

technical documentation

rubberlined butterfly
valves

manual operators

check valves

CONTENTS

1 WOUTER WITZEL COMPANY INFO	2
1.1 Wouter Witzel General	2
1.2 Sales and Distribution	2
1.3 Product philosophy	3
1.4 Manufacturing	3
1.5 Sales programme rubberlined butterfly valves, manual operators, check valves	4-5
1.5.1 Eurovalve ranges: centric rubberlined butterfly valves	6
1.5.2 Manual operators	6
1.5.3 Check valves	7
1.6 Quality Assurance	7
1.6.1 Quality assurance system	7
1.6.2 Type approvals	7
1.6.3 Material inspection certificates	7
1.6.4 Testing inspection certificates	7
2 PRODUCT DATA: RUBBERLINED BUTTERFLY VALVES	8
2.1 How to use a Wouter Witzel Eurovalve butterfly valve	8
2.2 Installation possibilities	9
2.3 Design (features and benefits for use)	10-11
2.4 Materials (bodies, discs, linings, coatings)	12-15
2.5 Product sheets (all body types)	16-44
2.6 Technical data (flow, torques, flanges)	45-48
2.7 Special executions (Halar coated disc, double block and bleed etc)	49-51
2.8 Storage and installation	52
3 PRODUCT DATA: MANUAL OPERATORS	53
3.1 Lever, type L	54
3.2 Gearbox, aluminium casing	55
3.3 Gearbox, cast iron casing	56
3.4 Gearbox for buried service	57
3.5 Gearbox extensions	58
4 PRODUCT DATA: CHECK VALVES	59
4.1 General	59
4.2 Design	59-61
4.3 Installation	61
4.4 Materials	62
4.5 Technical Data (flow)	63
5 SALES PROGRAMME: OTHER WOUTER WITZEL PRODUCTS	64
5.1 Large diameter butterfly valves and check valves	64
5.2 High performance butterfly valves	65
5.3 Regulating butterfly valves	65
5.4 PTFE lined butterfly valves for corrosive fluids	66
5.5 Power actuators	67
6 VALVE DATA SHEET	68
Information to be specified to select the correct valve type	68

1.3 PRODUCT PHILOSOPHY

The butterfly valve is probably one of the best known types of industrial valves for flow shut-off as well as for regulating services.

The Wouter Witzel product philosophy is based on the principle objective of having the possibility to offer, out of a wide spectrum of butterfly valves and actuators, the optimum solution for each specific market segment and application.

Although the external appearance of products on the market look very similar, Wouter Witzel butterfly valves incorporate important differences, aimed at achieving excellent product performance, high reliability, and low whole life cost.

The above principles have been at the core of Wouter Witzel business development over the years and is the basis of the company's high reputation and global expansion.

1.4 MANUFACTURING

Eurovalve butterfly valves are manufactured in-house, within its own engineering works, rubber factory and coating departments.

The manufacture of rubber lined butterfly valves with the lining 'Bonded-to-the-body' requires specialised techniques and the production vulcanizing presses have been designed and built by the company in its own toolroom. It is this expertise that has created the opportunity to develop and extend the rubberlined concept into larger sizes, currently up to DN 2000 (80"). Wouter Witzel is at the forefront of the innovation and manufacturing of large sized rubber lined butterfly valves.

1.5 SALES PROGRAMME

Wouter Witzel supplies a wide range of industrial butterfly valves up to DN 4000 (160") and actuators as listed in the product survey below and in chapter 5. Detailed product leaflets are available.

In addition to butterfly valves, Wouter Witzel can supply a complete package of industrial valves. For further information please contact our sales department.




1.5.1 Eurovalve ranges: centric rubberlined butterfly valves

For use as isolating or regulating valve in a wide spectrum of industrial processes, eg: water supply (water works and transport pipelines), ship building, petro-chemical industries, hevac, gas systems, fire fighting systems, environment control etc. Approved by different international certification bodies eg WRC, DVGW, KIWA, Lloyds, UL, FM, etc.

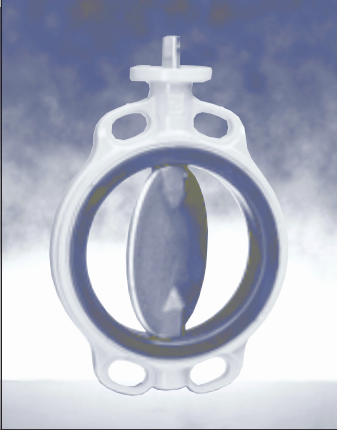
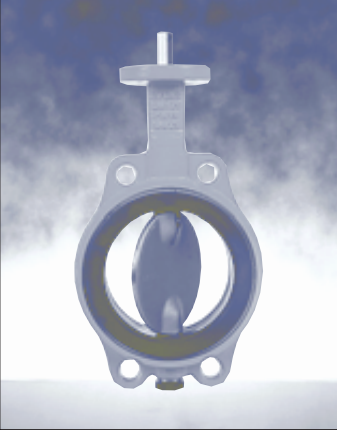
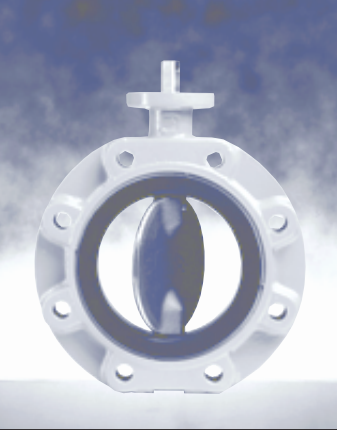
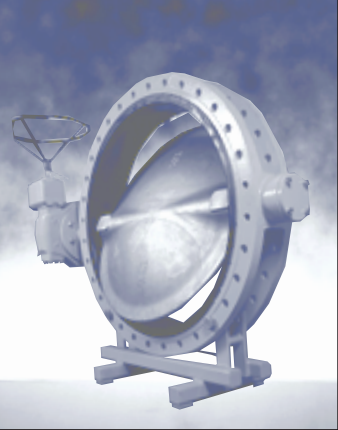
Installation in flanged piping systems: PN 6, 10, 16, 20, ANSI Class 150, JIS etc.

With manual or automatic operation.


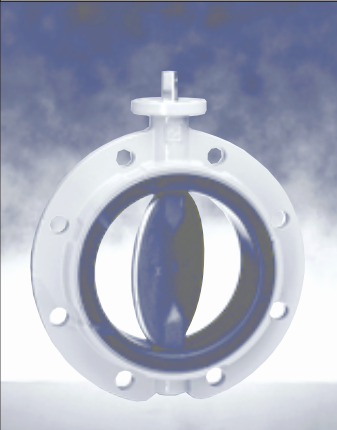
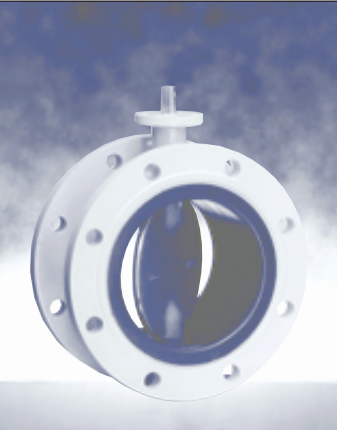
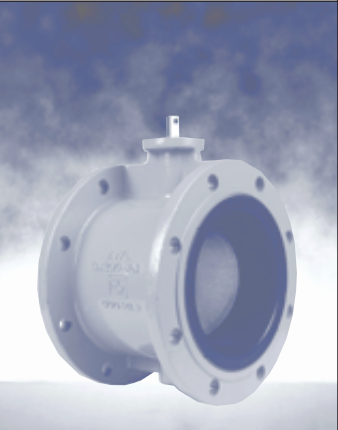
FLANGELESS WAFER BUTTERFLY VALVES

RANGE EVS Flangeless wafer type	RANGE EVL Flangeless wafer type (long)	RANGE EVCS Alignment lug wafer type
		
<p>Design: Bonded rubberlining in body. Centric shaft construction. Design pressure max. 16 bar. Bi-directional tight shut-off. DN 50 - 1400 (2" - 56").</p>	<p>Design: Bonded rubberlining in body. Centric shaft construction. Design pressure max. 16 bar. Bi-directional tight shut-off. DN 80 - 300 (3" - 12").</p>	<p>Design: Bonded rubberlining in body. Centric shaft construction. Design pressure max. 16 bar. Bi-directional tight shut-off. DN 50 - 300 (2 - 12").</p>

LUGGED AND U-SECTION WAFER BUTTERFLY VALVES

RANGE EVBS Semi-lug wafer type	RANGE EVBLS Semi-lug wafer type with long neck	RANGE EVTLS Tapped lug wafer type	RANGE EVUS U-section wafer type (with flanges)
			
Design: Bonded rubberlining in body. Centric shaft construction. Design pressure max. 16 bar. Bi-directional tight shut-off. DN 50 - 300 (2" - 12").	Design: Bonded rubberlining in body. Centric shaft construction. Design pressure max. 16 bar. Bi-directional tight shut-off. DN 50 - 200 (2" - 8"). Long neck for insulation.	Design: Bonded rubberlining in body. Centric shaft construction. Design pressure max. 16 bar. (25 bar on request) Bi-directional tight shut-off. DN 50 - 1000 (2"- 40").	Design: Bonded rubberlining in body. Centric shaft construction. Design pressure max. 10 bar. Bi-directional tight shut-off. DN 700 - 1600 (28" - 64").



FLANGED BUTTERFLY VALVES

RANGE EVMS Single flanged wafer	RANGE EVML Single flanged wafer type (long)	RANGE EVFS Double flanged type	RANGE EVFL Double flanged type (long)
			
Design: Bonded rubberlining in body. Centric shaft construction. Design pressure max. 16 bar. Bi-directional tight shut-off. DN 350 - 1000 (14" - 40").	Design: Bonded rubberlining in body. Centric shaft construction. Design pressure max. 16 bar. (25 bar on request) Bi-directional tight shut-off. DN 80 - 800 (3" - 32").	Design: Bonded rubberlining in body. Centric shaft construction. Design pressure max. 16 bar. (25 bar on request) Bi-directional tight shut-off. DN 50 - 2000 (2" - 80").	Design: Bonded rubberlining in body. Centric shaft construction. Design pressure max. 16 bar. Bi-directional tight shut-off. DN 50 - 1500 (2" - 60").

1.5.2 Manual operators

For manual operation of butterfly valves. Mounting possibilities on all types of butterfly valves for use in isolating or regulating duty in different environmental circumstances.

LEVER AND WORMGEAR

<p>LEVER Quick manual valve operation</p>	<p>WORMGEAR Easy manual valve operation</p>
	
<p>Design: Lift and turn operation. Spring activated locking. Lever parallel to disc. Notch plate for 10 positions. Valve sizes up to DN 300 (12").</p>	<p>Design: Self locking wormgearing. Handwheel or T-Key operation. Adjustable end stops. Position indicator. Valve sizes up to DN 2000 (80"). Different options available.</p>

1.5.3 Check valves

For use as a back flow prevention device in water supply systems, irrigation, heating systems, ship building, industrial processes.

Installation in flanged piping systems: PN 6, 10, 16, ANSI Class 150.

Approved by different international certification bodies eg DVGW, Lloyds.

WAFER CHECK VALVE

<p>RANGE ECV Flangeless wafer type</p>

<p>Design: Bonded rubberseat in body. Self acting pivoting double disc. Design pressure 16 bar. Uni-directional tight shut-off. DN 50 - 600 (2" - 24").</p>

1.6 QUALITY ASSURANCE

1.6.1 Quality assurance system

An important starting point for the design, manufacturing, testing and sales of valves is the fitness for use. This was for Wouter Witzel the reason to have the company's quality system certified according ISO 9001. BSI-QA has certified the company's QA system at an early stage (no. FM 2200).

1.6.2 Type approvals

Wouter Witzel butterfly valves are approved for application in a number of market areas by many international type approvals.

The most important ones are listed in the following table.

MARKET AREA	TYPE APPROVALS
Water supply	KIWA-The Netherlands DVGW-Germany WRC-United Kingdom SVGW-Switzerland University Twente-NL (Vacuum-test) JKR-Malaysia
Gas supply	DVGW-Germany British Gas- United Kingdom Gastec-The Netherlands
Ship building	Lloyds RS Det Norske Veritas American Bureau of Shipping Bureau Veritas Germanischer Lloyd RINA NKK Russian Maritime Register
Fire protection systems	Factory Mutual-USA Underwriters Laboratories-USA VdS-Germany APSAD-France
Chemical industries, steel works and mining	RWTÜV-Germany (TA-Luft) Bergbau Amt-Germany (anti-static) Stoomwezen (The Netherlands)
General approval confirming for standard compliance	British Standard Kitemark Licence. Compliance with BS 5155.

1.6.3 Material inspection certificates

Valve parts, eg body, disc, can be supplied on request with inspection certificates of the material supplier (foundry, forge) according EN 10204, 3.1.B. subject to material type. Other specifications are possible.

1.6.4 Testing inspection certificates

All valves are pressure and functional tested after assembly according to internal quality procedures which comply with international standards. Inspection certificates according EN 10204, 2.3, 3.1.B, 3.1.C can be submitted on request.

2 PRODUCT DATA: RUBBERLINED BUTTERFLY VALVES

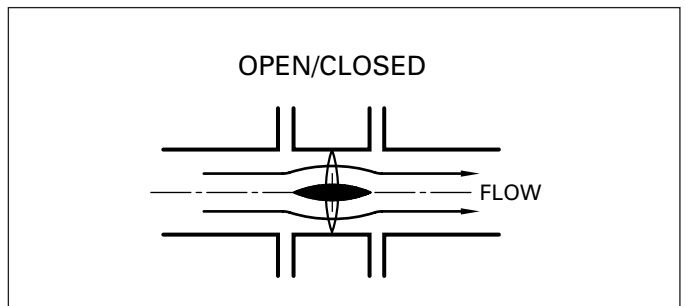
2.1 HOW TO USE A WOUTER WITZEL EUROVALVE BUTTERFLY VALVE

Butterfly valves are applied more and more in piping systems instead of traditional valves because of their general advantages (see 2.3).

The Eurovalve range is specially designed for the following process functions: 1. Isolating (100% tight shut off; zero leakage) and/or 2. Flow control regulation or modulating duties.

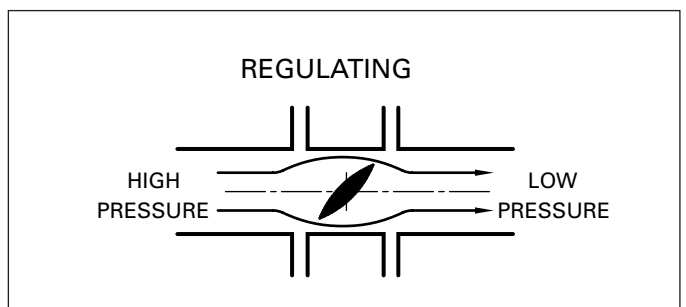
ISOLATING, STOP OR SHUT OFF VALVE (ON/OFF)

The butterfly valve is used in the fully open or in the closed position. With an isolating valve a part of a piping system can be isolated by closing the valve. It prevents flow or leakage into the downstream conduit. The advantage of a Wouter Witzel Eurovalve compared with other butterfly valves for this application is the low flow resistance when the valve is open. The design of slim and streamlined disc shapes results in low pressure losses and reduced energy costs for the end user. The saving of energy costs may be several times the initial price of the valve. Ask for our Technical Data sheet regarding flow through on/off valves and energy costs.



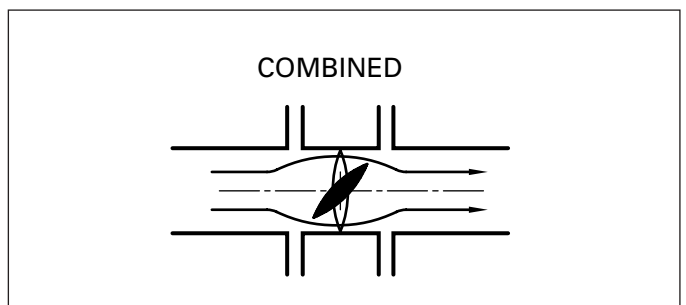
REGULATING VALVE

The butterfly valve is used in a partly open position to regulate the pressure, the capacity, level or temperature of a process. The Eurovalve range finds more and more application as regulating valves due to their good linear flow characteristic. Ask for our Technical Data sheet regarding flow control.



COMBINED REGULATING AND ISOLATING VALVE

The Eurovalve range can also be used for a combined function because the valves are 100 % tight shut off in the closed position as well as being suitable for regulating duties in the partly open position. Ask for our Technical Data sheets regarding flow control.



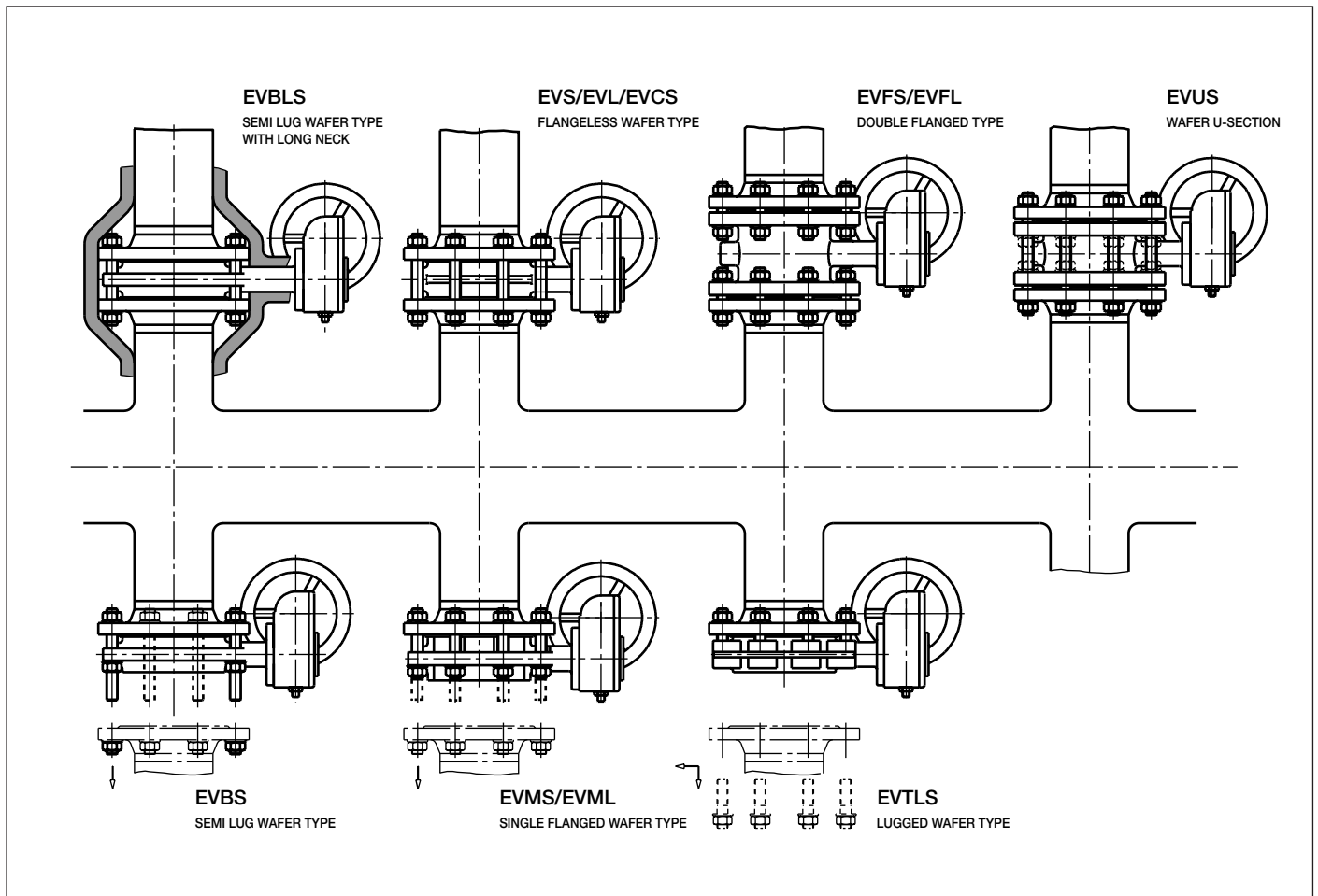
2.2 INSTALLATION POSSIBILITIES

The Eurovalve ranges are intended for installation in flanged piping systems. They are easy to install or to remove from the pipeline, being bolted between the mating pipe flanges. A selection can be made from different body types eg wafer, flanged. The correct body type of the valve should be selected on the basis of installation requirements.

	EVS/EVL/ EVCS	EVBS	EVBSL	EVMS/ EVML	EVTL	EVUS	EVFS/ EVFL
Body types:	Flangeless wafer type	Semi-lug wafer type	Semi-lug wafer type with long neck	Single flanged wafer type	Lugged wafer type (threaded lugs)	Wafer U-section	Double flanged type
Valve installation requirements:							
Clamping between flanges	OK	OK	OK	OK		OK	
Installation between flanges and possibility for downstream pipe dismantling		OK	OK	OK	OK	OK	OK
Valve bolted at end of the line flange		OK	OK	OK	OK	OK	OK
Two separate flange connections					OK	OK	OK
Bolting directly to hull (shipside)				OK			OK
Suitable for insulation of pipes	OK	OK	OK*	OK	OK	OK	OK

* special execution for insulation around valve

CHARACTERISTIC INSTALLATION SITUATIONS FOR DIFFERENT BODY TYPES



2.3 DESIGN

Eurovalve concept

Years of innovation, manufacturing and experience have created a complete range of centric rubberlined butterfly valves.

Up-to-date design and state of the art materials tailored to market needs and wishes such as no maintenance and long service life. The Wouter Witzel design philosophy is based on the principle objectives of achieving high reliability, high efficiency and to also be highly cost effective. High reliability by an excellent disc sealing concept with a bonded rubber lining reducing maintenance and downtime. High efficiency by excellent flow performance reducing energy losses.

The diameter range is from DN 50 - 2000 (2" - 80") and a wide variety of materials is available for many applications. The valves are designed according to the latest international standards and meet environmental requirements.

Design of the Eurovalve concept

The valve body is principally a cylindrical shape designed as a pressure containing part. The body is fully rubberlined inside for sealing and corrosion protection. The body has flanges, lugs, or end connections for mounting between pipe flanges and two necks for holding the shafts. The upper shaft extends out of the body and is used to operate the disc by the actuation device, mounted on a standardized interface flange.

The disc is basically a circular part, which can rotate 90° on the axis of the shaft. The outer edge of the disc seals against the lining in the closed position of the valve. When the disc is perpendicular to the pipeline, the valve is shut. When the disc is parallel with the pipe, the valve is fully open. The orientation of the disc is indicated by a groove at the shaft end that is in line with the disc. Additionally the lever position or position indicator of the actuator shows the disc orientation.

High reliability by bonded lining

One of the most significant steps forward in butterfly valve reliability has been development of bonded-to-body rubber linings. The most resilient of all types since the manufacturing process, akin to injection moulding or transfer moulding, bonds the rubber directly onto the valve body forming a permanent bond to body.

This process also ensures a perfect inner lining profile for sealing of the disc and integral flange gaskets. The benefits include increased operational life since scuffing resulting from liner distortion is eliminated. This concept is proving to be the most reliable and cost effective for many applications.

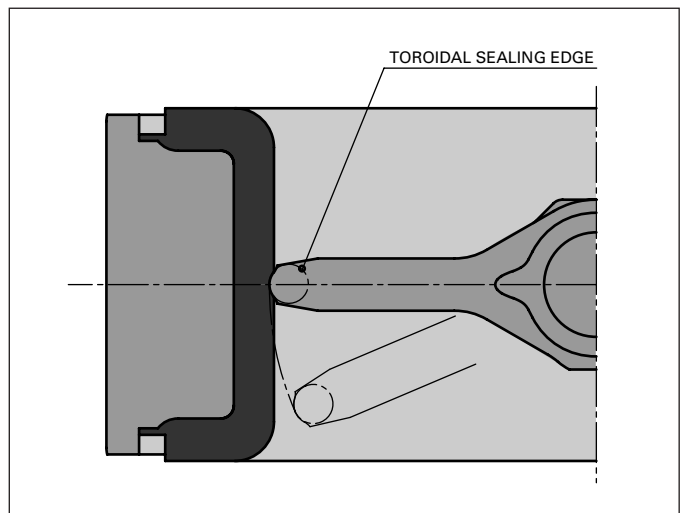
High efficiency by low profiled and streamlined discs

Wouter Witzel has developed full bore butterfly valves with special low profiled and streamlined discs which result in a low flow resistance when the valve is open and reduced energy costs for the end user. It is obvious that under full-flow conditions the shape of the valve disc and the diameter of the valve bore has a considerable effect on the fluid flow. Badly shaped discs or reduced bore valves create pressure drop, turbulence, as well as other potential side effects such as valve vibration resulting in reduced plant efficiency. Attention paid to the streamlining of the disc profile is paramount if good flow characteristics are to be achieved. The saving of energy costs by selecting a Eurovalve may be several times the initial cost of the valve (ask Wouter Witzel for an energy calculation)

High reliability by excellent seating concept

Wouter Witzel has developed a special seating concept for its Eurovalve ranges. The disc has a profiled sealing edge with the geometry of a centric located toroid. This accurate and smooth-machined profile of the disc edge requires minimal deformation of the resilient rubber lining to achieve a positive sealing. The low deformation results in less wear of the lining, a low seating angle and low operating torques.

This excellent seating concept together with a lining which is bonded to the valve body forms the heart of the valve performance, making these valves very reliable and suitable for high cycling frequencies and a long lifetime. These features also make the Eurovalve range particularly suitable for actuated duties.



Note: On clean duties tests carried out by a major German chemical company demonstrated that the zero leakage tight shut off rating was the same after 500.000 operations as when new.

Eurovalve design features and benefits for use:

CENTRIC SHAFT POSITION

100 % bi-directional tight shut off.
 Installation without restriction in direction of flow.

STREAMLINED AND SLIM DISC SHAPE; FULL BORE BODY

Low pressure loss and reduced energy costs.
 High Kv / Cv values.

NO CAVITIES IN THE FLOW PASSAGE

Easy to clean and disinfect for
 potable water systems etc.
 Self cleaning (no residue will be trapped).

FEW PROCESS WETTED PARTS

Good resistance to corrosion.
 High reliability.

COMPACT CONSTRUCTION; LOW WEIGHT

Easy to handle and to install.
 Less space in storage and installation.

BODY INTERNALLY RUBBERLINED

Fluid does not contact the body (no corrosion).
 No flange gaskets required.
 Insulation of noise and heat transfer.

LINING BONDED TO THE BODY

No corrosion between body and lining.
 Suitable for vacuum service, eg at the suction
 side of the pump.
 Longer life time.
 No distortion of lining.
 Excellent performance in dry duties.
 Valve can be installed with the disc fully closed.
 Particularly suited for actuated duties.
 Suitable for end of line use.

STANDARDIZED ACTUATION FLANGE

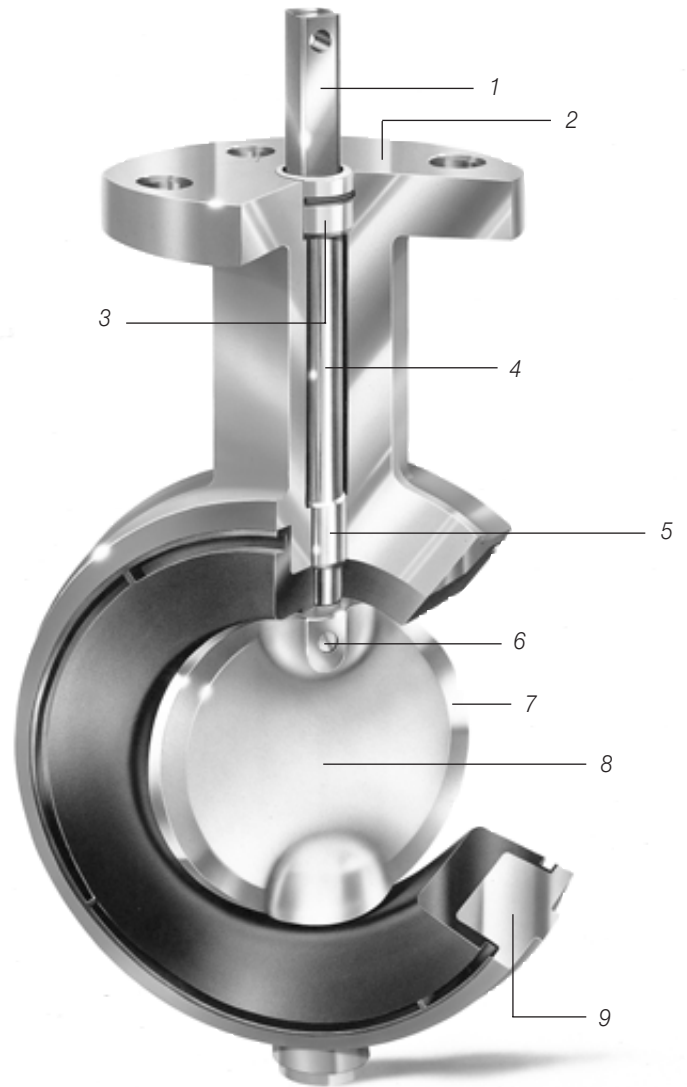
Easy automation.
 Retrofitting of actuator is possible.
 Actuator position can be changed on site.

LOW OPERATING TORQUES

Easy to operate.
 Economical actuator selection.

BOTH SHAFTS CARRIED IN PTFE LINED BEARINGS

Low shaft friction (operating torque) and wear.
 No lubrication required.



- (1) Shaft square with groove, indicating disc orientation
- (2) Topflange ISO 5211
- (3) O-ring / O-ring bush
- (4) Shaft (concentric)
- (5) Bearing
- (6) Conical pin
- (7) Toroidal disc edge
- (8) Centric valve disc
- (9) Rubberlined valve body

2.4 MATERIALS

Fluids

The selection of the right materials of the process wetted parts is mainly based on the nature of the fluid in the piping system. A broad range of material combinations can be selected for all valve body types.

Body materials:

As the body is internally fully rubberlined the body material is protected from corrosion by the fluid.

Wouter Witzel code	Type of material	Material standard	Examples for application
M01	Cast iron	GG25, DIN 1691 <i>cl. B, ASTM A126 Gr.250, BS 1452</i>	General applications.
M03	Ductile cast iron	GGG40, DIN 1693 <i>60-40-18, ASTM A536 400-18, BS 2789</i>	Heavy applications, eg high pressures, waterhammer, high bending moments in pipe line.
M85	Ductile cast iron (Heat treated)	GGG40.3, DIN 1693	Cold applications, petro-chemical industries, power stations, alternative for cast steel.
M22	Cast carbon steel	GS-C 25, DIN 17245 <i>WCB, ASTM A216 161-430A, BS 1504</i>	Heavy applications, eg petro-chemical industries, ship building.
M29	Bronze casting	C-CuSn10Zn, DIN 1705, (RG 10) <i>C90500, ASTM B584 LG1, BS 1400</i>	Marine service.

Note: The material standards printed in italics are comparable with the supplied materials. Other materials on request eg stainless steel.

External body coatings

Bodies in ductile or cast iron and steel are supplied externally coated using one of the following coating systems. The polyurethane coating type PUR is standard; the other coatings are supplied on request.

Note: These coatings are not process wetted.

Wouter Witzel code	Coating	Layer thickness	Colour	Typical environments
PUR	(primer), 1 pack polyurethane coating	60 µm	Orange RAL 2000	Indoor- and outside exposure. Normally dry.
PUR-1	primer, 2 pack polyurethane coating	120 µm	Grey, RAL 7038	Outside exposure, marine service. Frequently damp and wet.
EP	epoxy primer	50 µm	Grey, RAL 7002	As primer for further coating by the end user.
EP-1	primer, 2 pack epoxy coating system	200 µm	Black, RAL 9011	Buried service. Polluted inland and coastal sea water splash zone.
EP-2	primer, 2 pack epoxy coating system	350 µm	Black, RAL 9011	Buried or immersed service in heavy circumstances. Marine service.

Remarks:

- Polyurethane coating PUR and PUR-1 are available in other colours eg: Blue/RAL 5017, Red/RAL 3000 and Grey/Ral 7000.
- Epoxy coating EP-1 and EP-2 are available in the colour grey/RAL 7038 (application: overground service).
- Epoxy coating EP-1 is available with an extra polyurethane toplayer in different colours (aesthetic requirements).
- Other coatings are available on request.

Body lining materials

Wouter Witzel has invested heavily in research into formulation of rubber compounds and so developed 'in-house' expertise in rubber technology. The quality of rubber compounds is fundamental to the performance and reliability of the Eurovalve ranges.

Important: It is essential that for each individual case the selection of the type of rubber complies with the fluid characteristics.

A wrong selection may cause failure of the valve. The given temperature limits shall be used as guide lines. The suitability of a type of rubber depends on the actual service conditions such as working pressure, peak temperatures and the nature of both the process fluids and any cleaning medium etc. In case of doubt please contact Wouter Witzel for advice.

Wouter Witzel code	Type of material	Material standard ISO 1629	Examples for application
M80	Nitrile rubber, KTW/DVGW approved (Wouter Witzel standard)	NBR	Aliphatic hydrocarbons (fuels, low aromatic containing oils, gases), seawater, compressed air, powders, granulars. Temperature indication: 0 to 90°C.
M46	Nitrile rubber, DVGW approved	NBR DIN 3535 / T3	Gas supply when a DVGW approval for the lining material is required. Temperature indication: 0 to 50°C.
M16	Ethylene-propylene-diene rubber, KTW/DVGW approved (Wouter Witzel standard)	EPDM	<ul style="list-style-type: none"> - Water in general (hot-, cold-, sea-, ozone-, swimming-, glycolized-, industrial- etc). - Potable water. - Foodstuffs (including animal and vegetable oils/fats). - Weak acids, weak salt solutions, alcohols, ketones, sour gases. Temperature indication: -30 to 110°C.
M23	Ethylene-propylene-diene rubber, heat resistant	EPDM	Hot water, sugar juice. Temperature indication: 0 to 120°C.
M74	Ethylene-propylene-diene rubber, WRC approved Certification number 900527	EPDM	Potable water and foodstuffs/ when a WRC approval for the lining material is required. Temperature indication: 0 to 70°C.
M113	Fluor rubber (B type)	FPM	Many aliphatic, aromatic and halogen hydrocarbons, hot gases/ when NBR or EPDM is not suitable. Not for watery fluids. Temperature indication for gases: 0 to 200°C.
M56	Fluor rubber (GF type)	FPM	Concentrated acids, hot water, steam. Temperature indication: 0 to 150°C.

For detailed information about resistance / temperaturerange of the lining against fluids please contact Wouter Witzel for advice.

Note: In addition to the above standard rubbers there are several optional materials to suit special duties.

Disc materials

As the disc is a process wetted part the material should be carefully selected. Wouter Witzel can supply the following materials:

Wouter Witzel code	Type of material	Material standard	Examples for application (Fluids)
M52	Stainless steel forging, 17 % Cr Martensitic structure DN 50 - 600 (2" - 24")	1.4057, DIN 17440 <i>Gr.431, ASTM A276 431.S29, BS 970</i>	Air, non corrosive hot or cold water, solvents, fuels, abrasive duties (slurries, dry powders, granulates).
M50	Stainless steel forging 22Cr5Ni Duplex structure DN 50 - 600 (2" - 24")	1.4462, SEW 400 <i>F51, ASTM A276 318 S13, BS 1503</i>	Potable water, sea water, demineralized water, solvents, foodstuff.
M64	Stainless steel welding 18Cr 10Ni Austenitic structure DN 700 - 1600 (28" - 64")	1.4435, DIN 17440 <i>TP 316L, ASTM A774 316 S13, BS 1503</i>	Potable water, demineralized water, solvents, industrial water. Not recommended for sea water.
M20/M21	Aluminium bronze DN 50 - 2000 (2" - 80")	G-CuAl10Ni, DIN 1714 <i>C95800, ASTM B148 AB2, BS 1400</i>	Sea water, potable water, gas.
M77	Hastelloy-C DN 50 - 600 (2" - 24")	CW-12MW, ASTM A494,	Phosphoric, hypochloric, acetic, formic, sulfurous acids.
M03/ EP-W-2 coated	Ductile cast iron, 340 µm epoxy coated. WRC, DVGW, FDA approved DN 250 - 2000 (10" - 80")	GGG 40, DIN 1693 <i>60-40-18, ASTM A536 400-18, BS 2789</i>	Potable water, clean water (max. 60°C).
M03/Rilsan coated	Ductile cast iron, 300 µm Rilsan coated KIWA, BGA, KTW, FDA, WRC approv. DN 250 - 2000 (10" - 80")	GGG 40, DIN 1693 <i>60-40-18, ASTM A536 400-18, BS 2789</i>	Potable water, water (max. 70°C) pH values between 4,5 and 12.
M52/Halar coated M03/Halar coated	Stainless steel, 700 µm Halar coated DN 50 - 350 (2" - 14") Ductile cast iron, 700 µm Halar coated DN 400 - 1000 (16" - 40")	1.4057, DIN 17440 GGG 40, DIN 1693	Acids, alkali, organic solvents, sticky fluids (max 120°C) pH values between 1 and 14.

Note: The material standards printed in italics are comparable with the supplied materials.

Other materials (eg Uranus B6) are available on request.

Materials for shafts and tapered pins

Materials for shafts and tapered pins are selected on the basis of disc materials.

Wouter Witzel code	Type of material	Material standard	In combination with disc material
M52	Stainless steel 17 % Cr	1.4057, DIN 17440 <i>Gr.431, ASTM A276 431.S29, BS 970</i>	Stainless steel 17 % Cr, Ductile cast iron.
M50/M81	Duplex stainless steel 22Cr 5Ni	1.4462, SEW 400 <i>S31803, ASTM A276 318 S13, BS 1503</i>	Duplex stainless steel, austenitic stainless steel.
M31/M57	Aluminium bronze	CuAl10Ni5Fe4, DIN 17665 <i>C63000, ASTM B150</i>	Aluminium bronze.
M70	Monel	NA 18, BS 3076	Aluminium bronze (High pressure applications).
M94	Hastelloy C276	2.4819, DIN 17744 <i>N10276, ASTM B547</i>	Hastelloy C.

Note: The material standards printed in italics are comparable with the supplied materials.

Standard material configurations

The following tables give a survey of the standard material configurations with the Wouter Witzel combination code.

Disc: Stainless steel 1.4057

Shaft	SS 1.4057			
Conical pin	SS 1.4057			
Lining	NBR		EPDM	
Body	Cast iron	Ductile cast iron	Cast iron	Ductile cast iron
Code	AA	KA	BA	JA

Disc: Duplex SS 1.4462

Shaft	SS 1.4462			
Conical pin	SS 1.4462			
Lining	NBR		EPDM	
Body	Cast iron	Ductile cast iron	Cast iron	Ductile cast iron
Code	AE	KE	BE	JE

Disc: Ductile cast iron/ Rilsan coated

Shaft	SS 1.4057			
Conical pin	SS 1.4057			
Lining	NBR		EPDM	
Body	Cast iron	Ductile cast iron	Cast iron	Ductile cast iron
Code	AP	KP	BP	JP

Disc: Alubronze

Shaft	Alubronze			
Conical pin	Alubronze			
Lining	NBR		EPDM	
Body	Cast iron	Ductile cast iron	Cast iron	Ductile cast iron
Code	AK	KK	BK	JK

Disc: Alubronze

Shaft	SS 1.4462		SS 1.4057	
Conical pin	Alubronze		Alubronze	
Lining	NBR	EPDM	EPDM	NBR
Body	Cast iron	Cast iron	Cast iron	Cast iron
Code	AJ	BJ	BL	AL

Note: Other configurations on request.

2.5 PRODUCT SHEETS

BASIC INFORMATION OF EUROVALVE BUTTERFLY VALVES:

- Design in accordance with latest specifications of ISO, CEN, DIN, BS, API, JIS and others.
- Marking: ISO 5209/EN19 (API 609, MSS SP25 on request).
- Face to face equivalents:

DIN 3202:	wafer- and waferlug types	K1	(= ISO, series 20)
		K3	(= ISO, series 16)
	double flanged types	F16	(= ISO, series 13)
		F4	(= ISO, series 14)

BS 5155:	wafer- and waferlug types	short	(= ISO, series 20)
		long	(= ISO, series 16)
	double flanged types	short	(= ISO, series 13)
		long	(= ISO, series 14)

API 609:	wafer- and waferlug types		(= ISO, serie 20).
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- Customer specification and tailor made design are possible on request.
- Drawings are butterflyvalves with free shaft. On request we can supply specification related drawings completed with manual or power actuators or in accordance with customer's specification.

BUTTERFLY VALVE - RANGE EVS DN 50 - 600 (2" - 24")

PRODUCT SHEET

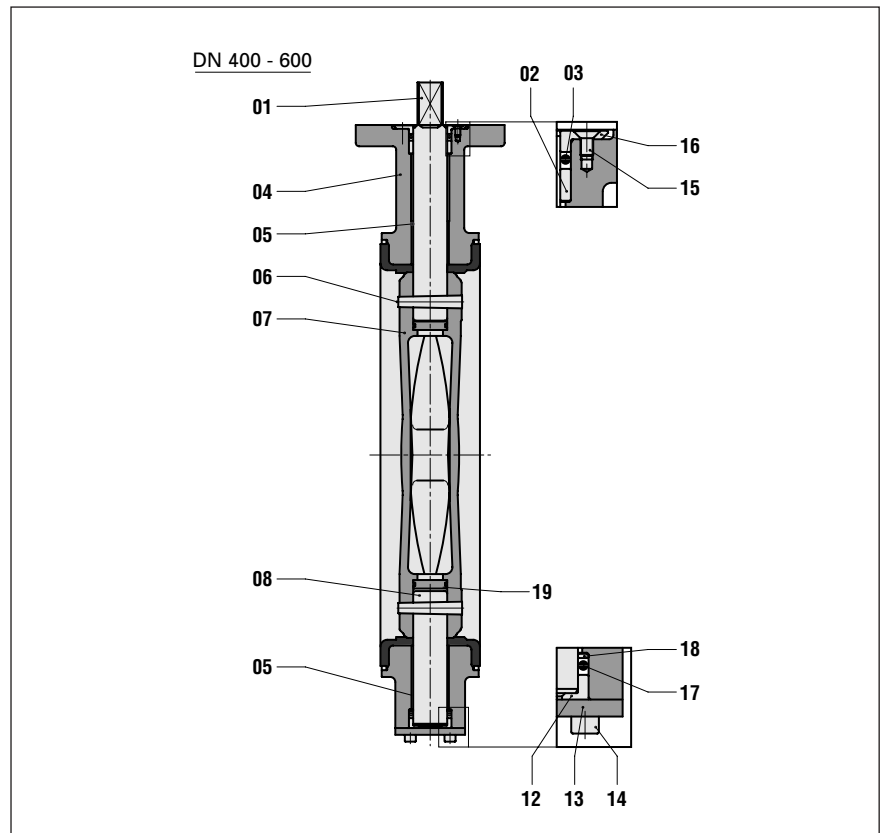
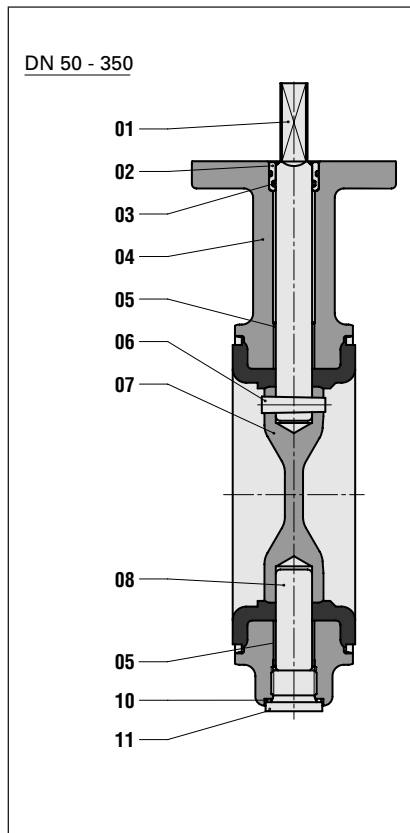
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Flangeless wafer short type, centric, rubberlined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between two flanges
Flange connections*	PN 6 / 10 / 16 / 20 / ANSI Class 150 / JIS 5 / 10 / 16
Valve shut off pressure*	2,5 / 6 / 10 / 16 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	KIWA,DVGW,WRC,SVGW,JKR,LRS,DNV,ABS,BV,GL,RIN,NKK,RMRS,UL,FM,VdS
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:



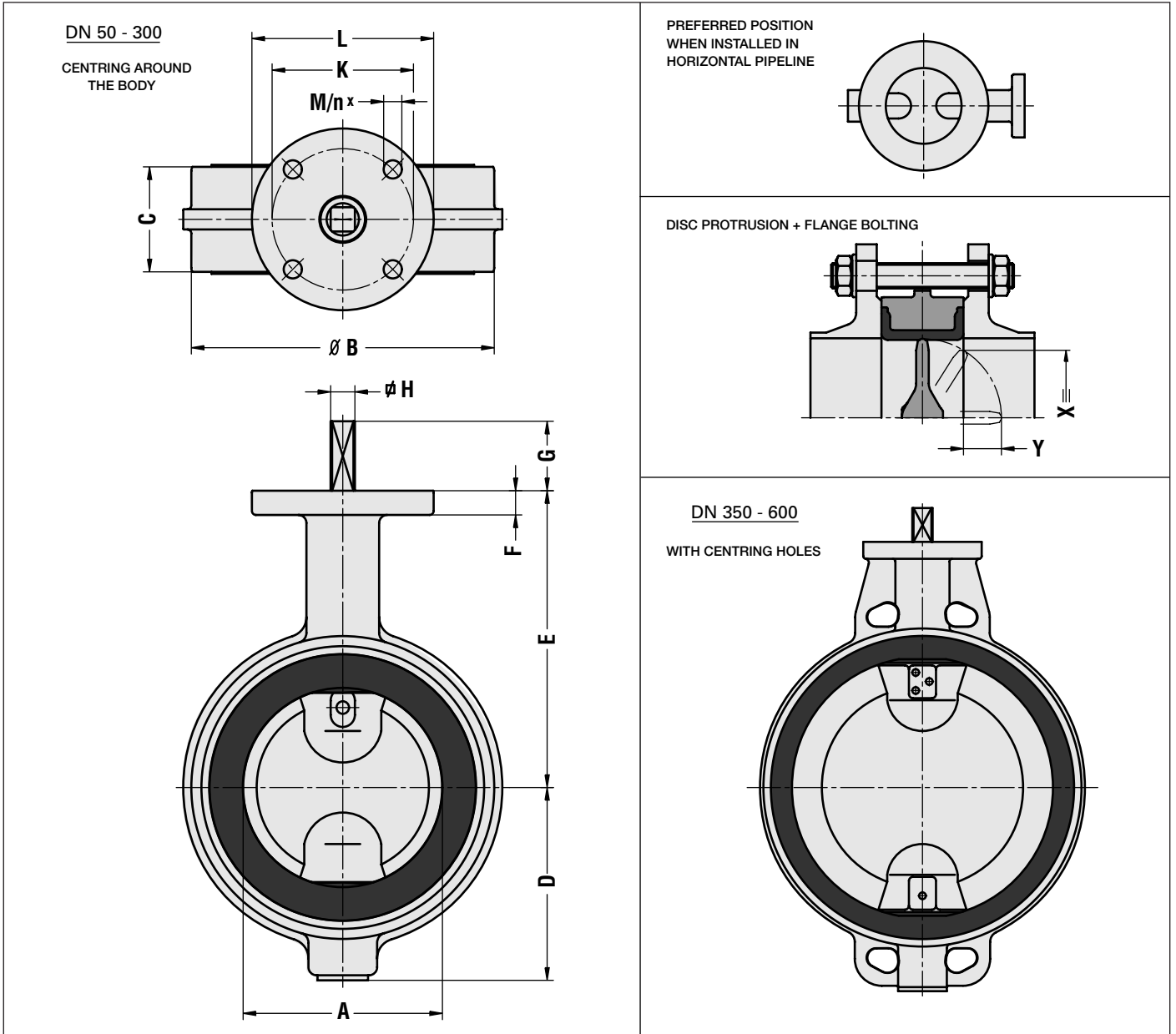
PARTS LIST:

ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

RANGE EVS DN 50 - 600 (2" - 24")

DIMENSIONS:



DN NPS	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211
40 1½"	50	*100	**43	63	118	12	34	10	70	90	9	4	F07
50 2"	50	100	43	63	118	12	34	10	70	90	9	4	F07
65 2½"	65	115	46	71	126	12	34	10	70	90	9	4	F07
80 3"	80	130	46	78	133	12	34	10	70	90	9	4	F07
100 4"	100	150	52	98	147	12	34	12	70	90	9	4	F07
125 5"	125	182	56	109	160	12	34	12	70	90	9	4	F07
150 6"	150	210	56	133	180	14	34	16	70	90	9	4	F07
200 8"	200	262	60	158	204	14	34	16	70	90	9	4	F07
250 10"	250	315	68	194	245	15	45	24	102	125	11	4	F10
300 12"	300	371	78	219	270	15	45	24	102	125	11	4	F10
350 14"	336	405	78	256	315	15	45	24	102	125	11	4	F10
400 16"	386	470	102	308	363	25	50	30	140	175	17	4	F14
450 18"	436	522	114	334	388	25	50	30	140	175	17	4	F14
500 20"	486	576	127	360	413	25	50	30	140	175	17	4	F14
600 24"	586	672	154	426	510	25	50	40	140	175	17	4	F14

X	Y	±kg
25	4	2.6
25	4	2.6
46	10	3.2
66	17	3.5
86	24	4.5
112	35	6.3
140	47	8.8
191	70	13.2
241	91	22
290	111	32
327	129	40
373	142	75
421	161	90
470	180	120
566	216	180

Note: Intermediate sizes (eg DN 175/7") are available on request.

* Notched body

** Works standard

BUTTERFLY VALVE - RANGE EVS DN 700 - 1400 (28" - 56")

PRODUCT SHEET

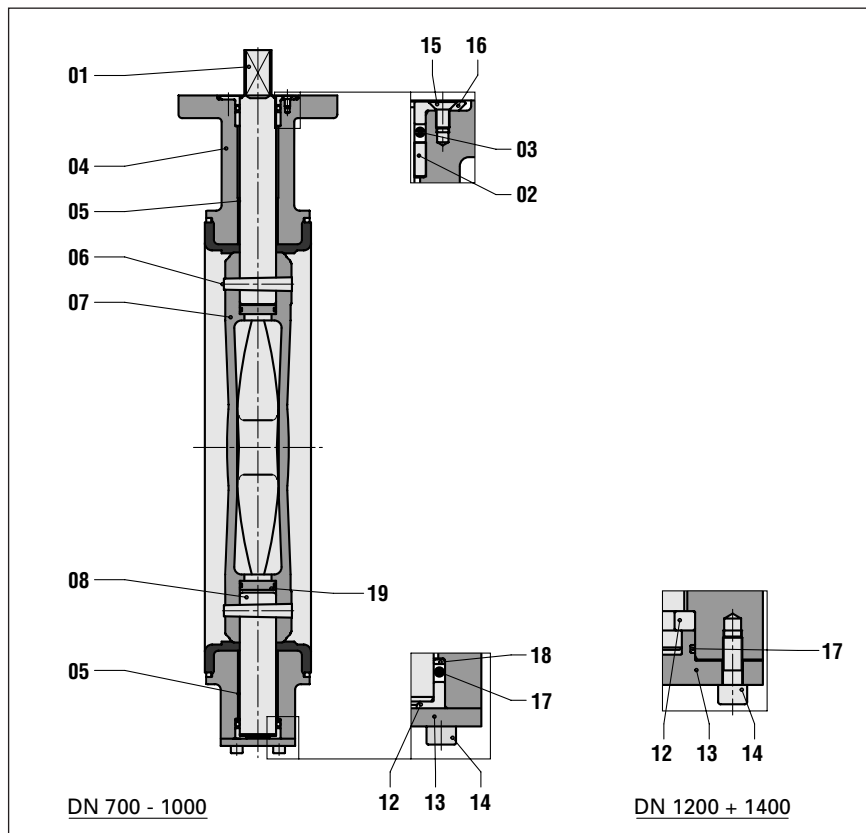
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Flangeless wafer short type with drilled or tapped centring holes, centric, rubber-lined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between two flanges
Flange connections*	PN 6 / 10 / 16 / 20 / ANSI Class 150 / JIS 5 / 10 / 16
Valve shut off pressure*	2,5 / 6 / 10 / 16 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 20 (wafer short). NB: DN 1400: Works standard
Available type approvals*	KIWA,DVGW,WRC,SVGW,JKR,LRS,DNV,ABS,BV,GL,RIN,NKK,RMRS
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:

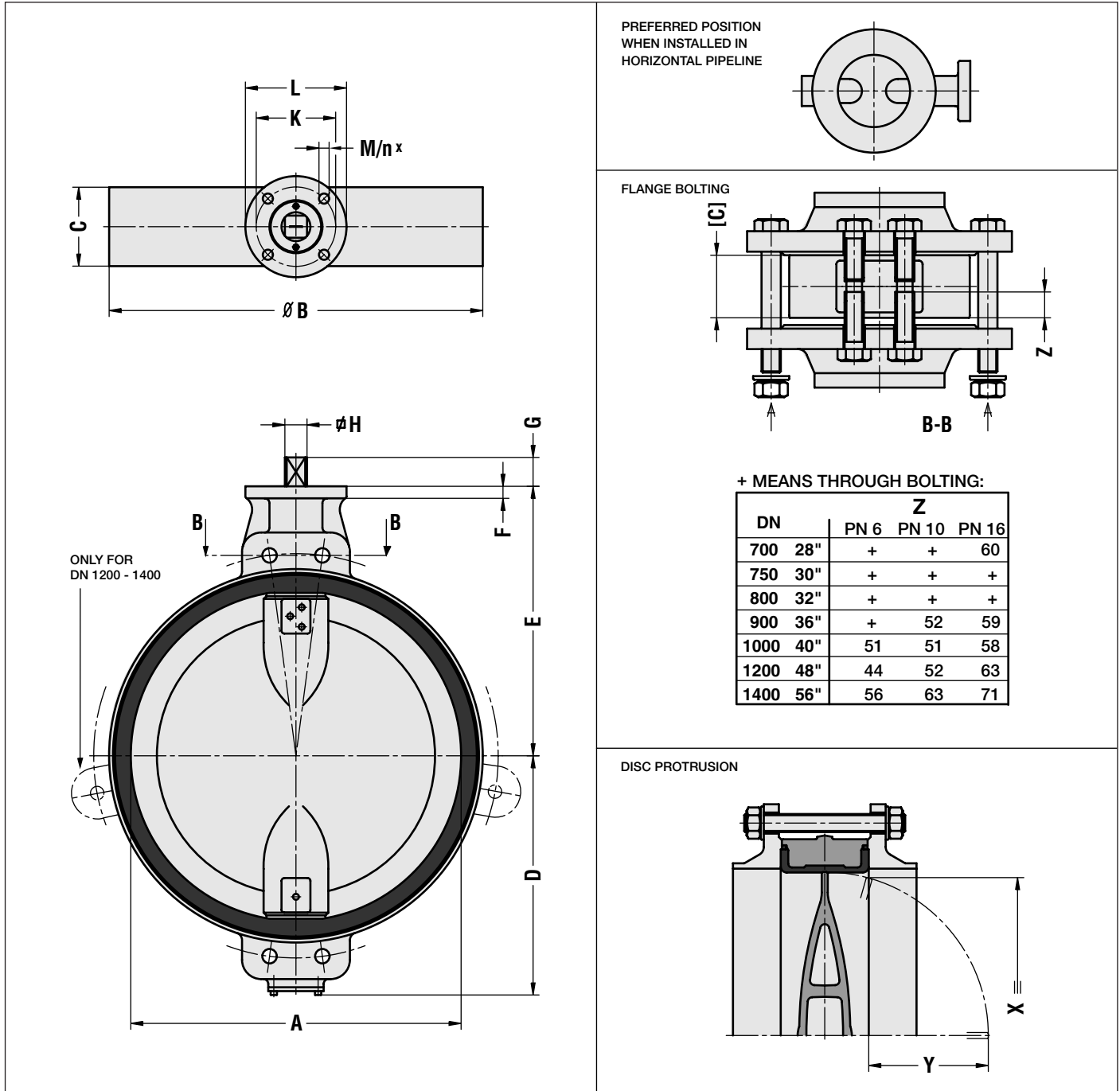


PARTS LIST:

ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

RANGE EVS DN 700 - 1400 (28" - 56")

DIMENSIONS:



DN	NPS	ΔPmax	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211
700	28"	16 bar	686	776	165	480	560	25	60	46	165	210	21	4	F16
750	30"	16 bar	736	826	190	520	585	25	60	46	165	210	21	4	F16
800	32"	16 bar	786	880	190	525	610	25	60	46	165	210	21	4	F16
900	36"	16 bar	886	980	203	635	690	30	90	60	254	300	17	8	F25
1000	40"	10 bar	986	1085	216	685	740	30	90	60	254	350	17	8	F25
1000	40"	16 bar	986	1085	216	685	740	30	90	60	298	350	21	8	F30
1200	48"	10 bar	1186	1300	254	870	855	35	85	75	298	415	21	8	F30
1200	48"	16 bar	1186	1300	254	870	855	35	85	75	356	415	31	8	F35
1400	56"	10 bar	1386	1500	*250	980	955	35	85	75	356	415	31	8	F35
1400	56"	16 bar	1386	1500	*250	980	955	35	100	90	356	415	31	8	F35

X	Y
666	261
666	261
763	298
863	342
973	390
973	390
1159	466
1159	466
1364	568
1364	568

±kg
295
295
345
475
635
635
1500
1500
1900
1900

Note: Intermediate sizes (eg DN 650/20", DN 850/34", DN 1100/44") are available on request

* Works standard

BUTTERFLY VALVE - RANGE EVL DN 80 - 300 (3" - 12")

PRODUCT SHEET

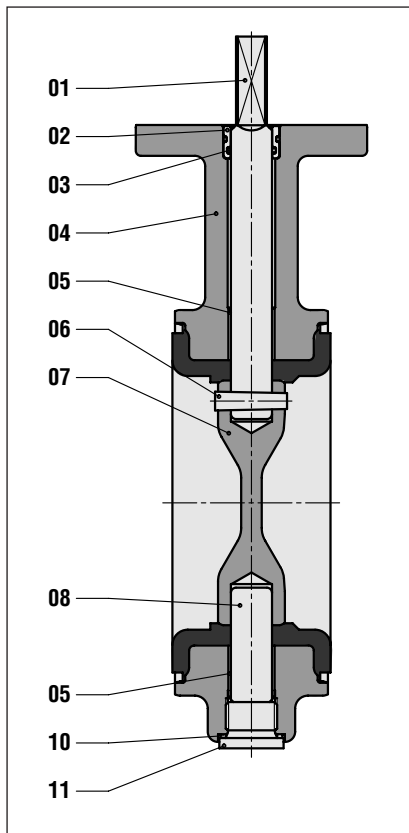
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Flangeless wafer long type, centric, rubberlined
Valve function*	Isolating valve (on/off) or regulating valve
Installation	Clamping between two flanges
Flange connections*	PN 6 / 10 / 16 / 20 /ANSI Class 150 / JIS 5 / 10 / 16
Valve shut off pressure*	6 / 10 / 16 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 16 (wafer long) (DN 50,65 = EVS series 20)
Available type approvals*	KIWA,DVGW,WRC,LRS,ABS,GL,RIN,NKK,DNV,RMRS
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

**Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.*

CONSTRUCTION DETAILS:

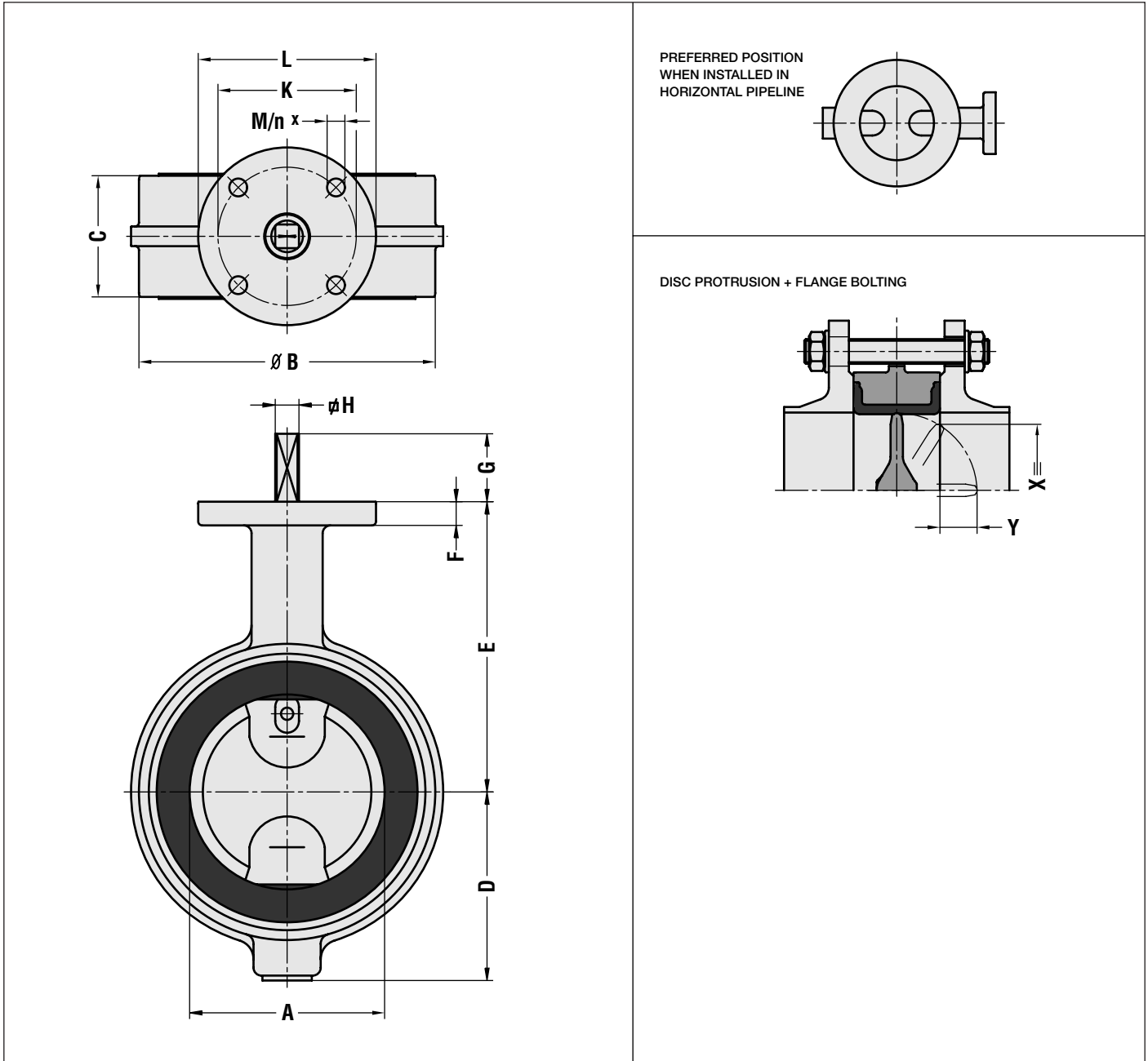


PARTS LIST:

ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

RANGE EVL DN 80 - 300 (3" - 12")

DIMENSIONS:



DN	NPS	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211	
50	2"	EQUAL TO EVS													
65	2½"	EQUAL TO EVS													
80	3"	80	130	64	78	133	12	34	10	70	90	9	4	F07	
100	4"	100	150	64	98	147	12	34	12	70	90	9	4	F07	
125	5"	125	182	70	109	160	12	34	12	70	90	9	4	F07	
150	6"	150	210	76	133	180	14	34	16	70	90	9	4	F07	
200	8"	200	262	89	158	204	14	34	16	70	90	9	4	F07	
250	10"	250	315	114	194	245	15	45	24	102	125	11	4	F10	
300	12"	300	371	114	219	270	15	45	24	102	125	11	4	F10	

X	Y
48	8
77	18
104	28
130	37
179	56
223	68
278	93

±kg
5.5
6.5
10
12
18
26
26

BUTTERFLY VALVE - RANGE EVCS DN 50 - 300 (2" - 12")

PRODUCT SHEET

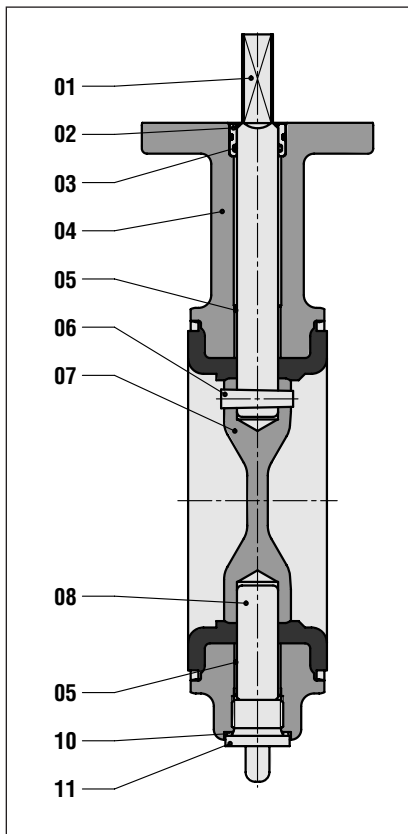
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Flangeless wafer short type with alignment lugs, centric, rubberlined
Valve function*	Isolating valve (on/off) or regulating valve
Installation	Clamping between two flanges
Flange connections*	PN 6 / 20 /ANSI Class 150
Valve shut off pressure*	6 / 10 / 16 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	FM
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:

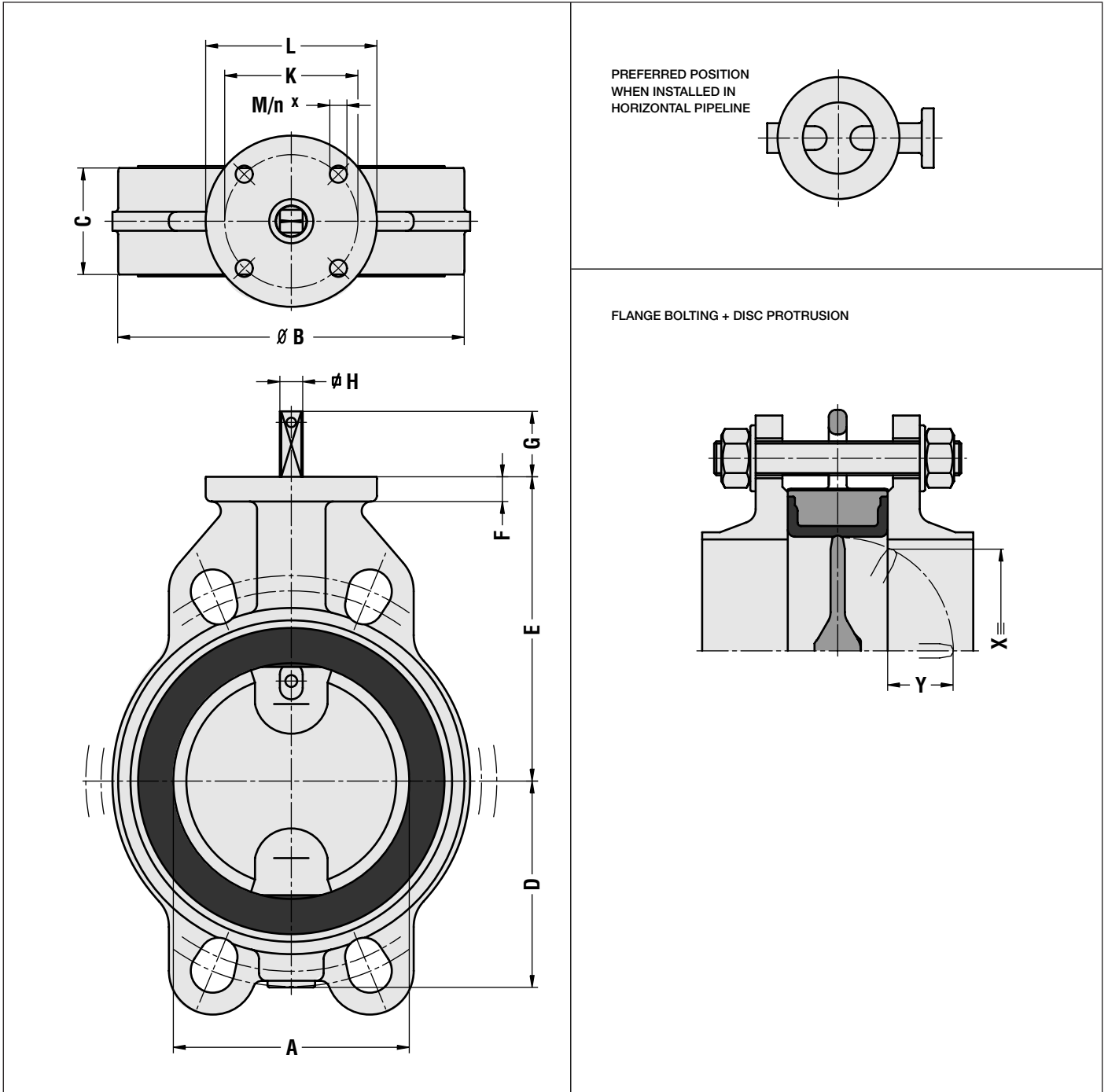


PARTS LIST:

ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

RANGE EVCS DN 50 - 300 (2" - 12")

DIMENSIONS:



DN NPS	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211
50 2"	50	100	43	63	118	12	34	10	70	90	9	4	F07
65 2½"	65	115	46	71	126	12	34	10	70	90	9	4	F07
80 3"	80	130	46	78	133	12	34	10	70	90	9	4	F07
100 4"	100	150	52	98	147	12	34	12	70	90	9	4	F07
125 5"	125	182	56	109	160	12	34	12	70	90	9	4	F07
150 6"	150	210	56	133	180	14	34	16	70	90	9	4	F07
200 8"	200	262	60	158	204	14	34	16	70	90	9	4	F07
250 10"	250	315	68	194	245	15	45	24	102	125	11	4	F10
300 12"	300	371	78	219	270	15	45	24	102	125	11	4	F10

X	Y
25	4
46	10
66	17
86	24
112	35
140	47
191	70
241	91
290	111

±kg
2.8
3.6
3.9
5.1
7.0
9.5
14
24
36

BUTTERFLY VALVE - RANGE EVBS DN 50 - 300 (2" - 12")

PRODUCT SHEET

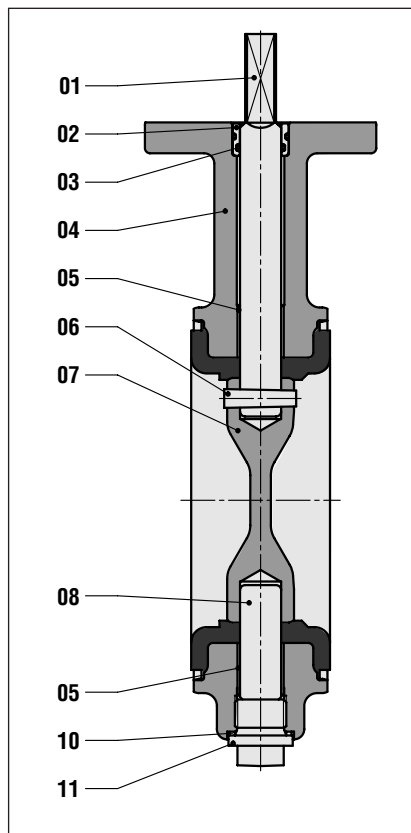
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Semi-lug wafer short type, centric, rubberlined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between flanges with possibility for downstream pipe dismantling. As end of line valve
Flange connections	PN10 / 16
Valve shut off pressure*	6 / 10 / 16 bar. As end of the line valve max. 10 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	KIWA,DVGW,WRC,LRS,DNV,ABS,BV,GL,RIN,NKK,RMRS,FM,UL,VdS,APSAD
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:

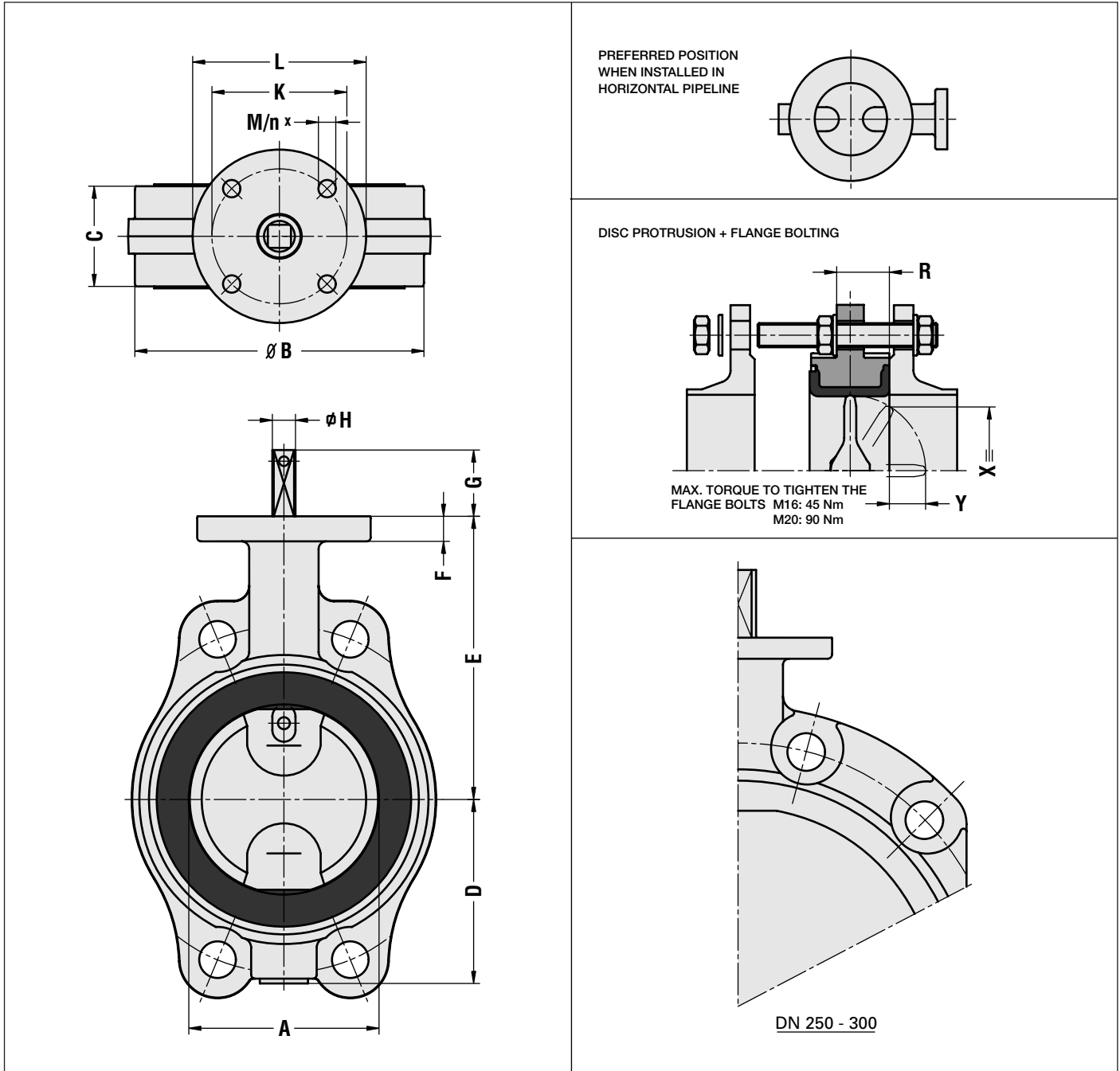


PARTS LIST:

ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

RANGE EVBS DN 50 - 300 (2" - 12")

DIMENSIONS:



DN	NPS	A	B	C	D	E	F	G	H	K	L	M	n	R	ISO 5211
50	2"	50	100	43	63	118	12	34	10	70	90	9	4	30	F07
65	2½"	65	115	46	71	126	12	34	10	70	90	9	4	32	F07
80	3"	80	130	46	78	133	12	34	10	70	90	9	4	32	F07
100	4"	100	150	52	98	147	12	34	12	70	90	9	4	35	F07
125	5"	125	182	56	109	160	12	34	12	70	90	9	4	39	F07
150	6"	150	210	56	133	180	14	34	16	70	90	9	4	39	F07
200	8"	200	262	60	158	204	14	34	16	70	90	9	4	44	F07
250	10"	250	315	68	194	245	15	45	24	102	125	11	4	47	F10
300	12"	300	371	78	219	270	15	45	24	102	125	11	4	53	F10

X	Y
25	4
46	10
66	17
86	24
112	35
140	47
191	70
241	91
290	111

±kg
2.8
3.6
3.9
5.1
7.0
9.5
14
24
36

BUTTERFLY VALVE - RANGE EVBLS DN 50 - 200 (2" - 8")

PRODUCT SHEET

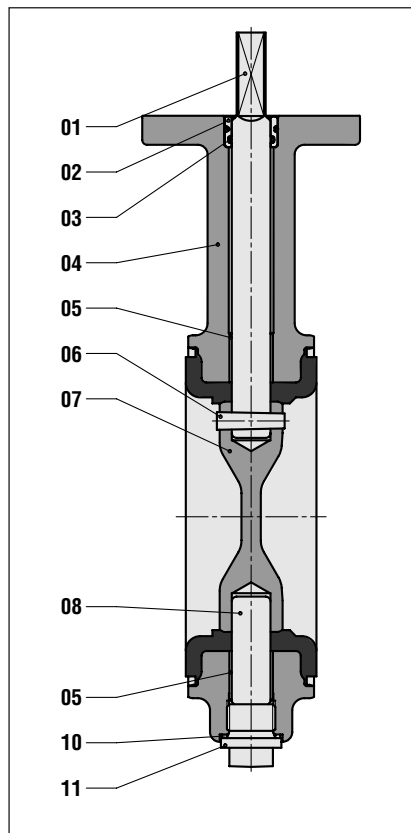
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Semi-lug wafer short type with long neck for insulation, centric, rubberlined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between flanges with possibility for downstream pipe dismantling. As end of line valve
Flange connections	PN10 / 16
Valve shut off pressure*	6 / 10 / 16 bar. As end of the line valve max. 10 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	WRC,LRS,BV,RMRS
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:

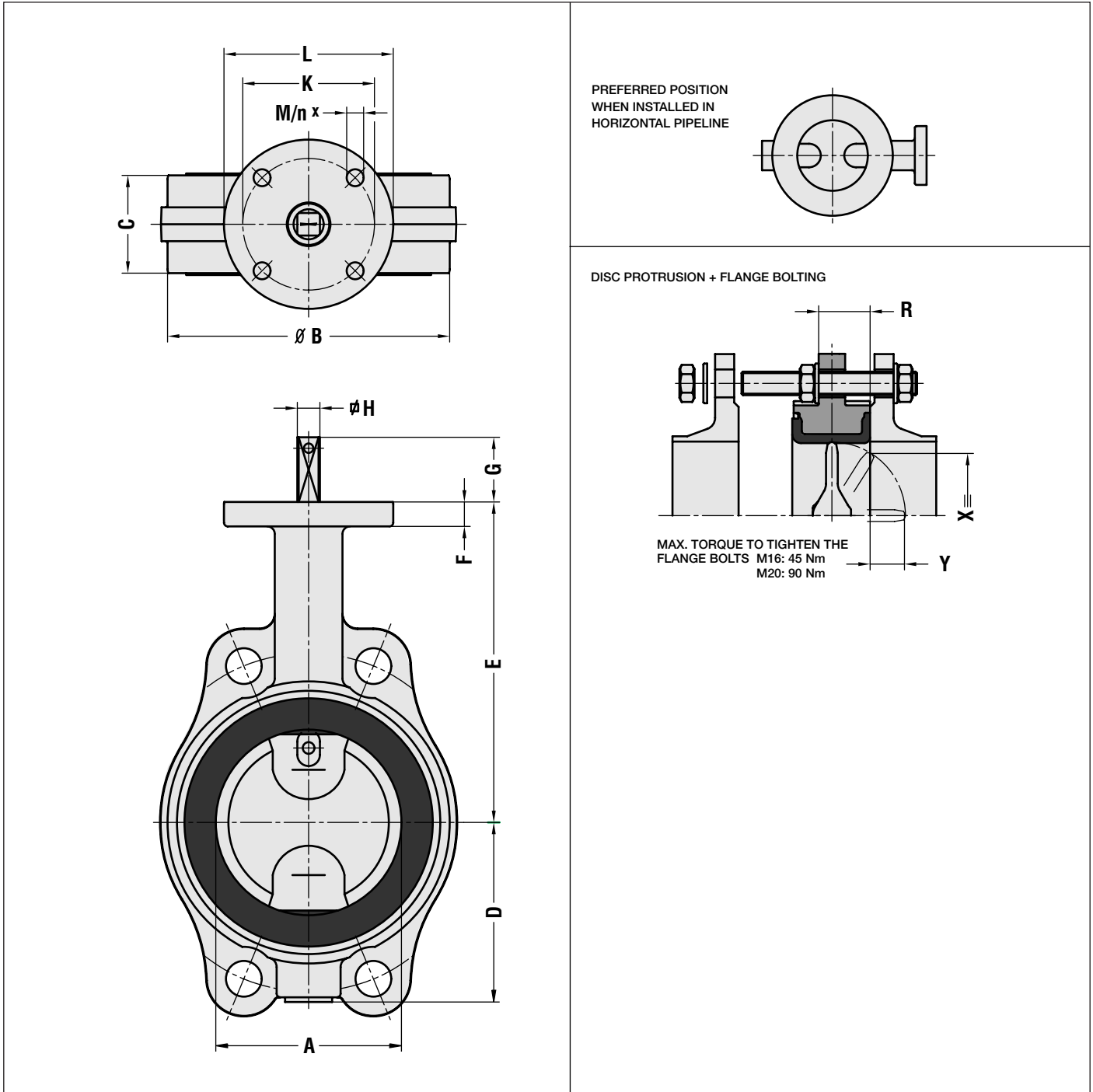


PARTS LIST:

ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

RANGE EVBLS DN 50 - 200 (2" - 8")

DIMENSIONS:



DN NPS	A	B	C	D	E	F	G	H	K	L	M	n	R	ISO 5211
50 2"	50	100	43	63	152	12	34	10	70	90	9	4	30	F07
65 2½"	65	115	46	71	160	12	34	10	70	90	9	4	32	F07
80 3"	80	130	46	78	167	12	34	10	70	90	9	4	32	F07
100 4"	100	150	52	98	189	12	34	12	70	90	9	4	35	F07
125 5"	125	182	56	109	202	12	34	12	70	90	9	4	39	F07
150 6"	150	210	56	133	224	14	34	16	70	90	9	4	39	F07
200 8"	200	262	60	158	248	14	34	16	70	90	9	4	44	F07

X	Y
25	4
46	10
66	17
86	24
112	35
140	47
191	70

±kg
3.1
3.9
4.2
5.5
7.5
10
15

BUTTERFLY VALVE - RANGE EVTLS DN 50 - 1000 (2" - 40")

PRODUCT SHEET

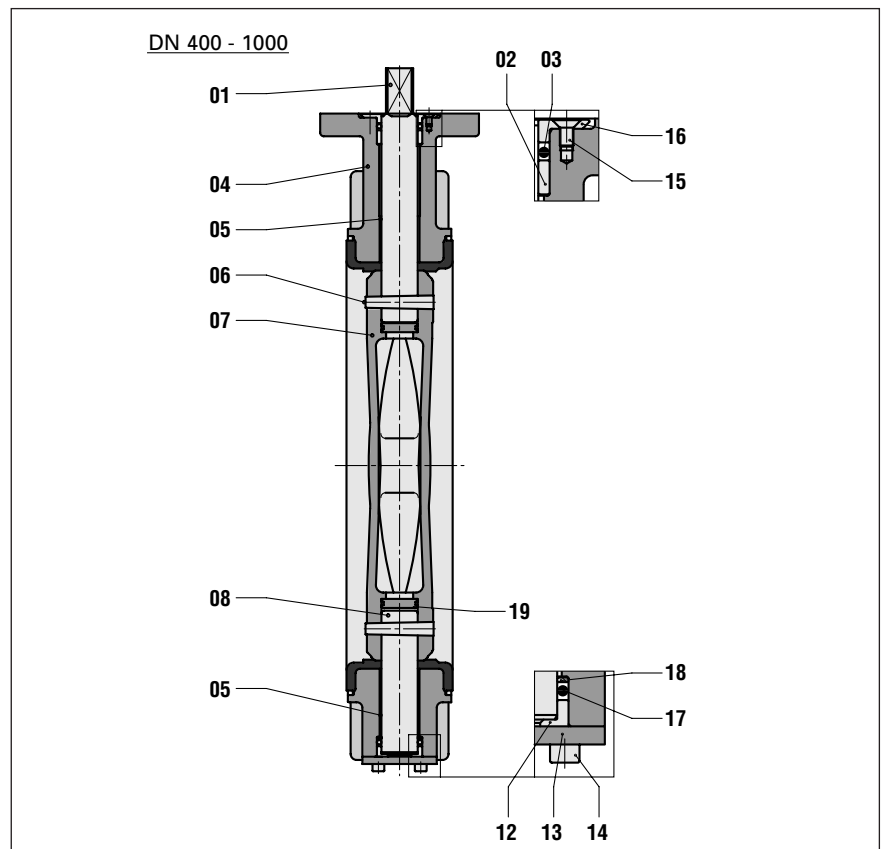
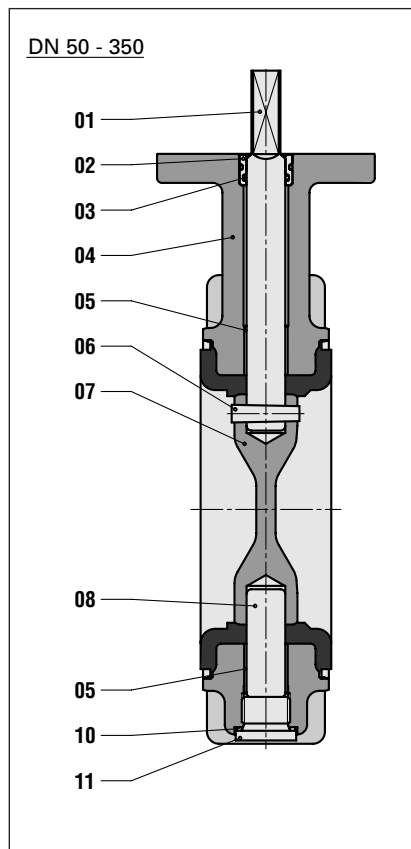
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Lugged wafer short type, centric, rubberlined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Bolting between flanges with possibility for downstream pipe dismantling. As end of line valve
Flange connections*	PN 6 / 10 / 16 /20 /ANSI Class 150 (JIS 5/10 on request)
Valve shut off pressure*	2,5 / 6 / 10 / 16 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	KIWA,DVGW,WRC,DNV,ABS,BV,GL,RIN,NKK,RMRS,UL,FM
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:



PARTS LIST:

ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

RANGE EVTLS DN 50- 1000 (2" - 40")

DIMENSIONS:

PREFERRED POSITION WHEN INSTALLED IN HORIZONTAL PIPELINE

DISC PROTRUSION AND FLANGE BOLTING

BOLTING BY HEXAGON HEAD BOLTS, STUDS OR THREADED ENDS

EVTLS DN 50-300				EVTLS DN 350-1000										
DN	PN ...	Rmin	Rmax	DN	PN 6	PN 10	PN 16	CL150	Rmin	Rmax	Rmin	Rmax	Rmin	Rmax
50	17	20		350	23	38	27	38	30	38	34	38		
65	19	22		400	39	50	42	50	42	50	47	50		
80	19	22		450	42	56	45	56	48	56	53	56		
100	22	25		500	48	62	54	62	54	62	60	62		
125	23	27		600	61	75	67	75	67	75	73	75		
150	23	27		700	68	78	72	78	79	81	79	81		
200	25	29		750	82	90	88	90	90	90	90	90		
250	28	33		800	82	90	88	90	90	90	90	90		
300	33	38		900	88	100	92	100	99	100	100	100		
				1000	95	103	101	103	103	103	103	103		

R FOR PN 6, PN 10, PN 16 AND CL 150 FLANGES

NB: Also available with through holes

DN NPS	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211
50 2"	50	100	43	63	118	12	34	10	70	90	9	4	F07
65 2½"	65	115	46	71	126	12	34	10	70	90	9	4	F07
80 3"	80	130	46	78	133	12	34	10	70	90	9	4	F07
100 4"	100	150	52	98	147	12	34	12	70	90	9	4	F07
125 5"	125	182	56	109	160	12	34	12	70	90	9	4	F07
150 6"	150	210	56	133	180	14	34	16	70	90	9	4	F07
200 8"	200	262	60	158	204	14	34	16	70	90	9	4	F07
250 10"	250	315	68	194	245	15	45	24	102	125	11	4	F10
300 12"	300	371	78	219	270	15	45	24	102	125	11	4	F10
350 14"	336	405	78	256	315	15	45	24	102	125	11	4	F10
400 16"	386	470	102	308	363	25	50	30	140	175	17	4	F14
450 18"	436	522	114	334	388	25	50	30	140	175	17	4	F14
500 20"	486	576	127	360	413	25	50	30	140	175	17	4	F14
600 24"	586	672	154	426	510	25	50	40	140	175	17	4	F14
700 28"	686	776	165	480	560	25	60	46	165	210	21	4	F16
750 30"	736	826	190	526	585	25	60	46	165	210	21	4	F16
800 32"	786	880	190	525	610	25	60	46	165	210	21	4	F16
900 36"	886	980	203	635	690	30	90	60	254	300	17	8	F25
1000 40"	986	1085	216	685	740	30	90	60	*254	350	*17	8	*F25

X	Y
25	4
46	10
66	17
86	24
112	35
140	47
191	70
241	91
290	111
327	129
373	142
421	161
470	180
566	216
666	261
712	273
863	342
863	342
973	390

±kg
8
9
10
12
16
20
25
28
36
50
85
105
130
205
325
385
625
625
950

* F30 (pcd. 298 - 8x ø 21) at Δp max = 16 bar

BUTTERFLY VALVE - RANGE EVUS DN 700 - 1600 (28" - 64")

PRODUCT SHEET

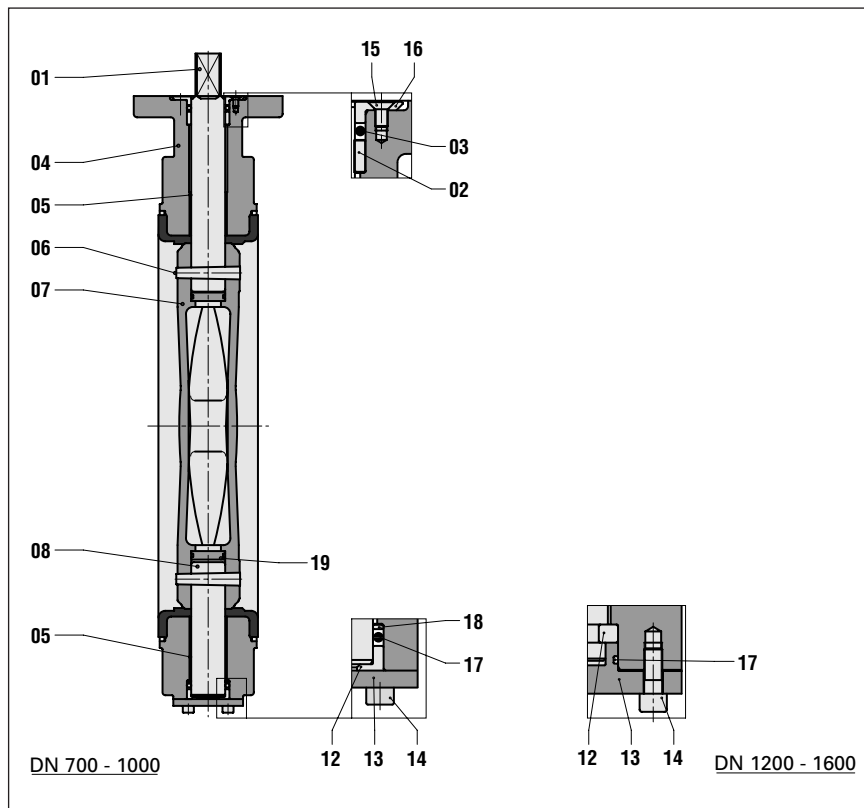
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	U-section wafer short type with drilled and tapped flange holes, centric, rubberlined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between two flanges, end of line as double flanged
Flange connections*	PN 10
Valve shut off pressure*	2,5 / 6 / 10 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	Pending
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:

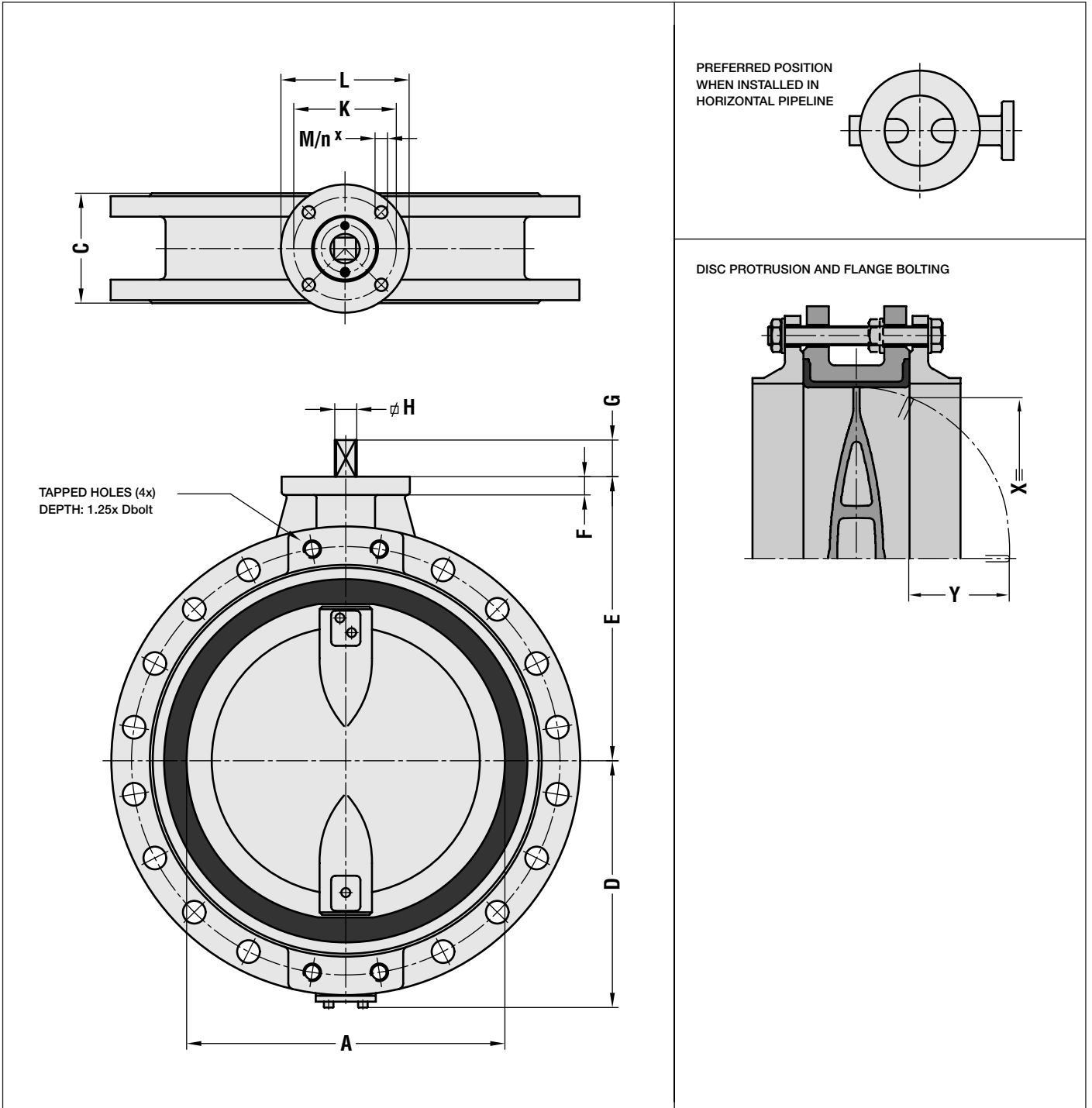


PARTS LIST:

ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

RANGE EVUS DN 700 - 1600 (28" - 64")

DIMENSIONS:



DN	NPS	ΔPmax	A	C	D	E	F	G	H	K	L	M	n	ISO 5211
700	28"	10 bar	686	165	480	560	25	60	46	165	210	21	4	F16
800	32"	10 bar	786	190	525	610	25	60	46	165	210	21	4	F16
900	36"	10 bar	886	203	635	690	30	90	60	254	300	17	8	F25
1000	40"	10 bar	986	216	685	740	30	90	60	254	300	17	8	F25
1200	48"	10 bar	1186	254	870	855	35	85	75	298	350	21	8	F30
1400	56"	6 bar	1386	279	980	955	35	85	75	298	415	21	8	F30
1400	56"	10 bar	1386	279	980	955	35	100	90	356	415	31	8	F35
1600	64"	6 bar	1586	318	1096	1079	50	100	90	298	415	21	8	F30
1600	64"	10 bar	1586	318	1096	1079	50	100	90	356	415	31	8	F35

X	Y
666	261
763	298
863	342
973	390
1159	466
1364	568
1364	568
1554	643
1554	643

±kg
323
425
560
760
1100
1800
1800
2400
2400

BUTTERFLY VALVE - RANGE EVMS DN 350 - 1000 (14" - 40")

PRODUCT SHEET

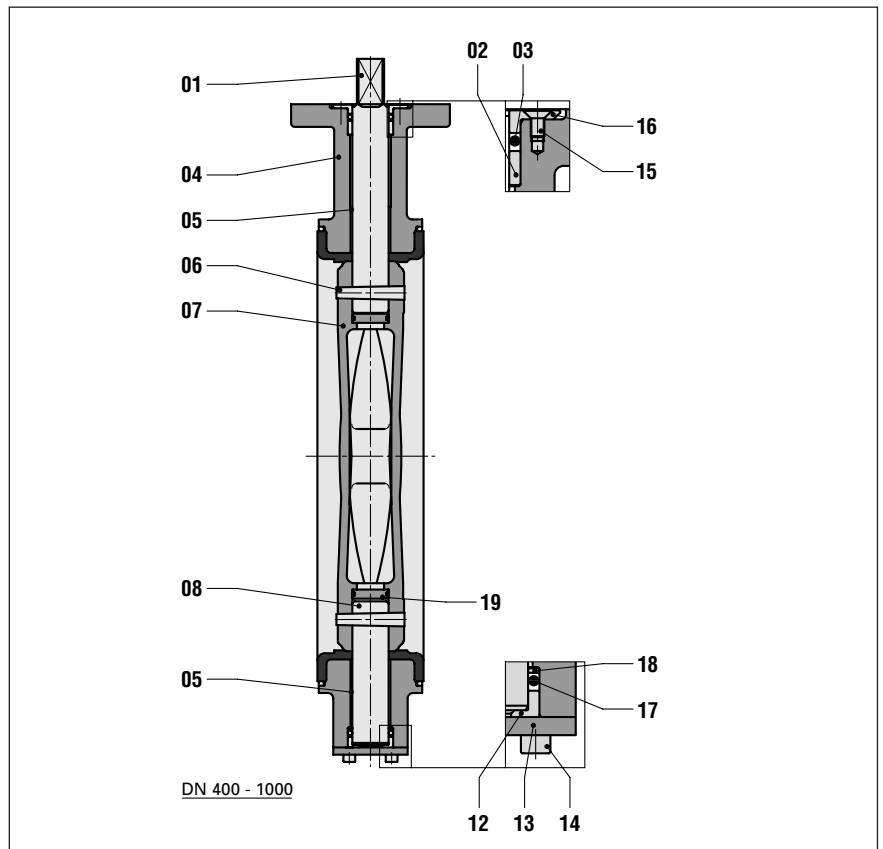
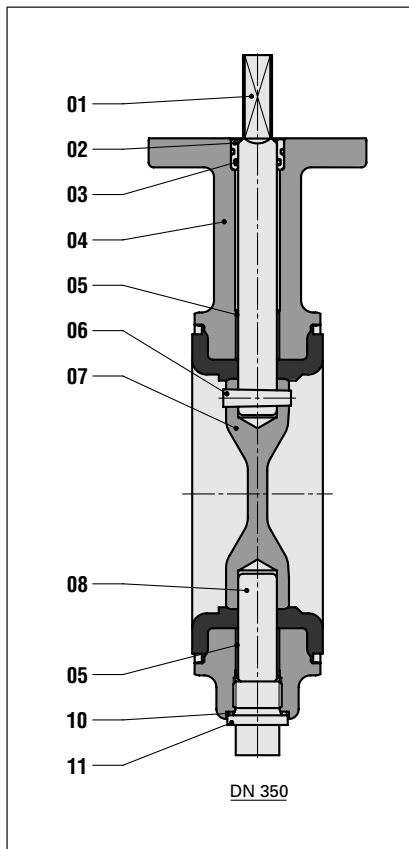
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Single flange wafer short type, centric, rubberlined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between flanges with possibility for downstream pipe dismantling. As end of line valve
Flange connections*	PN 10 / 16
Valve shut off pressure*	2,5 / 6 / 10 / 16 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	DNV,ABS,GL,RIN,NKK,RMRS,FM
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:



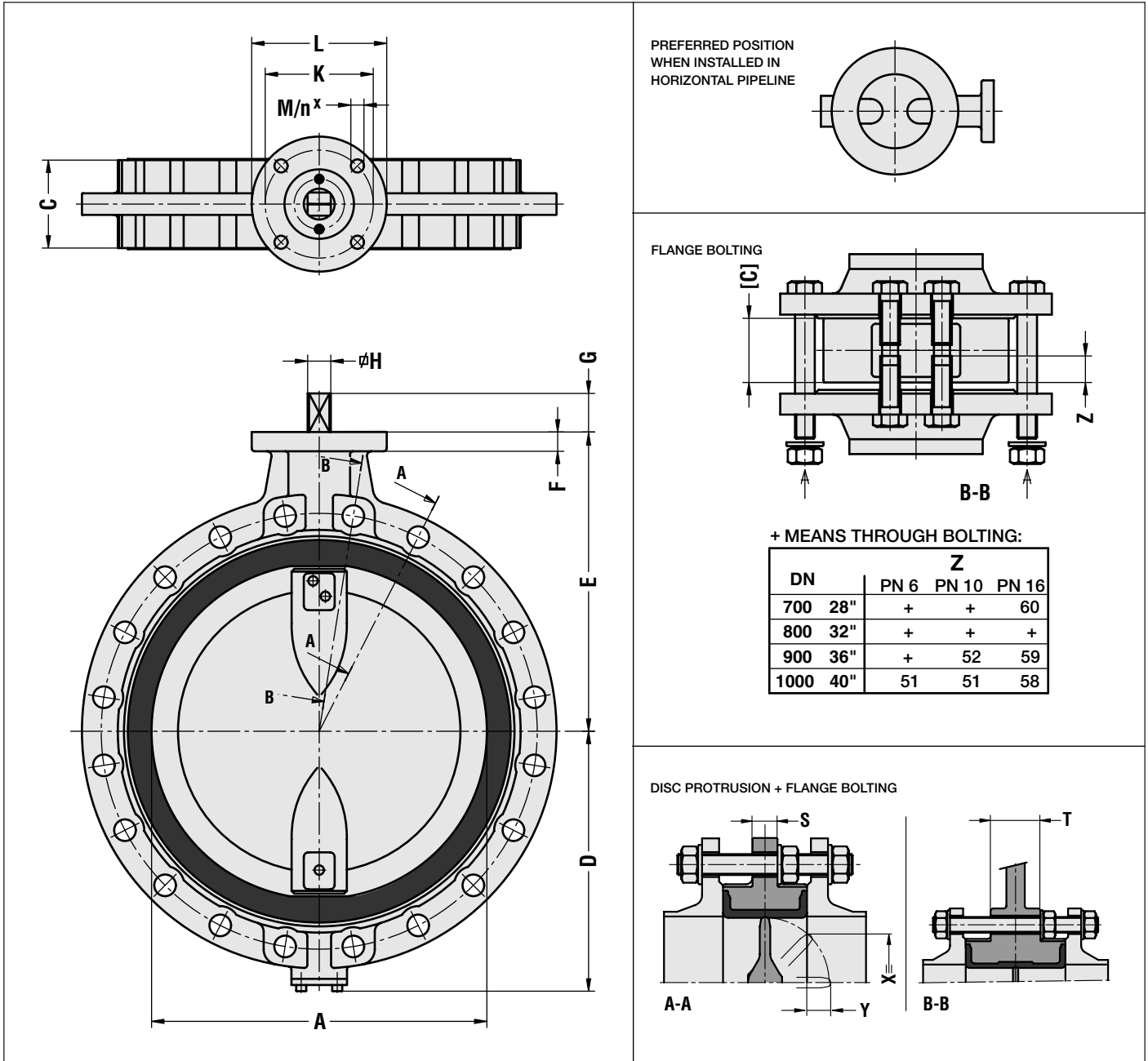
PARTS LIST:

ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

RANGE EVMS DN 350 - 1000 (14" - 40")

DIMENSIONS:



DN NPS	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211
350 14"	336	405	78	256	315	15	45	24	102	125	11	4	F10
400 16"	386	470	102	308	363	25	50	30	140	175	17	4	F14
450 18"	436	522	114	334	388	25	50	30	140	175	17	4	F14
500 20"	486	576	127	360	413	25	50	30	140	175	17	4	F14
600 24"	586	672	154	426	510	25	50	40	140	175	17	4	F14
700 28"	686	776	165	480	560	25	60	46	165	210	21	4	F16
800 32"	786	880	190	525	610	25	60	46	165	210	21	4	F16
900 36"	886	980	203	635	690	30	90	60	254	300	17	8	F25
1000 40"	986	1085	216	685	740	30	90	60	*254	350	*17	8	*F25

S	T
26	-
28	43
28	54
32	60
35	76
37	115
40	115
40	190
50	200

X	Y
327	129
373	142
421	161
470	180
566	216
666	261
763	298
863	342
973	390

±kg
45
85
100
135
200
315
365
500
670

*F30 (pcd. 298 - 8x ø 21) at Δp max = 16 bar

BUTTERFLY VALVE - RANGE EVML DN 80 - 800 (3" - 32")

PRODUCT SHEET

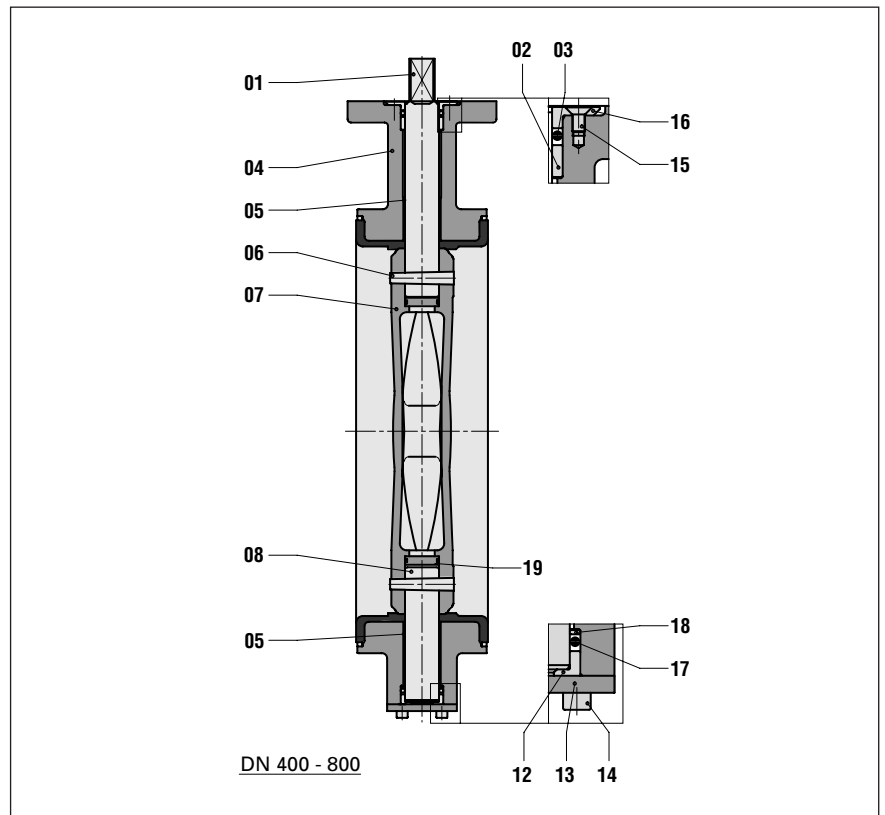
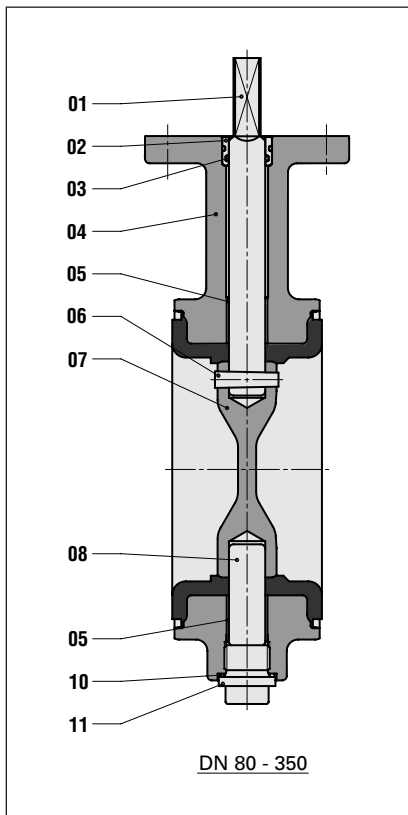
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Single flange wafer long type, centric, rubberlined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between flanges with possibility for downstream pipe dismantling. As end of line valve
Flange connections*	PN 10 / PN 16
Valve shut off pressure*	2,5 / 6 / 10 / 16 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 16 (wafer long)
Available type approvals*	KIWA,DVGW,WRC,LRS,DNV,ABS,BV,GL,RIN,RMRS,FM
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:



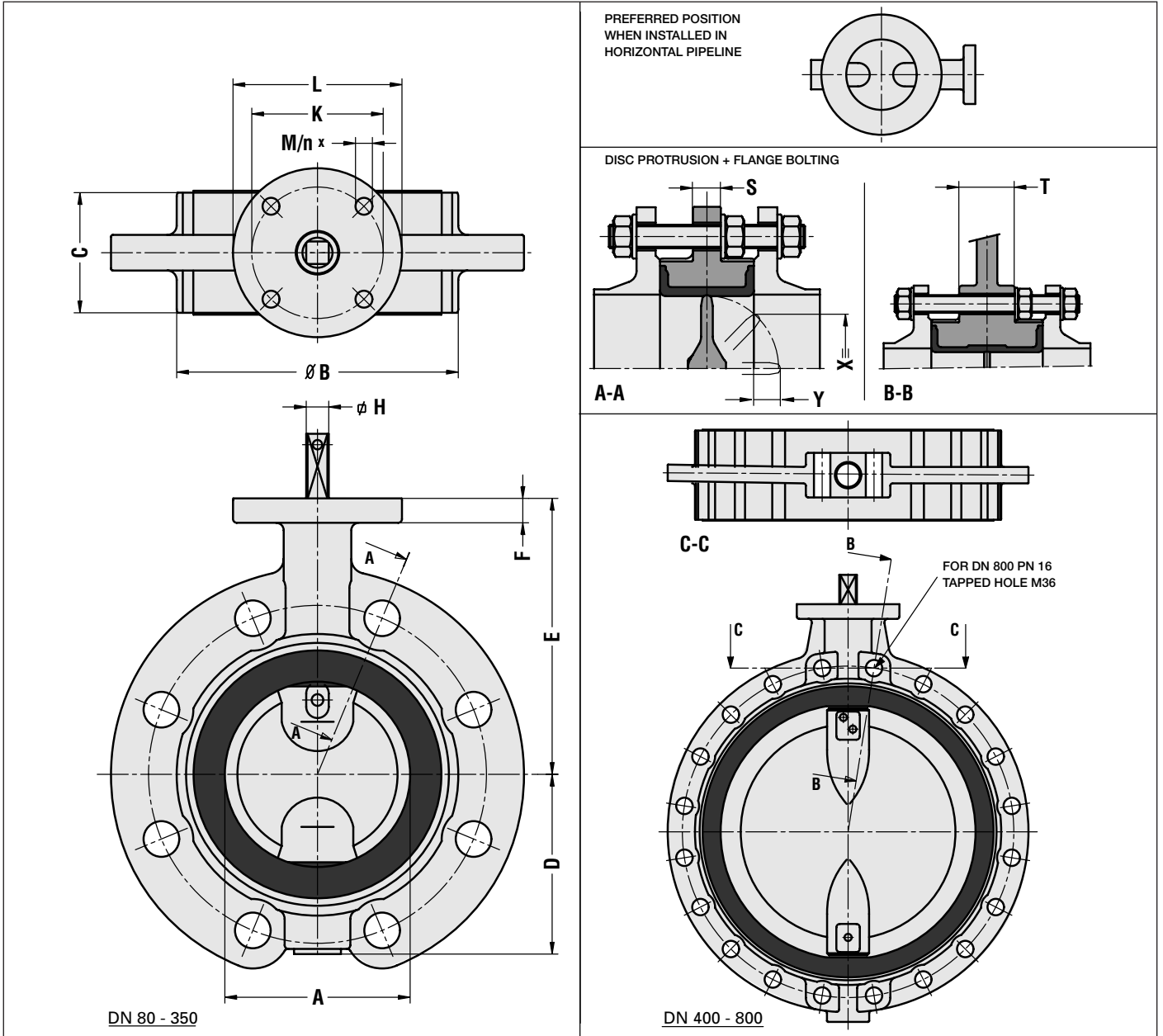
PARTS LIST:

ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

RANGE EVML DN 80 - 800 (3" - 32")

DIMENSIONS:



DN NPS	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211
50 2"	ALTERNATIVE, SEE EVBS												
65 2½"	ALTERNATIVE, SEE EVBS												
80 3"	80	130	64	78	133	12	34	10	70	90	9	4	F07
100 4"	100	150	64	98	147	12	34	12	70	90	9	4	F07
125 5"	125	182	70	109	160	12	34	12	70	90	9	4	F07
150 6"	150	210	76	133	180	14	34	16	70	90	9	4	F07
200 8"	200	262	89	158	204	14	34	16	70	90	9	4	F07
250 10"	250	315	114	194	245	15	45	24	102	125	11	4	F10
300 12"	300	371	114	219	270	15	45	24	102	125	11	4	F10
350 14"	336	405	127	256	315	15	45	24	102	125	11	4	F10
400 16"	386	470	140	308	363	25	50	30	140	175	17	4	F14
450 18"	436	522	152	334	388	25	50	30	140	175	17	4	F14
500 20"	486	576	152	360	413	25	50	30	140	175	17	4	F14
600 24"	586	672	178	426	510	25	50	40	140	175	17	4	F14
700 28"	686	776	229	480	560	25	60	46	165	210	21	4	F16
750 30"	736	826	229	520	585	25	60	46	165	210	21	4	F16
800 32"	786	880	241	525	610	25	60	46	165	210	21	4	F16

S	T
19	-
19	-
20	-
20	-
21	-
23	-
24	-
26	-
28	43
28	54
32	60
35	76
37	115
37	115
40	115

X	Y
48	8
77	18
104	28
130	37
179	56
223	68
278	93
311	105
360	123
409	142
462	167
559	204
647	229
699	253
749	273

±kg
6.5
7.5
11
14
18
28
39
50
95
115
155
230
330
380
430

BUTTERFLY VALVE - RANGE EVFS DN 50 - 1000 (2" - 40")

PRODUCT SHEET

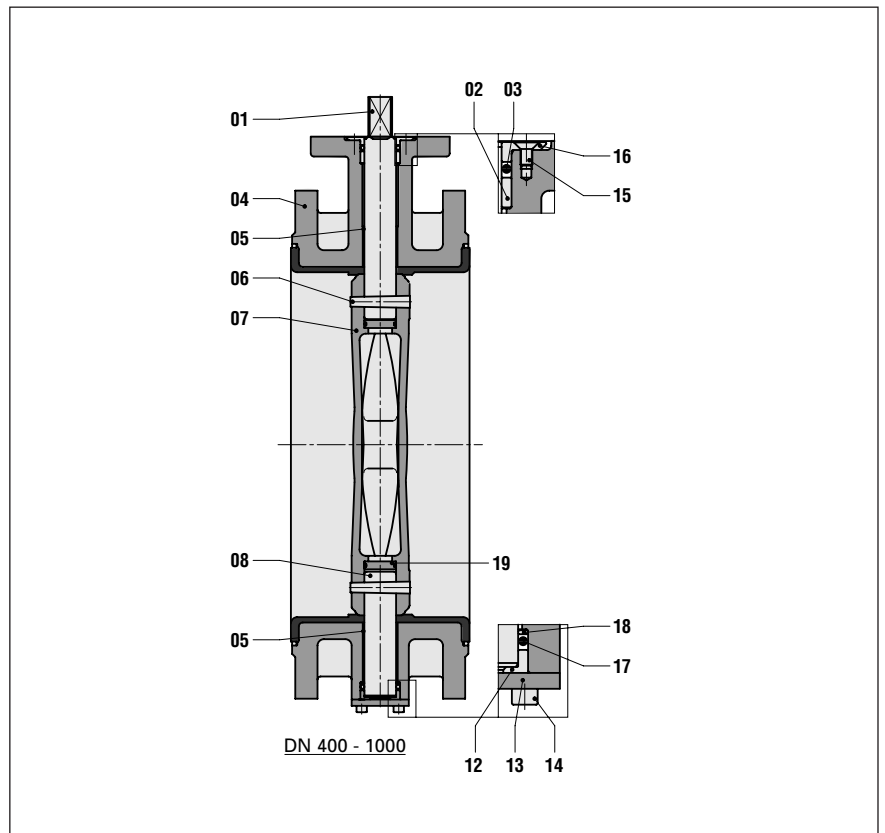
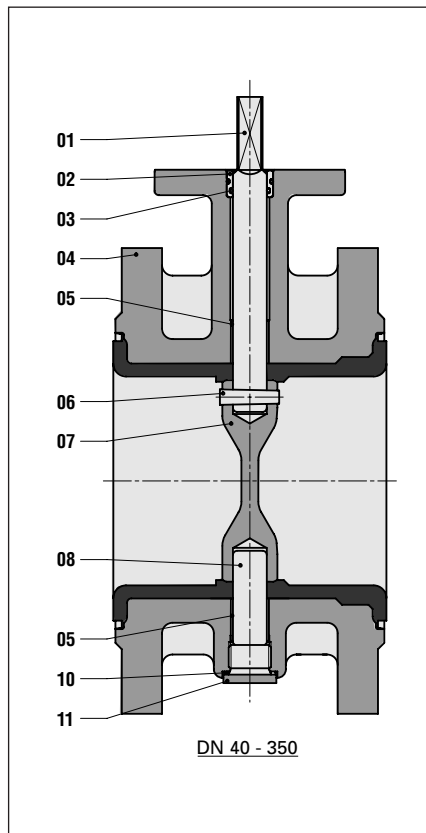
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Double flanged short type, centric, rubberlined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Bolting between flanges with possibility for downstream pipe dismantling. End of line valve
Flange connections*	PN 6 / 10 / 16 / 20 /ANSI Class 150 / JIS 5 / 10 / 16
Valve shut off pressure*	2,5 / 6 / 10 / 16 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 13 (double flanged short)
Available type approvals*	KIWA,DVGW,WRC,SVGW,LRS,DNV,ABS,BV,GL,RIN,NKK,RMRS,FM
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:



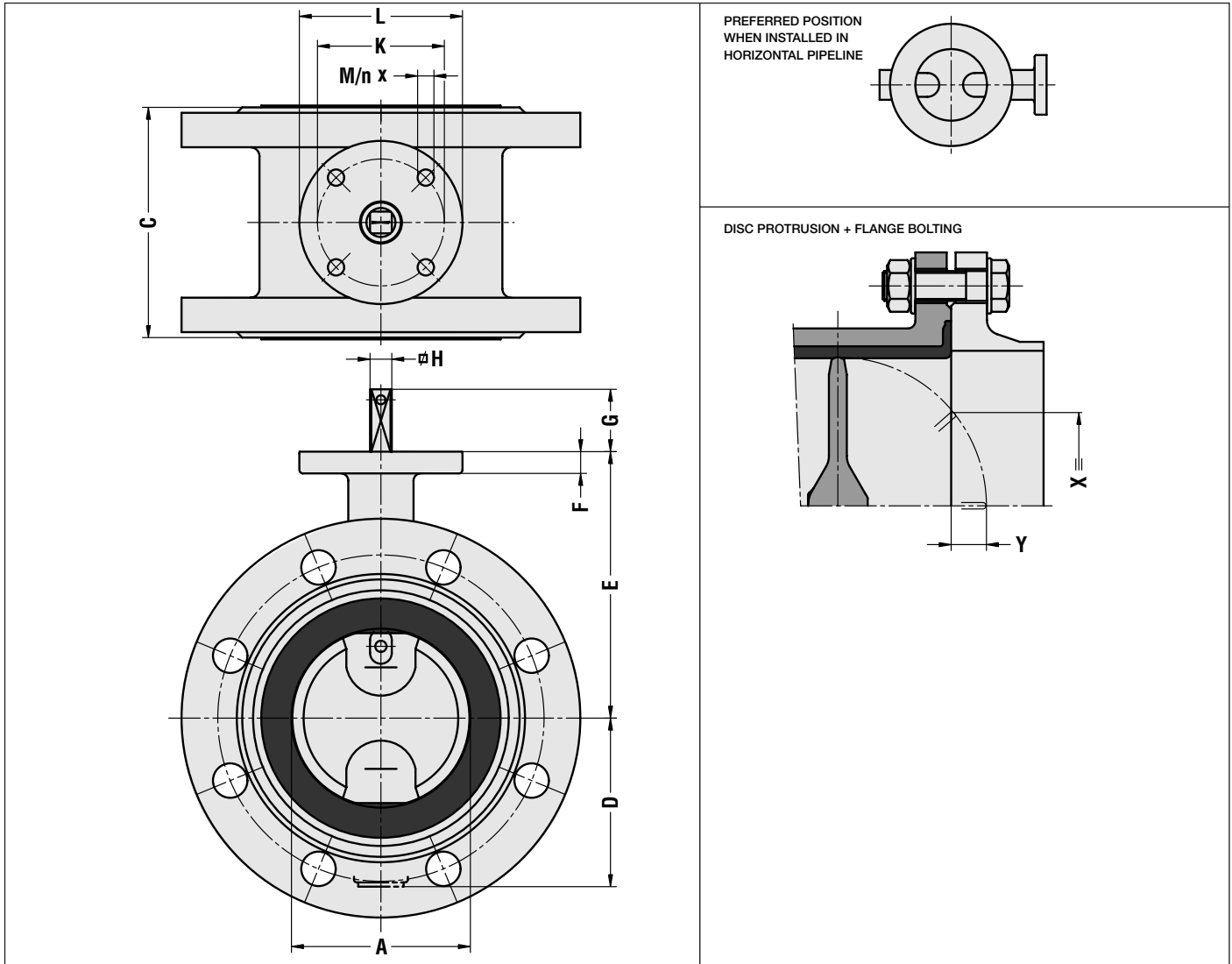
PARTS LIST:

ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

RANGE EVFS DN 50 - 1000 (2" - 40")

DIMENSIONS:



DN NPS	A	C	D	E	F	G	H	K	L	M	n	ISO 5211
40 1½"	40	106	58	113	12	34	10	70	90	9	4	F07
50 2"	50	108	63	118	12	34	10	70	90	9	4	F07
65 2½"	65	112	71	126	12	34	10	70	90	9	4	F07
80 3"	80	114	78	133	12	34	10	70	90	9	4	F07
100 4"	100	127	98	147	12	34	12	70	90	9	4	F07
125 5"	125	140	109	160	12	34	12	70	90	9	4	F07
150 6"	150	140	133	180	14	34	16	70	90	9	4	F07
200 8"	200	152	158	204	14	34	16	70	90	9	4	F07
250 10"	250	165	194	245	15	45	24	102	125	11	4	F10
300 12"	300	178	219	270	15	45	24	102	125	11	4	F10
350 14"	336	190	256	315	15	45	24	102	125	11	4	F10
400 16"	386	216	308	363	25	50	30	140	175	17	4	F14
450 18"	436	222	334	388	25	50	30	140	175	17	4	F14
500 20"	486	229	360	413	25	50	30	140	175	17	4	F14
600 24"	586	267	426	510	25	50	40	140	175	17	4	F14
700 28"	686	292	480	560	25	60	46	165	210	21	4	F16
750 30"	736	318	520	585	25	60	46	165	210	21	4	F16
800 32"	786	318	525	610	25	60	46	165	210	21	4	F16
900 36"	886	330	635	690	30	90	60	254	300	17	8	F25
1000 40"	986	410	685	740	30	90	60	*254	350	*17	8	*F25

X	Y	±kg
-	-	7
-	-	8
-	-	9
-	-	11
-	-	13
-	-	17
53	5	23
130	24	32
188	43	50
242	61	65
277	73	95
320	85	130
376	107	150
429	129	200
522	160	300
621	197	380
665	210	440
719	234	500
823	278	660
897	288	900

* F30 (pcd. 298 - 8x ø 21) at Δp max = 16 bar

BUTTERFLY VALVE - RANGE EVFS DN 1200 - 2000 (48" - 80")

PRODUCT SHEET

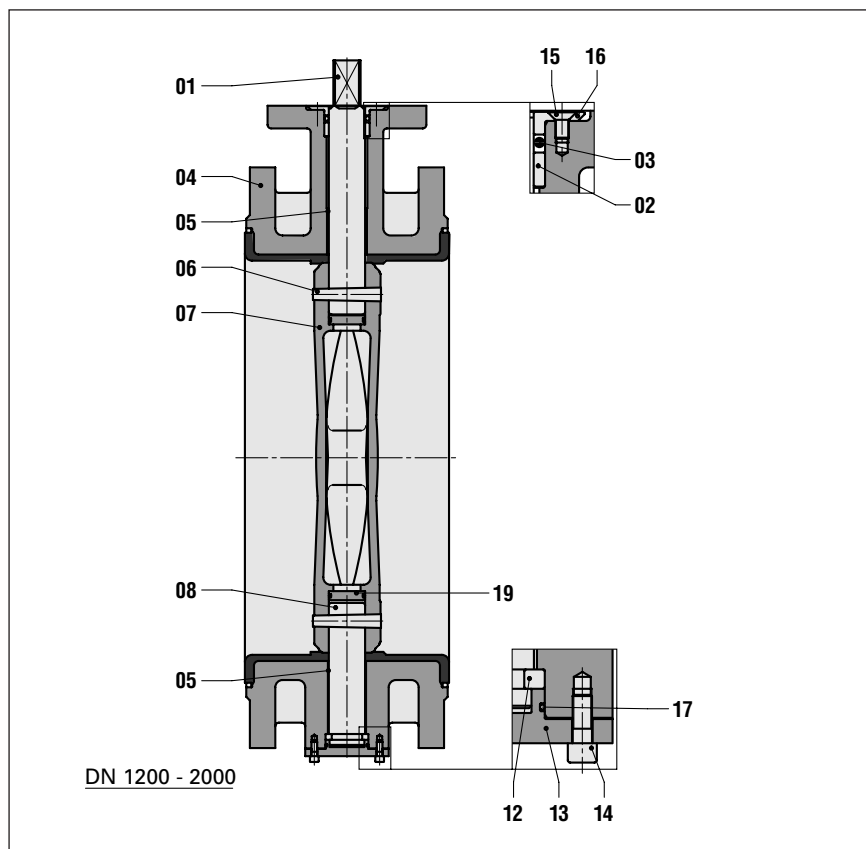
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Double flanged short type, centric, rubberlined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Bolting between flanges with possibility for downstream pipe dismantling. End of line valve
Flange connections*	PN 6 / 10 / 16 / 20 /ANSI Class 150 / JIS 5 / 10 / 16
Valve shut off pressure*	2,5 / 6 / 10 / 16 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 13 (double flanged short)
Available type approvals*	KIWA,DVGW,WRC,SVGW,LRS,DNV,ABS,BV,GL,RIN,NKK,RMRS
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:

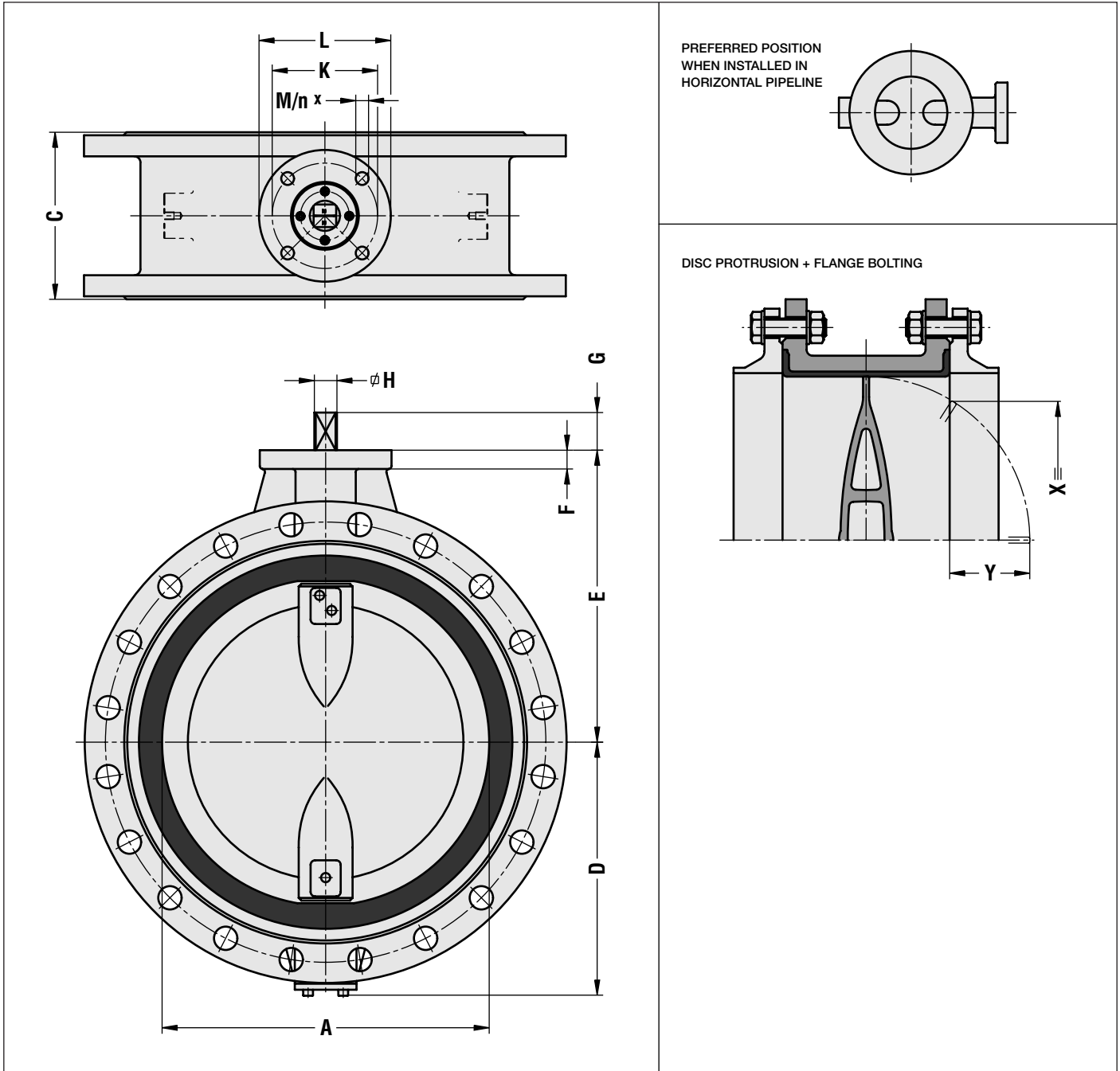


PARTS LIST:

ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

RANGE EVFS DN 1200 - 2000 (48" - 80")

DIMENSIONS:



DN	NPS	ΔP_{max}	A	C	D	E	F	G	H	K	L	M	n	ISO 5211
1200	48"	10 bar	1186	470	870	855	35	85	75	298	415	21	8	F30
1200	48"	16 bar	1186	470	870	855	35	85	75	356	415	31	8	F35
1400	56"	10 bar	1386	530	970	955	35	85	75	356	415	31	8	F35
1400	56"	16 bar	1386	530	980	955	35	100	90	356	415	31	8	F35
1600	64"	10 bar	1586	600	1096	1079	50	100	90	356	475	31	8	F35
1600	64"	16 bar	1586	600	1096	1079	50	120	105	406	475	37	8	F40
1800	72"	6 bar	1776	670	1187	1176	50	100	90	356	415	31	8	F35
1800	72"	10 bar	1776	670	1187	1176	50	120	105	406	475	37	8	F40
2000	80"	6 bar	1976	760	1287	1276	50	120	105	406	475	37	8	F40
2000	80"	10 bar	1976	760	1287	1276	50	140	120	406	475	37	8	F40

X	Y
1089	358
1089	358
1281	428
1281	428
1469	493
1469	493
1642	550
1642	550
1822	606
1822	606

$\pm kg$
1300
1300
1700
1700
2500
2500
3500
3500
4000
4000

BUTTERFLY VALVE - RANGE EVFL DN 50 - 1000 (2" - 40")

PRODUCT SHEET

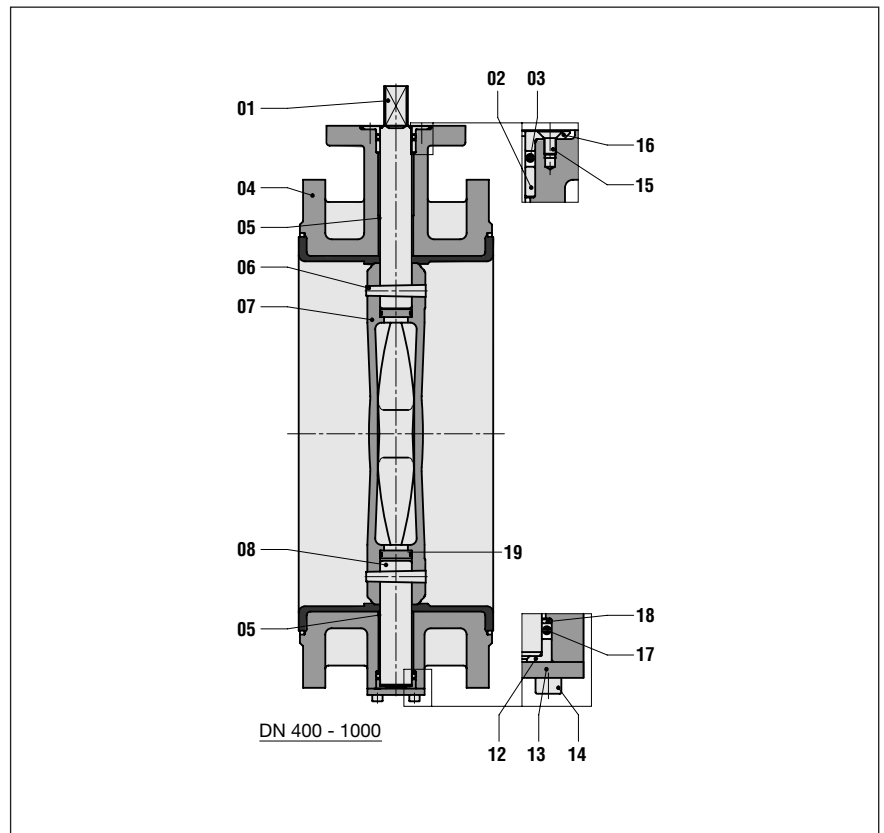
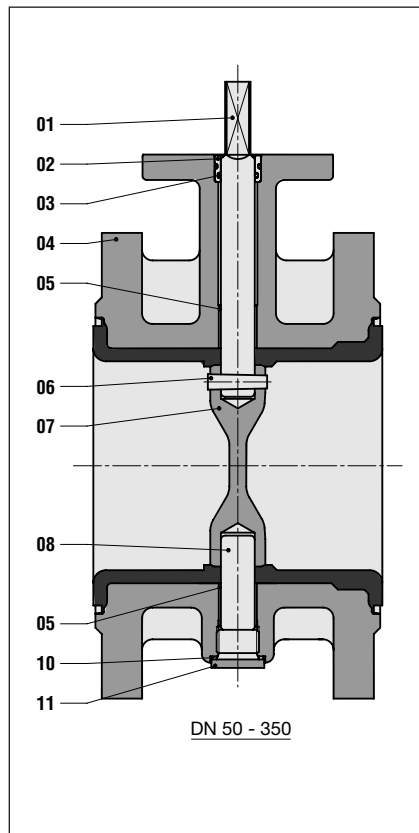
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Double flanged long type, centric, rubberlined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Bolting between flanges with possibility for downstream pipe dismantling. End of line valve
Flange connections*	PN 10 (PN 16 on some sizes)
Valve shut off pressure*	2.5 / 6 / 10 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 14 (double flanged long)
Available type approvals*	KIWA,DVGW,WRC,LRS,ABS,BV,GL,RINA,RMRS,FM
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:



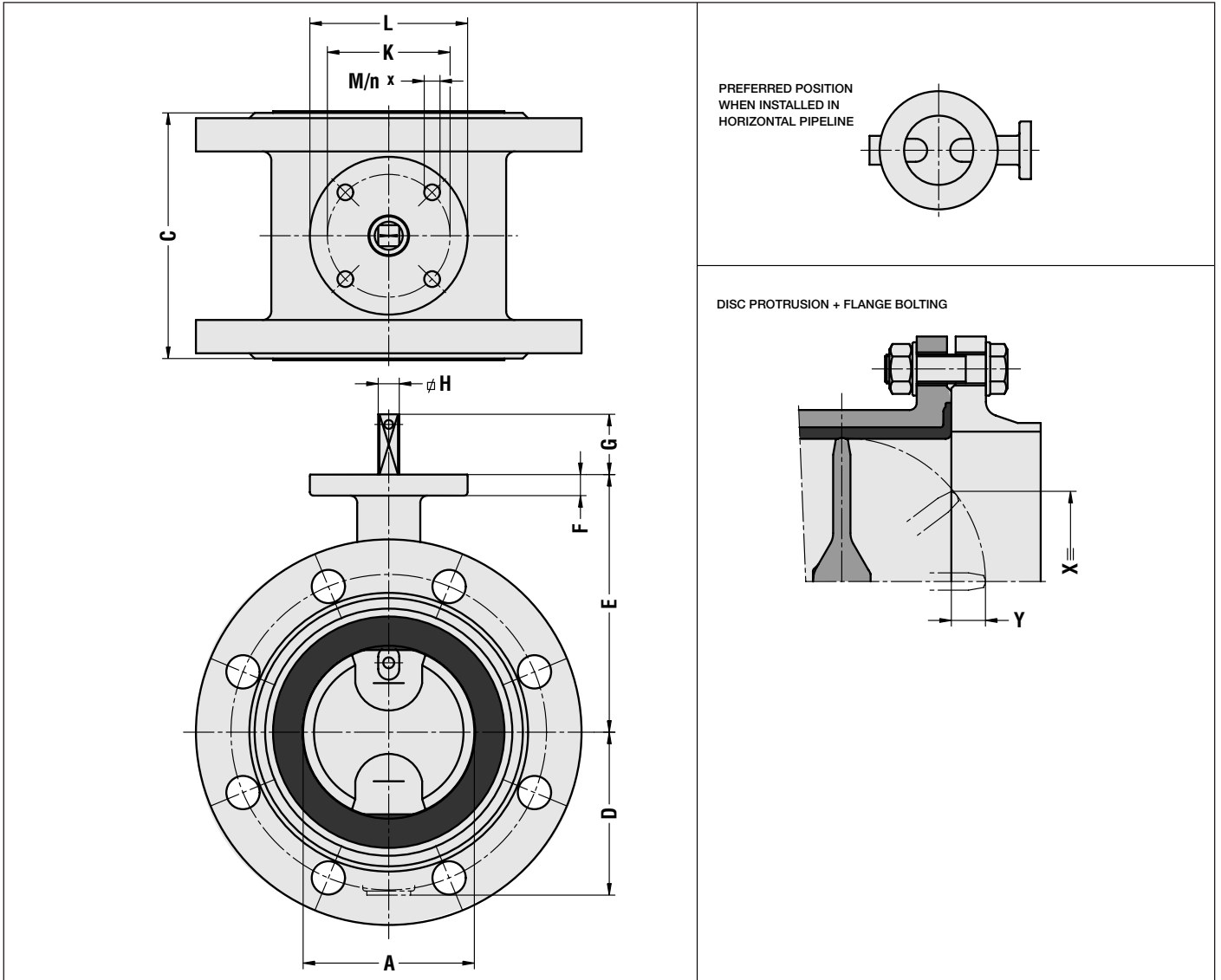
PARTS LIST:

ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

RANGE EVFL DN 50 - 1000 (2" - 40")

DIMENSIONS:



DN NPS	A	C	D	E	F	G	H	K	L	M	n	ISO 5211
50 2"	50	150	63	118	12	34	10	70	90	9	4	F07
65 2½"	65	170	71	126	12	34	10	70	90	9	4	F07
80 3"	80	180	78	133	12	34	10	70	90	9	4	F07
100 4"	100	190	98	147	12	34	12	70	90	9	4	F07
125 5"	125	200	109	160	12	34	12	70	90	9	4	F07
150 6"	150	210	133	180	14	34	16	70	90	9	4	F07
200 8"	200	230	158	204	14	34	16	70	90	9	4	F07
250 10"	250	250	194	245	15	45	24	102	125	11	4	F10
300 12"	300	270	219	270	15	45	24	102	125	11	4	F10
350 14"	336	290	256	315	15	45	24	102	125	11	4	F10
400 16"	386	310	308	363	25	50	30	140	175	17	4	F14
450 18"	436	330	334	388	25	50	30	140	175	17	4	F14
500 20"	486	350	360	413	25	50	30	140	175	17	4	F14
600 24"	586	390	426	510	25	50	40	140	175	17	4	F14
700 28"	686	430	480	560	25	60	46	165	210	21	4	F16
800 32"	786	470	525	610	25	60	46	165	210	21	4	F16
900 36"	886	510	635	690	30	90	60	254	300	17	8	F25
1000 40"	986	550	685	740	30	90	60	*254	350	*17	8	*F25

X	Y
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-
131	15
170	23
230	38
285	53
337	68
438	98
535	128
630	158
725	188
819	218

±kg
11
13
17
20
26
31
45
70
90
120
165
200
230
320
420
610
820
1130

* F30 (pcd. 298 - 8x ø 21) at Δp max = 16 bar

BUTTERFLY VALVE - RANGE EVFL DN 1200 - 1400 (48" - 56")

PRODUCT SHEET

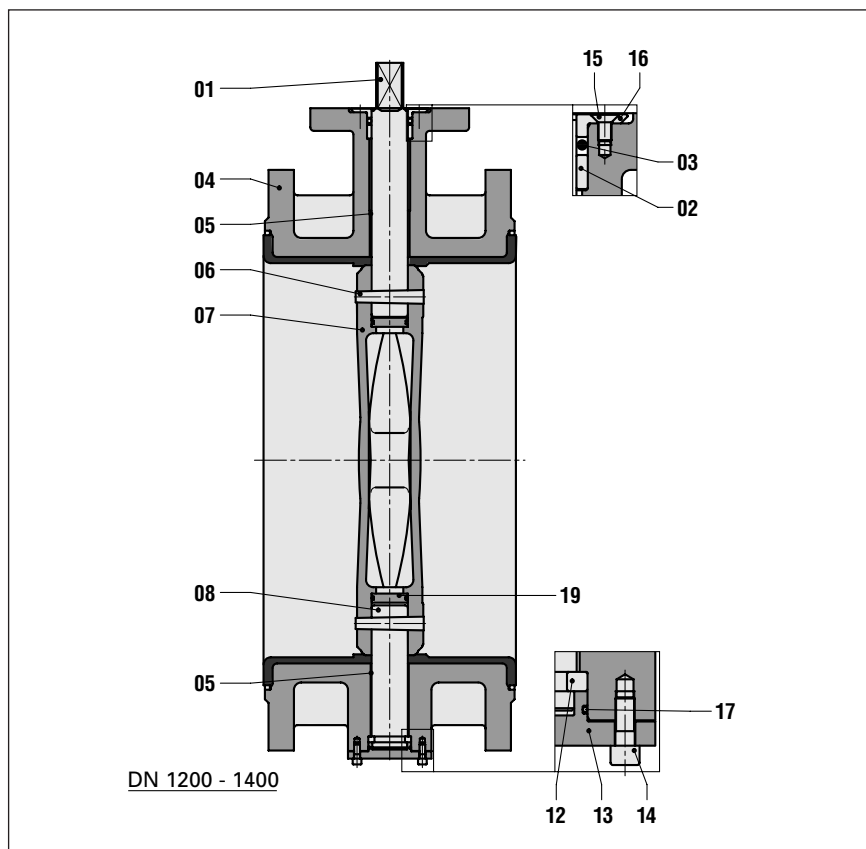
General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:

Body type	Double flanged long type, centric, rubberlined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Bolting between flanges with possibility for downstream pipe dismantling. End of line valve
Flange connections*	PN 10 / 16
Valve shut off pressure*	2,5 / 6 / 10 bar
Leakage rate	ISO 5208, Rate A (Bi-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 14 (double flanged long)
Available type approvals*	KIWA,DVGW,WRC,LRS,ABS,BV,GL,RINA,RMRS
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

*Needs to be specified when ordering. Contact Wouter Witzel for detailed advice.

CONSTRUCTION DETAILS:

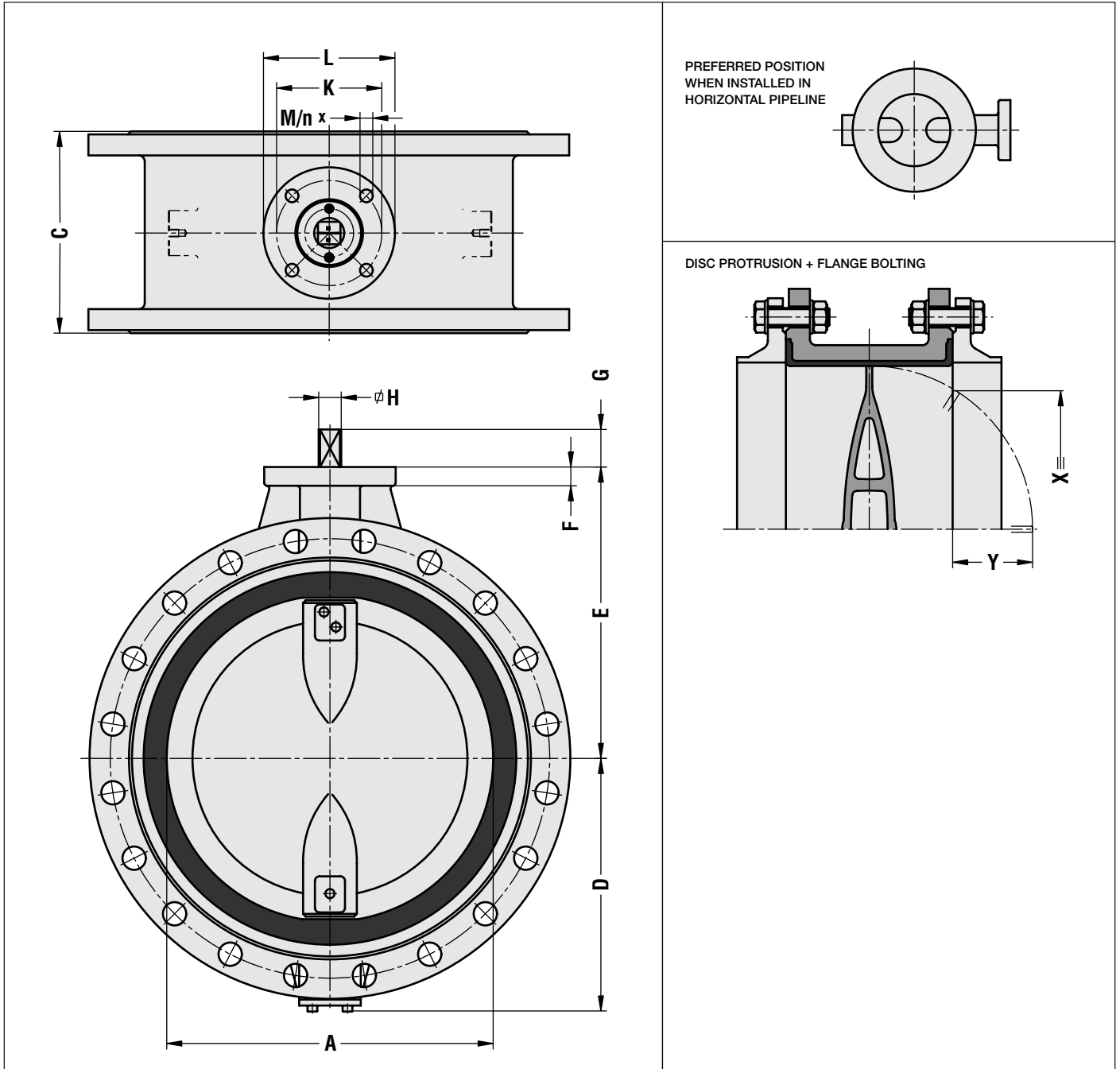


PARTS LIST:

ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

RANGE EVFL DN 1200 - 1400 (48" - 56")

DIMENSIONS:



DN	NPS	ΔPmax	A	C	D	E	F	G	H	K	L	M	n	ISO 5211
1200	48"	10 bar	1186	630	870	855	35	85	75	298	415	21	8	F30
1200	48"	16 bar	1186	630	870	855	35	85	75	356	415	31	8	F35
1400	56"	10 bar	1386	710	970	955	35	85	75	356	415	31	8	F35
1400	56"	16 bar	1386	710	980	955	35	100	90	356	415	31	8	F35

X	Y
1005	315
1005	315
1184	330
1184	330

±kg
1600
1600
2100
2100

Note: Bigger sizes on request

2.6 TECHNICAL DATA

2.6.1 Flow data

ISOLATING VALVES (ON-OFF)

Flow data of isolating valves is normally used within the calculations for pipework sizing and system pressure losses when the valve is in the fully open position. Many on/off isolating valves spend most of the time in the fully open position and therefore these valves should have high Kv figures to reduce pressure drops, increase plant efficiency and contribute to reducing energy costs. Wouter Witzel has developed valves with a lot of attention being paid to achieving excellent flow characteristics. (See table)

Table: Flow coefficient Kv at fully open valve position.

DN	NPS	Valves with stainless steel disc (Kv)	Valves with aluminium bronze disc (Kv)	Valves with ductile iron disc (Kv)
50	2"	95	95	-
65	2 1/2"	231	231	-
80	3"	491	491	-
100	4"	690	690	-
125	5"	1450	1450	-
150	6"	1945	1945	-
200	8"	4095	4095	-
250	10"	6085	4260	4260
300	12"	9570	6360	6360
350	14"	13500	8975	8975
400	16"	16350	10130	10130
450	18"	21550	12730	12730
500	20"	27700	17000	17000
600	24"	37200	24810	24810
700	28"	34470	34470	34470
800	32"	45540	45540	45540
900	36"	58290	58290	58290
1000	40"	73510	73510	73510

Note: $C_v=1,16 K_v$

Flow sizing formulae:

$$\text{Incompressible fluid flow (liquids): } \Delta p = \frac{\rho}{\rho_0} * \frac{Q^2}{K_v^2} \quad K_v = Q * \sqrt{\frac{\rho/\rho_0}{\Delta p}} \quad Q = K_v * \sqrt{\frac{\Delta p}{\rho/\rho_0}}$$

$$\text{Flow velocity: } v = \frac{354 * Q}{DN^2}$$

The maximum recommended flow velocity, avoiding cavitation, vibration, noise etc is: - for liquids: 5 m/sec
- for gases : 50 m/sec

Nomenclature: K_v = Valve flow coefficient in m³/h water (5 - 30°C) at pressure drop of 1 bar across the valve.
 Q = Flow capacity (m³/h).
 Δp = Pressure drop across the valve (bar).
 ρ = Density of fluid (kg/m³).
 ρ_0 = Density of water at 288 K = 1000 (kg/m³).
 v = Flow velocity based upon nominal pipe size (m/s).
 DN = Nominal valve size (mm).

For more information (eg gas calculation) please ask Wouter Witzel for advice or ask for our Technical Data sheet regarding flow through butterfly valves for on-off applications. Also available is a method to calculate energy losses of valves.

REGULATING VALVES

The sizing of regulating valves requires detailed calculations for each case, taking into account eg noise and cavitation. Please ask Wouter Witzel for advice or ask for our special Technical Data Sheet for the selection and sizing of butterflyvalves for control applications.

2.6.2 Valve operating torques

The operating torque of a butterfly valve is in general the result of four partial torques:

- 1-**Seating torque** : Torque to overcome the rubberseat friction.
- 2-**Bearing friction torque** : Torque to overcome the friction between shaft and bearing.
- 3-**Dynamic torque** : Torque developed by pressure differences across a partly opened valve as a result of high flow velocities.
- 4-**Hydrostatic torque** : Torque caused by the difference in static head of liquid on the valve disc above and below the valve shaft in a horizontal position. (Only important for large valve sizes > DN 1000).

The operating torque of a valve under operating conditions may vary depending on different fluid aspects. When ordering it is important to submit the right fluid data (see Valve Data Sheet) to Wouter Witzel to avoid valve operating failures due to incorrect actuator sizing. When no information is available Wouter Witzel takes the following assumptions as a basis for actuator sizing:

- The fluid is water (without solid particles) in the temperature range of +1 up to 80 °C.
- The fluid does not include chemicals or contamination that may increase the friction between the seating surfaces.
- At least one operation cycle per month.
- Flow velocity in the pipe not more than 4 m/s.

Operating torques (Nm) at differential pressures under above mentioned conditions:

DN	NPS	6 BAR	10 BAR	16 BAR
50	2"	10	10	11
65	2 1/2"	13	14	15
80	3"	18	19	21
100	4"	30	32	36
125	5"	42	46	52
150	6"	67	75	86
200	8"	130	140	160
250	10"	220	250	400
300	12"	310	350	560

When other field conditions are expected please contact Wouter Witzel for detailed advice regarding operating torques and actuator selection (Examples: Dry gas or air, slurries, low temperatures, infrequent cycling, high flow velocities)

Notes: - DN 50 - 200 (2"-8") are 16 bar rated valves.
 - Bigger sizes on request.

2.6.3 Mating flanges, compatibility

The Eurovalve ranges are designed for installation between flat or raised faced flanges with preference of the welding neck type according the following standards.

NOTE: It is important to specify the right PN number and flange standard when ordering.

PN number	Weld neck flanges with raised face	(Slip on flanges with flat face*)
PN 6	ISO 7005, type 11 DIN 2631 BS 4504, code 111	ISO 7005, type 01 DIN 2573 BS 4504, code 101
PN 10	ISO 7005, type 11 DIN 2632 BS 4504, code 111	ISO 7005, type 01 DIN 2576 BS 4504, code 101
PN 16	ISO 7005, type 11 DIN 2633 BS 4504, code 111	ISO 7005, type 01 BS 4504, code 101
PN 20/ CLASS 150	ISO 7005, type 11 ANSI B 16.5 MSS SP 44	
JIS 5K JIS 10K	JIS B 2211 JIS B 2212	

Other flanges:

To guarantee the compatibility of the valve with other types of flanges it is recommended to check the following points:

- Sealing area between valve and flange eg for lapped pipe ends (specific Technical Data sheet available)
- Protrusion of the disc to avoid interference between disc and pipe or flange bore (see the Valve Product sheets)
- Stability of plastic flanges when used. Flat faced flanges and valves are recommended.

Ask Wouter Witzel for detailed advice.

*Valves installed between slip on flanges shall be accurately centered to ensure gasket sealing.

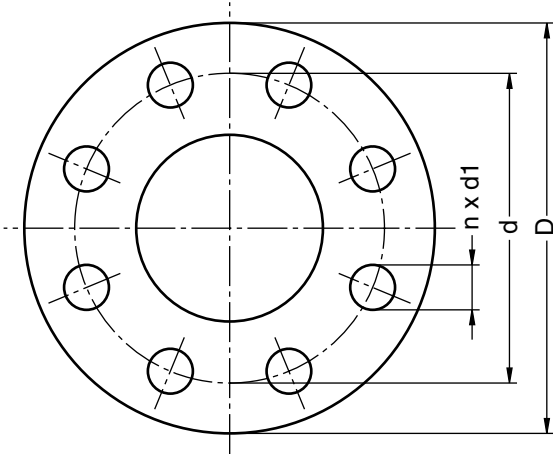
FLANGES, MATING DIMENSIONS

Flanged butterfly valves with PN 6, 10 or 16 flanges are drilled in accordance with ISO 7005.

- Steel valve bodies : ISO 7005/1
- Cast iron/ductile iron valve bodies : ISO 7005/2
- Copper alloy valve bodies : ISO 7005/3

Standards

- PN 6, 10, 16, 20 : ISO 7005 1/2/3 - Metallic flanges*
- PN 6, 10, 16 : DIN 2501 - Flansche, Anschlußmaße (Flanges, mating dimensions)
- PN 6, 10, 16 : BS 4504 - Flanges and bolting, metric series
- ANSI, Class 150 : ANSI B16.5 - Pipe flanges and flanged fittings
- MSS/BS, Class 150 : MSS SP 44 - Steel pipeline flanges
- BS 3293 - Carbon steel pipe flanges



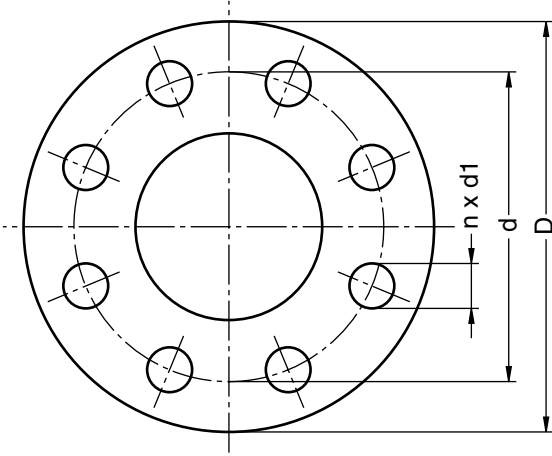
* It should be noted that the diameters of the bolt holes in steel and copper alloy flanges are different from cast iron flanges.

NOM-DIAM DN NPS	PN 6 (cast iron)			PN 10 (cast iron)			PN 16 (cast iron)			PN 20			ANSI Class 150			MSS/BS, Class 150				
	D	d	Bolt n	D	d	Bolt n	D	d	Bolt n	D	d	Bolt n	D	d	Bolt n	D	d	Bolt n		
40 1 1/2	130	110	14	M12	4	150	110	18	M16	4	130	98,5	16	M14	4	127	98,5	15,9	1/2	4
50 2	140	110	14	M12	4	165	125	19	M16	4	150	120,5	18	M16	4	152	120,6	19,1	5/8	4
65 2 1/2	160	130	14	M12	4	185	145	19	M16	4	180	139,5	18	M16	4	178	139,7	19,1	5/8	4
80 3	190	150	19	M16	4	200	160	19	M16	8	200	160	19	M16	4	191	152,4	19,1	5/8	4
100 4	210	170	19	M16	4	220	180	19	M16	8	230	190,5	18	M16	8	229	190,5	19,1	5/8	8
125 5	240	200	19	M16	4	250	210	19	M16	8	255	216,0	22	M20	8	254	215,9	22,4	3/4	8
150 6	265	225	19	M16	8	285	240	23	M20	8	280	241,5	22	M20	8	279	241,3	22,4	3/4	8
200 8	320	280	19	M16	8	340	295	23	M20	8	345	298,5	22	M20	8	343	298,5	22,4	3/4	8
250 10	375	335	19	M16	12	395	350	23	M20	12	400	355	28	M24	12	406	362,0	25,4	7/8	12
300 12	440	395	23	M20	12	445	400	23	M20	12	455	410	28	M24	12	485	432,0	26	M24	12
350 14	490	445	23	M20	12	505	460	23	M20	16	520	470	28	M24	16	535	476,0	29,5	M27	12
400 16	540	495	23	M20	16	565	515	28	M24	16	580	525	31	M27	16	600	540,0	29,5	M27	16
450 18	595	550	23	M20	16	615	565	28	M24	20	640	585	31	M27	20	635	578,0	32,5	M30	16
500 20	645	600	23	M20	20	670	620	28	M24	20	715	650	34	M30	20	700	635,0	32,5	M30	20
600 24	755	705	26	M24	20	780	725	31	M27	20	840	770	37	M33	20	815	749,5	35,5	M33	20
700 28	860	810	26	M24	24	895	840	31	M27	24	910	840	37	M33	24					
750 30	920	865	31	M27	24	965	900	34	M30	24	970	900	37	M33	24					
800 32	975	920	31	M27	24	1015	950	34	M30	24	1025	950	40	M36	24					
900 36	1075	1020	31	M27	24	1115	1050	34	M30	28	1125	1050	40	M36	28					
1000 40	1175	1120	31	M27	28	1230	1160	37	M33	28	1255	1170	43	M39	28					
1100 44	1305	1240	34	M30	32	1340	1270	37	M33	32	1355	1270	43	M39	32					
1200 48	1405	1340	34	M30	32	1455	1380	40	M36	32	1485	1390	49	M45	32					
1400 56	1630	1560	37	M33	36	1675	1590	43	M39	36	1685	1590	49	M45	36					
1600 64	1830	1760	37	M33	40	1915	1820	49	M45	40	1930	1820	56	M52	40					
1800 72	2045	1970	40	M36	44	2115	2020	49	M45	44	2130	2020	56	M52	44					
2000 80	2265	2180	43	M38	48	2325	2230	49	M45	48	2345	2230	62	M56	48					

FLANGES, MATING DIMENSIONS

Standards

- BS, Table D, Table E : BS 10 - Flanges and bolting for pipes, valves and fitting
- API, class 150 : API 605 - Large diameter carbon steel flanges
- JIS 5 K : JIS B 2211 - Basic dimensions of 5 kgf/cm² ferrous materials pipe flanges
- JIS 10 K : JIS B 2212 - Basic dimensions of 10 kgf/cm² ferrous materials pipe flanges
- JIS 16 K : JIS B 2213 - Basic dimensions of 16 kgf/cm² ferrous materials pipe flanges



NOM-DIAM DN NPS	BS, table D			BS, table E			JIS 5 K			JIS 10 K			JIS 16 K		
	D	d	d1 Bolt n	D	d	d1 Bolt n	D	d	d1 Bolt n	D	d	d1 Bolt n	D	d	d1 Bolt n
40 1 1/2	133,4	98,4	15,9 1/2 4	133,4	98,4	15,9 1/2 4	120	95	15 M12 4	140	105	19 M16 4	140	105	19 M16 4
50 2	152,4	114,3	19,1 5/8 4	152,4	114,3	19,1 5/8 4	130	105	15 M12 4	155	120	19 M16 4	155	120	19 M16 8
65 2 1/2	165,1	127,0	19,1 5/8 4	165,1	127,0	19,1 5/8 4	155	130	15 M12 4	175	140	19 M16 4	175	140	19 M16 8
80 3	184,2	146,1	19,1 5/8 4	184,2	146,1	19,1 5/8 4	180	145	19 M16 4	185	150	19 M16 8	200	160	23 M20 8
100 4	215,9	177,8	19,1 5/8 4	215,9	177,8	19,1 5/8 4	200	165	19 M16 8	210	175	19 M16 8	225	185	23 M20 8
125 5	254,0	209,6	19,1 5/8 8	254,0	209,6	19,1 5/8 8	235	200	19 M16 8	250	210	23 M20 8	270	225	25 M22 8
150 6	279,4	235,0	19,1 5/8 8	279,4	235,0	22,2 3/4 8	265	230	19 M16 8	280	240	23 M20 8	305	260	25 M22 12
200 8	336,6	292,1	19,1 5/8 8	336,6	292,1	22,2 3/4 8	320	280	23 M20 8	330	290	23 M20 12	350	305	25 M22 12
250 10	406,4	355,6	22,2 3/4 8	406,4	355,6	22,2 3/4 12	385	345	23 M20 12	400	355	25 M22 12	430	380	27 M24 12
300 12	457,2	406,4	22,2 3/4 12	457,2	406,4	25,4 7/8 12	430	390	23 M20 12	445	400	25 M22 16	480	430	27 M24 16
350 14	527,1	469,9	25,4 7/8 12	527,1	469,9	25,4 7/8 12	480	435	25 M22 12	490	445	25 M22 16	540	480	33 M30x3 16
400 16	577,9	520,7	25,4 7/8 12	577,9	520,7	25,4 7/8 12	540	495	25 M22 16	560	510	27 M24 16	605	540	33 M30x3 16
450 18	641,4	584,2	25,4 7/8 12	641,4	584,2	25,4 7/8 16	605	555	25 M22 16	620	565	27 M24 20	675	605	33 M30x3 20
500 20	704,9	641,4	25,4 7/8 16	704,9	641,4	25,4 7/8 16	655	605	25 M22 20	675	620	27 M24 20	730	660	33 M30x3 20
600 24	825,5	755,7	28,5 1 16	825,5	755,7	31,7 1.1/8 16	770	715	27 M24 20	795	730	33 M30 24	845	770	39 M36x3 24
700 28	-	-	-	-	-	-	875	820	27 M24 24	905	840	33 M30 24	960	875	42 M30x3 24
750 30	997,0	927,1	31,7 1.1/8 20	997,0	927,1	34,9 1.1/4 20	945	880	33 M30 24	970	900	33 M30 24	1020	935	42 M30x3 24
800 32	-	-	-	-	-	-	995	930	33 M30 24	1020	950	33 M30 28	1085	990	48 M45x3 24
900 36	1174,8	1092,2	34,9 1.1/4 24	1174,8	1092,2	34,9 1.1/4 24	1095	1030	33 M30 24	1120	1050	33 M30 28	1185	1090	48 M45x3 28
1000 40	-	-	-	-	-	-	1195	1140	33 M30 28	1235	1160	39 M36 28	1320	1210	56 M52x3 28
1100 44	-	-	-	-	-	-	1305	1240	33 M30 28	1345	1270	39 M36 28	1420	1310	56 M52x3 32
1200 48	1492,3	1409,7	34,9 1.1/4 32	1492,3	1409,7	38,1 1.3/8 32	1420	1350	33 M30 32	1465	1380	39 M36 32	1530	1420	56 M52x3 32
1400 56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1600 64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1800 72	2108,2	2019,3	41,3 1.1/2 44	-	-	-	-	-	-	-	-	-	-	-	-
2000 80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

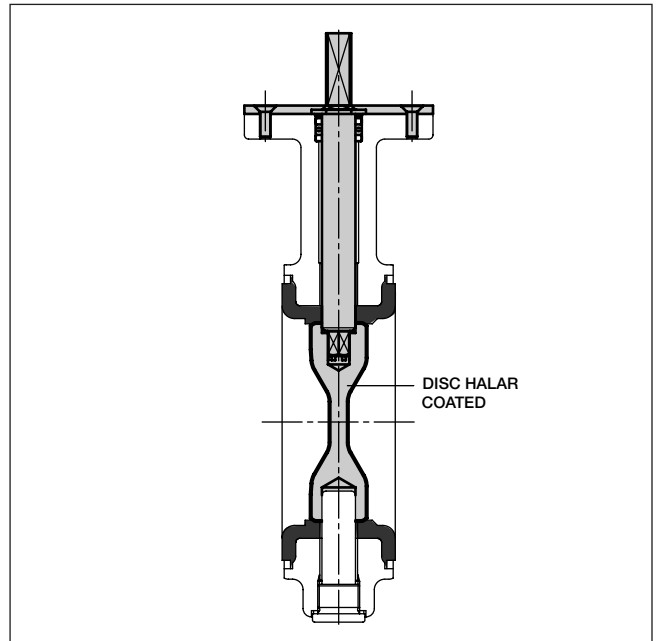
2.7 SPECIAL EXECUTIONS AND ACCESSORIES

The following special butterfly valves executions and accessories are available on request:

2.7.1 Valve with Halar® coated disc for corrosive fluids

SPECIFICATION

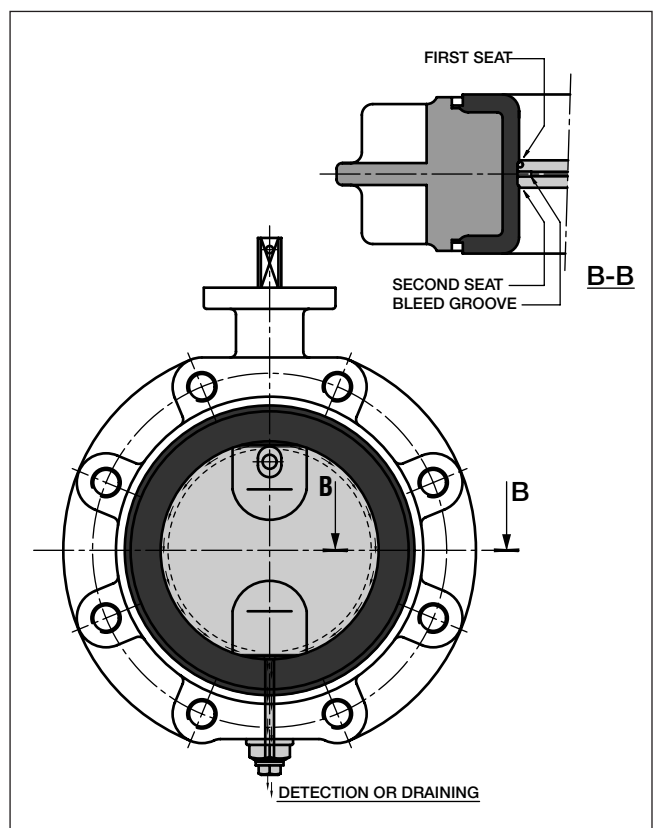
Application	In extremely corrosive fluids e.g. most technical acids, alkalis and organic solvents where stainless steel discs are not resistant. Also for sticky fluids. Max. temperature: 120 °C.
Description	The disc surface is fully coated with Halar® (ECTFE). The conical pin has been replaced by inner hexagon or square. Only the disc and body lining are wetted by the process fluid.
Available on	All Eurovalve ranges. DN 50 - 350 (2"-14"): Max. 10 bar working pressure. Disc stainless steel. DN 400 - 1000 (16"-40"): Max. 6 bar working pressure. Disc ductile iron. <i>Note: Shaft square may be different from standard.</i>



2.7.2 Double block and bleed valve for hazardous applications

SPECIFICATION

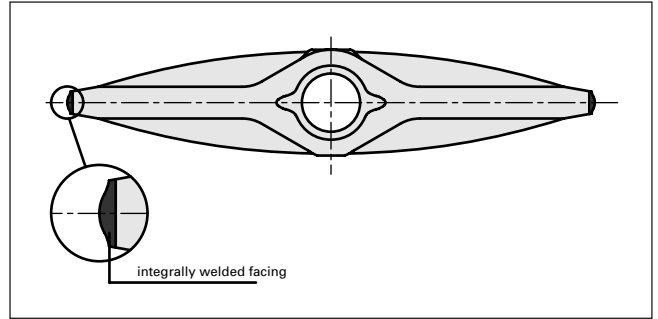
Application	Where seat leakage may be the cause for: -danger at pipe inspection or repair. -explosion risk -unallowed mixing or loss of fluids The fluid must be gaseous or non-corrosive liquids.
Description	The disc has two peripheral seating edges. The valve when in the closed position provides blockage of flow from both valve ends. The cavity between the seats is connected to a R 1/4 vent plug provided on the valve shell for detection or draining of seat leakage.
Available on	All Eurovalve ranges DN 50 - 300 (2"-12"). Maximum working pressure 10 bar. The valve disc material is aluminium bronze.



2.7.3 Ductile iron disc with corrosion resistant disc sealing edge for erosive and corrosive fluids

SPECIFICATION

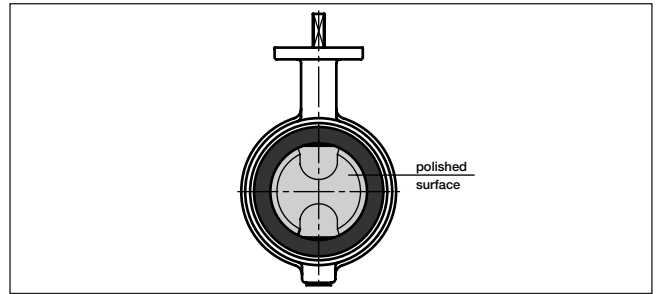
Application	Erosive and corrosive fluids with high flow velocities where ductile cast iron discs are specified.
Description	The disc edge in contact with the rubber lining is faced with a corrosion resistant nickel-chromium alloy (Inconel applied) by welding and finish machined.
Available on	Valves with ductile iron discs, sizes \geq DN 600 (24").



2.7.4 Polished stainless steel disc for clean services

SPECIFICATION

Application	Valves used in the pharmaceutical, chemical and food industry.
Description	The disc surface has been polished to avoid contamination and bacterial growth.
Available on	Valves with duplex or austenitic stainless steel discs in all Eurovalve ranges DN 50 - 1600 (2"-64").



2.7.5 Silicone free valves for coating installations

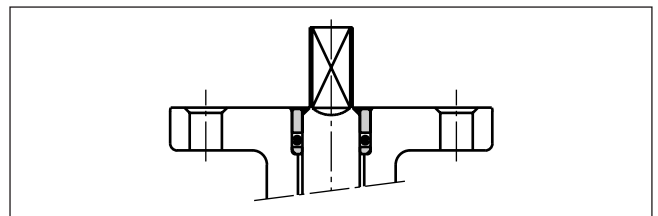
SPECIFICATION

Application	Valves used in silicone free processes e.g. coating systems for car manufacturers.
Description	All valve parts are cleaned before assembly in the clean room where no grease is used. Valves are marked with the letter 'R' and specially packed in sealed plastic bags.
Available on	All Eurovalve ranges DN 50 - 600 (2"-24").

2.7.6 Copper free material execution for ammonia containing fluids

SPECIFICATION

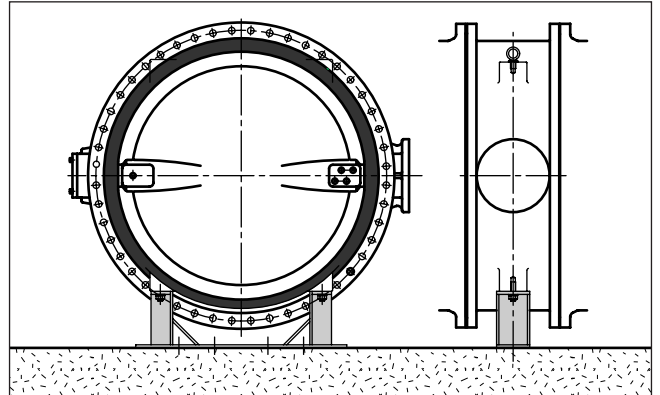
Application	For use in fluids containing ammonia.
Description	All valve parts made from non copper containing materials.
Available on	All Eurovalve ranges and sizes.



2.7.7 Support legs (accessory)

SPECIFICATION

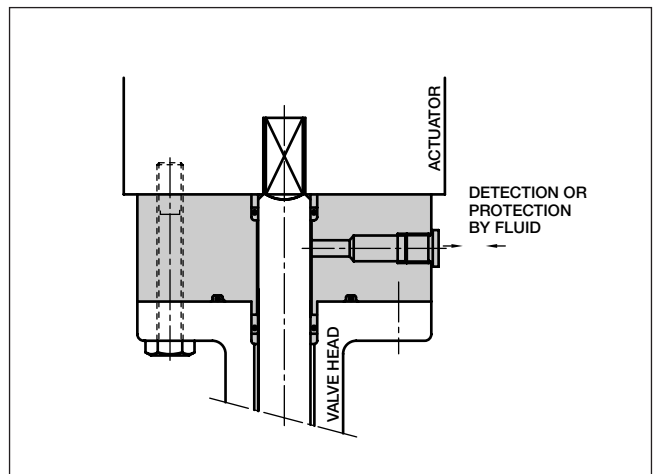
Application	When the valve is to be set on a fixed base to support the valve.
Description	Steel welded structure, connected to the valve body by bolting; tailor made.
Available on	EVFS DN 1200 - 2000 (48"-80") Other sizes and types on request.



2.7.8 Leakage detection/protection (accessory)

SPECIFICATION

Application	-Extra environmental protection of the shaft passage out of the pressure containing cavity in case of harmful pipe fluids (additional to German TA-Luft). -In case of requirement for exceptional high valve performance reliability.
Description	Additional intermediate part on the valve head with internal R ¹ / ₄ threaded connection for detection, draining or emergency sealing of leakage. TüV approved.
Available on	All Eurovalve ranges and sizes. Extended shaft necessary.



2.8 STORAGE AND INSTALLATION

General

This chapter gives general instructions regarding storage, installation and system testing of butterfly valves.

For each type of valve Wouter Witzel has drafted a detailed user manual with the following contents:

- Safety precautions
- Handling and storage
- Installation
- Operating conditions
- Maintenance
- Trouble shooting

Ask Wouter Witzel for a User Manual when ordering.

Storage of valves

Store the valve in dry, dark and cool conditions, preferably indoors with the actual valve temperature higher than the dew point. If outdoor storage is unavoidable, support the valves off the ground and protect the valves with a watertight cover.

Do not remove the valve packaging or end port protection, until necessary for inspection or installation. Store the valve in the slightly open position to avoid deformation of the rubberlining.

Inspection prior to installation

- 1 Inspect the valve visually for damage or contamination during transport, handling and storage as this could adversely affect valve performance.
- 2 Carefully unpack the valve.
- 3 Check the tagplates if attached on the valve.
- 4 Inspect the valve interior and lining. It shall be clean, free from foreign matter or damage.
- 5 Check that all electric components are marked with the correct IP rating and hazardous class when the valve is to be used in a hazardous location (explosive gas or vapour).
- 6 If practical, actuate the valve through close/open and open/close cycles to check the correct function.
Warning: Avoid contact with the valve disc.
- 7 Immediately prior to installation, check the flanges to which the valve is to be fastened. The flanges shall have a raised face or a flat face. The sealing face shall be flat, without burrs, grooves, weld spatters, sharp edges and free from oil.
- 8 The inside diameter shall be large enough to accommodate the protrusion of the valve disc when the valve is open. The possibility of interference between disc and pipe shall be checked and avoided.
- 9 Check that the inside diameter of the flange or pipe bore is not too large as this will reduce the flange to valve sealing of the gasket face.
- 10 Check the diameter of the raised face, stub end or equivalent of all pipe ends to ensure sufficient face to face contact with the metal face of the valve.
- 11 Ask for specific installation instruction for plastic pipework or flanged pipe ends of thin wall pipework.

Installation between flanges

Note: - New valves **do not** require additional flange gaskets. The lining will seal against the mating flange face.

- Where practical, valves in buried installations should be located in unpaved areas.
- As the valve is bi-directional tight shut off, the direction of installation is not relevant.
- When installed in a horizontal pipe line, valves larger than DN 300 should have the shaft positioned horizontally.

Option: Vertical shaft position on request.

INSTALLATION IN AN EXISTING PIPELINE:

- 1 Check that the installation length between the pipe flanges is enough to position the valve without damaging the rubber lining.
- 2 Position the valve in the centre of the pipeline and with the shaft horizontally if possible.
- 3 Check the bolts for proper size and length.
- 4 Tighten the bolts in a crisscross fashion until the valve body (metal) touches the flange face.

INSTALLATION IN A NEW PIPELINE:

- 1 Weld the flange to the pipe so that the sealing faces are parallel.
Caution: Do not weld a connecting flange to the pipe with the valve installed in order to avoid overheating of the rubber lining.
- 2 After cooling the flange, position the valve in the centre of the pipeline and with the shaft horizontally if possible.
Note: - Valves may be fitted when in fully closed position
 - Valves fitted with spring to open actuators may be fitted when in the fully open position (avoid damage of disc) or in the fully closed position.
- 3 Tighten the bolts in a crisscross fashion until the valve body (metal) touches the flange face.

Testing

- 1 Open and close the valve (if possible by hand) to ensure no disc interference.
- 2 Clean the pipe interior with a rinsing fluid compatible with the rubber lining and process.
- 3 Connect the actuator (if applicable) to the power supply in accordance with the user manual of the actuator.
- 4 Check the operation and tightness when the system is under (working) pressure.

3 PRODUCT DATA: MANUAL OPERATORS

Wouter Witzel supplies a wide selection of manual operators: lever and wormgear in different executions. Extensions and other options are available.

Lever

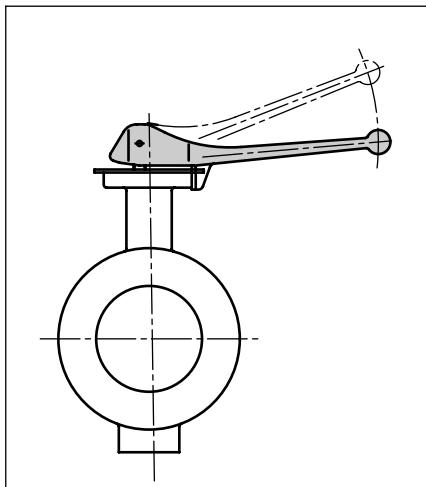
The basic manual operator for Eurovalves up to DN 200 (8") is the 10 position spring loaded lever with notch plate which provides quick operation, economy and simplicity. When the lever is not in manual control it always returns to a latched position.

It is designed to open or close the valve or to regulate the flow. The lever is also designed to serve as valve disc position indicator. When the lever is positioned parallel to the pipeline the valve is open.

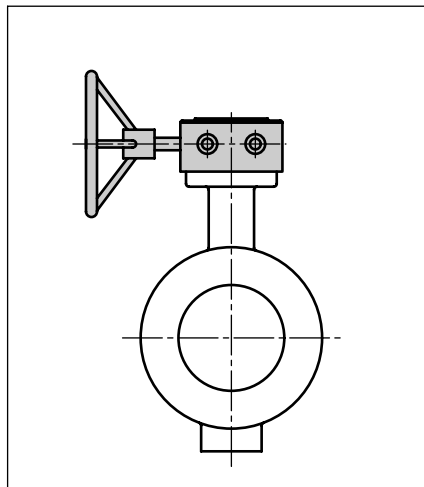
Wormgear

To reduce the required manual effort applied to operate a Eurovalve larger than DN 150 (6") a wormgear is preferred. A wormgear allows greater ease of operation and gives a better protection against system damage caused by waterhammer due to quick closing. For regulating valves with a wormgear the system can be properly balanced by fine manual control. Casing materials are aluminium or cast iron. The available operating devices for wormgear are handwheels, tee caps for buried service or chainwheels for overhead installations.

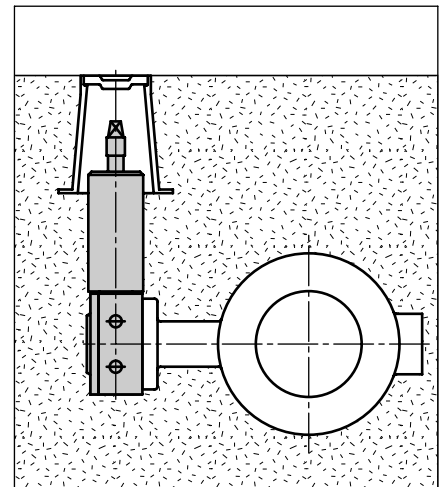
LEVER



WORMGEAR



EXTENSIONS



Technical data is given in the following product data sheets

3.1 LEVER, TYPE L

PRODUCT SHEET

Application:

For the quick manual operation of Eurovalves up to and including DN 300 (12"). For open/close or regulating purposes.

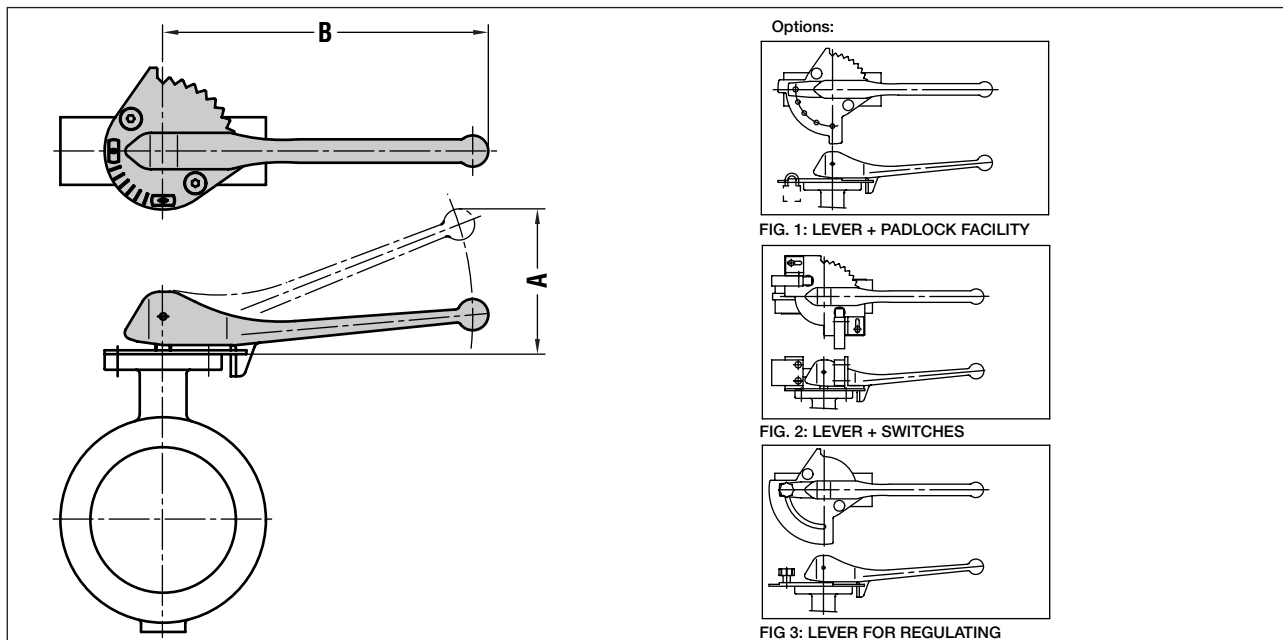
Product description:

- Fits to all Eurovalves up to and including DN 300 (above DN 200 for low pressure applications only)
- Length depending on valve size
- Easy operating
- Lever made of malleable cast iron (bending on site is possible by heating)
- Notch plate made of zinc plated steel
- Notch plate with 10 positions

Options:

- Various padlock facilities (figure 1)
- Limit switches for position monitoring (figure 2)
- Special notch plate for regulating purposes (figure 3)
- Stainless steel notch plate
- L-short, extra short execution (only L1 and L2)

Figure:



Dimensions:

LEVER	A	B	KG
L1	112	250	1
L2	112	250	1
L3	121	315	1,4
L4	184	500	3,2

Selection of lever, type L:

Valve DN	2,5 bar	6 bar	10 bar	16 bar
50 - 80 (2"-3")			L1	
100 - 125 (4"-5")			L2	
150 - 200 (6"-8")			L3	
250 (10")	L4	-	-	-
300 (12")	L4	-	-	-

3.2 GEARBOX, ALUMINIUM CASING

PRODUCT SHEET

Application:

For the manual operation of Eurovalves up to and including DN 500 (20"). General purpose applications.

Product description:

- Body of (polyurethane coated) light weight aluminium
- Self-locking
- Suitable for fine control service
- Adjustable end stops
- Visual position indicator
- Life time lubrication
- Replaceable stem drive bush (n.a. for AM type)
- Steel handwheel

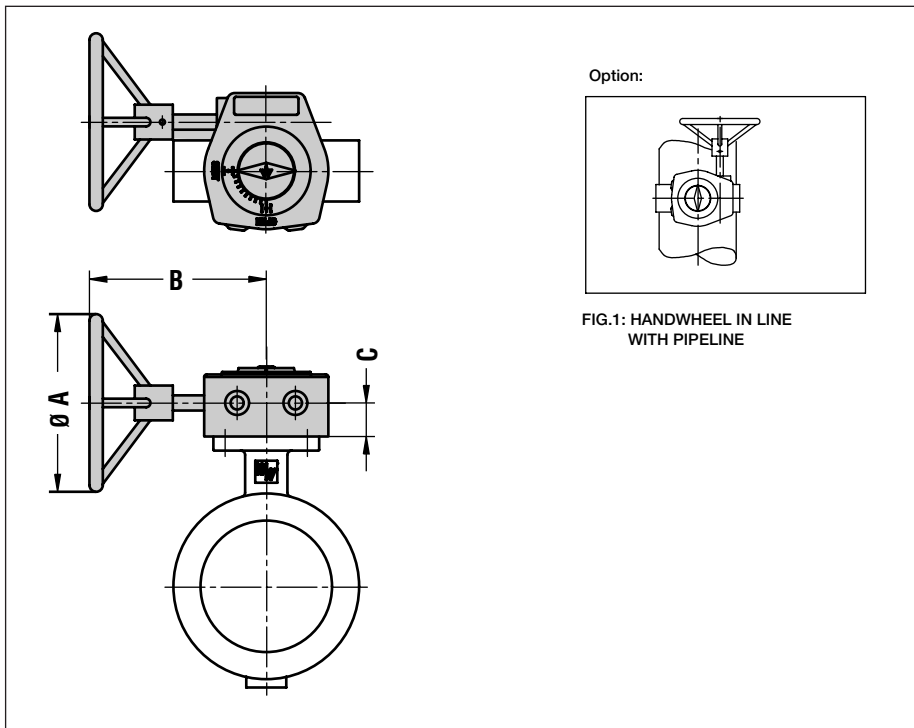
Technical data:

- Stroke : 90° with ± 5° adjustment
- Rotation : Clockwise closing
- Enclosure : IP 64 according DIN 40050 / IEC 529
- Temperature : -20° to 80°C

Options:

- Handwheel in line with pipeline (figure 1)
- Approved gearboxes eg UL, VdS, Apsad

Figure:



Available types and dimensions:

Wormgear type	A	B	C	KG
WK 232 - 05 M100	100	104	21	1
WK 232 - 07 M125	125	123	30	2
WK 232 - 10 M300	300	228	36	5
WK 232 - 12 M400	400	294	40	8
WK S 980 M125	125	134	27	1.3
WK S 984 M300	300	223	29	4.4
WK S 987 M350	350	252	33	8
AM 1	150	155	30	2.5
AM 2	315	190	42	4.5

3.3 GEARBOX, CAST IRON CASING

PRODUCT SHEET

Application:

For the manual operation of Eurovalves up to and including DN 600 (24"). Heavy duty applications. Bigger sizes on request.

Product description:

- Body of polyurethane coated cast iron
- Self-locking
- Suitable for fine control service
- Adjustable end stops
- Visual position indicator
- Life time lubrication
- Handwheel operation

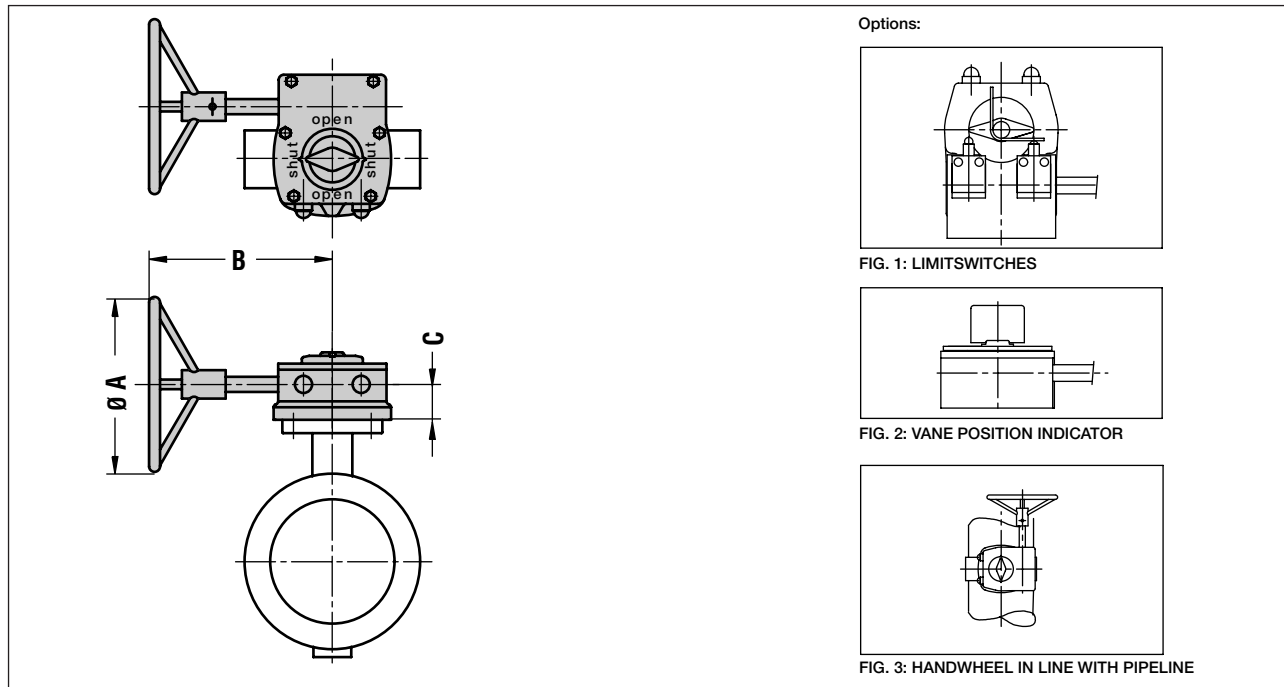
Technical data:

- Stroke : 90° with ± 5° adjustment
- Rotation : Clockwise closing
- Enclosure : AB: IP65; GSH: IP68; M: IP67
acc. to DIN 40050 /IEC 529/EN60529
- Temperature : -20° to 80°C

Options:

- Body of ductile cast iron
- IP 68 executions for buried or immersed exposure
- Limit switches (figure 1)
- Vane position indicator (figure 2)
- Various locking possibilities
- Shaft extension possibilities
- Memory stop
- WK AB is FM approved
- Handwheel in line with pipeline (figure 3)

Figure:



Available types and dimensions:

Wormgear type	A	B	C	KG
WK AB 210 M200	200	185	27	4
WK AB 550 M300	300	191	41	11
WK AB 880 M400	400	247	42	18
WK AB 1250 SG 500	500	346	48	27
WK GSH 40.3 SG 160	160	150	32	5
WK GSH 50.3 SG 300	300	215	40	8
WK GSH 63.3 SG 300	300	240	42	12
WK GSH 80.3 SG 400	400	191	57	18
WK GSH 100.3 SG 500	500	262	75	32
WK M10 SG 200	200	202	35	4
WK M10 SG 300	300	332	35	4
WK M12 SG 400	400	348	42	8
WK M14 SG 500	500	475	50	15
WK M15 SG 500	500	427	50	28

3.4 GEARBOX FOR BURIED SERVICE

with input shaft extension

PRODUCT SHEET

Application:

For the manual operation (open/close) by T-key of Eurovalve butterfly valves buried service.

Product description:

- Body of epoxy coated cast iron
- Clockwise closing is standard
- Self-locking
- Adjustable end stops
- Life time lubrication
- Option: body ductile iron (type E ≥ 1950 standard)
- Option: anti clockwise closing

Technical data:

- Stroke : 90° with ±5° adjustment
- Enclosure : IP 68 according IEC 529 / EN 60529
- Temperature : - 20° to 80° C
- Input : max. 250 Nm (EN 1074)

Figure:

Wormgears type M with B3C extension

Wormgear type	A (mm)	B (mm)	X min (m)	X max (m)	Turns to close	KG
MYF 40	40	77	0,7	3,0	10	15
MAF 46	45	86	0,7	3,0	11,5	17
MAF 46 / S3	45	8	0,7	3,0	34,5	32
MCF 72	48	137	0,7	3,0	18	33
MCF 72 / S3	48	59	0,7	3,0	54	48

Wormgears types E and GS with B3T extension

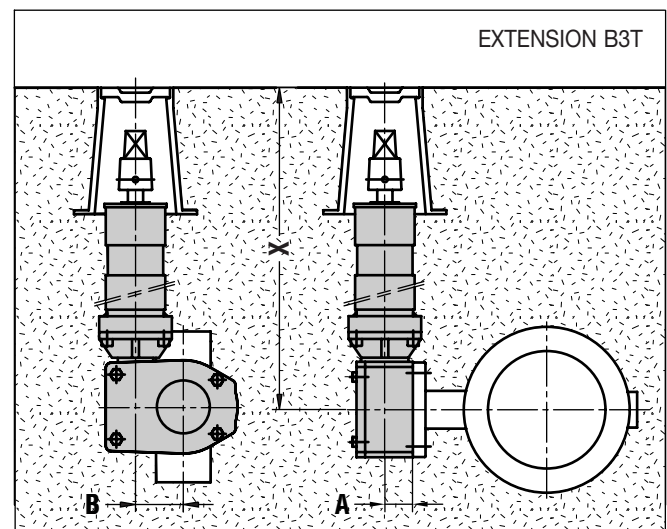
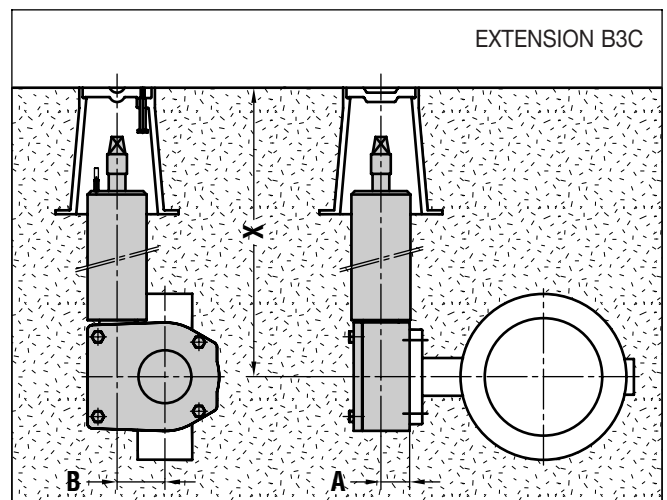
Wormgear type	A (mm)	B (mm)	X min* (m)	X max* (m)	Turns to close	KG
E 550 G	41	71	0,8	4,7	8,5	11
E 880 G	42	86	0,8	4,7	9,5	15
E 1250 G	48	105	0,8	4,7	13,7	22
E 1950 G	55	130	0,8	4,7	13	37
E 1950 G / SP2.4	55	211	1,0	4,9	31	46
E 6800 G / SP4	59	263	1,0	4,9	78	71
E 250 G / SP9	88	431	1,1	5,0	176	226
GSM 63.3	42	63	0,8	4,7	13	12
GSM 80.3	57	80	0,8	4,7	13	18
GSM 100.3	75	100	0,8	4,7	13	32
GSM 125.3 / VZ2.3	75	125	0,8	4,8	31,5	45
GS160 / GZ14 (4:1)	76	150	1,1	5,0	54	160
GS200 / GZ16 (6:1)	101	200	1,2	5,1	79,5	180

Product description spindle extension type B3C

- Square (30 mm) for T-key operation
- Tailor made length (factory made)
- Plastic (PVC) protection pipe
- Option: position indicator

Product description extension type B3T

- Square (30 mm) for T-key operation (DIN 3223)
- In 5 executions with telescopic length adjustment
- Plastic (Polythene) protection pipe
- Internal fracture pin against overloading of wormgear
- Options: position indicator, position indicator with limit switches



*The B3T extension is available in 5 different successive units of lengths. By stating X Wouter Witzel will select the most suitable unit of length, taking into consideration with the sizes of the wormgear. Surface Box is not included.

3.5 GEARBOX EXTENSIONS

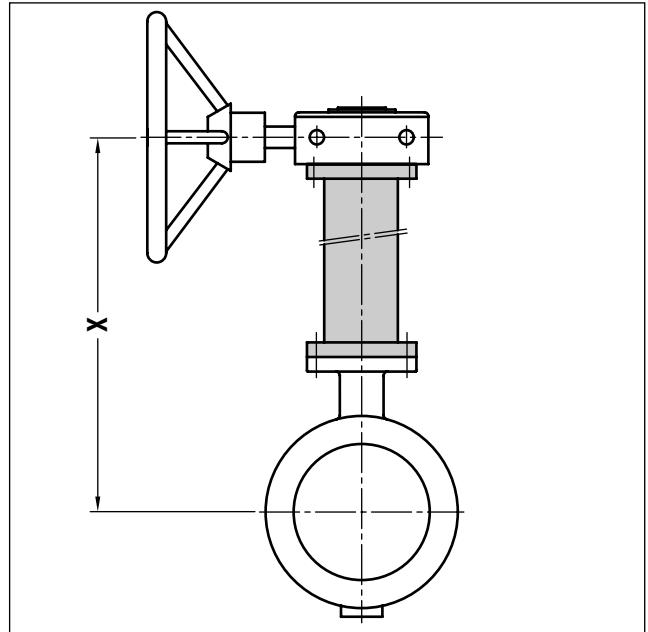
Wouter Witzel supplies different types of wormgear extensions for remote operation of butterfly valves.

- a - Extension between valve head and actuator eg the type B3E.
- b - Extension of the operating device, eg the types B3D and B3F.

PRODUCT SHEET

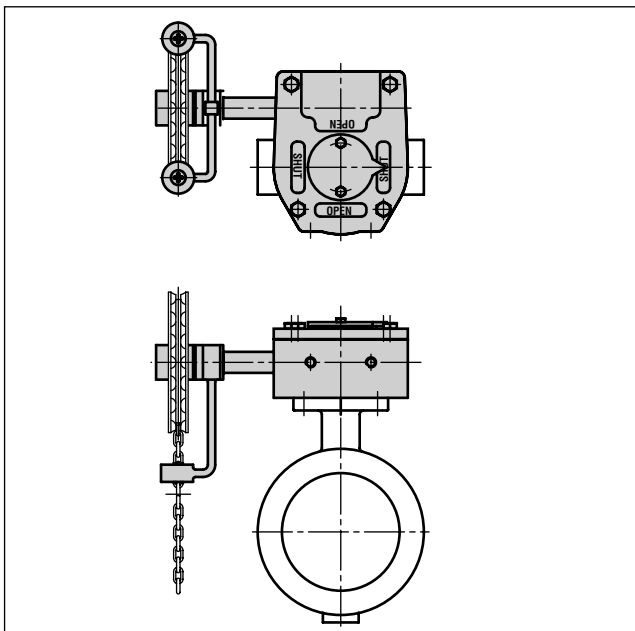
Extension type B3E for remote operation.

A steel extension to extend the valve shaft for fitting a lever, any type of wormgear or power actuator.
 Maximum length 3 m.



Extension type B3D for overhead installations.

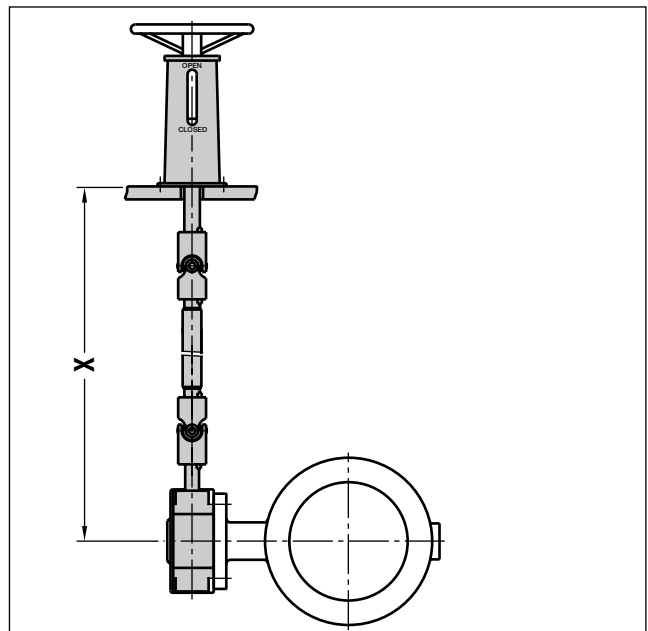
Execution with a chainwheel and chain.



Extension type B3F for operation from another floor level.

Extension arrangement which allows up to 35° misalignment of the universal coupling.

Note: Also available with position indicator or electric actuator instead of handwheel.



4 PRODUCT DATA: CHECK VALVES

FLANGELESS WAFER TYPE, RUBBER SEATED

4.1 GENERAL

Function

The ECV is a check valve to avoid unwanted back flow in a pipe.

Applications

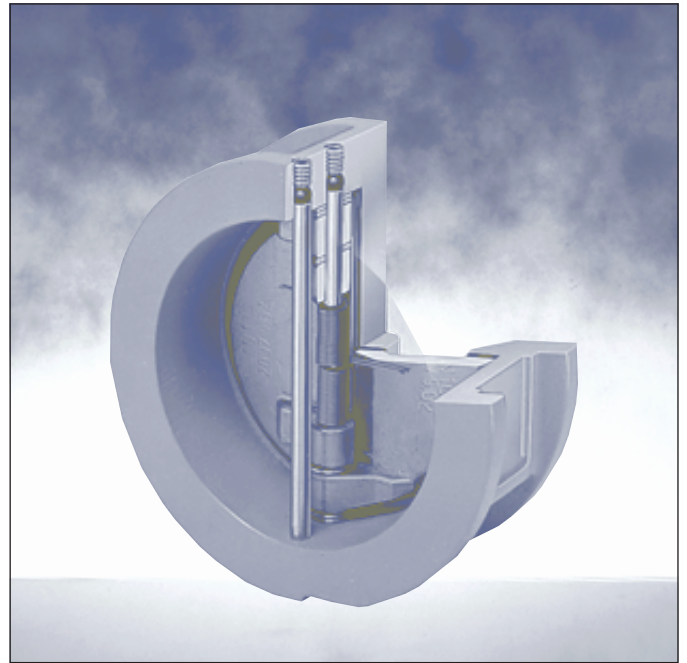
In water supply systems (distribution, treatment etc.), irrigation, heating systems, ship building, industrial processes (liquids and gases).

Temperature indication: EPDM -30° C to 110° C
NBR 0° C to 90° C

Pipe connection

The ECV check valve has been designed for installation in flanged piping systems (PN 10, PN 16, etc.).

The flangeless wafer type body shall be clamped between two flanges with flat or raised faces (weld neck or slip on flanges). Suitable gaskets shall be used for sealing between valve and flanges.



4.2 DESIGN

The ECV is a self acting pivoting check valve of the double disc wafer type. The valve is maintenance free. The design is compact and space saving.

The ECV check valve has a superior closing response prior to flow reversal. The corrosion resistant springs are designed to quickly close the valve at zero flow to prevent undesirable pressure surges. In the closed position the valve is tight shut off. It opens automatically when the flow starts again.

The elastomer seat is vulcanized and bonded to the body casting. It is out of the flow path thus ensuring extended seal life. Spherical profiling of the seat ensures positive shut-off even at low pressures and the area adjacent to the seat is also protected by the same elastomer material.

Attention paid to the streamlining of the flow path is paramount if good flow characteristics are to be achieved. The saving of energy costs by selecting a Wouter Witzel check valve may be several times the initial cost of the valve (ask Wouter Witzel for an energy calculation).

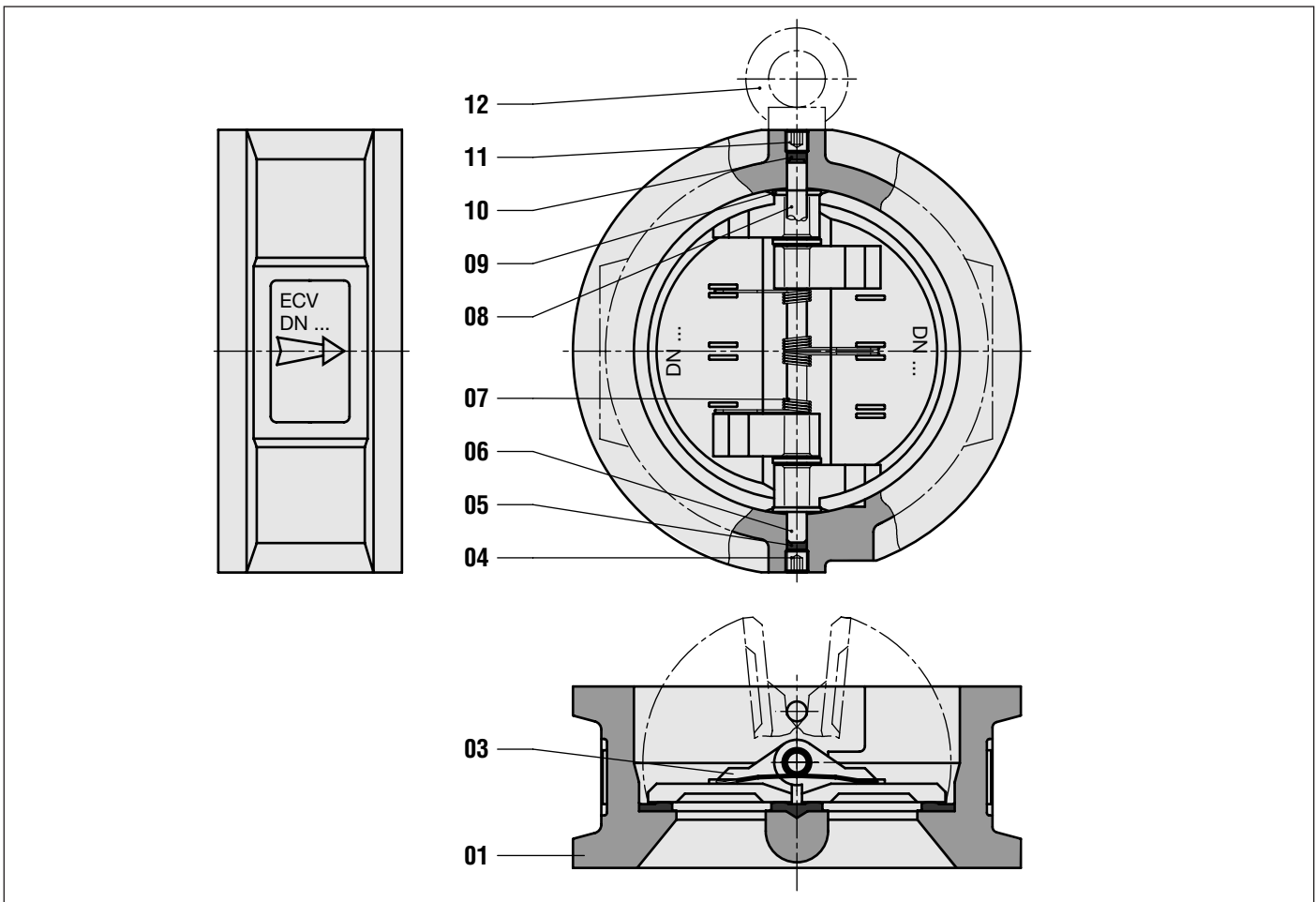
The use of these design features together with careful material selection makes the ECV a product with a high reliability and a low operating costs.

SPECIFICATION:

Body type	Flangeless wafer
Function	Back flow prevention
Installation	Clamping between flanges
Flange connections*	PN 10 / 16 / ANSI Class 150 (other connections on request)
Valve shut off pressure	Between 0,2 and 16 bar
Pressure differential to open	0,02 bar minimum
Leakage rate	ISO 5208, Rate A (uni-directional tight shut off)
Face to Face dimension	ISO 5752 / EN 558, basic series 16 (wafer long)
Available type approvals*	LRS, GL
Body and trim materials*	See material table.

* Needs to be specified when ordering

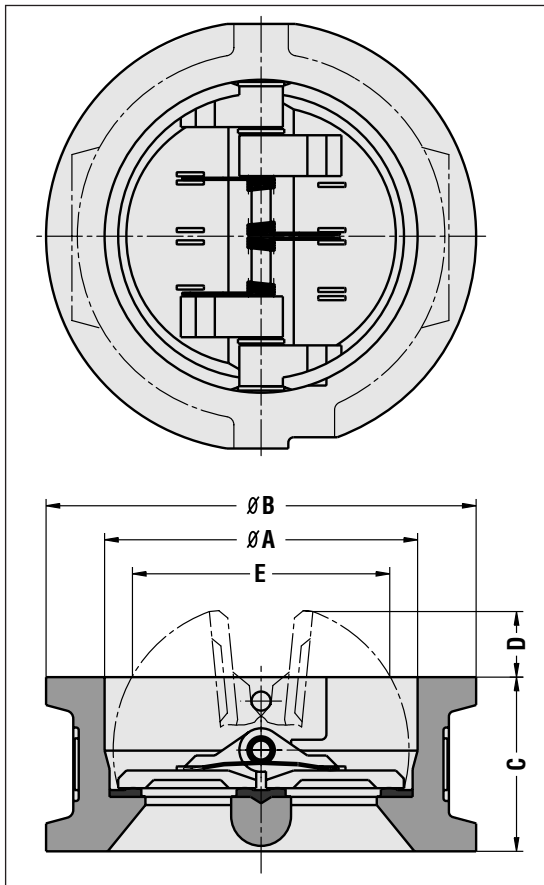
CONSTRUCTION DETAILS:



PARTS LIST:

ITEM	DESCRIPTION
01	body rubber seated
03	disc
04	plug
05	sealing ring
06	shaft
07	spring
08	stop pin
09	ring
10	seal
11	plug
12	lifting eye bolt (≥ DN 250/10")

DIMENSIONS:



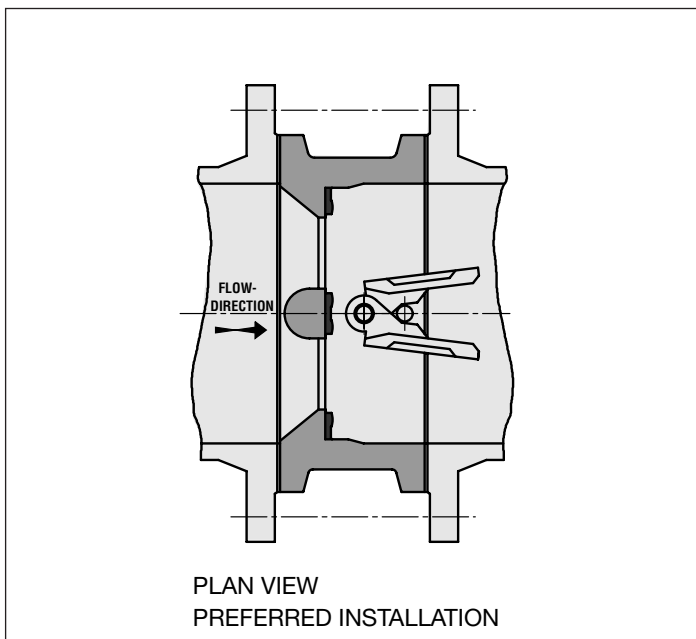
DN	NPS	A	B	C	D	E	±kg
50	2"	67	100	43	8	41	1.3
65	2½"	84	118	46	14	59	1.8
80	3"	100	140	64	16	69	3.5
100	4"	115	158	64	25	90	4.5
125	5"	135	188	70	34	110	6.5
150	6"	160	212	76	43	136	8.5
200	8"	210	268	89	61	185	13
250	10"	256	325	114	72	225	24
300	12"	306	375	114	97	278	36
350	14"	356	430	127	122	331	45
400	16"	406	475	140	147	381	60
450	18"	466	554	152	152	428	85
500	20"	486	620	152	159	428	105
600	24"	600	733	178	216	570	150

4.3 INSTALLATION

The ECV check valve is designed for steady flow conditions and can be installed in horizontal and vertical pipelines but the instructions shown must be adhered to.

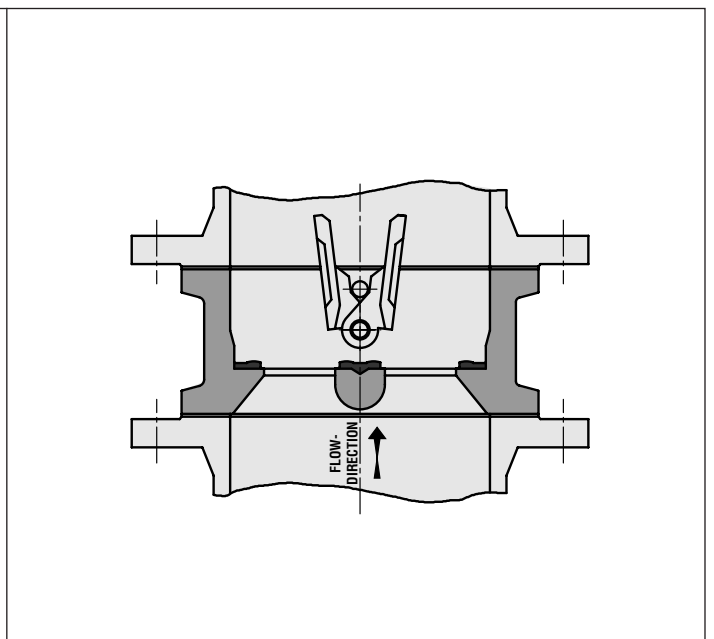
Note: The valve must not be installed in pipelines with pulsating flow or near to reciprocating pumps.

Installation in a horizontal pipeline:



The disc shaft must be in the vertical position.

Installation in a vertical pipeline:



As standard the valve must be installed with flow up.

Note: Additional pressure drop can be expected due to the weight of the discs.

4.4 MATERIALS

The ECV is available in different materials as shown in the following tables. The selection is mainly based on the corrosive properties of the fluid(s). Inconel springs have a longer life time specially in chloride containing fluids eg sea water.

PART	MATERIAL	MATERIAL STANDARDS		
Body	Cast iron (DN 50 - 200/2"-8")	GG 25, DIN 1691	<i>cl., ASTM A126</i>	<i>Gr. 250, BS 1452</i>
	Ductile cast iron (≥ 250/10")	GGG 40, DIN 1693	<i>60-40-18, ASTM A536</i>	<i>400-18, BS 2789</i>
	Aluminium bronze:	G-CuAl10Ni, DIN 1714	<i>C95800, ASTM B148</i>	<i>AB2, BS 1400</i>
Disc	Aluminium bronze:	G-CuAl10Ni, DIN 1714	<i>C95800, ASTM B148</i>	<i>AB2, BS 1400</i>
Shaft / stop pin	Stainless steel:	X5CrNiMo 17 12 2	<i>AISI 316</i>	<i>316S16, BS 970</i>
Spring	Stainless steel:	X5CrNiMo 17 12 2	<i>AISI 316</i>	<i>316S16, BS 970</i>
	Inconel:	<i>NiCrMo9Nb, DIN 17744</i>	<i>UNS N06625, ASTM B446</i>	<i>NA 21, BS 3076</i>
Seat	Rubber:	EPDM, NBR, FPM		

Note: The material standards printed in italics are comparable with the supplied materials.

External and internal coating for grey and ductile cast iron bodies:

Code	Coating	Colour	Use
PUR	Polyurethane coating. Thickness 60 µm.	Orange RAL 2000	Indoor and outside exposure. Light and normal circumstances.
EP-W-2	Epoxy coating Thickness 350 µm.	Grey RAL 7038	Potable water systems.

Remark: Polyurethane coating is also available in the colours: blue/RAL 5017, red/RAL 3000 or grey/RAL 7000. Other coatings on request.

Standard material configurations and Wouter Witzel combination codes

DN 50 - 200 (2"-8")

Body: Cast iron

Disc : Aluminiumbronze

Shaft	SS		Alubronze	
Spring	SS		Inconel	
Seat	NBR	EPDM	NBR	EPDM
Code	AW	BW	-	-

DN 250 - 600 (10"-24")

Body: Ductile cast iron

Disc : Aluminiumbronze

Shaft	SS		Alubronze	
Spring	SS		Inconel	
Seat	NBR	EPDM	NBR	EPDM
Code	KW	JW	-	-

DN 50 - 600 (2"-24")

Body: Aluminiumbronze (recommended for sea water applications)

Disc : Aluminiumbronze

Shaft	SS		Alubronze	
Spring	SS		Inconel	
Seat	NBR	EPDM	NBR	EPDM
Code	-	-	-	-

Remark: Other materials on request.

4.5 TECHNICAL DATA

Flow resistance

As a check valve is permanently open in normal service the flow resistance is a very important feature of a check valve with regard to the energy loss per year which can amount up to many times the initial cost of the valve. Wouter Witzel has reduced the pressure loss of the ECV design to very low levels. This is indicated by high Kv values as stated in the following table determined by flow testing.

Flow coefficient Kv

DN	NPS	Kv values
50	2"	55
65	2½"	150
80	3"	180
100	4"	280
125	5"	420
150	6"	750
200	8"	1800
250	10"	2800
300	12"	4500
350	14"	6300
400	16"	8200
450	18"	9000
500	20"	10000
600	24"	18000

Note: $C_v = 1,16 K_v$

Flow sizing formulae:

Incompressible fluid flow (liquids):

$$\Delta p = \frac{\rho}{\rho_0} * \frac{Q^2}{K_v^2} \qquad K_v = Q * \sqrt{\frac{\rho/\rho_0}{\Delta p}} \qquad Q = K_v * \sqrt{\frac{\Delta p}{\rho/\rho_0}}$$

Flow velocity: $v = \frac{354 * Q}{DN^2}$

The maximum recommended flow velocity, avoiding cavitation, vibration, noise etc is for liquids: 5 m/sec

Nomenclature:

- Kv = Valve flow coefficient in m³/h water (5 - 30°C) at pressure drop of 1 bar across the valve.
- Q = Flowcapacity (m³/h).
- Δp = Pressure drop across the valve (bar).
- ρ = Density of fluid (kg/m³).
- ρ_0 = Density of water at 288 K = 1000 (kg/m³).
- v = Flow velocity based upon nominal pipe size (m/s).
- DN = Nominal valve size (mm).

For more information (eg about gas flow) please ask Wouter Witzel for advice or ask for our special Technical Data sheet regarding flow through check valves. Also available is a method to calculate energy losses by flow through valves.

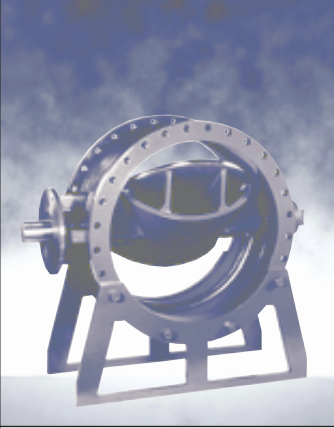
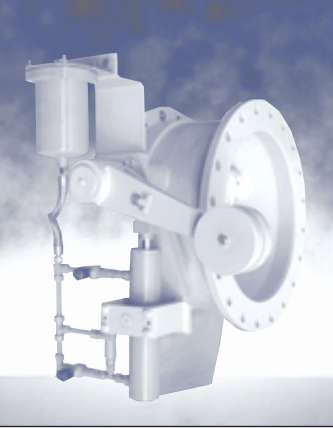
5 SALES PROGRAMME: OTHER WOUTER WITZEL PRODUCTS

5.1 LARGE DIAMETER BUTTERFLY VALVES AND CHECK VALVES

For use as isolating valves or check valves in special duties eg: dry docks, power stations, water supply, sewage stations.
 Installation in flanged piping systems: PN 2,5 , 6, 10, AWWA, API.

Installation with welded pipe connection: Welding ends according DIN, ANSI, API.

With manual or automatic operation.

<p>RANGE TFL Double flanged type</p>	<p>RANGE TCV CHECK VALVE Double flanged type</p>
	
<p>Design: Rubber seat in body Double-eccentric shaft construction. Design pressure max. 16 bar. DN 700 - 4000 (28" - 160").</p>	<p>Design: Rubber seat in body Double-eccentric shaft construction with counter weight and power unit. Design pressure max. 16 bar. DN 700 - 2000 (28" - 80").</p>

5.2 HIGH PERFORMANCE BUTTERFLY VALVES

For use as isolating or regulating valve in heavy duty applications, eg ship building cargo systems, petro-chemical industries, industrial systems.
 Approved by different international certification bodies eg Lloyds. Fire safe executions available.


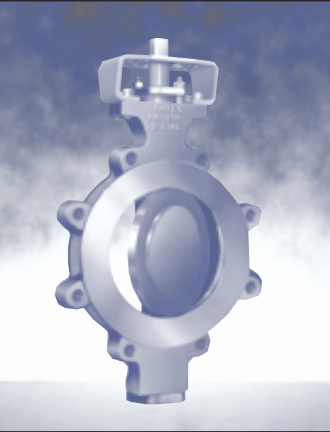
Installation in flanged piping systems: PN 10, 16, 20, ANSI Class 150.

With manual or automatic operation.

Also available in double flanged type.

Note: PN 25/40 Class 300 on request.


WAFER AND FLANGED VALVES

RANGE EMS Flangeless wafer type	RANGE EMTLS Tapped lug wafer type
PN 10/16 class 150	
	
<p>Design: Metallic or soft seat in body. Double-eccentric shaft construction. Design pressure max. 20 bar. Bi-directional sealing. DN 80 - 600 (3" - 24").</p>	<p>Design: Metallic or soft seat in body. Double-eccentric shaft construction. Design pressure max. 20 bar. Bi-directional sealing. DN 80 - 600 (3" - 24").</p>

Ask for our special product leaflets.

5.3 REGULATING BUTTERFLY VALVES



For use as regulating valve in low-pressure systems with gaseous or granular fluids, eg: coking plants, steel works, air conditioning systems, granular transport systems.
 Installation in flanged piping systems: PN 6, 10, 16.
 With manual or automatic operation.

RANGE EVR Flangeless wafer type

<p>Design: Clearance between disc edge and inside body diameter. Centric shaft construction. Design pressure 2,5 bar. Bi-directional flow. DN 50 - 600 (2" - 24"). Up to 550 °C.</p>

5.4 PTFE LINED BUTTERFLY VALVES FOR CORROSIVE FLUIDS

For use as isolating or regulating valve in industrial processes with highly corrosive fluids eg: petro-chemical industries, foodstuff industries, sugar refineries, paper- and pulp mills, shipbuilding, cargo systems, off-shore.
 Installation in flanged piping systems: PN 6, 10 16, ANSI Class 150.
 With manual or automatic operation.


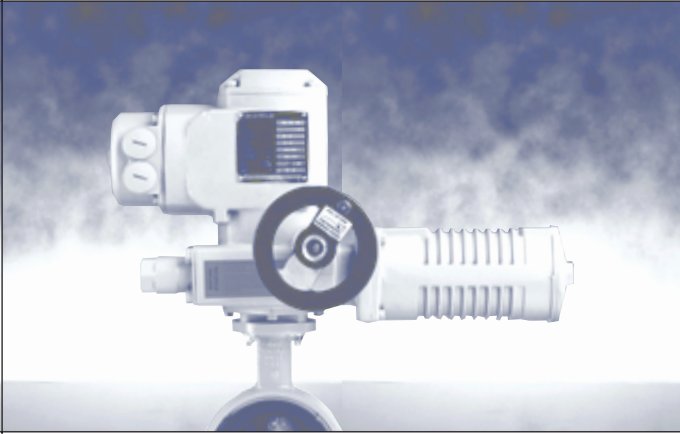

WAFER BUTTERFLY VALVES

RANGE EVT-WAFER Flangeless wafer type	RANGE EVT-WAFER LUG Lug wafer type
	
<p>Design: PFA coated disc. PTFE liner in body. Centric shaft construction. Design pressure max. 16 bar. Bi-directional tight shut-off. DN 40 - 700 (1½" - 28").</p>	<p>Design: PFA coated disc. PTFE liner in body. Centric shaft construction. Design pressure max. 16 bar. Bi-directional tight shut-off. DN 25 - 900 (1" - 36").</p>

Ask for our special leaflet.

5.5 POWER ACTUATORS

For automatic operation of butterfly valves by electric power, pneumatic or hydraulic pressure. Mounting possibilities on all types of butterfly valves for use in isolating or regulating service. Different makes and options available for most environmental and/or hazardous duties.

PNEUMATIC ACTUATOR Double acting or spring return	ELECTRIC ACTUATOR	HYDRAULIC ACTUATOR Double acting or spring return
 A compact, white pneumatic actuator mounted on a butterfly valve stem.	 A white electric actuator with a prominent black handwheel and a cylindrical motor housing, mounted on a butterfly valve stem.	 A compact hydraulic actuator with a cylindrical body and mounting flange, mounted on a butterfly valve stem.
<p>Design: Different types available. *Rack and pinion construction, compact and short stroke *Heavy duty execution with long stroke rack and pinion construction. Available as double acting, spring to close or spring to open executions. Included position indication. Ideal for on/off as well as modulating duties.</p>	<p>Design: Electrical AC or DC motor with gear unit (self locking). Limit switches for open and close stroke adjustment. Position indicator. Emergency operation by handwheel.</p> <p><i>Note: Most actuators require an external relay box.</i></p>	<p>Design: Compact designs. Not self locking. Rotary type or linear type depending on the make. Two way stroke adjustment. Position indicator.</p>

Ask for our special Automation catalogue.

6 VALVE DATA SHEET

Company: Your ref:

Information to be specified to select the right valve type and actuator. Send this form to Wouter Witzel for inquiry or ordering.

Please tick this box where applicable.

1-PROCESS OPERATING CONDITIONS:

Type of installation/process:		Fluid(s):	
		<input type="checkbox"/> Clean <input type="checkbox"/> Depositing <input type="checkbox"/> Crystalizing <input type="checkbox"/> Abrasive	
Max. working pressure (bar):		Max shut off pressure (bar):	
Max. fluid temperature (deg. C):		Flow rate (m³/h):	
Valve function : <input type="checkbox"/> Isolating; valve usually open <input type="checkbox"/> Isolating; valve usually closed <input type="checkbox"/> Combined isolating/regulating		<input type="checkbox"/> Regulating, modulating <input type="checkbox"/> Back flow prevention (Please submit additional flow <input type="checkbox"/> Emergency/safety valve data eg Qmin, Qmax, dp...)	
Required seat leakage rate: <input type="checkbox"/> Tight shut off		<input type="checkbox"/> Allowed leakage (cc/min):	
Valve exposure: <input type="checkbox"/> Indoor		<input type="checkbox"/> Outside; open air <input type="checkbox"/> Buried or submersed	
Frequency of operation (per year):		Remarks:	

2-FLANGE CONNECTION:

Nominal Diameter(s) of flange:	DN:	NPS: ... [inch]
Nominal Pressure of flange:	<input type="checkbox"/> PN 10 <input type="checkbox"/> PN 16	<input type="checkbox"/> ...

3-BODY TYPE SELECTION:

body type:	<input type="checkbox"/> Flangeless wafer type	<input type="checkbox"/> Semi-lug wafer type	<input type="checkbox"/> Semi-lug wafer type with long neck	<input type="checkbox"/> Single flanged wafer type	<input type="checkbox"/> Lug wafer type (threaded lugs)	<input type="checkbox"/> Wafer U-section type	<input type="checkbox"/> Double flanged type
Valve installation requirements:							
Clamping between flanges	OK	OK	OK	OK		OK	
Installation between flanges and possibility for downstream pipe dismantling	-	OK	OK	OK	OK	OK	OK
Valve bolted at end of the line flange	-	OK	OK	OK	OK	OK	OK
Two separate flange connections	-	-	-	-	OK	OK	OK
Bolting directly to hull (shipside)	-	-	-	OK	-	-	OK
Suitable for insulation of pipes	OK	OK	OK*	OK	OK	OK	OK

* NB: Special execution for insulation around valve.

4-MATERIAL REQUIREMENTS:

Material	Cast iron	Ductile cast iron	(Alu) bronze	Stainless steel	Carbon steel	Rubber NBR	Rubber EPDM	Rubber FPM	Halar PTFE/PFA	Metallic	Special or Quality
Disc	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	-	-	-	<input type="checkbox"/>	-	
Seat/lining	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Body	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	-	-	-	-	

5-ACTUATION REQUIREMENTS (Not applicable to check valves)

Manual operator	<input type="checkbox"/> Electric actuator	<input type="checkbox"/> Pneumatic actuator:	<input type="checkbox"/> Hydraulic actuator
<input type="checkbox"/> Lever (up to DN 300/12') <input type="checkbox"/> Wormgear with handwheel <input type="checkbox"/> Wormgear with square for T key operation	<input type="checkbox"/> AC <input type="checkbox"/> DC (Power supply)VHZ.....Ph <input type="checkbox"/> IP54 <input type="checkbox"/> IP65 <input type="checkbox"/> IP67 <input type="checkbox"/> IP68 <input type="checkbox"/> Explosion proof; class:.....	<input type="checkbox"/> Double acting <input type="checkbox"/> Single acting, fail safe position normally valve open <input type="checkbox"/> Single acting, fail safe position normally valve closed <input type="checkbox"/> Positioner; signal valve open:.....mA/bar; valve closed:..... mA/bar <input type="checkbox"/> Supply pressure bar	

6-ADDITIONAL REQUIREMENTS:

Regarding the valve, eg: <input type="checkbox"/> Type approvals:..... <input type="checkbox"/> Body material certificates 3.1.B <input type="checkbox"/> Inspection certificates <input type="checkbox"/> Fire safe design <input type="checkbox"/> Special body coatings: <input type="checkbox"/> Double block and bleed valve <input type="checkbox"/> Polished disc <input type="checkbox"/> Silicone free execution	Regarding the actuator, eg: <input type="checkbox"/> Limit switch(es) for disc position(s) open / closed <input type="checkbox"/> Solenoid valve; electric rating:.....; normal disc position:..... <input type="checkbox"/> Position transmitter <input type="checkbox"/> All equipment explosion proof; classification:..... <input type="checkbox"/> Emergency operation <input type="checkbox"/> Extension (please supply layout drawing + dimensions) <input type="checkbox"/> Closing/opening time
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