	1200	1400
Kvs [m³/h]	23127	37343	50688	60618	76210	93971	104111	149372

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

PRESSURE DROP DIAGRAM PN10-PN16



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

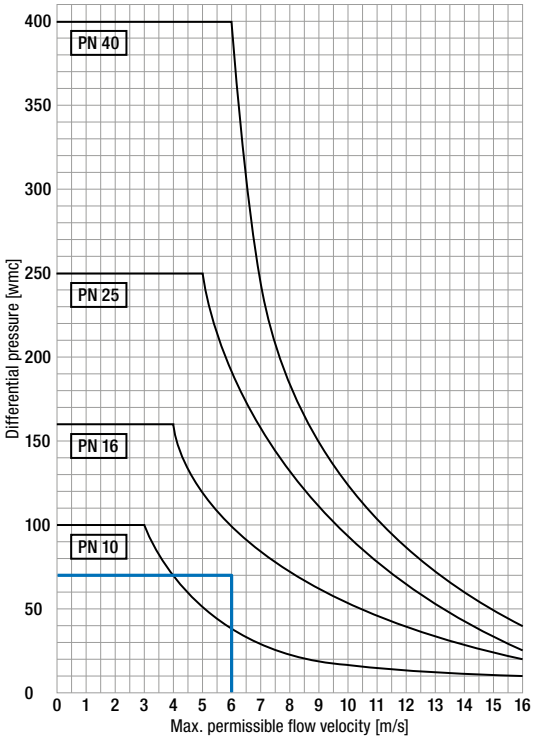
The cavitation number is helpful when exploring flow dynamics problems in fluids in which cavitation can occur.
The cavitation number can be expressed as follows:

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

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 ECL.).
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.

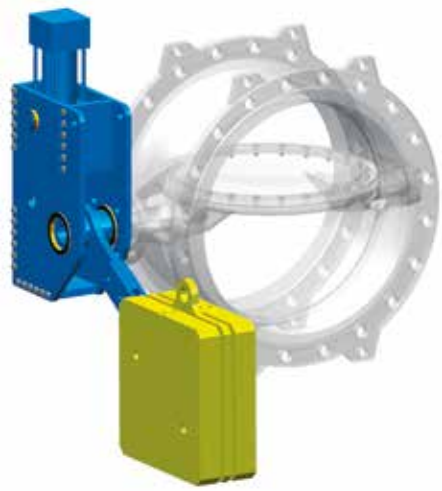
OPERATING DEVICES

BURIED SERVICE

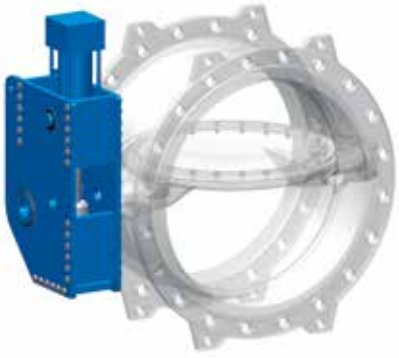
WORM GEARBOX
AND HANDWHEEL

ELECTRIC ACTUATOR

BARESHAFT
VALVE



HYDRAULIC CYLINDER
AND COUNTERWEIGHT

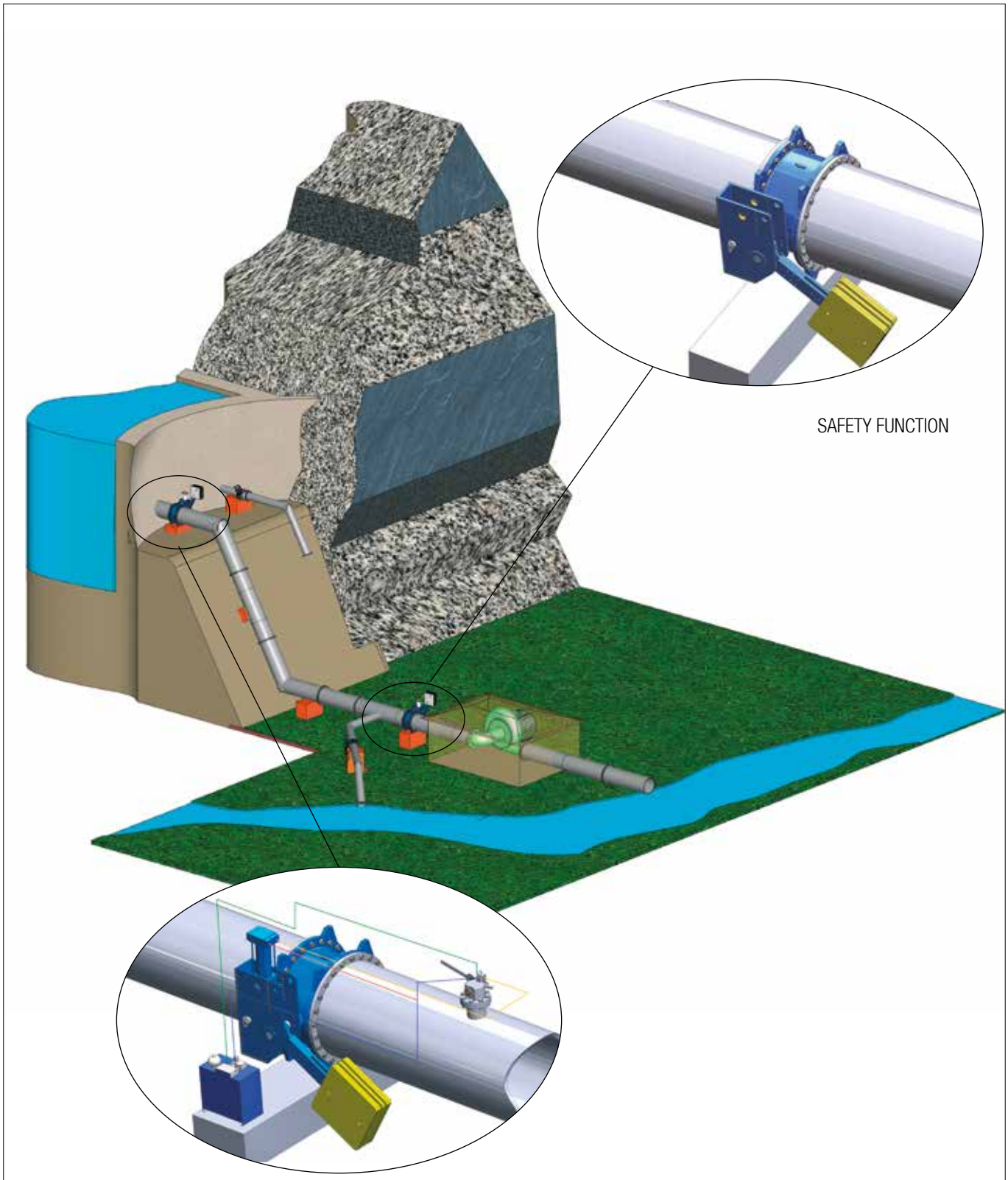


DOUBLE ACTING
HYDRAULIC CYLINDER

PNEUMATIC ACTUATOR

MAIN APPLICATION

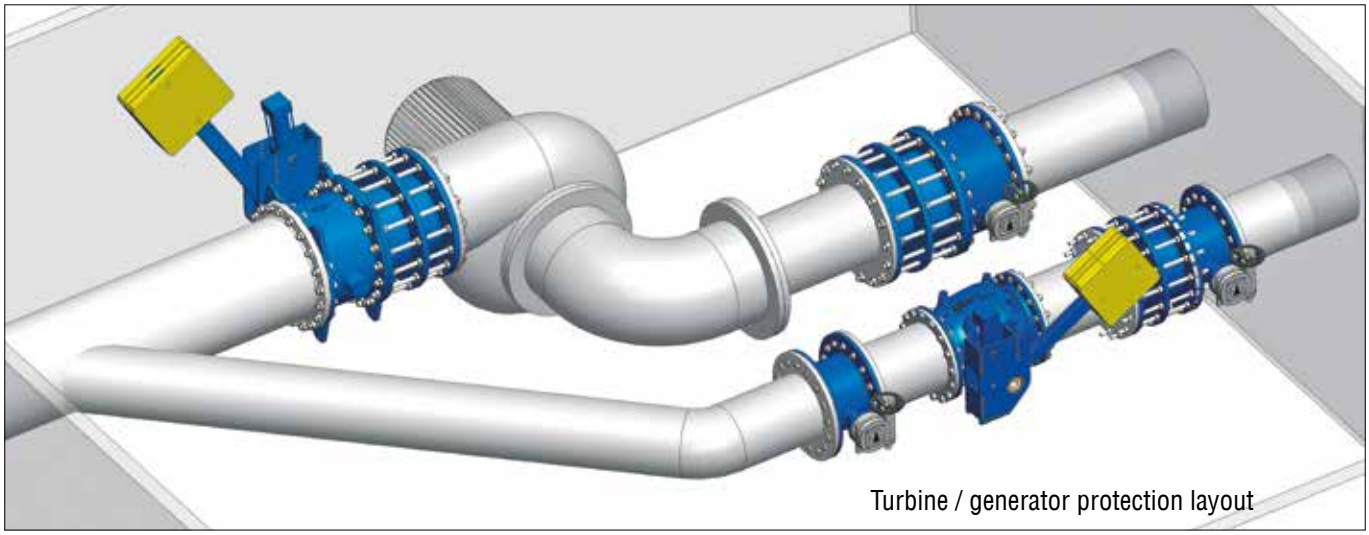
HYDRO POWER PLANTS APPLICATION



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:

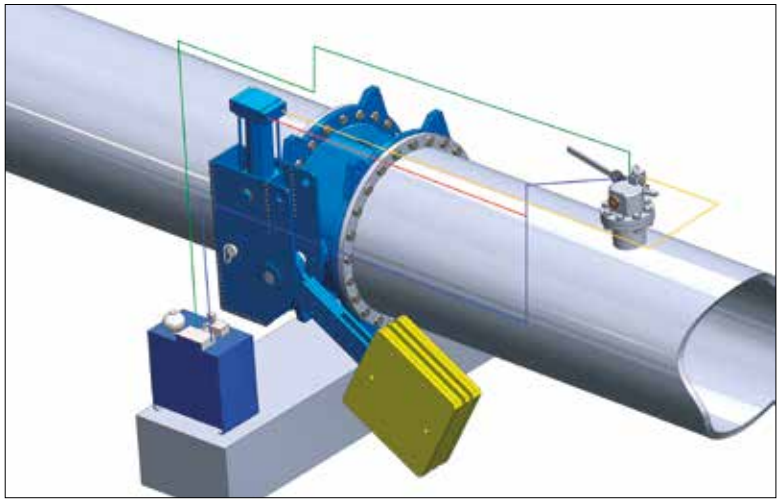
- to protect turbines/generators;
- to prevent damage caused by pipeline failure;
- to shut off the supply line in case of power failure;
- as a check valve in case of pipe backflow.



Turbine / generator protection layout

SAFETY FUNCTION WITH PADDLE FLOW DETECTION SYSTEM

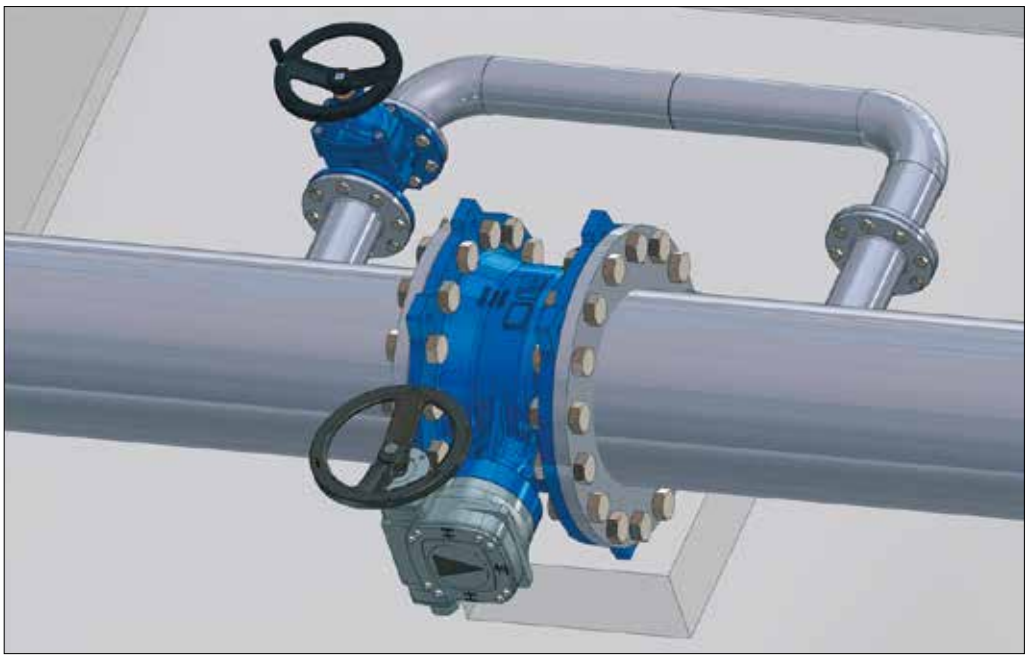
The butterfly valve with hydraulic cylinder and counterweight is equipped with a mechanical device for fluid speed detection in case of applications as turbine (or generator) protection or to prevent possible leakage of fluid due to pipeline breakage.
The paddle system detects the fluid speed in the 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.



T.i.S.

AN ELECTROSTEEL ENTERPRISE

RESILIENT SEATED GATE VALVE

RESILIENT SEATED GATE VALVE

Resilient seated gate valve is a bidirectional on/off full port valve, made of ductile iron and designed for the supply and distribution of drinking water and also used in sewage water treatment plants.

The wedge is fully rubber lined with high quality EPDM material, which ensures a perfect hydraulic sealing of the valve: thanks to the elastic features of the rubber, the obturator can recover its original shape also after long periods of compression when the valve is closed. During opening and closing operations the sliding friction of the wedge on the valve body is reduced by its slippery guides: in this way the operating torque is lowered, and the valve 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.

RESILIENT SEATED GATE VALVE

DN40-DN1000 | PN10-PN16-PN25

DESIGN FEATURES

- According to EN 1074-1 and EN 1074-2, confirming to IS 14846;
- Face to face dimension according to EN 558 series 14, series 03;
- Body, bonnet and wedge made of Ductile Iron EN GJS 500-7 according to EN 1563 / IS 1865;
- Wedge coating made of vulcanized EPDM rubber according to EN 681-1 WA;
- Gasket and o-rings made of EPDM rubber according to EN 681-1 WA;
- Flange dimensions according to EN 1092-2, IS 9523;
- Body and bonnet connection made of 8.8 grade galvanized steel screws fully protected against corrosion;
- Shaft made of Stainless Steel 1.4021 EN 10088-3 (AISI 420);
- Stem Nut made of Brass;
- Packing Gland made of Brass (upto DN300) & Ductile Iron EN GJS 500-7 (Above DN300);
- All materials, including lubricants, in contact with water approved for human consumption according to EN 1074-1 and EN 1074-2;
- Internal and external coated with fusion bonded epoxy, having thickness of minimum 250µm as per EN 14901;
- Hydraulic test according to EN 12266-1, IS 14846;
- Tight in both directions, rate A according to EN 12266-1 (zero leakage);
- Working temperature Min. 0°C (excluded frost) Max. + 70°C.

HIGH CORROSION-RESISTANT MATERIALS

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

- Shaft made of stainless steel 1.4301 EN 10088-3 (AISI 304) or 1.4401 EN 10088-3 (AISI 316);
- Screws made of stainless steel A2-70 EN ISO 3506-1 or A4-70 EN ISO 3506-1;

OTHER VARIANTS

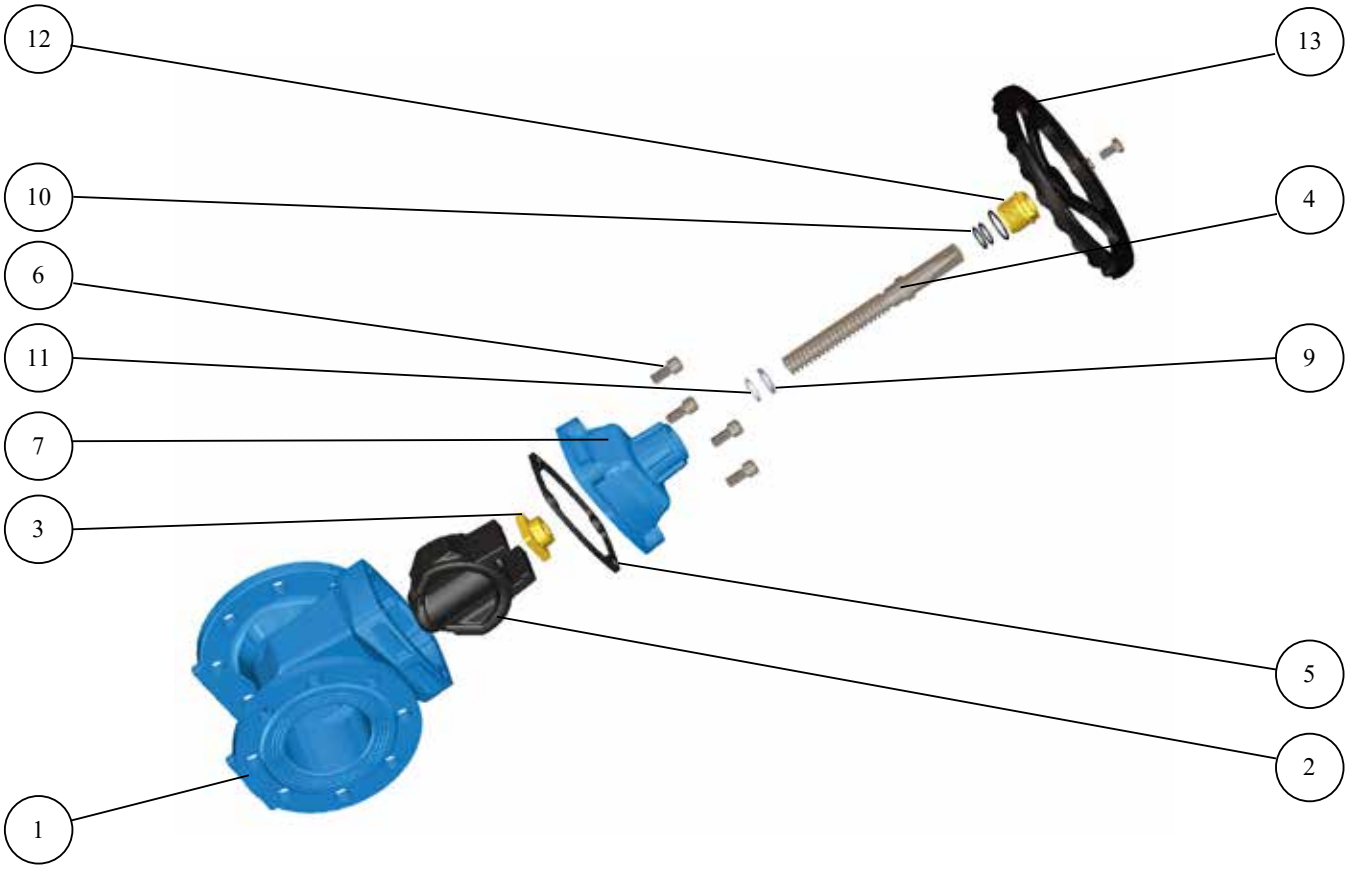
- A021 IND With Position Indicator (DN40-DN300, PN10-PN16)
- A025 With PN25 Pressure Rating (Upto DN300)
- A002/A004 Metal seated Gate Valves (DN40-1200, PN10-PN16)
- A022/A023 With series 15 (DN40-DN1000, PN10-PN25)
- A340/A363 Cast Steel Gate Valves (DN50-DN400, PN40-PN64)

APPLICATIONS

- Supply, collection and distribution of drinking water
- Networks for collection and discharge of waste water and sewage systems *
- Other non-hazardous liquids for industrial systems *
- Desalination Plants *

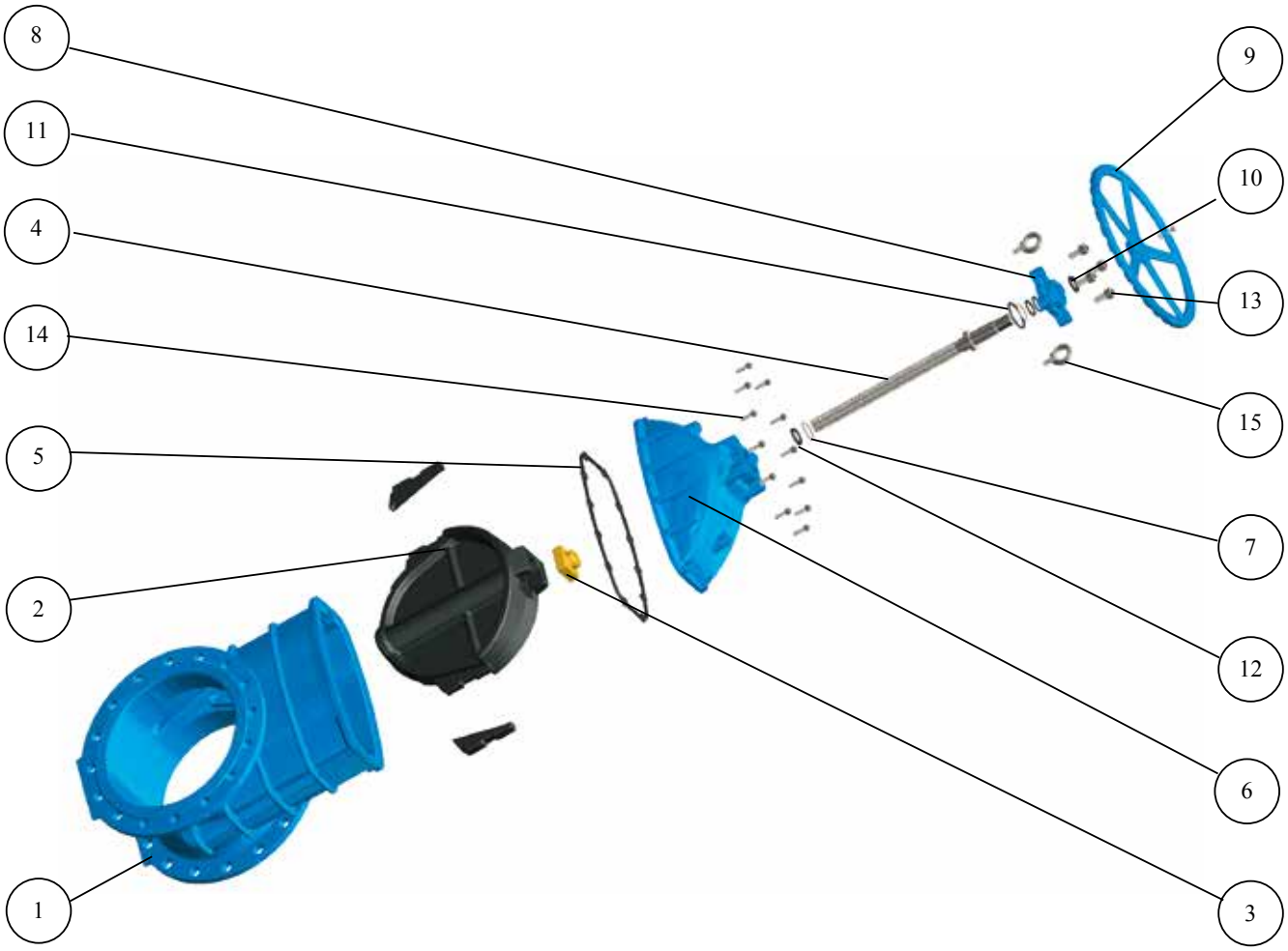
* suitable with valves materials

COMPONENTS AND MATERIALS FROM DN40 TO DN300 PN10 - PN16



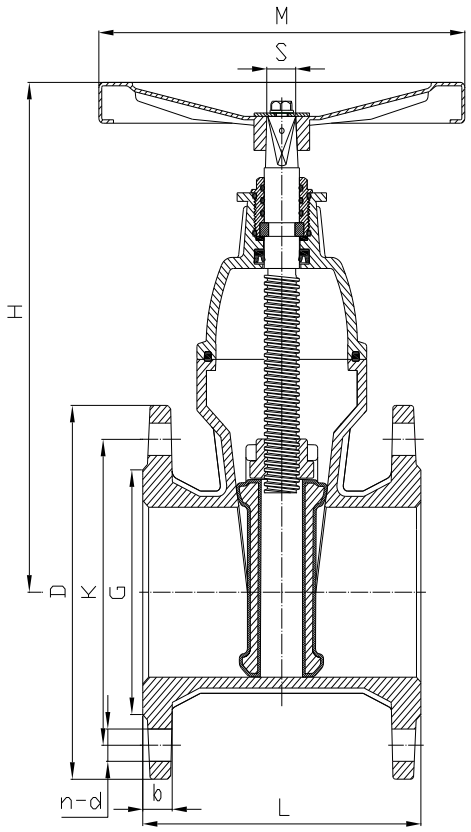
ITEM	COMPONENT	MATERIAL	NOTE
1	Body	Ductile iron EN GJS 500-7	Epoxy coating 250 µm
2	Wedge	Ductile iron EN GJS 500-7 EPDM coated	Low friction guides
3	Stem nut	Brass	
4	Shaft	Stainless steel EN 1.4021 (AISI 420)	
5	Main gasket	EPDM rubber	
6	Bolts	8.8 Galvanized steel	
7	Bonnet	Ductile iron EN GJS 500-7	Epoxy coating 250 µm
9	Washer	POM	
10	O-Ring	EPDM rubber	
11	Anti-blowout ring	Aluminum bronze	
12	Packing gland	Aluminum bronze	
13	Hand wheel	Carbon steel	Epoxy coating
-	Eye bolt	Galvanized steel	DN200 and above

COMPONENTS AND MATERIALS FROM DN350 TO DN600 PN10 - PN16



ITEM	COMPONENT	MATERIAL	NOTE
1	Body	Ductile iron EN GJS 500-7	Epoxy coating 250 µm
2	Wedge	Ductile iron EN GJS 500-7 EPDM coated	Low friction guides
3	Stem nut	Brass	
4	Shaft	Stainless steel EN 1.4021 (AISI 420)	
5	Main gasket	EPDM rubber	
6	Bonnet	Ductile iron EN GJS 500-7	Epoxy coating 250 µm
7	Washer	Aluminum bronze or inox	
8	Cover	Ductile iron EN GJS 500-7	Epoxy coating 250 µm
9	Hand wheel	Ductile iron EN GJS 500-7	Epoxy coating
10	Dust proof	EPDM rubber	
11	O-ring	EPDM rubber	
12	Lip seal	EPDM rubber	
13	Screw	Galvanized steel 8.8	
14	Screw	Galvanized steel 8.8	
15	Eye bolt	Galvanized steel	

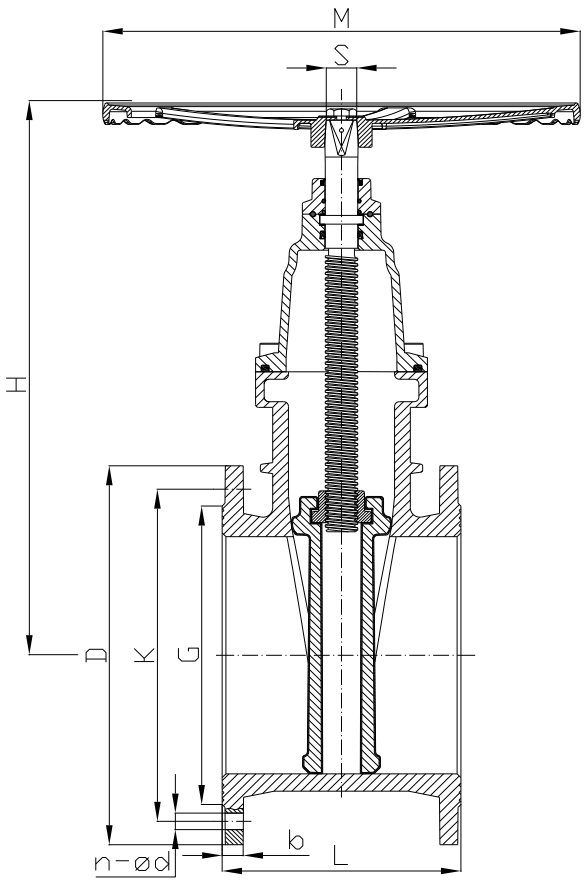
DIMENSIONS AND WEIGHTS FROM DN40 TO DN300 PN10 - PN16



DN	G	K		D		L		H	n-ød		b	M	S	W (kg)	
		PN10	PN16	PN10	PN16	S14	S03		PN10	PN16				S14	S03
40	84	110	110	150	150	140	165	220	4-19	4-19	19.0	200	14	7.8	7.8
50	99	125	125	165	165	150	178	220	4-19	4-19	19.0	200	14	8.7	9.2
65	118	145	145	185	185	170	190	255	4-19	4-19	19.0	200	17	12.3	12
80	132	160	160	200	200	180	203	280	8*-19	8-19	19.0	200	17	13.5	13.8
100	156	180	180	220	220	190	229	320	8-19	8-19	19.0	250	19	18.7	20.2
125	184	210	210	250	250	200	254	355	8-19	8-19	19.0	250	19	21.3	24
150	211	240	240	285	285	210	267	400	8-23	8-23	19.0	350	19	30.0	32.52
200	266	295	295	340	340	230	292	510	8-23	12-23	20.0	350	24	49.0	51.6
250	319	350	355	395	405	250	330	600	12-23	12-28	22.0	500	27	75.0	83.32
300	370	400	410	445	460	270	356	685	12-23	12-28	24.5	500	27	107	113.38

* Available also with 4 holes

DIMENSIONS AND WEIGHTS FROM DN350 TO DN1000 PN10 - PN16



DN	G		K		D		L		H	n-ød		b		M	S	W (kg) S14		W (kg) S03	
	PN10	PN16	PN10	PN16	PN10	PN16	S14	S03		PN10	PN16	PN10	PN16			PN10	PN16	PN10	PN16
350	429	429	460	470	505	520	290	381	810	16-23	16-28	24.5	26.5	500	27	167	171	200.2	200.2
400	480	480	515	525	565	580	310	406	900	16-28	16-31	24.5	28	640	32	216	221	225.2	225.2
450	530	548	565	585	615	640	330	432	985	20-28	20-31	25.5	30	800	32	313	322	341.35	341.35
500	582	609	620	650	670	715	350	457	1065	20-28	20-34	26.5	31.5	800	36	372	391	412.05	412.05
600	682	720	725	770	780	840	390	508	1265	20-31	20-37	30	36	800	41	625	657	725.45	725.45
*700	794	794	840	840	910	910	430	610	1390	24-31	24-37	39.5	39.5	460	-	980	980	1194	1194
*800	901	901	950	950	1025	1025	470	660	1570	24-34	24-41	43.0	43.0	460	-	1280	1280	1583	1583
*900	1001	1001	1050	1050	1125	1125	510	711	1750	28-34	28-41	46.5	46.5	550	-	1650	1650	1829	1829
*1000	1112	1112	1160	1170	1255	1255	550	813	1950	28-37	28-44	50.0	50.0	550	-	2350	2350	2788	2788

* Manual gearbox version.

OPERATING DEVICES

STEM EXTENSION

FLOOR PEDESTAL WITH ACTUATOR

FLOOR PEDESTAL WITH HANDWHEEL

UNDERGROUND SERVICE

ELECTRIC ACTUATOR

MANUAL GEAR BOX SPUR TYPE

MANUAL GEAR BOX BEVEL TYPE

HANDWHEEL

SQUARE CAP

BARESHAFT VALVE

SWING CHECK VALVE (SOFT SEATED)

DN40-DN600 | PN10-PN16

DESIGN FEATURES

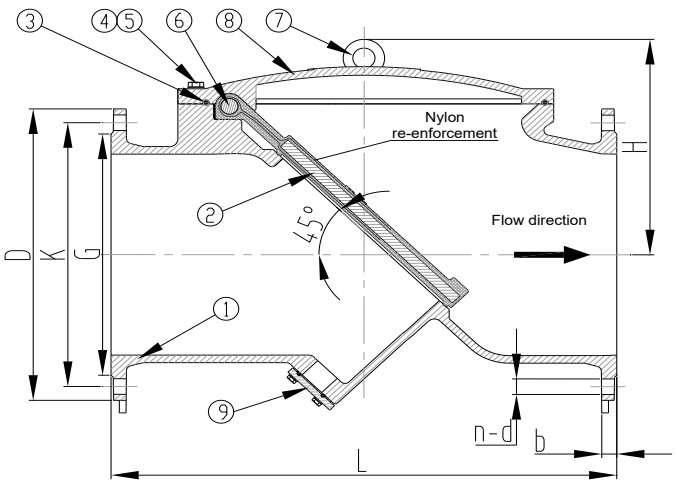
- According to EN 16767, EN 1074-3, confirming to IS 5312;
- Face to face dimension according to EN 558 series 48, IS 5312;
- Flange dimensions according to EN 1092-2, IS 1538;
- Body made of Ductile Iron EN GJS 500-7 according to EN 1563 / IS 1865;
- DISC is made of WCB Steel Core EPDM coated;
- Shaft made of Stainless Steel 1.4021 EN 10088-3 (AISI420);
- DRAIN COVER made of Ductile Iron EN GJS 500-7 according to EN 1563 / IS 1865;
- Gasket made of EPDM / NBR rubber;
- Body and bonnet connection made of galvanized steel screws fully protected against corrosion;
- All materials, including lubricants, in contact with water approved for human consumption according to EN 1074-1;
- Internal and external coated with fusion bonded epoxy, having thickness of minimum 250µm as per EN 14901;
- Hydraulic test according to EN 12266-1, IS 5312;
- Working temperature Min. 0°C (excluded frost) Max. + 70°C.

APPLICATIONS

- Supply, collection and distribution of drinking water
- Networks for collection and discharge of waste water and sewage systems *

* suitable with valves materials

COMPONENTS AND MATERIALS



	PARTS	MATERIALS
1	Body	EN-GJS-500-7
2	Disc	WCB Steel Core EPDM Coated
3	Gasket	NBR
4	Bolts	Galvanized Steel
5	Washers	Galvanized Steel
6	Shaft	SS AISI420 (EN 1.4021)
7	Bolt	Galvanized Steel
8	Bonnet	EN-GJS-500-7
9	Drain Cover*	EN-GJS-500-7

*For DN 250 and above

DIMENSIONS AND WEIGHTS

SWING CHECK VALVE (SOFT SEATED) FROM DN50 TO DN200 PN10 OR PN16

DN	G	K	D	n-ød		b	f	L	H	W (kg)
				PN10	PN16					
40	84	110	150	4-19	4-19	19	3	180	83	7.5
50	99	125	165	4-19	4-19	19	3	200	83	8.0
65	118	145	185	4-19	4-19	19	3	240	93	11.6
80	132	160	200	8**-19	8-19	19	3	260	106	14.0
100	156	180	220	8-19	8-19	19	3	300	110	19.3
125	184	210	250	8-19	8-19	19	3	350	140	28.4
150	211	240	285	8-23	8-23	19	3	400	143	34.3
200	266	295	340	8-23	12-23	20	3	500	235	71.0

DN200 only ** Also available with 4 holes
DN200 suitable for horizontal installation

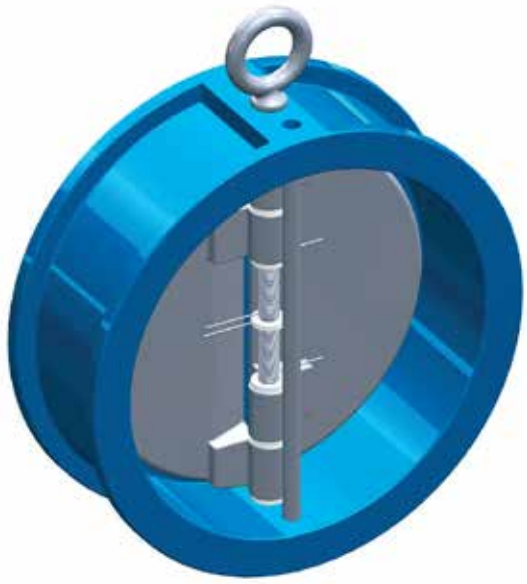
SWING CHECK VALVE (SOFT SEATED) FROM DN250 TO DN600 PN10 OR PN16

DN	G		K		D		n-ød		b		L	H	W (kg)
	PN10	PN16	PN10	PN16	PN10	PN16	PN10	PN16	PN10	PN16			
250	319	319	350	355	395	405	12-Ø23	12-Ø28	22.0	22.0	600	295	104
300	370	370	400	410	445	460	12-Ø23	12-Ø28	24.5	24.5	700	330	172
350	429	429	460	470	505	520	16-Ø23	16-Ø28	24.5	26.5	800	386	243
400	480	480	515	525	565	580	16-Ø28	16-Ø31	24.5	28.0	900	430	315
450	530	548	565	585	615	640	20-Ø28	20-Ø31	25.5	30.0	1000	455	410
500	582	609	620	650	670	715	20-Ø28	20-Ø34	26.5	31.5	1100	530	573
600	682	720	725	770	780	840	20-Ø31	20-Ø37	30.0	36.0	1300	580	907

Suitable for horizontal installation

DUAL PLATE CHECK VALVE WAFER TYPE

DN50-DN600 | PN10-PN16



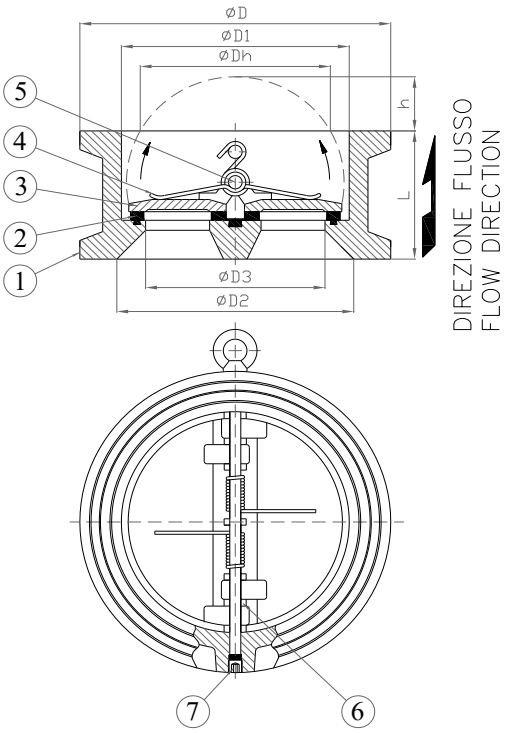
DESIGN FEATURES

- According to API 594; EN 12334;
- Face to face dimension according to EN 558 series 16;
- Body made of
    - Upto DN 300: Cast Iron EN GJL 250 according to EN 1563;
    - For DN 350 & Above: Ductile Iron EN GJS 400-15 according to EN 1563;
- DISC is made up of Stainless steel 1.4301 EN 10270-3 (AISI 304);
- Spring made of Stainless steel 1.4401 EN 10270-3 (AISI 316);
- Shaft made of Stainless steel 1.4301 EN 10270-3 (AISI 304);
- Seat Gasket made of EPDM rubber according to EN 681-1 WA;
- Washer made of PTFE;
- Screw connection made of Stainless steel fully protected against corrosion;
- All materials, including lubricants, in contact with water approved for human consumption according to EN 1074-1;
- Internal and external coated with fusion bonded epoxy, having thickness of minimum 200µm as per EN 14901;
- Hydraulic test according to EN 12266-1, IS 5312;
- Working temperature Min. 0°C (excluded frost) Max. + 70°C.

APPLICATIONS

- Supply, collection and distribution of drinking water

COMPONENTS AND MATERIALS



	PARTS	MATERIALS	
		DN50 - DN300	DN350 - DN600
1	Body	EN-GJL 250	EN-GJS 400-15
2	Disc	SS AISI 304 (EN 1.4301)	
3	Spring	SS AISI 316 (EN 1.4401)	
4	Shaft	SS AISI 304 (EN 1.4301)	
5	Seat Gasket	EPDM	
6	Washer	PTFE	
7	Screw	Stainless Steel	

DIMENSIONS AND WEIGHTS

DN		50	65	80	100	125	150	200	250	300	350	400	450	500	600
D	PN10	See PN16	See PN16	See PN16	See PN16	See PN16	See PN16	See PN16	/	/	/	/	541	594	696
	PN16	107	127	142	162	192	218	273	329	380	440	491	555	618	735
D1		66	80	95	117	145	170	224	265	310	360	410	450	505	624
D2		59	72	86	112	130	160	205	265	310	350	400	440	487	580
D3		48	59	72	90	110	135	175	220	260	302	346	385	435	516
Dh		40	51	59	90	112	140	192	226	273	320	362	410	462	560
h		8	11	12	25	32	45	65	70	94	118	129	154	178	210
L		43	46	64	64	70	76	89	114	114	127	140	152	152	178
W (kg)		1,3	2,0	3,0	3,8	6,0	7,9	14,5	25,0	33,9	52,0	77,5	88 / 90	117 / 120	146 / 150

AIR VALVE – DOUBLE CHAMBER TRIPLE FUNCTION

DN50-DN200 | PN10-PN16-PN25-PN40

DESIGN FEATURES

- Design standard EN 1074-4, EN 1074-1;
- Body, Cover and Dust Cover made of Ductile Iron GJS 500-7 according to EN 1563 / IS 1865;
- Float / Ball made of Stainless steel 1.4301 EN 10088-3 (AISI 304);
- Float Guide made of Ductile Iron GJS 500-7 according to EN 1563 / IS 1865;
- Exhaust Nut made of Stainless steel 1.4301 EN 10088-3 (AISI 304);
- O-rings and seal face made of EPDM rubber according to EN 681-1 WA;
- Minimum working pressure of 0.2 Bar to operate the valve;
- Flange dimensions according to EN 1092-2, IS 1538;
- Screws Cap, Cap Nut, Bolts made Stainless Steel of A2-70 EN ISO3506-1 (AISI 304);
- Hexagon Screw plug made of Stainless Steel A2-70 EN ISO3506-1 (AISI 304);
- Internal and external coated with fusion bonded epoxy, having thickness of minimum 250µm as per EN 14901;
- Hydraulic test according to EN 12266-1 / IS 14845;
- Working temperature Min. 0°C (excluded frost) Max. + 70°C.

- *Double Chamber Air Valve is capable of triple function for air release:*
- *Large air release (during system filling).*
- *Small air release (during system operation).*
- *Air intake (to prevent vacuum conditions when the system is draining).*

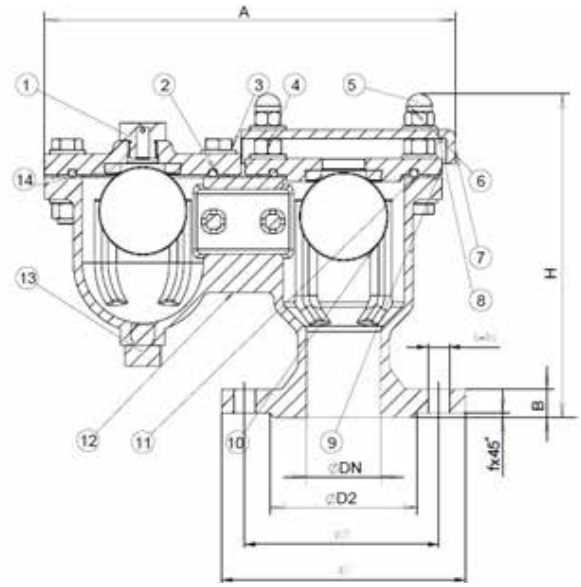
OTHER VARIANTS

- E073/E074 With PN25 & PN40 Pressure Rating

APPLICATIONS

- Supply, collection and distribution of drinking water

COMPONENTS AND MATERIALS



ITEM	PART NAME	MATERIAL
1	Exhaust Nut	SS304
2	Cover	GGG50
3	Bolt	SS304
4	Screw Cap	SS304
5	Cap Nut	SS304
6	Bolt	SS304
7	Dust Cover	GGG50
8	Gasket	SS304
9	Cover	GGG50
10	Ball	SS304
11	O Ring	EPDM
12	Body	GGG50
13	Hexagon Screw Plug	SS304
14	Seal	EPDM

DIMENSIONS AND WEIGHTS

ART	E070					E071				
DN	50	80	100	150	200	50	80	100	150	200
A/L	276	332	352	434	458	276	332	352	434	458
H	216	256	262	302	396	216	256	262	302	396
D	165	200	220	285	340	165	200	220	285	340
k/D1	125	160	180	240	295	125	160	180	240	295
g/d2	100	135	156	212	268	100	135	156	212	268
nXd	4-19	8-19	8-19	8-23	8-23	4-19	8-19	8-19	8-23	12-23
B/B	19	19	19	19	20	19	19	19	19	20
Bolt	M16	M16	M16	M20	M20	M16	M16	M16	M20	M20
Weight (kg)	12.1	18.25	21.2	33.5	50	12.1	18.25	21.2	33.5	50

AIR VALVE - SINGLE ORIFICE

DN25-DN100 | PN10 - PN16

DESIGN FEATURES

- Design standard EN 1074-4, EN 1074-1;
- Body, Bonnet made of ductile iron EN GJS 500-7 according to EN 1563;
- FLOAT is made of Stainless steel 1.4301 EN 10088-3 (AISI 304);
- GASKET & SEAT: NBR / EPDM rubber according to EN 681-1 WA;
- Exhaust Nut: Brass;
- PIN is made of Stainless steel;
- Isolating Ball Valve of Nickle Plated Brass;
- Screws, washers made of Stainless Steel A2-70 EN ISO3506-1 (AISI 304);
- Flange dimensions according to EN 1092-2, IS 1538;
- Internal and external surface protection made of epoxy resin powder (FBE), and thickness of 250µm, as per EN 14901;
- Hydraulic test according to EN 12266-1 / IS 14845;
- Working temperature Min. 0°C (excluded frost) Max. + 60°C.

- *Single Orifice Air Valve is designed to release small amounts of accumulated air from a pipeline.*

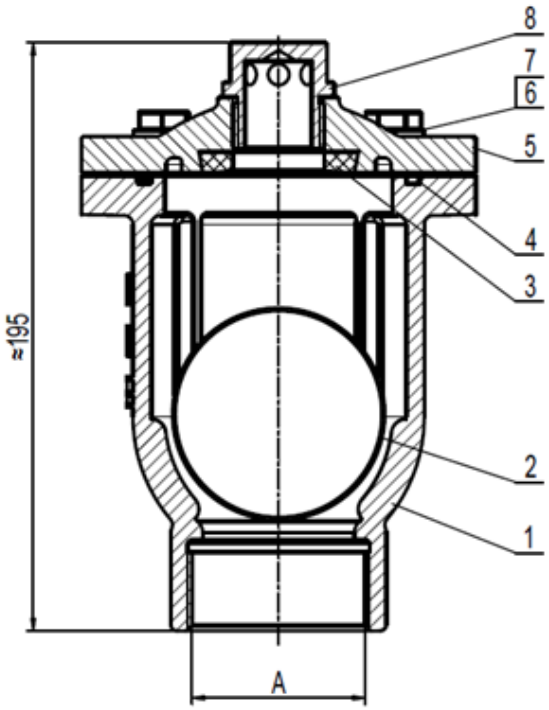
OTHER VARIANTS

- E113 - With Ball Valve
- E111 -With Flange (DN 40 - DN 100, PN10 - PN16)

APPLICATIONS

- Supply, collection and distribution of drinking water

COMPONENTS AND MATERIALS



ITEM	PART NAME	MATERIAL
8	Exhaust Nut	Brass
7	Washers	A2-70
6	Bolt	A2-70
5	Bonnet	GGG50
4	O Ring	NBR
3	Seal Plate	EPDM
2	Floating Ball	304
1	Body	GGG50

MONOBLOCK KNIFE GATE VALVE

DN50-DN600 | PN10-PN04

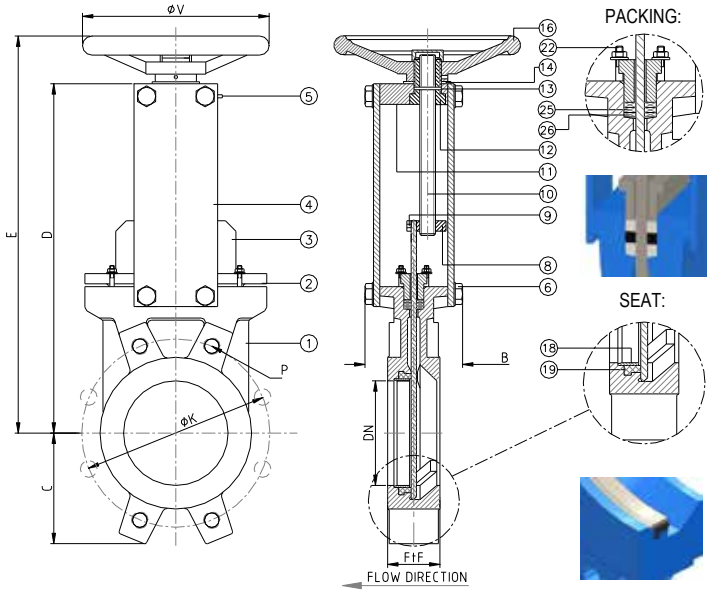
DESIGN FEATURES

- Body and Handwheel made of Cast iron EN GJL250 according to EN 1561;
- Knife: Stainless steel 1.4307 EN 10088-3 (AISI 304L);
- Packing gland made of Aluminium (Upto DN300) / Ductile Iron (Above DN300);
- GASKET: EPDM rubber according to EN 681-1 WA;
- Support & Support Bridge: Steel;
- Bolts is made of Stainless Steel A2-70 EN ISO3506-1 (AISI 304);
- Stem made of Stainless steel 1.4301 EN 10088-3 (AISI 304);
- Stem Nut made of Brass;
- Seat Ring made of Stainless steel 1.4404 EN 10088-3 (AISI 316L) for Mono directional Type;
- Seat made of EPDM Rubber with steel reinforced core for Bidirectional Type;
- Screws, washers made of Stainless Steel A2-70 EN ISO3506-1 (AISI 304);
- Flange drilled according to EN 1092-2;
- Internal and external surface protection made of epoxy resin powder (FBE), and thickness of 80µm;
- Hydraulic test according to EN 12266-1;
- Working temperature Min. 0°C (excluded frost) Max. + 90°C.

APPLICATIONS

- Water supply and distribution, waste water treatment and sewerage

COMPONENTS AND MATERIALS



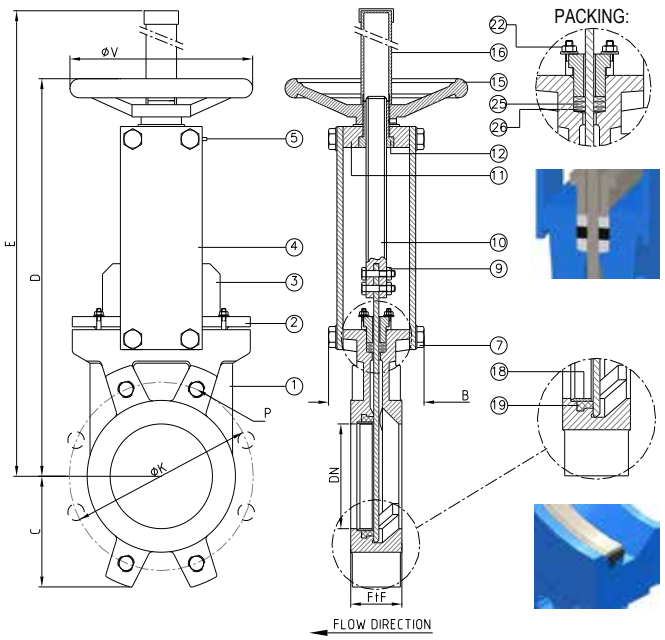
	PARTS	MATERIALS
1	Body	EN-GJL 250
2	Packing Gland	Aluminum Up To DN300
		Ductile Iron From DN350 Upward
3	Knife	AISI 304L Stainless Steel
4	Support Plate	Steel
5	Greaser	Standard
6 - 9	Bolts	A2-70 Stainless Steel
8	Stem Nut	Bronze
10	Stem	AISI 304 Stainless Steel
11	Support Bridge	Steel
12	Stem Bushing	Brass
13	Pin	A2-70 Stainless Steel
14	Washer	Brass
16	Handwheel	EN-GJL 250
18	Seat Ring	AISI 316L Stainless Steel
19	Gasket	EPDM Rubber
24	Bolts	A2-70 Stainless Steel
25	Packing O-Ring	EPDM
26	Packing	Syntetic Fibers + PTFE

MAXIMUM ALLOWABLE WORKING PRESSURE (PS):		
DN50-250 = 10 bar	DN300-400 = 6 bar	DN450-DN600 = 4 bar

DIMENSIONS AND WEIGHTS

DN	K	n-M	FtF	B	C	D	E	ØV	W (kg)
50	125	4-M16	40	82	65	240	285	200	8
65	145	4-M16	40	82	68	267	310	200	9
80	160	8-M16	50	85	90	292	336	200	10
100	180	8-M16	50	85	105	338	382	200	12
125	210	8-M16	50	92	120	367	430	250	15
150	240	8-M20	60	92	135	417	480	250	19
200	295	8-M20	60	120	170	521	605	300	32
250	350	12-M20	70	120	205	622	697	300	44
300	400	12-M20	70	120	240	722	797	300	57
350	460	16-M20	96	192	258	898	1074	400	107
400	515	16-M24	100	192	295	1003	1167	400	132
450	565	20-M24	106	192	318	1093	1175	500	160
500	620	20-M24	110	192	345	1207	1284	500	180
600	725	20-M27	110	290	405	1410	1487	500	292

COMPONENTS AND MATERIALS



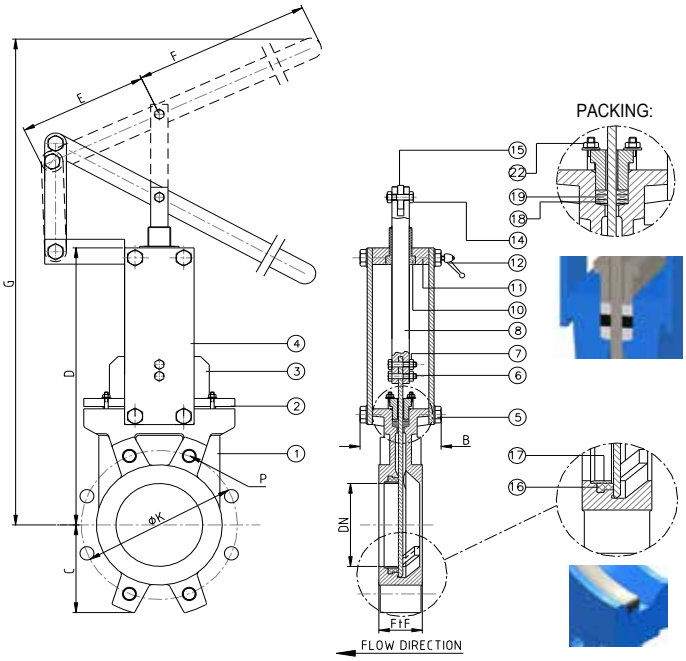
	PARTS	MATERIALS
1	Body	EN-GJL 250
2	Packing Gland	Aluminum Up To DN300
		Ductile Iron From DN350 Upward
3	Knife	AISI 304L Stainless Steel
4	Support	Steel
5	Greaser	Standard
7 - 8	Bolts	A2-70 Stainless Steel
10	Stem	Stainless Steel
11	Support Bridge	Steel
12	Stem Nut	Brass
15	Handwheel	EN-GJL 250
16	Protective Pipe	Steel
18	Seat Ring	AISI 316L Stainless Steel
19	Gasket	EPDM Rubber
22	Bolts	A2-70 Stainless Steel
25	Packing O-Ring	EPDM
26	Packing	Syntetic Fibers + PTFE

MAXIMUM ALLOWABLE WORKING PRESSURE (PS):		
DN50-250 = 10 bar	DN300-400 = 6 bar	DN450-DN600 = 4 bar

DIMENSIONS AND WEIGHTS

DN	K	n-M	FtF	B	C	D	E	ØV	W (kg)
50	125	4-M16	40	90	65	285	439	200	8
65	145	4-M16	40	90	68	310	464	200	9
80	160	8-M16	50	90	90	336	490	200	10
100	180	8-M16	50	90	105	382	536	200	12
125	210	8-M16	50	100	120	430	636	250	15
150	240	8-M20	60	100	135	480	686	250	19
200	295	8-M20	60	120	170	605	879	300	32
250	350	12-M20	70	120	205	697	1021	300	44
300	400	12-M20	70	120	240	797	1171	300	57
350	460	16-M20	96	192	258	1074	1504	400	107
400	515	16-M24	100	192	295	1167	1647	400	132
450	565	20-M24	106	192	318	1175	1722	500	160
500	620	20-M24	110	192	345	1284	1874	500	180
600	725	20-M27	110	290	405	1487	2177	500	292

COMPONENTS AND MATERIALS



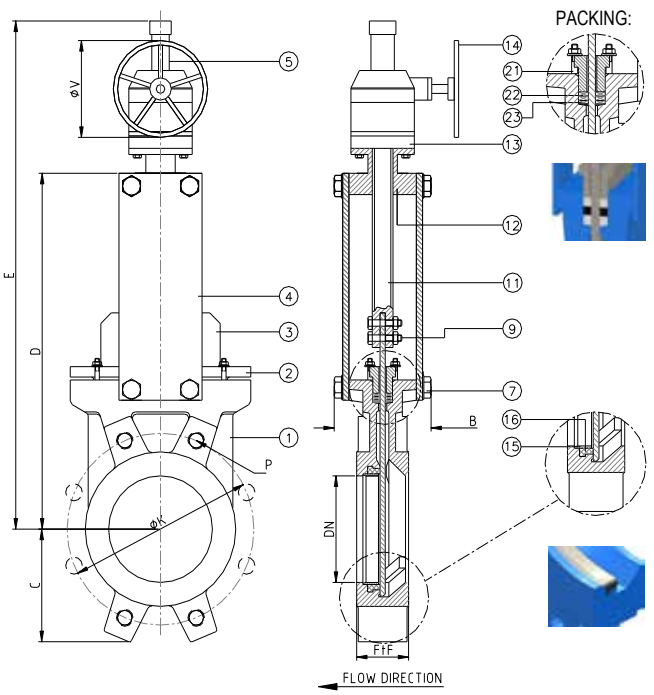
	PARTS	MATERIALS
1	BODY	EN-GJL 250
2	PACKING GLAND	ALUMINUM up to DN300
3	KNIFE	AISI 304L STAINLESS STEEL
4	SUPPORT	STEEL
5 - 6 - 7	BOLTS	A2-70 STAINLESS STEEL
8	STEM	AISI 304 STAINLESS STEEL
10	STEM NUT	BRASS
11	SUPPORT BRIDGE	STEEL
12	BLOCK SYSTEM	STANDARD
14	BOLTS	A2-70 STAINLESS STEEL
15	LEVER	STEEL
16	GASKET	EPDM RUBBER
17	SEAT RING	AISI 316L STAINLESS STEEL
18	PACKING	SYNTETIC FIBERS + PTFE
19	PACKING O-RING	EPDM
22	BOLTS	A2-70 STAINLESS STEEL

MAXIMUM ALLOWABLE WORKING PRESSURE (PS):		
DN50-250 = 10 bar	DN300-400 = 6 bar	DN450-DN600 = 4 bar

DIMENSIONS AND WEIGHTS

DN	K	n-M	FtF	B	C	D	E	F	G	W (kg)
50	125	4-M16	40	90	65	240	150	300	395	8
65	145	4-M16	40	90	68	270	150	300	435	9
80	160	8-M16	50	90	90	295	150	300	458	10
100	180	8-M16	50	90	105	335	150	400	590	12
125	210	8-M16	50	100	120	370	150	400	725	15
150	240	8-M20	60	100	135	418	150	400	892	19
200	295	8-M20	60	120	170	522	232	600	1280	32
250	350	12-M20	70	120	205	625	232	600	1430	44
300	400	12-M20	70	120	240	725	232	600	1580	57

COMPONENTS AND MATERIALS



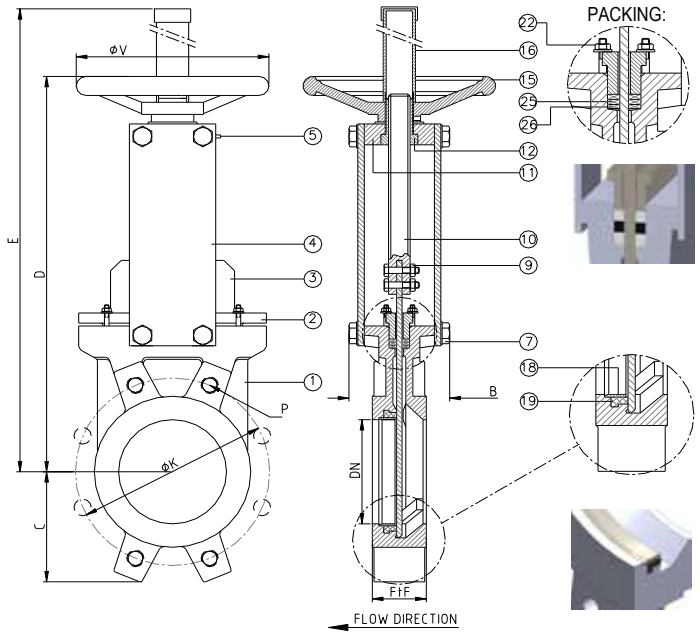
	PARTS	MATERIALS
1	BODY	EN-GJL 250
2	PACKING GLAND	ALUMINUM up to DN300
		DUCTILE IRON from DN350 upward
3	KNIFE	AISI 304L STAINLESS STEEL
4	SUPPORT	STEEL
5	PROTECTIVE PIPE	STEEL
7 - 9	BOLTS	A2-70 STAINLESS STEEL
11	STEM	AISI 304 STAINLESS STEEL
12	SUPPORT BRIDGE	STEEL
13	GEARBOX	- -
14	HANDWHEEL	EN-GJL 250
15	SEAT RING	AISI 316L STAINLESS STEEL
16	GASKET	EPDM RUBBER
21	BOLTS	A2-70 STAINLESS STEEL
22	ACKING O-RING	EPDM
23	PACKING	FIBERS + PTFE

MAXIMUM ALLOWABLE WORKING PRESSURE (PS):		
DN50-250 = 10 bar	DN300-400 = 6 bar	DN450-DN600 = 4 bar

DIMENSIONS AND WEIGHTS

DN	K	n-M	FtF	B	C	D	E	ØV	W (kg)
200	295	8-M20	60	120	170	522	930	300	43.5
250	350	12-M20	70	120	205	625	1130	300	56
300	400	12-M20	70	120	240	725	1230	300	69
350	460	16-M20	96	192	258	845	1502	450	125
400	515	16-M24	100	192	295	945	1607	450	150
450	565	20-M24	106	192	318	1045	1697	450	178
500	620	20-M24	110	192	345	1148	1813	450	198
600	725	20-M27	110	290	405	1360	2148	450	310

COMPONENTS AND MATERIALS



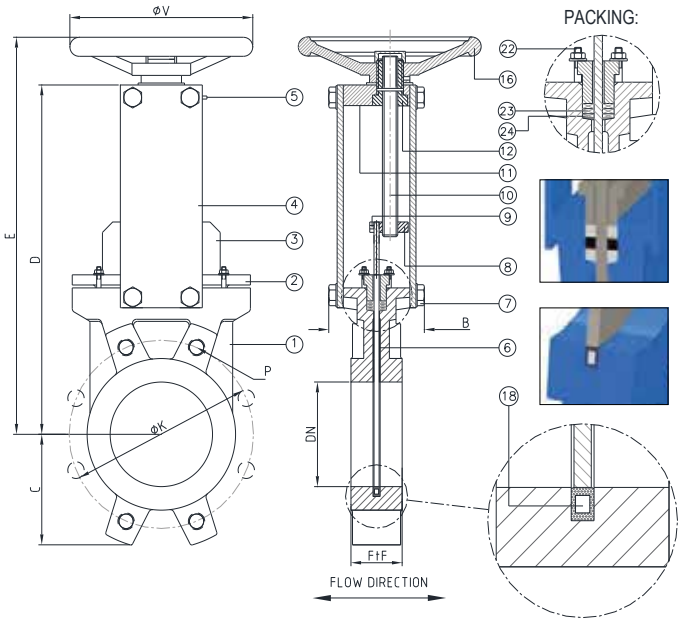
	PARTS	MATERIALS
1	BODY	ISI 316 STAINLESS STEEL
2	PACKING GLAND	AISI 316 STAINLESS STEEL
3	KNIFE	AISI 316L STAINLESS STEEL
4	SUPPORT	AISI 316 STAINLESS STEEL
5	GREASER	STANDARD
7 - 8	BOLTS	A4-70 STAINLESS STEEL
10	STEM	AISI 304 STAINLESS STEEL
11	SUPPORT BRIDGE	AISI 316 STAINLESS STEEL
12	STEM NUT	BRASS
15	HANDWHEEL	EN-GJL 250
16	PROTECTIVE PIPE	STEEL
18	SEAT RING	AISI 316L STAINLESS STEEL
19	GASKET	EPDM RUBBER
22	BULLONI BOLTS	A4-70 STAINLESS STEEL
25	PACKING O-RING	EPDM
26	PACKING	SYNTETIC FIBERS + PTFE

MAXIMUM ALLOWABLE WORKING PRESSURE (PS):		
DN50-250 = 10 bar	DN300-400 = 6 bar	DN450-DN600 = 4 bar

DIMENSIONS AND WEIGHTS

DN	K	n-M	FtF	B	C	D	E	ØV	W (kg)
50	125	4-M16	40	90	65	285	439	200	8
65	145	4-M16	40	90	68	310	464	200	9
80	160	8-M16	50	90	90	336	490	200	10
100	180	8-M16	50	90	105	382	536	200	12
125	210	8-M16	50	100	120	430	636	250	15
150	240	8-M20	60	100	135	480	686	250	19
200	295	12-M20	60	120	170	605	879	300	32
250	355	12-M24	70	120	205	697	1021	300	44
300	410	12-M24	70	120	240	797	1171	300	57
350	470	16-M24	96	192	258	1074	1504	400	107
400	525	16-M27	100	192	295	1167	1647	400	132
450	585	20-M27	106	192	318	1175	1722	500	160
500	650	20-M30	110	192	345	1284	1874	500	180
600	770	20-M33	110	290	405	1487	2177	500	292

COMPONENTS AND MATERIALS

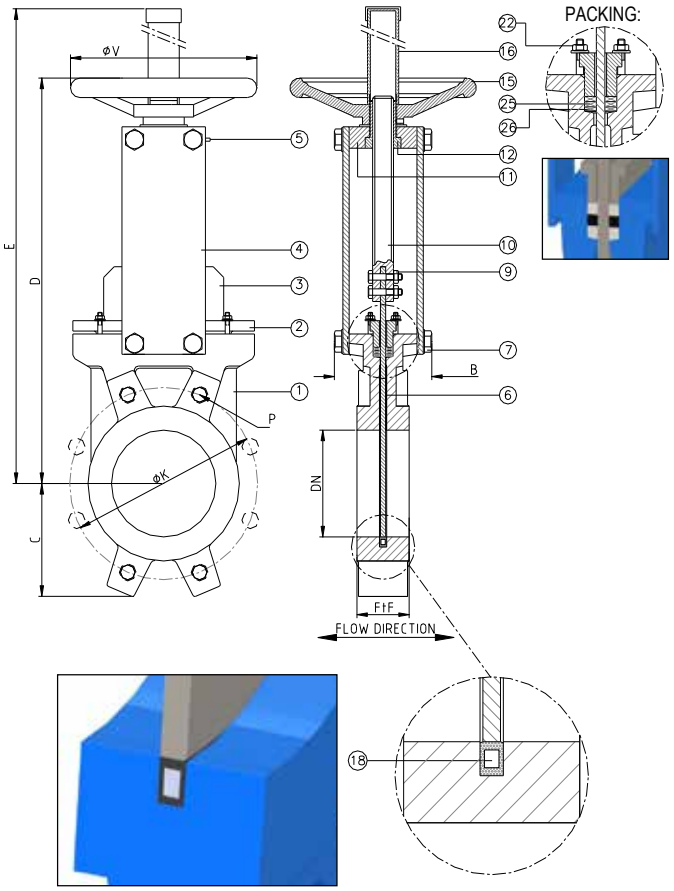


	PARTS	MATERIALS
1	Body	EN-GJL 250
2	Packing Gland	Aluminum
3	Knife	AISI 304L Stainless Steel
4	Support	Steel
5	Greaser	Standard
6	Internal Guide	Polyethylene
7	Bolts	A2-70 Stainless Steel
8	Stem Nut	Bronze
9	Bolts	A2-70 Stainless Steel
10	Stem	AISI 304 Stainless Steel
11	Support Bridge	Steel
12	Stem Nut	Brass
16	Handwheel	EN-GJL 250
18	Tenuta Seat	EPDM Rubber With Steel Reinforced Core
22	Bolts	A2-70 Stainless Steel
23	Packing O-Ring	EPDM
24	Packing	Syntetic Fibers + PTFE

DIMENSIONS AND WEIGHTS

DN	K	n-M	FtF	B	C	D	E	ØV	W (kg)
50	125	4-M16	40	82	65	238	285	200	8
65	145	4-M16	40	82	70	266	310	200	9
80	160	8-M16	50	85	92	291	336	200	10
100	180	8-M16	50	85	107	337	382	200	12
125	210	8-M16	50	92	120	366	430	250	15
150	240	8-M20	60	92	130	416	480	250	19
200	295	8-M20	60	120	158	523	595	300	32
250	350	12-M20	70	120	200	622	697	300	44

COMPONENTS AND MATERIALS



	PARTS	MATERIALS
1	Body	EN-GJL 250
2	Packing Gland	Aluminum
3	Knife	AISI 304L Stainless Steel
4	Support	Steel
5	Greaser	Standard
6	Internal Guide	Polyethylene
7 - 9	Bolts	A2-70 Stainless Steel
10	Stem	AISI 304 Stainless Steel
11	Support Bridge	Steel
12	Stem Nut	Brass
15	Handwheel	EN-GJL 250
16	Protective Pipe	Steel
18	Tenuta Seat	EPDM Rubber With Steel Reinforced Core
22	Bolts	A2-70 Stainless Steel
23	Packing O-Ring	EPDM
24	Packing	Syntetic Fibers + PTFE

DIMENSIONS AND WEIGHTS

DN	K	n-M	FtF	B	C	D	E	ØV	W (kg)
50	125	4-M16	40	90	65	284	439	200	8
65	145	4-M16	40	90	68	308	464	200	9
80	160	8-M16	50	90	90	334	490	200	10
100	180	8-M16	50	90	105	374	536	200	12
125	210	8-M16	50	100	120	413	636	250	15
150	240	8-M20	60	100	135	465	686	250	19
200	295	8-M20	60	120	170	582	879	300	32
250	350	12-M20	70	120	205	682	1021	300	44

MONODIRECTIONAL (NON-RISING STEM)

MONODIRECTIONAL (RISING STEM)

MONODIRECTIONAL
(RISING STEM WITH LEVER)

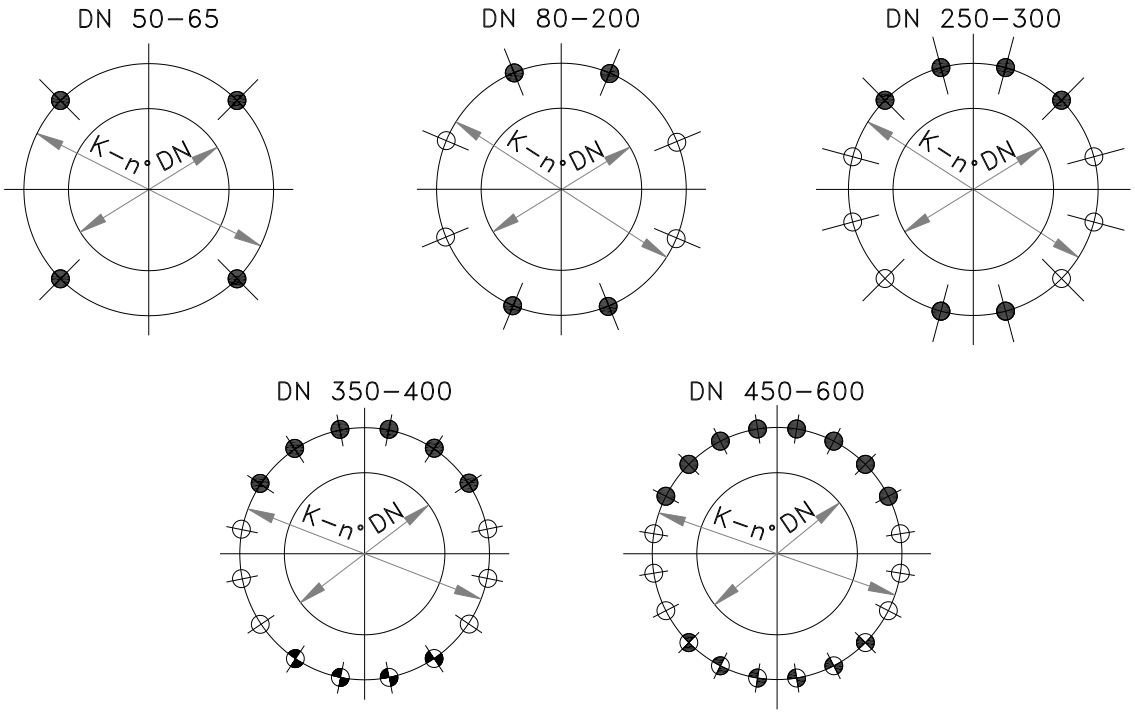
MONODIRECTIONAL
(RISING STEM WITH SS BODY)

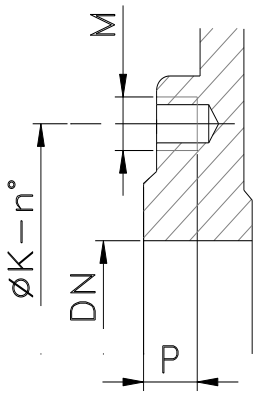
MONODIRECTIONAL
(RISING STEM WITH GEAR BOX)

BIDIRECTIONAL (NON RISING STEM)

BIDIRECTIONAL (RISING STEM)

EN1092-2 PN10 FLANGE DETAILS





DN	øK	n°	M	P	●	◒	⊕
50	125	4	M16	10	4	-	-
65	145	4	M16	10	4	-	-
80	160	8	M16	10	4	-	4
100	180	8	M16	10	4	-	4
125	210	8	M16	10	4	-	4
150	240	8	M20	14	4	-	4
200	295	8	M20	14	4	-	4
250	350	12	M20	18	6	-	6
300	400	12	M20	18	6	-	6
350	460	16	M20	22	6	4	6
400	515	16	M24	24	6	4	6
450	565	20	M24	24	8	6	6
500	620	20	M24	24	8	6	6
600	725	20	M27	24	8	6	6

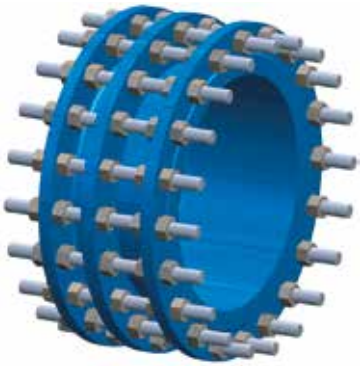
● BLIND TAPPED BOLT HOLES

◒ TAPPED TROUGHT

⊕ TROUGHT GOING BORE

DISMANTLING JOINTS RIGID TYPE

DN50-DN2000 | PN10-PN16-PN25



The dismantling joint is an accessory used to support assembly and maintenance of hydraulic equipment (especially for big diameters) along the pipeline line. The adjustable stroke facilitates the valve installation and the disassembly of the valve for its future maintenance.

DESIGN FEATURES

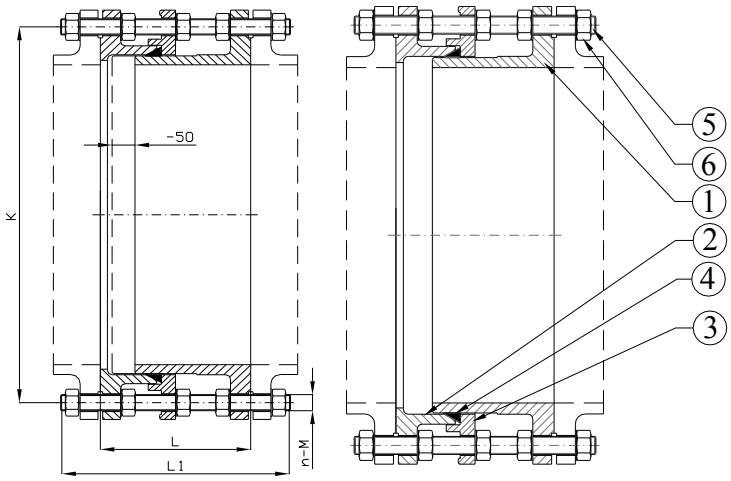
- Body (Flanged Pipe, Long & Short) made of ductile iron EN GJS 500-7 according to EN 1563;
- Middle Flange made of ductile iron EN GJS 500-7 according to EN 1563;
- Flanges as per EN 1092-2;
- Main Seal made of EPDM rubber according to EN 681-1 WA;
- Tie Rod made of 4.8 galvanized steel fully protected against corrosion;
- Nuts & Washers made of 4.8 galvanized steel fully protected against corrosion;
- AXIAL STROKE: 0 - 50mm;
- SURFACE PROTECTION: External and internal with epoxy resin powder of blue colour and 250 µm of thickness;
- WORKING TEMP.: Max. +70°C.

APPLICATIONS

- Supply, collection and distribution of drinking water
- Networks for collection and discharge of waste water and sewage systems *
- Other non hazardous liquids for industrial systems *

* suitable with valves materials

COMPONENTS AND MATERIALS



ITEM	PARTS	MATERIALS
1	Flanged pipe - long	Ductile iron EN - GJS 400 - 15
2	Flanged pipe - short	Ductile iron EN - GJS 400 - 15
3	Middle flange	Ductile iron EN - GJS 400 - 15
4	Main seal	EPDM rubber
5	Tie rod	4.8 dacromet steel
6	Nut and washer	Dacromet steel

DIMENSIONS AND WEIGHTS

PN10																							
DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400	1600	1800	2000
L	PN16	PN16	PN16	PN16	PN16	PN16	235	250	265	265	275	295	295	315	325	340	350	360	370	380	400	420	440
L1	PN16	PN16	PN16	PN16	PN16	PN16	350	370	390	400	420	435	440	460	480	500	500	545	580	630	700	730	730
n-M	PN16	PN16	PN16	PN16	PN16	PN16	8-20	12-20	12-20	16-20	16-24	20-24	20-24	20-27	24-27	24-30	28-30	28-33	32-36	36-39	40-45	44-45	48-45
K	PN16	PN16	PN16	PN16	PN16	PN16	295	350	400	460	515	565	620	725	840	950	1050	1160	1380	1590	1820	2020	2230
kg	PN16	PN16	PN16	PN16	PN16	PN16	41	53	66.5	80	104	125	145	183	237	305	364	468	679	925	1579	2350	2650

PN16																							
DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	800	900	1000	1200	1400	1600	1800	2000
L	215	215	225	225	225	225	235	250	265	265	275	295	295	315	325	340	350	360	370	380	400	420	440
L1	330	330	340	340	340	350	350	380	400	410	430	450	460	500	500	530	530	570	620	630	700	730	730
n-M	4-16	4-16	8-16	8-16	8-16	8-20	12-20	12-24	12-24	16-24	16-27	20-27	20-30	20-33	24-33	24-36	28-36	28-39	32-45	36-45	40-52	44-52	48-56
K	125	145	160	180	210	240	295	355	410	470	525	585	650	770	840	950	1050	1170	1390	1590	1820	2020	2230
kg	9.9	10.5	16	18.5	21.5	29	43	56	70	94	118	146	192	259	315	385	455	598	898	1360	1936	2460	3058

REMARKS :

REMARKS :

REMARKS :

ESTABLISHMENTS

Head Office

Electrosteel Castings Limited

GK Tower, 19, Camac Street, Kolkata - 700017, India, Ph: +91 33 2283 9990/ 7103 4400

Production Units

KHARDAH
30, B. T. Road, Khardah,
P.O. - Sukchar, Dist.- 24 Parganas (N),
West Bengal, India. Pin - 700115
Tel: +91 33 7101 4300 / 4450

BANSBERIA
Vill - Chak Bansberia, Saptagram
Panchayat, PO. - Adcconagar,
District - Hooghly,
West Bengal, India. Pin - 712121
Tel: +91 6292219270

HALDIA
Vill - Kasberia, P.O. - Shibramnagar,
Haldia, District- Purba Medinipur,
West Bengal, India. Pin - 721635
Tel: +91 9083280640
+91 9434095385

SRIKALAHASTHI
Vill - Rachagunneri,
Mandal-Srikalahasthi
District - Tirupati, Andhra Pradesh, India,
Pin 517641
Tel: +91 8578 286650 - 55

ELAVUR
12/72 GNT Road, P.O.- Elavur,
Taluk - Gummidipondi,
District - Tiruvallur, Tamil Nadu,
India. Pin - 601201
Tel: +91 44-67911800

PUNGANUR
27-5-114, Chowdepalli
Punganur
District- Chittoor, Andhra Pradesh,
India, Pin- 517641
Tel: +91 8578 286650 - 55

ITALY
T.I.S. NUOVAL S.r.l.: Via Broletti,
20 - 38050 Castelnuovo (TN)

TURKEY
T.I.S. TURKEY SU TEKNOLOJLER
SAN. VE TC. A..: 75. Yil OSB Mah.
2001 Cad. Ofis Ve Iyeri No:22
Odunpazari/Eskiehir

Regional Offices

SOUTH
148/150, Luz Church Road, Mylapore
Chennai - 600 004, Tamil Nadu
Tel: 044 - 2467 4900
E-mail: swmarketing@electrosteel.com

NORTH
B-47, Shiv Mahal Building, 2nd Floor,
Connaught Place,
New Delhi - 110001
Tel: 011 - 23412838
E-mail: ecldelhi@electrosteel.com

WEST
B-707, Mahavir Icon
Plot No.89-90, Sector 15, CBD Belapur
Navi Mumbai - 400 614
Tel: 022 - 2756 1334
E-mail: eclmum@electrosteel.com

Global Presence

ITALY
T.I.S. Service S.p.A.
Via lago d'Iseo 4/6 24060 Bolgare,
Italy
Tel: +39- 0358354811
www.latis-service.com

POLAND
T.I.S. POLSKA SP. Z O.O.
Ul. Oarowska, 30D 05-850 Oarów
Mazowiecki, Duchnice - Poland
Tel: +48/22.483.56.00
www.latis-service.com

CROATIA
T.I.S. ENGINEERING D.O.O.
Varaždinska Ulica, 1 - Odvojak 11
- Jalkovec
42000 Varaždin - Croatia
www.latis-service.com

FRANCE
Electrosteel Europe S.A.,
Zone Industrielle Nord,
9, Rue Galilee, F13200 Arles, France
Tel: +334 90968130
www.electrosteel.fr

GERMANY
Electrosteel Europe S.A.
Niederlassung Deutschland,
Bruder-Kremer-Str. 6 65549
Limburg a.d. Lahn Germany
Tel: +49 6442 9559340
www.electrosteel.de

SPAIN
Electrosteel Sucursal En España
Calle Anabel Segura Nº 11, Edificio
Albatros .- A, Planta 4ª Modulo B2, 28108
Alcobendas (Madrid), Spain
Tel: +34 91 564 73 29
www.electrosteel.es

USA
Electrosteel USA, LLC
421 Telfair Road,
Savannah, GA-31415, USA
Tel: +01 912-387-0613
www.electrosteelusa.com

UK
Electrosteel Castings (UK) Limited
Ambrose House,
Broombank Road Trading Estate
Broombank Road, Off Carrwood Road
Chesterfield, Derbyshire,
S41,9QJ, United Kingdom
Tel: +44 1246 264222,
www.electrosteel.co.uk

BAHRAIN
Electrosteel Bahrain Trading WLL
Building No 966, Road 5218
Block 952,Area Rus Zuwayed,
Kingdom of Bahrain
Tel: +973 17404791
Fax: +973 77322288
www.electrosteel.com

UAE
Electrosteel Castings Gulf FZE
Office No. LB090201, Lob: 9,
P.O Box 261462, Jebel Ali Free Zone,
Dubai, UAE
Tel: +971 50 5928405
www.electrosteel.com

QATAR
Electrosteel Doha For Trading L.L.C
P.O. Box 80368, Office No 502,
5th Floor,AL Mansour
Business Park, Building No. 20,
Zone 27, Street 950,
Umm Ghuwailina, Doha, Qatar,
Tel:+974 50196226
www.electrosteel.com

SINGAPORE
Singardo International Pte. Ltd,
2, Kallang Avenue,
#09-23 CT Hub, Singapore - 339407,
Tel: +65 62945875
Fax: +65 62970238
www.singardo.com.sg

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