TECHNICAL DOCUMENTATION

VALID FROM AUGUST 2016

WOUTER WITZEL® VALVE TECHNOLOGY

CENTRIC RUBBERLINED BUTTERFLY VALVES

MANUAL OPERATIONS

CHECK VALVES

always in touch

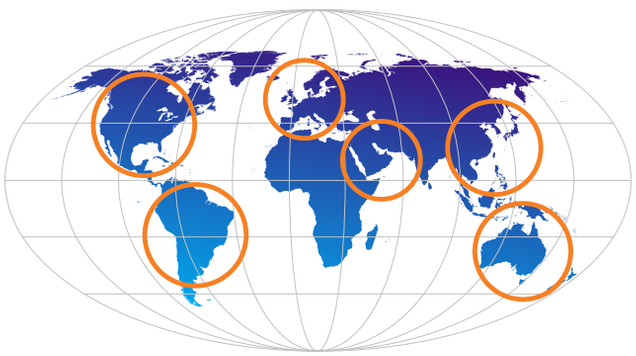
Chemical | Sugar | Paper | Cement | District Heating | Oil & Gas Processing | Energy & Power Supply | Petrochemical | Food & Beverages | Water | HVAC | Ship Building | Tank Store | On-Off Shore

CENTRIC RUBBERLINED BUTTERFLY VALVES

WOUTER WITZEL EUROVALVE

THE WOUTER WITZEL BUTTERFLY VALVES ARE SUITED FOR ANY POSSIBLE APPLICATION. FOR TAILORED TO MARKET NEEDS SUCH AS RELIABILITY, NO MAINTENANCE AND LONG SERVICE LIFE, A COMPLETE RANGE OF INDUSTRIAL BUTTERFLY VALVES UNDER THE WELL-KNOWN BRAND NAME OF WOUTER WITZEL HAS BEEN DEVELOPED.

Renowned as the producer and supplier with the most complete range of fluid management solutions, Wouter Witzel EuroValve operates from sales offices all around the world.
A strong customer relationship is ensured as Wouter Witzel EuroValve expert technicians and consultants are always close by, no matter where the expertise is needed. The production facilities employ the latest technology for the design and manufacture of valves and instruments for the industrial, commercial, municipal and utility markets.



Wouter Witzel is a member
of the AVK Group www.avkvalves.com

CENTRIC RUBBERLINED BUTTERFLY VALVES

Long application experiences, continuous material research and innovation of efficient manufacturing technologies have resulted in an up-to-date product range of Wouter Witzel brand.
The unique bonded lining concept and profiled sealing design have increased the functional performance to a very high level.

CHECK VALVES

Compact and space saving check valves developed by Wouter Witzel EuroValve have proven to be a leading back flow prevention devices widely used throughout water supply systems, irrigation systems, heating systems, ship building and industrial processes.

ACTUATION

To match the valve product range, Wouter Witzel EuroValve offers several types of levers, worm gears and pneumatic, electric and hydraulic actuators to operate all kinds of valves. From manually operated solutions to highly advanced remotely operated systems – these actuators are sure to contribute to a tight flow management and control precision.

Contents

CENTRIC RUBBERLINED BUTTERFLY VALVES

1 WOUTER WITZEL EUROVALVE COMPANY INFO

1.1 GENERAL

Wouter Witzel EuroValve, established in 1966 and located in Losser, The Netherlands is a leading developer, designer, manufacturer and distributer of a wide range of high quality industrial valves: Rubberlined(centric) and High Performance(double eccentric) butterfly valves, check valves, remote controlled hydraulic systems, pneumatic and electric actuators and accessories. From standard designs, which are available directly from stock, to custom-made products for specific applications, Wouter Witzel EuroValve offers an ultimate range of flow management solutions, continuously satisfying even the most demanding clients, thus earning a reputation of a valued and expert supplier.

1.2 SALES AND DISTRIBUTION

As a member of the AVK Group, Wouter Witzel EuroValve has access to a worldwide distribution network. Through this vast network the whole assortment is presented in over 80 countries. The vending of butterfly valves for the water treatment solutions is currently carried out by the dedicated sales force of the AVK Group, which receives full support of Wouter Witzel EuroValve highly professional and skilled technical team. Sales for other applications like Oil & Gas and Maritime industry, are done by company's own sales team, thus insuring ultimate expertise and professionalism from the beginning up to the very end - to the very moment the customer is fully satisfied.
Two leading players joined forces to provide the ultimate solutions and outstanding level of expertise and know-how.

1.3 PRODUCT PHILOSOPHY

The Wouter Witzel EuroValve product philosophy is to provide the end user with high quality, low maintenance, long life product. By applying the principle of having the possibility to offer a wide spectrum of industrial valves and actuators, the optimal solution for each specific market segment and application can be found or developed at all times. The above principle has been at the core of Wouter Witzel EuroValve business development through the years and is the basis of the company's high reputation and global expansion.

Wouter Witzel EuroValve BV
Industrieterrein De Pol 12
NL-7581 CZ Losser
Phone: +31 (0)53 536 95 36
Fax: +31 (0)53 536 95 00
e-mail: info@wouterwitzel.nl
www.wouterwitzel.nl

2 QUALITY ASSURANCE

2.1 QUALITY ASSURANCE SYSTEM

All valves are designed, manufactured and sold in accordance with ISO 9001/EN 29001 and Module H of the European legislation for Pressure Equipment (PED).
BSI-QA has certified the company's QA system at an early stage (no. FM 2200).

2.2 TYPE APPROVALS

Wouter Witzel® centric 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 WRAS – United Kingdom SVGW – Switzerland FDA – USA
Gas supply	DVGW – Germany Advantica – United Kingdom SVGW –Swiss
Shipbuilding	LR – United Kingdom DNV – Norway ABS – USA BV – The Netherlands GL – Germany RINa – Italy NKK – Japan RS – Russia CCS – China CRS – Croatia USCG – USA
Fire protection systems	FM – USA UL – USA VdS – Germany APSAD – France
(Petro)chemical industries, steel works and mining	RWTÜV – Germany (TA-Luft) Bergbau Amt – Germany (anti-static) GOST – Russia Petrobas – Brazil Achilles – Norway Shell – Netherlands
General approval confirming for standard compliance	Kitemark Licence acc. BS 5155 – United Kingdom CSTB-France for hevac applications
Europe (general)	Pressure Equipment Directive certification – EU

2.3 PED QUALIFICATION

2.3.1 CERTIFICATE

In the European Economic Area the Pressure Equipment Directive (PED) 97/23/EC is mandatory.
Therefore Wouter Witzel EuroValve has been PED (Module H) certified by BSI since January 2001.

Certificate

of Conformity

No. CE 57126

Issued to:

Wouter Witzel EuroValve B.V.
Industrieterrein De Pol 12
7581 CZ Losser
Netherlands

In respect of:

Pressure Accessories

On the basis of our examination under the requirements of Council Directive 97/23/EC Module H of the Pressure Equipment Directive, as transposed into UK law by the Pressure Equipment Regulations SI 1999 2001.

For and on behalf of the British Standards Institution, a Notified Body for the above Directive (Notified Body Number 0086):

Alastair Trivett, Managing Director, BSI Product Services – Global

First issued: **6 Dec 2001** Date: **12 Jun 2008**

Page: 1 of 2

Products produced outside the scope of this certificate will not be covered by the requirements of the Directive and the application of the BSI Notified Body, Number 0086, will be illegal.
BSI must be informed without delay if the said products are required to be included in the scope.
This certificate remains valid as long as compliance with the requirements of the Directive are maintained.

raising standards worldwide™

Product Services

BSI Product Services, Kitemark House, Maylands Avenue, Hemel Hempstead, Hertfordshire, HP2 4SQ United Kingdom Tel: +44 (0)8450 765600 Web: www.bsigroup.com
BSI Group Headquarters 389 Chiswick High Road, London W4 4AL Tel: +44 (0)20 8996 9000

2.3.2 CLASSIFICATION OF VALVES

Outside the European Union	Inside the European Union	
	Low hazardous applications:	More hazardous applications:
Valves brought on the market	Pressure < 0,5 bar.	Different classifications determined by:
outside the European Union	Small product: sizes x pressure	• Valve size
do not need a PED certification	Excluded applications	• Allowable pressure
	(eg. Shipbuilding)	• Type of fluid
Valves without CE certification	Valves without CE certification	Valves with PED certification (categories I, II, III).
No CE marking	No CE marking	CE marking mandatory

According the PED regulations valves can be classified for safety reasons on their size DN, allowable pressure PS and hazard of the fluid. This classification is the basis for material selection, material inspection documentation and manufacturing quality system.
Types of fluid:

- G1: Dangerous gas (explosive, flammable, toxic, oxidizing).
- G2: Non dangerous gas.
- L1: Dangerous liquids (explosive, flammabele, toxic, oxidizing).
- L2: Non dangerous liquids.

A purchaser should indicate when ordering the required category with help of the following table:

Classification table of valve categories:

	PS 2,5 bar				PS 6 bar				PS 10 bar				PS 16 bar				PS 25 bar			
Fluid:	G1	G2	L1	L2	G1	G2	L1	L2	G1	G2	L1	L2	G1	G2	L1	L2	G1	G2	L1	L2
DN	**CATEGORY**																			
50	I	S	S	S	I	S	S	S	I	S	S	S	I	S	S	S	I	II	S	S
65	I	S	S	S	I	S	S	S	I	S	S	S	II	I	S	S	II	II	S	S
80	I	S	S	S	I	S	S	S	I	S	S	S	II	I	S	S	II	II	S	S
100	I	S	S	S	I	S	S	S	I	S	S	S	II	I	S	S	II	II	S	S
125	II	S	S	S	II	S	S	S	II	I	S	S	II	I	S	S	II	I	II	S
150	II	S	S	S	II	S	S	S	II	I	S	S	II	I	II	S	III	II	II	S
200	II	S	S	S	II	I	S	S	II	I	S	S	II	I	II	S	III	II	II	S
250	II	S	S	S	II	I	S	S	II	I	I	S	III	II	II	S	III	II	II	I
300	II	S	S	S	II	I	S	S	II	I	I	S	III	II	II	S	III	III	II	I
350	II	S	S	S	II	I	I	S	II	I	I	S	III	III	II	I	III	III	II	I
400	II	S	S	S	III	I	I	S	III	II	I	S	III	III	II	I	III	III	II	I
450	III	I	S	S	III	I	I	S	III	II	I	S	III	III	II	I	III	III	II	I
500	III	I	S	S	III	I	I	S	III	II	I	S	III	III	II	I	III	III	II	I
600	III	I	S	S	III	II	I	S	III	III	I	S	III	III	II	I	III	III	II	I
700	III	I	S	S	III	II	I	S	III	III	I	S	III	III	II	I	III	III	II	I
750	III	I	S	S	III	II	I	S	III	III	I	S	III	III	II	I	III	III	II	I
800	III	I	S	S	III	II	I	S	III	III	I	S	III	III	II	I	III	III	II	I
900	III	I	I	S	III	III	I	S	III	III	I	S	III	III	II	I	III	III	II	I
1000	III	I	I	S	III	III	I	S	III	III	I	S	III	III	II	I	III	III	II	I
1100	III	I	I	S	III	III	I	S	III	III	I	S	III	III	II	I	III	III	II	I
1200	III	I	I	S	III	III	I	S	III	III	I	S	III	III	II	I	III	III	II	I
1400	III	I	I	S	III	III	I	S	III	III	I	S	III	III	II	I	III	III	II	I
1500	III	I	I	S	III	III	I	S	III	III	I	S	III	III	II	I	III	III	II	I
1600	III	I	I	S	III	III	I	S	III	III	I	S	III	III	II	I	III	III	II	I
1800	III	I	I	S	III	III	I	S	III	III	I	S	III	III	II	I	III	III	II	I
2000	III	I	I	S	III	III	I	S	III	III	I	S	III	III	II	I	III	III	II	I
2000	III	I	I	S	III	III	I	S	III	III	I	S	III	III	II	I	III	III	II	I
2200	III	I	I	S	III	III	I	S	III	III	I	S	III	III	II	I	III	III	II	I

Note: S: Sound Engineering Practice without CE marking.

2.3.3 MATERIAL INSPECTION CERTIFICATES

All (main) pressure bearing parts of the valves are manufactured with the following inspection documentation for material traceability (in accordance with the PED regulations).

EN 10204: 2000 Metallic materials – Types of inspection certificates

Category 0 (no CE marking)	Category I	Category II and III
Non-Specific Inspection & test	Non-Specific Inspection & test	Product-Specific Inspection & test
2.2	**2.2**	**3.1**

Copies of the material inspection certificates of the main pressure bearing parts, eg body castings, can be ordered on request.

2.4 TESTING INSPECTION CERTIFICATES

All valves are pressure and functional tested after assembly according to internal quality procedures which comply with international standards. Testing inspection certificates according ISO 10474/EN 10204, 2.3, 3.1, 3.2 can be submitted on request.

3 PRODUCT LINES

Industrial centric butterfly valves up to DN 2200 (88"), actuators and check valves are listed in the product survey below.
Detailed product leaflets are available on our website:
www.wweurovalve.nl.

3.1 CENTRIC RUBBERLINED BUTTERFLY VALVES

Wouter Witzel® centric butterfly valves incorporate important differences, aimed at achieving excellent product performance, high reliability, and low whole life cost.

- For use as isolating or regulating valve in a wide spectrum of industrial processes, eg: water supply (water works and transport pipelines), shipbuilding, (petro)chemical industries, hevac, gas systems, fire fighting systems, environment control etc.
- The Wouter Witzel range of centric butterfly valves has integral bonded rubber linings and is bi-directional tight shut off.
- Approved by different international certification bodies (e.g. WRC, BSI, DVGW see chap. 2).
- Installation in flanged piping systems: PN6, 10, 16, 20, 25, ANSI Class 150, JIS etc.
- With manual or automatic operation.

3.1.1 FLANGELESS WAFER VALVES

RANGE EVS
Flangeless wafer type

In line installation
Design pressure max. 16 bar.
DN 50 - 1400 (2''- 56'').

RANGE EVCS
Alignment lug wafer type

In line installation
Design pressure max. 16 bar.
DN 50 - 300 (2'' - 12'')

3.1.2 LUGGED AND U-SECTION WAFER VALVES

RANGE EVBS
Semi-lug wafer type

In line and dead end installation
Design pressure max. 16 bar.
DN 50 - 1200 (2'' - 12'').

RANGE EVBLS
Semi-lug wafer type
with long neck

In line and dead end installation
Design pressure max. 16 bar.
DN 50 - 800 (2'' - 8'').
Long neck for insulation.

RANGE EVTLS
Tapped lug wafer type

In line and dead end installation
Design pressure max. 16 bar.
(25 bar on request)
DN 50 - 1200 (2''- 48'').

RANGE EVUS
U-section wafer type
(with full strenght flanges)

In line and dead end installation
Design pressure max. 10 bar.
DN 600 - 2200 (24'' - 88'').

3.1.3 FLANGED VALVES

RANGE EVML
Single flanged wafer type (long)

In line and dead end installation
Design pressure max. 16 bar.
DN 50 - 800 (3'' - 32'').

RANGE EVMS
Single flanged wafer

In line and dead end installation
Design pressure max. 16 bar.
Bi-directional tight shut-off.
DN 350 - 1000 (14'' - 40'').

RANGE EVFS
Double flanged type

In line and dead end installation
Design pressure max. 16 bar.
DN 50 - 2000 (2'' - 80'').
Design pressure max. 25 bar.
DN 50 - 1000 (2'' - 40'').

RANGE EVFL
Double flanged type (long)

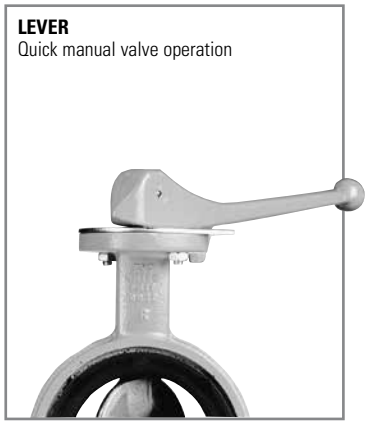
In line and dead end installation
Design pressure max. 16 bar.
DN 50 - 1500 (2'' - 60'').

3.2 MANUAL OPERATORS

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

LEVER AND WORMGEAR

LEVER
Quick manual valve operation



Design:
Lift and turn operation.
Spring activated locking.
Lever parallel to disc.
Notch plate for 10 positions.
Valve sizes up to DN 300 (12").

WORMGEAR
Easy manual valve operation

Design:
Self locking wormgearing.
Handwheel or T-Key operation.
Adjustable end stops.
Position indicator.
Valve sizes up to DN 2200 (88").
Different options available.

Note for sizes <DN 400:
When wormgears are mounted by third parties, an intermediate flange plate should be used between mounting flange and wormgear.
These plates can be supplied by Wouter Witzel EuroValve®.

3.3 POWER ACTUATORS

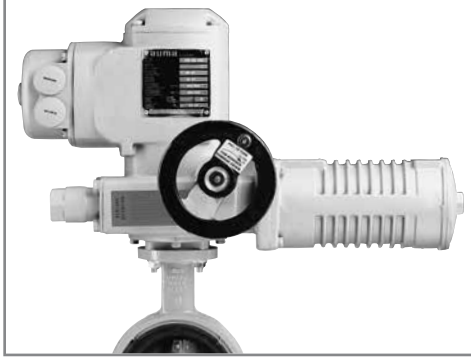
Different pneumatic, electric and hydraulic actuators can be supplied on request. Ask the special actuation catalogue.
Mounting possibilities on all types of butterfly valves for use in isolating or regulating service.
Different makes and options available for most environmental and/or hazardous duties.

PNEUMATIC ACTUATOR

Double acting or spring return

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.

ELECTRIC ACTUATOR



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.

Note:
Most actuators require an external relay box

Remark applicable to valve sizes up to DN 400:
When actuators are mounted by third parties, an intermediate plate should be clamped between mounting flange and actuator.
These plates can be supplied by Wouter Witzel EuroValve®

HYDRAULIC ACTUATOR

Double acting or spring return

Design:
Compact designs. Not self locking.
Rotary type or linear type depending on the make.
Two way stroke adjustment.
Position indicator.

CENTRIC RUBBERLINED BUTTERFLY VALVES

3.4 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: PN6, 10, 16, ANSI Class 150.
Approved by different international certification bodies eg DVGW, Lloyds.

RANGE ECV
Flangeless wafer type

Design:
Bonded rubberseat in body.
Self acting rotating double disc.
Design pressure 16 bar.
Uni-directional tight shut-off.
DN 50 - 600 (2'' - 24'').

4 GENERAL TECHNICAL INFORMATION

4.1 FACE TO FACE DIMENSIONS (MM)

Butterfly valves are designed with face to face dimensions according international standards.

		Wafer valve types PN 6 / 10 / 16 / 25		Double flanged valves	
		Basic series 20	Basic series 16	Basic series 13	Basic series 14
DN	NPS	EN 558 / 20 ISO 5752 / 20 DIN 3202, K1 API 609 ASME B 16.10, tab. 9, col.3/4	EN 558 / 16 ISO 5752 / 16 DIN 3202, K3 BS 2080, tab 1, series 16	EN 558 / 13 ISO 5752 / 13 DIN 3202/1, F16 BS 2080, Tab. 1, series 13	EN 558 / 14 ISO 5752 / 14 DIN 3202/1, F4
32	**1 1/4**	–	–	–	–
40	**1 1/2**	33	33	106	140
50	**2**	43	43	108	150
65	**2 1/2**	46	46	112	170
80	**3**	46	64	114	180
100	**4**	52	64	127	190
125	**5**	56	70	140	200
150	**6**	56	76	140	210
200	**8**	60	89	152	230
250	**10**	68	114	165	250
300	**12**	78	114	178	270
350	**14**	78 (92*)	127	190	290
400	**16**	102	140	216	310
450	**18**	114	152	222	330
500	**20**	127	152	229	350
600	**24**	154	178	267	390
700	**28**	165	229	292	430
750	**30**	–	–	–	–
800	**32**	190	241	318	470
900	**36**	203	241	330	510
1000	**40**	216	300	410	550
1200	**48**	254	350	470	630
1400	**56**	279	390	530	710
1600	**64**	318	440	600	790
1800	**72**	356	490	670	870
2000	**80**	406	540	760	950
Corresponding Wouter Witzel valve types:		EVS, EVBS, EVCS, EVBLS, EVTLS, EVUS, EVMS	ECV, EVML	EVFS	EVFL

* EN 558, 20.

4.2 SEAT TIGHTNESS RATES

Wouter Witzel rubberlined butterfly valves are designed to have a bi-directional 100 % seat tightness in accordance with the following standard rates:

- EN 12266-1, Rate A
- ISO 5208, Rate A
- DIN 3230, BO and BN, Leakage rate 1*
- API 598

* Expired

Standardized leakage rates [Drops/min] or [Bubbles/min]

Standard	Test fluid	Rate A	Rate B	Rate C	Rate D	Rate E	Rate F	Rate G
EN 12266-1	Liquid	Tight shut off	0,01 x DN	0,03 x DN	0,1 x DN	0,3 x DN	1,0 x DN	2,0 x DN
	Gas	Tight shut off	0,3 x DN	3,0 x DN	30 x DN	300 x DN	3000 x DN	6000 x DN
ISO 5208	Liquid	Tight shut off	0,01 x DN	0,03 x DN	0,1 x DN			
	Gas	Tight shut off	0,3 x DN	3,0 x DN	30 x DN			
API 598								

4.3 FLOW CALCULATIONS

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 K_v figures to reduce pressure drops, increase plant efficiency and contribute to reducing energy costs. Wouter Witzel EuroValve has developed valves with a lot of attention being paid to achieve excellent flow characteristics (see table).

Table: Flow coefficient K_v at fully open valve position

DN	NPS	Valves with stainless steel disc (K_V)	Valves with aluminium bronze disc (K_V)	Valves with ductile iron disc (K_V)
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**	17000	17000	17000
600	**24**	24810	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:

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

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

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

Nomenclature:

K_V	=	Valve flow coefficient in m^3/h water (5 – 30 °C) at pressure drop of 1 bar across the valve.
Q	=	Flow capacity (m^3/h).
p	=	Pressure drop across the valve (bar).
ρ	=	Density of fluid (kg/m^3).
ρ_0	=	Density of water at 288 K = 1000 (kg/m^3).
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 EuroValve® 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 EuroValve® for advice or ask for our special Technical Data Sheet for the selection and sizing of butterfly valves for control applications.

4.4 MATING FLANGES

4.4.1 TYPES OF STEEL FLANGES

The Wouter Witzel butterfly valves are designed for installation between flat or raised faced flanges with preference of the welding neck type according the following standards (flanges between brackets are of the slip-on type).

International flange standard

	DIN	EN	BS	ISO	ASME	JIS
PN 6	2631 (2573)	1092/1, type 11 (01)	4504, type 111 (101)	7005/1, type 11		
PN 10	2632 (2576)	1092/1, type 11 (01)	4504, type 111 (101)	7005/1, type 11		
PN 16	2633	1092/1, type 11 (01)	4504, type 111 (101)	7005/1, type 11		
CL 150					B16.5, B16.47	
JIS 5K						B 2211
JIS 10K						B 2212
JIS 16K						B 2213

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

Other flange types:

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

- Valves installed between slip-on flanges shall be accurately centered to ensure gasket sealing
- 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 and resistance against bolt forces
- Centering of the valve in the pipe axis to guarantee proper gasket sealing

Ask Wouter Witzel EuroValve for detailed advice.

4.4.2 ISO PN STEEL FLANGES

		PIPE	FLANGE ISO PN 6			FLANGE ISO PN 10			FLANGE ISO PN 16		
DN	**NPS**	**OD**	**OD**	**Pcd**	**Bolts**	**OD**	**Pcd**	**Bolts**	**OD**	**Pcd**	**Bolts**
32	1 1/4	42,4	120	90	4 x M12		Use PN 40			Use PN 40	
40	**1 1/2**	48,3	130	100	4 x M12		Use PN 40			Use PN 40	
50	**2**	60,3	140	110	4 x M12		Use PN 16		165	125	4 x M16
65	**2 1/2**	76,1	160	130	4 x M12		Use PN 16		185	145	4/8* x M16
80	**3**	88,9	190	150	4 x M16		Use PN 16		200	160	8 x M16
100	**4**	114,3	210	170	4 x M16		Use PN 16		220	180	8 x M16
125	**5**	139,7	240	200	8 x M16		Use PN 16		250	210	8 x M16
150	**6**	168,3	265	225	8 x M16		Use PN 16		285	240	8 x M20
200	**8**	219,1	320	280	8 x M16	340	295	8 x M20	340	295	12 x M20
250	**10**	273	375	335	12 x M16	395	350	12 x M20	405	355	12 x M24
300	**12**	323,9	440	395	12 x M20	445	400	12 x M20	460	410	12 x M24
350	**14**	355,6	490	445	12 x M20	505	460	16 x M20	520	470	16 x M24
400	**16**	406,4	540	495	16 x M20	565	515	16 x M24	580	525	16 x M27
450	**18**	457	595	550	16 x M20	615	565	20 x M24	640	585	20 x M27
500	**20**	508	645	600	20 x M20	670	620	20 x M24	715	650	20 x M30
600	**24**	610	755	705	20 x M24	780	725	20 x M27	840	770	20 x M33
700	**28**	711	860	810	24 x M24	895	840	24 x M27	910	840	24 x M33
800	**32**	813	975	920	24 x M27	1015	950	24 x M30	1025	950	24 x M36
900	**36**	914	1075	1020	24 x M27	1115	1050	28 x M30	1125	1050	28 x M36
1000	**40**	1016	1175	1120	28 x M27	1230	1160	28 x M33	1255	1170	28 x M39
1200	**48**	1219	1405	1340	32 x M30	1455	1380	32 x M36	1485	1390	32 x M45
1400	**56**	1422	1630	1560	36 x M33	1675	1590	36 x M39	1685	1590	36 x M45
1600	**64**	1626	1830	1760	40 x M33	1915	1820	40 x M45	1930	1820	40 x M52
1800	**72**	1829	2045	1970	44 x M36	2115	2020	44 x M45	2130	2020	44 x M52
2000	**80**	2032	2265	2180	48 x M39	2325	2230	48 x M45	2345	2230	48 x M56
2200	**88**	2220	2475	2390	52 x M39	2550	2440	52 x M52	2555	2440	52 x M56

* Valves, suitable for 8 bolts on request.

4.4.3 ASME STEEL FLANGES

		Pipe	= < NPS 24: Flange ASME B16.5, Class 150. > NPS 24: ASME B16.47 Class 150 Series A.			Flange ASME B16.47 Class 150, Series B		
DN	NPS	OD	OD	Pcd	Bolts	OD	Pcd	Bolts
32	1 1/4	42,2	117	88,9	4 x 1/2			
40	**1 1/2**	48,3	127	98,6	4 x 1/2			
50	**2**	60,3	152	120,6	4 x 5/8			
65	**2 1/2**	73,0	178	139,7	4 x 5/8			
80	**3**	88,9	190	152,4	4 x 5/8			
90	3 1/2	101,6	216	177,8	8 x 5/8			
100	**4**	114,3	229	190,5	8 x 5/8			
125	**5**	141,3	254	215,9	8 x 3/4			
150	**6**	168,3	279	241,3	8 x 3/4			
200	**8**	219,1	343	298,4	8 x 3/4			
250	**10**	273,0	406	362,0	12 x 7/8			
300	**12**	323,8	483	431,8	12 x 7/8			
350	**14**	355,6	535	476,2	12 x 1			
400	**16**	406,4	595	539,8	16 x 1			
450	**18**	457	635	577,8	16 x 1 1/8			
500	**20**	508	700	635,0	20 x 1 1/8			
600	**24**	610	815	749,3	20 x 1 1/4			
650	**26**	660	870	806,4	24 x 1 1/4	785	744,5	36 x 3/4
700	**28**	711	925	863,6	28 x 1 1/4	835	795,3	40 x 3/4
750	**30**	762	985	914,4	28 x 1 1/4	885	846,1	44 x 3/4
800	**32**	813	1060	977,9	28 x 1 1/2	940	900,2	48 x 3/4
850	34	864	1110	1028,7	32 x 1 1/2	1005	957,3	40 x 7/8
900	**36**	914	1170	1085,8	32 x 1 1/2	1055	1009,6	44 x 7/8
950	38	965	1240	1149,4	32 x 1 1/2	1125	1069,8	40 x 1
1000	**40**	1016	1290	1200,2	36 x 1 1/2	1175	1120,6	44 x 1
1050	**42**	1067	1345	1257,3	36 x 1 1/2	1225	1171,4	48 x 1
1100	**44**	1118	1405	1314,4	40 x 1 1/2	1275	1222,2	52 x 1
1150	46	1168	1455	1365,2	40 x 1 1/2	1340	1284,2	40 x 1 1/8
1200	**48**	1219	1510	1422,4	44 x 1 1/2	1390	1335,0	44 x 1 1/8
1250	50		1570	1479,6	44 x 1 3/4	1445	1385,8	48 x 1 1/8
1300	52	1321	1625	1536,7	44 x 1 3/4	1495	1436,6	52 x 1 1/8
1350	**54**		1685	1593,8	44 x 1 3/4	1550	1402,2	56 x 1 1/8
1400	**56**	1422	1745	1651,0	48 x 1 3/4	1600	1543,0	60 x 1 1/8
1450	58		1805	1708,2	48 x 1 3/4	1675	1611,4	48 x 1 1/4
1500	**60**	1524	1855	1759,0	52 x 1 3/4	1725	1662,2	52 x 1 1/4
1650	66		2032	1930,4	52 x 1 3/4			
1800	**72**		2197	2095,5	60 x 1 3/4			
1950	78		2362	2260,6	64 x 2			
2000	**80**		–	–	–			
	Equal bolt circles:		AWWA C207, Class B (6 bar) AWWA C207, Class D (10 bar) AWWA C207, Class E (20 bar)					

Nominal pipe sizes printed not bold are non standard valve sizes.

Important note regarding type of thread of flange bolts:
Butterfly valves with threaded body flange holes for bolts 1 inch or less are drilled and tapped in accordance with ASME B1.1, UNC course thread series, Class 2B.
Body flange holes for bolts 1 1/8 inch and larger are drilled and tapped in accordance with ASME B1.1, UN 8 eight thread series, Class 2B.

4.4.4 JIS STEEL FLANGES

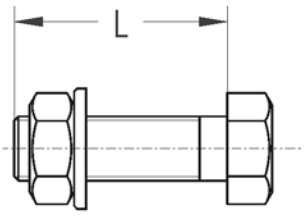
		PIPE	FLANGE JIS 5K			FLANGE JIS 10 K			FLANGE JIS 16 K		
DN (A)	NPS	OD	OD	Pcd	Bolts	OD	Pcd	Bolts	OD	Pcd	Bolts
50	**2**	60,5	130	105	4 x M12	155	120	4 x M16	155	120	8 x M16
65	**2 1/2**	76,3	155	130	4 x M12	175	140	4 x M16	175	140	8 x M16
80	**3**	89,1	180	145	4 x M16	185	150	8 x M16	200	160	8 x M20
90	3 1/2	101,6	190	155	4 x M16	195	160	8 x M16	210	170	8 x M20
100	**4**	114,3	200	165	8 x M16	210	175	8 x M16	225	185	8 x M20
125	**5**	139,8	235	200	8 x M16	250	210	8 x M20	270	225	8 x M22
150	**6**	165,2	265	230	8 x M16	280	240	8 x M20	305	260	12 x M22
175	7	190,7	300	260	8 x M20	305	265	12 x M20	–	–	–
200	**8**	216,3	320	280	8 x M20	330	290	12 x M20	350	305	12 x M22
225	9	241,8	345	305	12 x M20	350	310	12 x M20	–	–	–
250	**10**	267,4	385	345	12 x M20	400	355	12 x M22	430	380	12 x M24
300	**12**	318,5	430	390	12 x M20	445	400	16 x M22	480	430	16 x M24
350	**14**	355,6	480	435	12 x M22	490	445	16 x M22	540	480	16 x M30x3
400	**16**	406,4	540	495	16 x M22	560	510	16 x M24	605	540	16 x M30x3
450	**18**	457,2	605	555	16 x M22	620	565	20 x M24	675	605	20 x M30x3
500	**20**	508,0	655	605	20 x M22	675	620	20 x M24	730	660	20 x M30x3
550	**22**	558,8	720	665	20 x M24	745	680	20 x M30	795	720	20 x M36x3
600	**24**	609,6	770	715	20 x M24	795	730	24 x M30	845	770	24 x M36x3
650	**26**	660,4	825	770	24 x M24	845	780	24 x M30			
700	**28**	711,2	875	820	24 x M24	905	840	24 x M30	960	875	24 x M30x3
750	**30**	762,0	945	880	24 x M30	970	900	24 x M30	1020	935	24 x M30x3
800	**32**	812,8	995	930	24 x M30	1020	950	28 x M30	1085	990	24 x M45x3
850	34	863,6	1045	980	24 x M30	1070	1000	28 x M30			
900	**36**	914,4	1095	1030	24 x M30	1120	1050	28 x M30	1185	1090	28 x M45x3
1000	**40**	1016,0	1195	1130	28 x M30	1235	1160	28 x M36	1320	1210	28 x M52x3
1100	**44**	1117,6	1305	1240	28 x M30	1345	1270	28 x M36	1420	1310	32 x M52x3
1200	**48**	1219,2	1420	1350	32 x M30	1465	1380	32 x M36	1530	1420	32 x M52x3
1350	54	1371,6	1575	1505	32 x M30	1630	1540	36 x M42			
1500	**60**	1524,0	1730	1660	36 x M30	1795	1700	40 x M42			

DN sizes printed not bold are non standard valve sizes

4.4.5 FLANGE BOLTING LENGTH

The minimum bolting length for installation of a wafer type valve between flanges with through bolting can be calculated with the formula:

Lmin = FtF + 2xflange thickness + Hnut + 2xHspacer



F-EXA024-A

The following tables show the calculated bolt lenght for ISO PN and ASME flanges, based on the following assumptions:

- Flange thickness of a steel welding neck flange according EN 1092 and ASME B16.5.
- Use of hex head cap screws and two spacers
- Standard available L dimensions.

Important: Any deviation may require recalculation of the L dimension.

BOLTING LENGTH: INSTALLATION BETWEEN ISO PN STEEL FLANGES (only as a guideline)

		Bolt length L (mm) Flanges PN 10					Bolt length L (mm) Flanges PN 16				
		Flange	EVS	EVL	EVTLS	EVFS	Flange	EVS	EVML	EVTLS	EVFS
		thickness*	EVB(L)S	EVML		EVFL	thickness*	EVB(L)S	ECV		
DN	NPS		EVMS	ECV				EVMS			EVFL
40	1 1/2			See colums PN 16			110			60	
50	2	18		See colums PN 16		18	110		35	65	
65	2 1/2	18		See colums PN 16		18	110		35	70	
80	3	20		See colums PN 16		20	110	130	40	70	
100	4	20		See colums PN 16		20	120	130	40	70	
125	5	22		See colums PN 16		22	130	140	45	75	
150	6	22		See colums PN 16		22	130	150	45	75	
200	8	24	140	180	50	80	24	140	180	50	80
250	10	26	150	200	55	90	26	160	200	55	90
300	12	26	160	200	60	90	28	180	220	65	100
350	14	26	160	220	60	90	30	180	240	65	100
400	16	26	200	240	75	100	32	220	260	80	110
450	18	28	220	260	80	100	40	220	260	80	110
500	20	28	220	260	80	100	44	240	260	90	110
600	24	28	260	280	100	110	54	280	300	110	120
700	28	30	280	340	100	110	36	300/100	360/130	110	130
800	32	32	300	360	120	120	38	320	380	120	140
900	36	34	320/90		130	130	40	340/100		130	140
1000	40	34	340/90		130	140	42	360/100		140	150

Note: Where 2 length dimensions are given, the short one is not-through bolting at the shaft passages (8 bolts/valve)

* Acc. EN 1092

BOLTING LENGTH: INSTALLATION BETWEEN ASME STEEL FLANGES
(only as a guideline)

		Bolt length L (inch) ASME B 16.5, Class 150			
		Flange	EVS	EVTLS	EVFS
DN	NPS	thickness*	EVCS		
40	1 1/2	17,6	4"	–	–
50	2	19,1	4"	1 1/2"	2 1/2"
65	2 1/2	22,4	4 1/2"	1 3/4"	2 1/2"
80	3	23,9	5"	1 3/4"	2 3/4"
100	4	23,9	5"	2"	2 3/4"
125	5	23,9	5 1/2"	2"	3"
150	6	25,4	5 1/2"	2"	3"
200	8	28,5	6"	2 1/4"	3 1/4"
250	10	30,3	6 1/2"	2 1/2"	3 1/2"
300	12	31,8	6 1/2"	2 1/2"	4"
350	14	35,1	7"	3"	
400	16	36,6	8 1/2"	3 1/2"	
450	18	39,7	9 1/2"	4"	
500	20	43,0	10"	4"	
600	24	47,8	12"	5"	

* Acc. ASME B 16.5

Important note:
Butterfly valves with threaded body flange holes for bolts 1 inch or less are drilled and tapped in accordance with ASME B1.1, UNC course thread series, Class 2B. Body flange holes for bolts 1 1/8 inch and larger are drilled and tapped in accordance with ASME B1.1, UN 8 eight thread series, Class 2B.

4.5 CONVERSION UNITS

ITEM	UNIT	SYMBOL	VALUE	
Pressure	Pascal	Pa	1 Pa	= 1 N/m^2 = 0.00001 bar
	Mega Pascal	MPa	1 MPa	= 10 bar
	Kilo Pascal	KPa	1 KPa	= 0,01 bar
	Pounds per square inch	psi	1 psi	= 0.069 bar
	Atmosphere (phys.)	atm.	1 atm.	= 1.013 bar
	Atmosphere (techn.)	at.	1 at.	= 1 kgf/cm^2 = 0.98 bar
	Metre of mercury	mHg	1 mHg	= 1.33 bar
	Torr (Vacuum)	Torr	1 Torr	= 1 mmHg = 0.0013 bar (abs.)
	Inch of mercury	in Hg	1 in Hg	= 0.00339 bar
	Metre water gauge	mwg	1 mwg	= 0.098 bar
	Inch water gauge	in wg	1 in wg	= 0.00249 bar
Length	Metre	m	1 m	= 1000 mm
	Micrometer (micron)	µm	1 µm	= 0.001 mm
	Inch	in (")	1 in	= 25.4 mm
	Foot (= 12 inch)	ft	1 ft	= 304.8 mm
	Yard (= 3 feet)	yd	1 yd	= 914.4 mm
Volume	Liter	l	1 l	= 1 dm^3
	Cubic inch	cu in	1 cu in	= 0.016 l
	Cubic feet	cu ft	1 cu ft	= 28.32 l
	Cubic yard	cu yd	1 cu yd	= 746.6 l
	US-gallon	US-gallon	1 US-gallon	= 3.785 l
	Imp-gallon	Imp-gallon	1 Imp-gallon	= 4.546 l
	US-barrel (Oil)	US-barrel (Oil)	1 US-barrel	= 159 l
Temperatures	Grade Fahrenheit	°F	°C	= (°F–32) x 5/9
	Grade Kelvin	K	°C	= K – 273
Torque	Foot pound	ft lb	1 ft ib	= 1.356 Nm
	Kilogram metre, kilopond metre	kgm, kpm	1 kgm	= 9.81 Nm
Capacity	Cubic metre per second	m^3/s	1 m^3/S	= $\frac{1}{3600}$ m^3/h
	Cubic feet per hour	cu ft/h	1 cu ft/h	= 0.0283 m^3/h
	Gallons per minute	gall/min.	1 gall/min.	= 0.227 m^3/h
	Torr litre/second (Vacuum)	Torr l/s	1 Torr l/s	= 1.33 mbar l/s
Viscosity	Centistokes (kinemat. Viscosit.)	cSt	1 cSt	= 1 mm^2/s
	Poise (dynam. Viscosit.)	P	1 P	= 0.1 Pa.s
Nomenclature	Mega	M	1,000,000	= 10^6
	Kilo	K	1,000	= 10^3
	Deca	da	10	= 10
	Deci	d	0,1	= 10^{-1}
	Centi	c	0,01	= 10^{-2}
	Milli	m	0,001	= 10^{-3}
	Micro	µ	0,00001	= 10^{-6}

5 CENTRIC BUTTERFLY VALVES: PRODUCT DATA

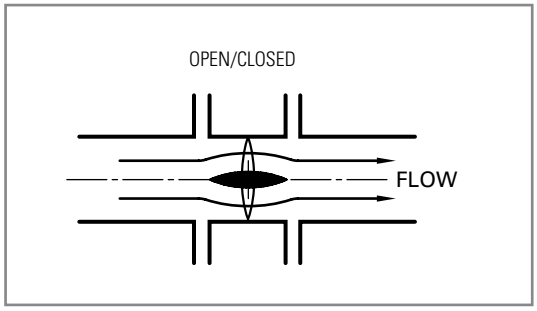
5.1 HOW TO USE A WOUTER WITZEL® BUTTERFLY VALVE

The Wouter Witzel® 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.

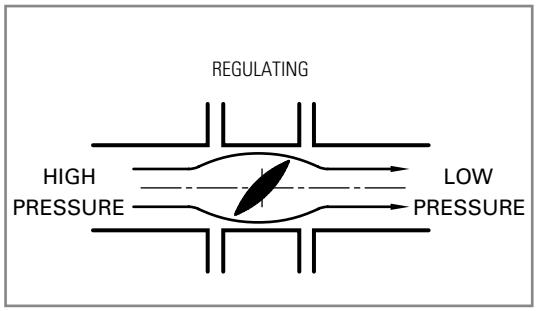
ISOLATING, STOP OR SHUT OFF VALVE (ON/OFF)

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® butterfly valve 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.



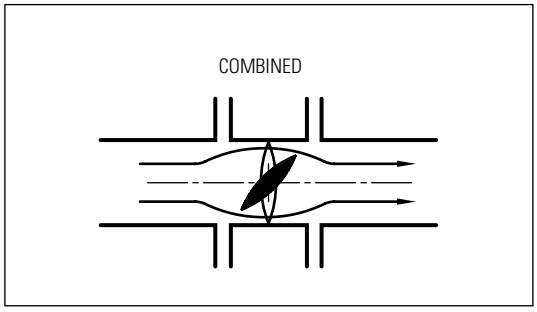
REGULATING VALVE

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



COMBINED REGULATING AND ISOLATING VALVE

The Wouter Witzel® 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.



CENTRIC RUBBERLINED BUTTERFLY VALVES

5.2 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, lugged or flanged. The correct body type of the valve should be selected on the basis of installation requirements. The valves can be installed for in line service and depending on the valve type for end of line service. (see table below)

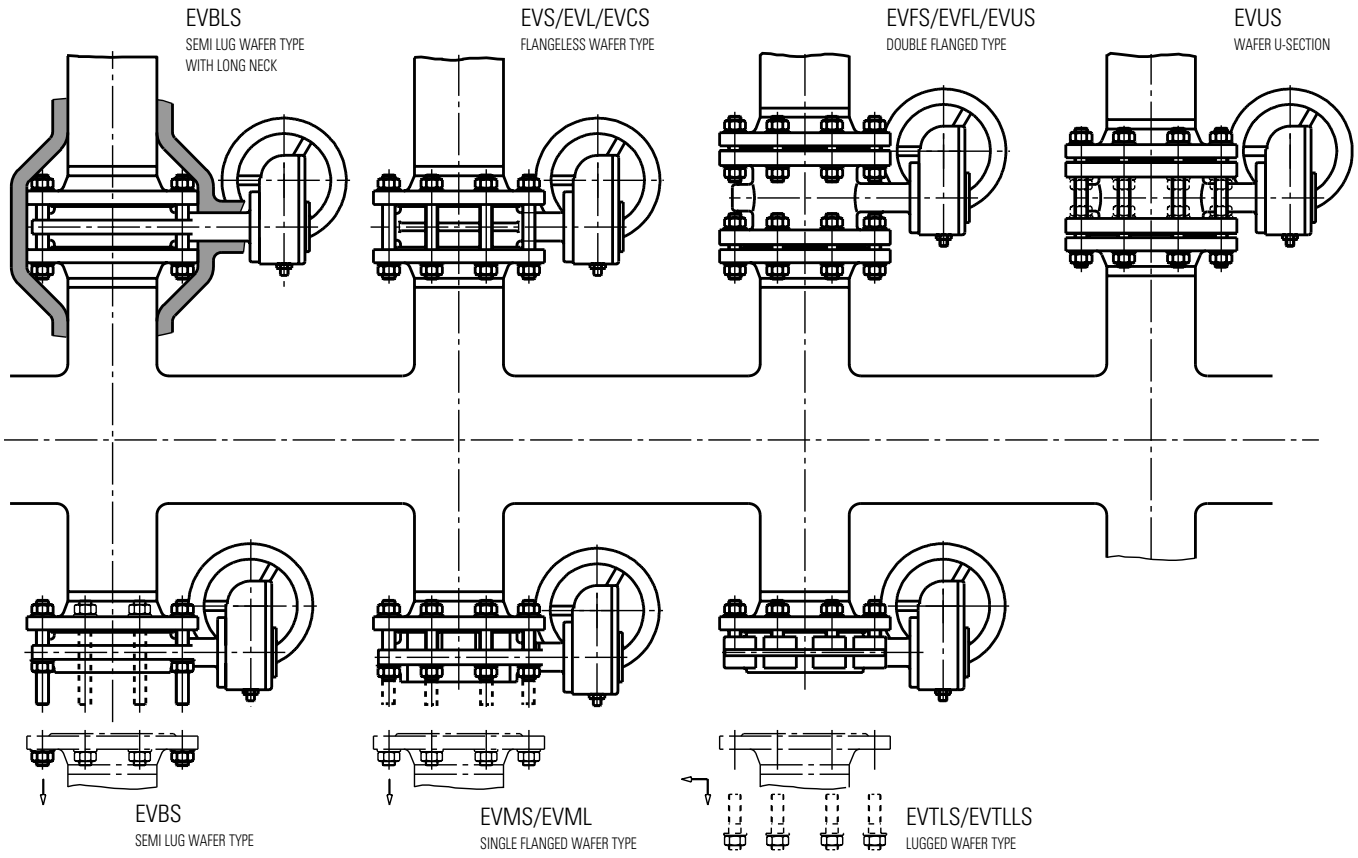
In line installation: In line service is the condition where the valve is installed between two pipe flanges.

End of line service.
End of line service ist the condition that occurs when the downstream side of the valve is open to atmosphere.

Caution: End of line installation is not allowed when the fluid is a hazardous gas or liquid unless adequate precautions have to be taken for safety reasons.

Valve type		Valve design is suitable for in line installation	Valve design is suitable for end of line installation
EVS / EVCS	Flangeless wafer types	Yes	No
EVTLS / EVTLLS	Lugged wafer type with through holes	Yes	No
	Lugged wafer type with tapped holes	Yes	Yes
EVBS / EVBLS	Semi lug wafer type	Yes	Yes
EVMS / EVML	Single flanged wafer type	Yes	Yes
EVFS / EVFL / EVUS	Double flanged type	Yes	Yes

CHARACTERISTIC INSTALLATION SITUATIONS FOR DIFFERENT BODY TYPES



5.3 BUTTERFLY VALVE DESIGN

5.3.1 THE 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 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 - 2200 (2"- 88") 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.

5.3.2 DESIGN DESCRIPTION

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.

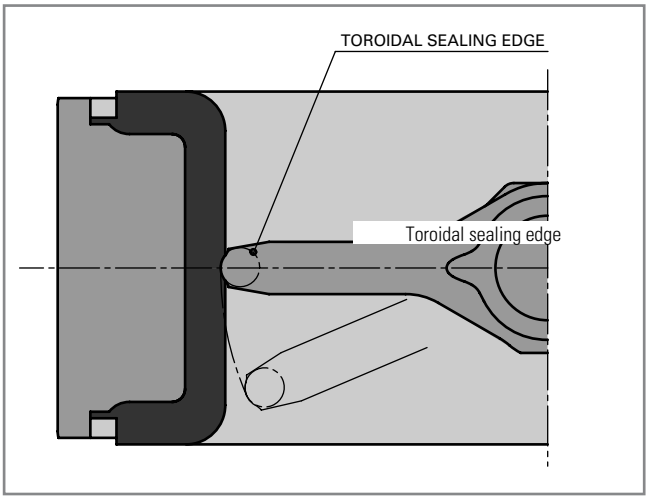
HIGH RELIABILITY BY BONDED LINING

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. Presure result: low torque and choice of smaller actuator.

High efficiency by low profiled and streamlined discs
Wouter Witzel EuroValve® 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, turbulance, 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 EuroValve® for an energy calculation).

HIGH RELIABILITY BY EXCELLENT SEATING CONCEPT

Wouter Witzel EuroValve® has developed a special seating concept for its EuroValve® ranges. The disc has a profiled sealing edge with the geometry of a centric located toroïd. 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

CENTRIC RUBBERLINED BUTTERFLY VALVES

5.3.3 DESIGN FEATURES AND BENEFITS:

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.

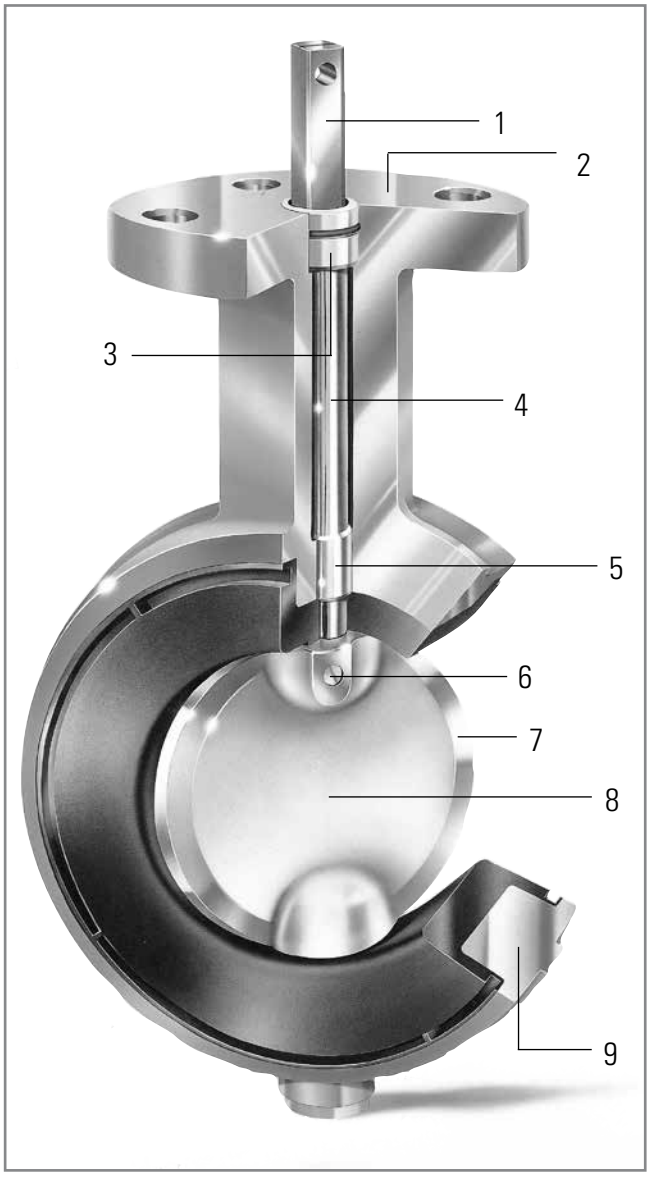
BODY INTERNALLY RUBBERLINED
Fluid does not contact the body (no corrosion).
No flange gaskets required.
Insulation of noise and heat transfer.

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 (depending on type).

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

5.4 MATERIALS AND COATINGS

5.4.1 BODY MATERIALS

Bodies are fully corrosion protected inside by the rubber lining and outside by a coating (bronze bodies are uncoated).

Type of material	Typical applications	Material designation		PED category	WWE material code
		EN / DIN	Comparable ASTM:		
Ductile cast iron (GGG 40)	Normal applications	JS 1030, EN 1563	A 395, 60-40-18	I, II, III	M03
Ductile cast iron (GGG 40.3)	Heavy duties Cold applications (Petro-)chemical industries	JS1049, EN1563 (GJS-400-18U-LT)	–	II, III	M85
Grey cast iron (GG25)	Light applications Not suitable for pressure shocks or rapid closing valves	JL 1040, EN 1561	A 126, Class B.	I	M01
Carbon steel	Heavy duties (Petro-)chemical industries	GP240GH, EN10213-2 (1.0619)	A216, WCB	II, III	M22
Bronze casting (RG 10)	Shipbuilding/Marine applications	C-CuSn10Zn, DIN 1705	B584, C90500	I	M29

5.4.2 EXTERNAL BODY COATINGS

Type of coating	Colour	Typical environments/applications acc. ISO 12944-2		WWE code
		Exterior	Interior	
Polyurethane coating	Orange, RAL 2000 (100 µm) Options: • PUR Blue, RAL 5017 • PUR Red, RAL 3000 • PUR Grey, RAL 7000 • PUR1 (120 µm)	Urban and industrial atmospheres, moderate sulphur dioxide pollution. Coastal areas with low salinity	Production rooms with high humidity and some air pollution, e.g. food-processing plants, laundries, breweries	PUR (Option PUR 1)
Epoxy coating	Black, RAL 9011 (150 µm) Options: • With extra polyurethane toplayer for other colour requirements • Black, RAL 9011 (300 µm)	Industrial areas with high humidity and aggressive atmosphere. Coastal and offshore areas with high salinity* Buried in soil.	Buildings or areas with almost permanent condensation and with high pollution –	EP 1 EP 2
Epoxy primer	Beige, RAL 1001 (50 µm)	As primer for further coating by the end user	EP	

- Other coating systems on request.
- A Rilsan coating (blue) is available on some valve types.

5.4.3 BODY LINING MATERIALS

Wouter Witzel EuroValve has invested heavily in research into formulation of rubber types and so developed 'in-house' expertise in rubber technology. The quality of rubber compounds is fundamental to the performance and reliability of the Wouter Witzel® valve ranges. The rubber lining has 3 important functions:

- Protection of the body against corrosion and erosion by the fluid
- Resilient seating material
- Flange gasket sealing

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

5.4.3 RUBBER TYPES

Material Standard ISO 1629	Grade of material	Examples of application	WWE Material Code
NBR	**Standard grade**	• Alphatic hydrocarbons (low aromatic containing fuels, oils and gases) • Animal fats • Seawater • Compressed air, powder and granulars convey Temperature indication: 0 ↔ 90 °C	M203
EPDM	**Standard grade**	• Water in general (hot-, cold-, sea-, ozone-, swimming-, glycolized-, industrial-) • Potable water • Foodstuffs (including vegetable oils and fats) • Weak acids, weak salt solutions, alcohols, ketones, sour gases Temperature indication: –20 ↔ 110 °C	M16
EPDM	**Special grade**	• Potable water • Foodstuffs • Open water systems • Unchlorined drinking water Temperature indication: 0 ↔ 70 °C	M201
EPDM	**Special grade** (with a wide temperature range)	• HEVAC (hot water service) • Chilled water • Food stuffs & Sugar juice Temperature indication: –30 ↔ 120 °C	M23
FPM	**Standard grade** (B type)	• Many aliphatic, aromatic, and halogen hydrocarbons when EPDM or NBR is not suitable • Hot gases (Not for aequous fluids) Temperature indication: 0 ↔ 200 °C	M113
FPM	**Special grade** (GF type) with high chemical resistance	• Concentrated acids Temperature indication: 0 ↔ 150 °C	M56
VQM	**Special grade** (silicon, high temperature, low pressure)	• Air (high temperature) Max. pressure 2.5 bar Temperature indication: 0 ↔ 180 °C	M141

On request, the following approvals are available:

- KIWA/EN 681-1
- FDA§177.2600
- WRAS, BS 6920
- KTW D1, D2
- W270
- ACS, XP P 41-250
- NSF Standard 61
- AS/NZS 4020
- Belg AQUA
- DVGW Gas/EN 682

5.4.4 DISC MATERIALS

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

Type of material	Typical applications	Material designation		PED category	WWE material code
		EN / DIN	Comparable ASTM:		
Austenitic stainless steel > DN 450 (> 18'')	Potable water, cooling water, sea water, demineralized water, solvents, foodstuff	1.4408, EN 10213	A351, CF8M	II, III	M14
Duplex stainless steel DN 50 – 2200 (2'' – 88'')	Potable water, cooling water, chlorinated water, sea water, demineralized water, solvents, foodstuff, biogas	1.4462, EN 10088 >600: 1.4517, EN 10213		II, III	M50 M97
Martensitic stainless steel DN 50 – 450 (2'' – 18'')	Non corrosive hot or cold water, solvents, fuels, air, abrasive duties (slurries, dry powders, granulates), gas	1.4057, EN 10088	A276, Grade 431	I	M52
Ductile cast iron with Rilsan coating (GGG 40) DN 250 – 2200 (2'' – 88'')	Water incl. potable water, KIWA, BGA, KTW, FDA, WRAS approved Up to 70 °C	JS 1030, EN 1563	A395, 60-40-18	I	M03
Aluminium bronze AB2 DN 50 – 2200 (2'' – 88'')	Sea water, potable water, gas	G-CuAl10Ni, DIN 1714	B148, C95800	I	M20
Hastelloy-C®	Phosphoric, hypochloric, acetic, formic, sulfurous acids	–	A494, CW-12MW	II, III	M77
Super Duplex stainless steel DN50 – 2200 (2''- 88'')	desalination, seawater	1.4469, EN 10213	A890	II, III	M151

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

5.4.5 SHAFTS AND PIN MATERIALS

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

Type of material	in combination with disc material	Material designation		PED category	WWE material code
		EN / DIN	Comparable ASTM:		
Duplex stainless steel DN 50 – 2200 (2'' – 88'')	Duplex stainless steel or austenitic stainless steel	1.4462, EN 10088	A276, S31803	II, III	M50/81
Martensitic stainless steel DN 50 – 2200 (2'' – 88'')	Martensitic stainless steel Ductile cast iron	1.4057, EN 10088	A276, Grade 431	I	M52
Aluminium bronze DN 50 – 2200 (2'' – 88'')	Aluminium bronze	CuAl10Ni5Fe4 / EN DIN 17665	B150, C63000	I	M31
Monel K500®	Aluminium bronze (high pressures)	NA 18, BS 3076		I	M17
Hastelloy C276®	Hastelloy C	–	B547, N10276	II, III	M77
Super Duplex stainless steel DN 50 – 2200 (2'' – 88'')	Super Duplex stainless steel	1.4501, EN10272	-	II, III	M140

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

5.5 MAXIMUM ALLOWABLE PRESSURE (PS)

In line installation

The maximum allowable pressure of the valve (PS) is depending on the flange connection and the disc shut off pressure (Δp max).

Flange connection	Δp max options				
	Δp max 2,5 bar (> DN 400)	Δp max 6 bar (250 – 2200)	Δp max 10 bar (> DN 150)	Δp max 16 bar (50 – 2000)	Δp max 25 bar (50 – 1000)
PN 6	PS 2,5 bar	PS 6 bar	–	–	
PN 10 (> DN 150)	PS 2,5 bar	PS 6 bar	PS 10 bar	–	
PN 16	PS 2,5 bar	PS 6 bar	PS 10 bar	PS 16 bar*	
PN 25	PS 2.5 bar	PS 6 bar	PS 10 bar	PS 16 bar*	PS 25 bar*
ANSI CL 150 (> DN 600)	PS 2,5 bar	PS 6 bar	PS 10 bar	PS 16 bar*	

* Only in combination with lining materials EPDM and NBR. Higher pressures on request.

The Δp max (bar) is related to the seat tightness pressure of the disc as a result of the interference between disc diameter and rubber lining. For a specific application with a defined working pressure, the nearest higher Δp max should be chosen in order to minimize the operating torque.

Vacuum service

The valves are suitable for vacuum service up to the following absolute pressure : 1,3 x 10^{-6} mbar = 10^{-6} Torr (high vacuum)

End of line installation

The maximum allowable pressure of the valve in end of line installation is equal to the minimum of PS and the pressure given in the following table:

DN	Δp max of the valve	Maximum pressure in end of line installation	
		Semi lugged	Tapped lug, single or double flanged
50 – 200	16	10 bar	16 bar*
250 – 400	16	10 bar	10 bar
> 400		On request	

* With stainless steel disc (see table 5.4.4 and 5.4.5)

For other product (configurations) ask Wouter Witzel EuroValve for advice.

5.6 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 no information is available Wouter Witzel EuroValve takes the normal operating conditions as a basis for actuator sizing:

Normal operating conditions:

- 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 normal operating conditions:

DN	NPS	6 BAR	10 BAR	16 BAR
50	**2″**	10	10	11
65	**2½″**	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

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

Severe operating conditions:

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

6 PRODUCT SHEETS

6.1 CENTRIC BUTTERFLY VALVES

The following pages give the product sheets with information of every valve type.

- Customer specification and tailor made design are possible on request.
- Drawings in this catalogue are butterfly valves with free shaft.
  On request we can supply project drawings completed with manual or power actuators in accordance with customer's specification.

6.1.1 FLANGELESS WAFER VALVES

PRODUCT SHEET

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

General specification, construction details, parts list and dimensions

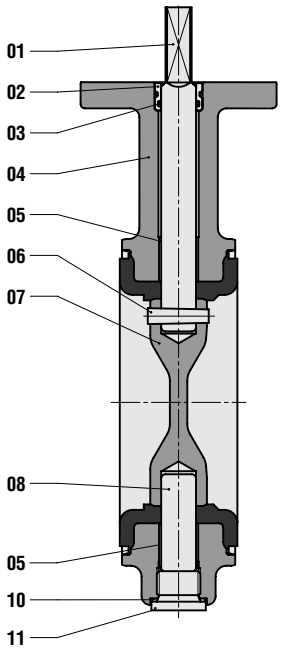
GENERAL SPECIFICATION:

Body type	Flangeless wafer short type
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between two flanges with through bolting
Flange connections*	PN 6 / 10 / 16 / Class 150 / JIS 5 / 10 / 16
Valve shut off pressure*	dp max 2,5 / 6 / 10 / 16 / 20 bar
Seat tightness	Bi-directional tight shut off acc. ISO 5208, Rate A
Face to face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	PED, Kitemark, KIWA, DVGW gas & water, SVGW, WRAS, LRS, DNV, ABS, BV, GL, RINa, NKK, RMRS, CCS, CRS, UL, FM, GOST, LR, VDS, USCG
Actuation possibilities*	Manuel, electric, pneumatic or hydraulic

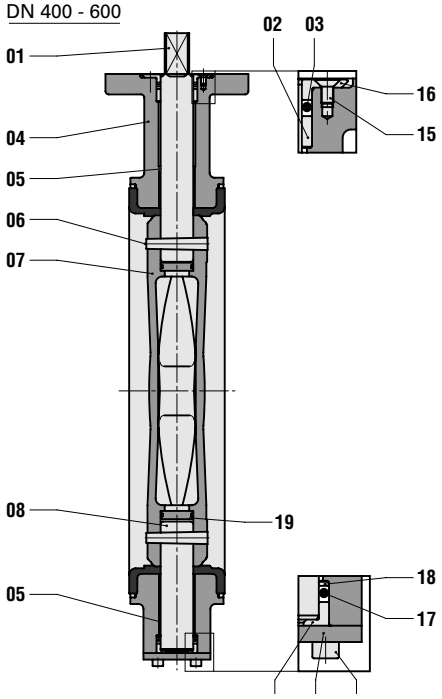
* Needs to be specified when ordering. Contact Wouter Witzel EuroValve for detailed advice.

CONSTRUCTION DETAILS:

DN 50 - 350



DN 400 - 600



PARTS LIST:

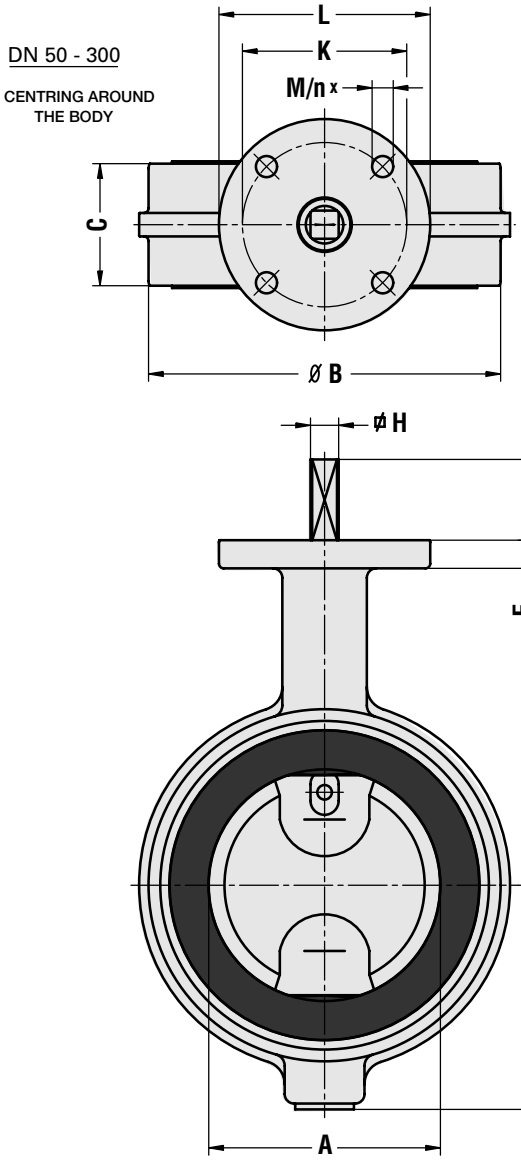
ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

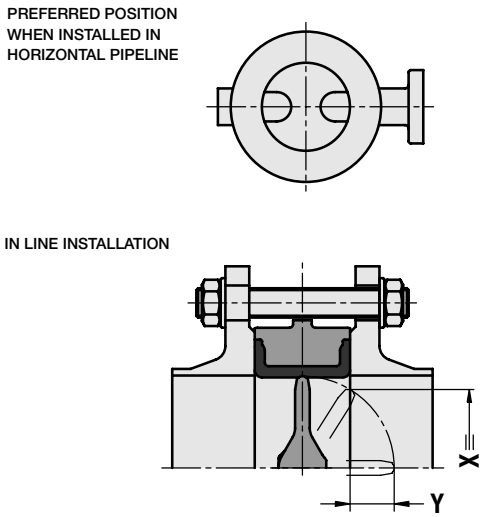
PARTS LIST:

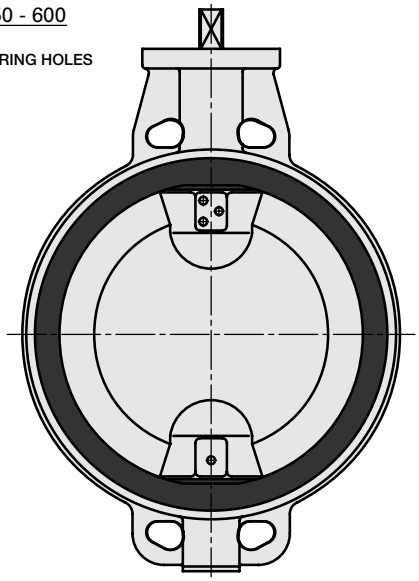
ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

CENTRIC RUBBERLINED BUTTERFLY VALVES

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







DIMENSIONS:

DN	NPS	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211	X	Y	±kg
40	**1½**	50	*100	**43	63	118	12	34	10	70	90	9	4	F07	25	4	2.6
50	**2**	50	100	43	63	118	12	34	10	70	90	9	4	F07	25	4	2.6
65	**2½**	65	115	46	71	126	12	34	10	70	90	9	4	F07	46	10	3.2
80	**3**	80	130	46	78	133	12	34	10	70	90	9	4	F07	66	17	3.5
100	**4**	100	150	52	98	147	12	34	12	70	90	9	4	F07	86	24	4.5
125	**5**	125	182	56	109	160	12	34	12	70	90	9	4	F07	112	35	6.3
150	**6**	150	210	56	133	180	14	34	16	70	90	9	4	F07	140	47	8.8
200	**8**	200	262	60	158	204	14	34	16	70	90	9	4	F07	191	70	13.2
250	**10**	250	315	68	194	245	15	45	24	102	125	11	4	F10	241	91	22
300	**12**	300	371	78	219	270	15	45	24	102	125	11	4	F10	290	111	32
350	**14**	336	405	78	256	315	15	45	24	102	125	11	4	F10	327	129	40
400	**16**	386	470	102	308	363	25	50	30	140	175	17	4	F14	373	142	75
450	**18**	436	522	114	334	388	25	50	30	140	175	17	4	F14	421	161	90
500	**20**	486	576	127	360	413	25	50	30	140	175	17	4	F14	470	180	120
600	**24**	586	672	154	426	510	25	50	40	140	175	17	4	F14	566	216	180

Note. Intermediate sizes (eg DN 175/7'' or DN 550/22'') are available on request. * Notched body ** Works standard

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

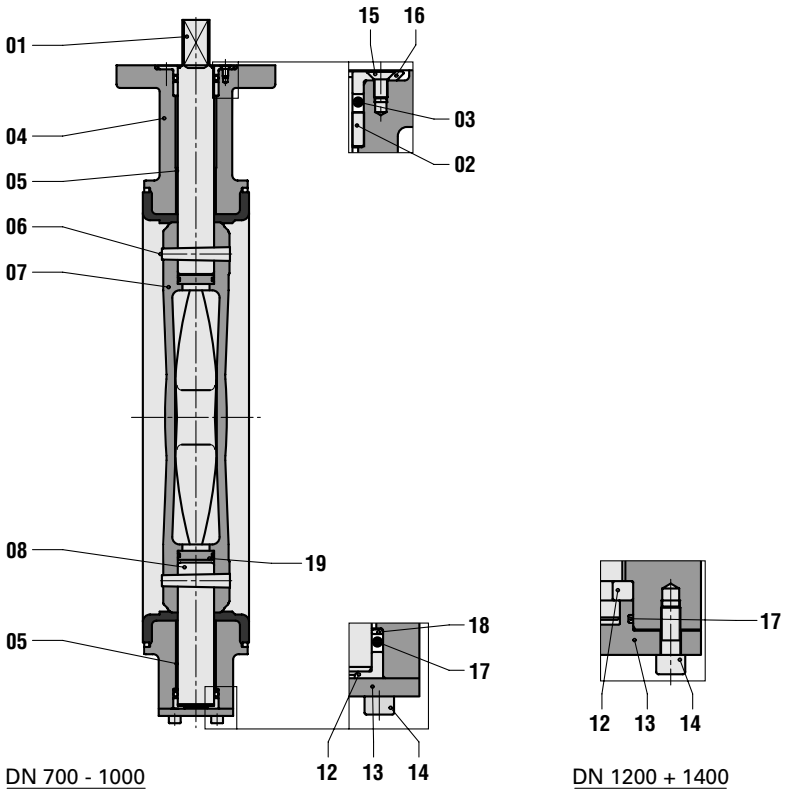
PRODUCT SHEET

General specification, construction details, parts list and dimensions

GENERAL SPECIFICATION:	
Body type	Flangeless wafer short type with drilled or tapped holes
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between two flanges
Flange connections*	PN 6 / 10 / 16 / ASME Class 150 / JIS 5 / 10 / 16
Valve shut off pressure*	2,5 / 6 / 10 / 16 bar
Seat tightness	Bi-directional tight shut off acc. ISO 5208, Rate A
Face to face dimension	ISO 5752 / EN 558, basic series 20 (wafer short). NB: DN 1400: Works standard
Available type approvals*	PED, KIWA, DVGW gas & Water, SVGW, WRAS, LRS, DNV, ABS, BV, GL, RINa, NKK, RMRS, CCS, CRS, GOST, LR, Kitemark
Actuation possibilities*	Manuel, electric, pneumatic or hydraulic

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

CONSTRUCTION DETAILS:



DN 700 - 1000

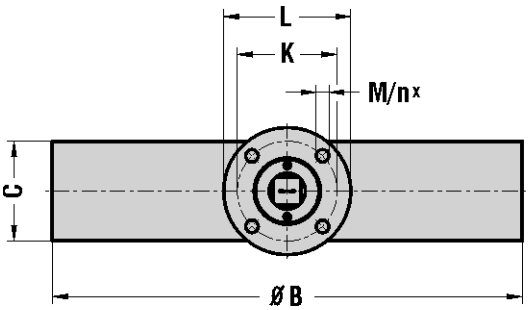
DN 1200 + 1400

PARTS LIST:

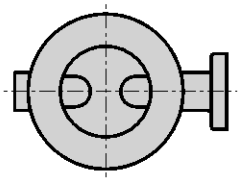
ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

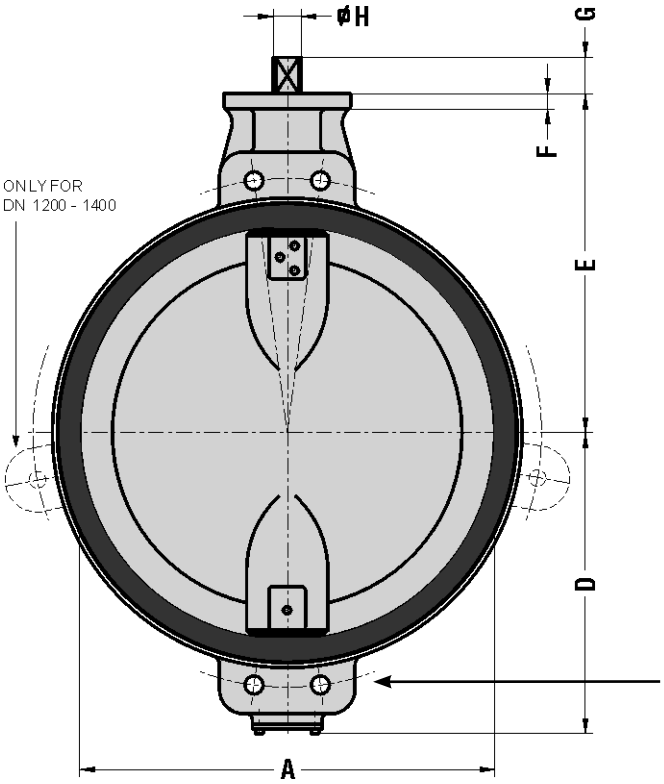
CENTRIC RUBBERLINED BUTTERFLY VALVES

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

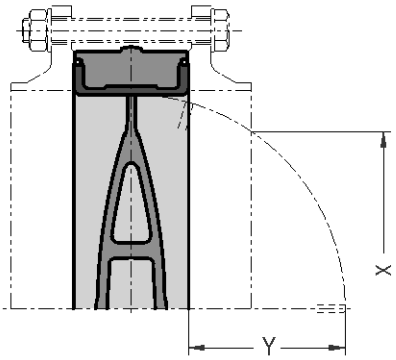


PREFERRED POSITION
WHEN INSTALLED IN
HORIZONTAL PIPELINE





IN LINE INSTALLATION



Holes drilled through or blind tapped, depending on flange connection. (see page 19)

DIMENSIONS:

DN	NPS	ΔPmax	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211	X	Y	±kg
700	**28**	**16 bar**	686	776	165	480	560	25	60	46	165	210	21	4	F16	666	261	295
750	**30**	**16 bar**	736	826	190	520	585	25	60	46	165	210	21	4	F16	711	278	295
800	**32**	**16 bar**	786	880	190	525	610	25	60	46	165	210	21	4	F16	763	298	345
900	**36**	**16 bar**	868	980	203	635	690	30	90	60	254	300	17	8	F25	863	342	475
1000	**40**	**10 bar**	986	1085	216	685	740	30	90	60	254	350	17	8	F25	973	390	635
1000	**40**	**16 bar**	986	1085	216	685	740	30	90	60	298	350	21	8	F30	973	390	635
1200	**48**	**10 bar**	1168	1300	254	870	855	35	85	75	298	415	21	8	F30	1159	466	1500
1200	**48**	**16 bar**	1168	1300	254	870	855	35	85	75	356	415	21	8	F35	1159	466	1500
1400	**56**	**10 bar**	1386	1500	*250	980	955	35	85	75	356	415	31	8	F35	1364	568	1900
1400	**56**	**16 bar**	1386	1500	*250	980	955	35	85	90	356	415	31	8	F35	1364	568	1900

Note: Intermediate sizes (eg DN 650/26'', DN 850/34'', DN 1100/44'') are available on request * Works standard dimension

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

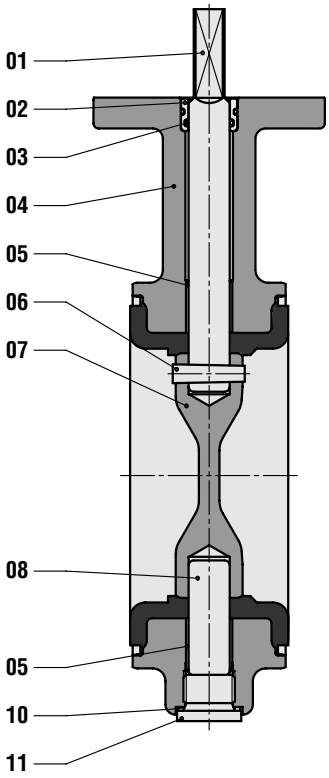
PRODUCT SHEET

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 with through bolting
Flange connections*	PN 6 / ANSI Class 150
Valve shut off pressure*	6 / 10 / 16 / 20 bar
Seat tightness	Bi-directional tight shut off acc. ISO 5208, Rate A
Face to face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	PED, WRAS, GOST, LR, FM, Kitemark, ABS, USCG, VDS, RMRS
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

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

CONSTRUCTION DETAILS:

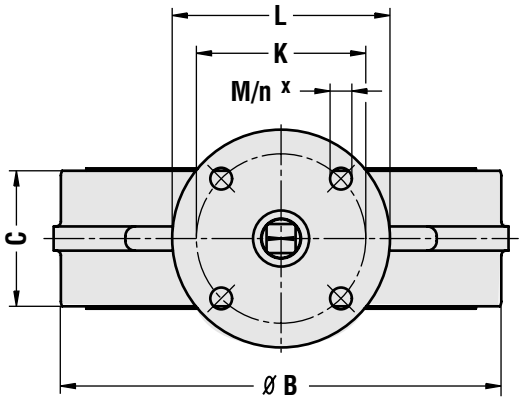


PARTS LIST:

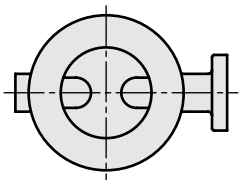
ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

CENTRIC RUBBERLINED BUTTERFLY VALVES

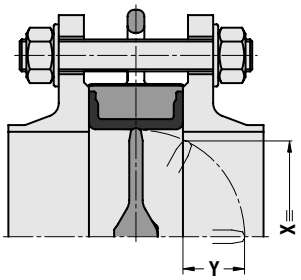
RANGE EVCS DN 50 - 300 (2" - 12")

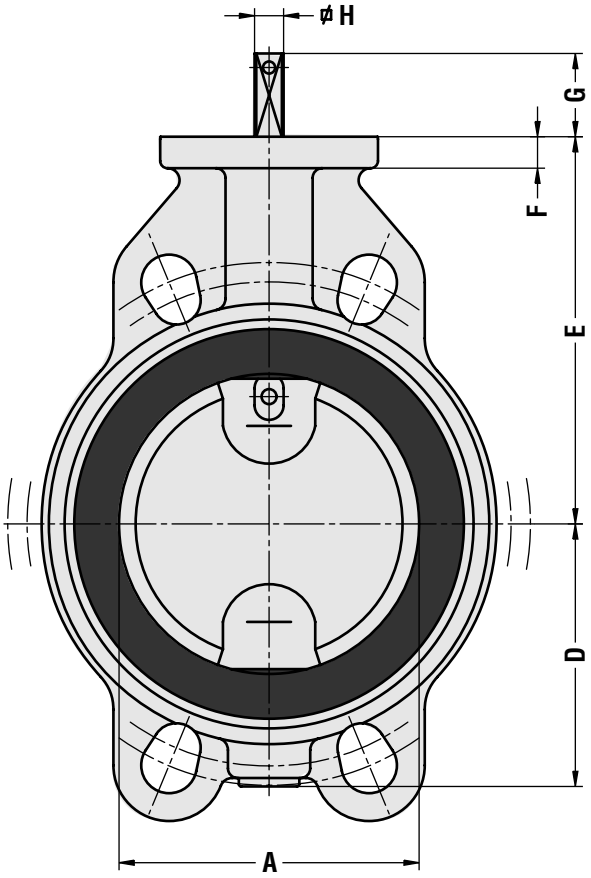


PREFERRED POSITION
WHEN INSTALLED IN
HORIZONTAL PIPELINE



IN LINE INSTALLATION





for bolt lengths see pag. 19

DIMENSIONS:

DN	NPS	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211	X	Y	±kg
50	**2**	50	100	43	63	118	12	34	10	70	90	9	4	F07	25	4	2.8
65	**2½**	65	115	46	71	126	12	34	10	70	90	9	4	F07	46	10	3.6
80	**3**	80	130	46	78	133	12	34	10	70	90	9	4	F07	66	17	3.9
100	**4**	100	150	52	98	147	12	34	12	70	90	9	4	F07	86	24	5.1
125	**5**	125	182	56	109	160	12	34	12	70	90	9	4	F07	112	35	7.0
150	**6**	150	210	56	133	180	14	34	16	70	90	9	4	F07	140	47	9.5
200	**8**	200	262	60	158	204	14	34	16	70	90	9	4	F07	191	70	14
250	**10**	250	315	68	194	245	15	45	24	102	125	11	4	F10	241	91	24
300	**12**	300	371	78	219	270	15	45	24	102	125	11	4	F10	290	111	36

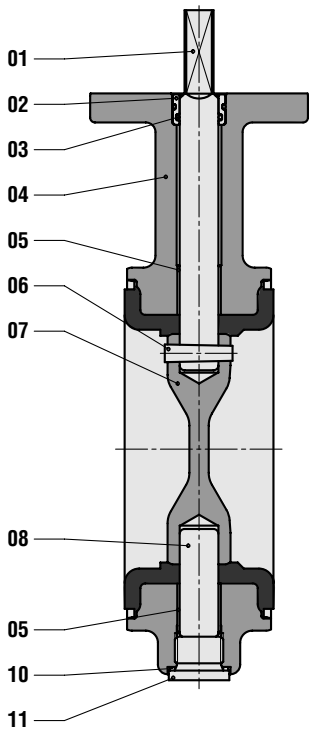
6.1.2.1 BUTTERFLY VALVE - RANGE EVBS DN 50 - 300 (2˝ - 12˝)

General specification, construction details, parts list and dimensions

General Specification:	
Body type	Semi-lug wafer short type
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between flanges with through bolting. As end of line valve
Flange connections*	PN 10 / 16
Valve shut off pressure*	6 / 10 / 16 bar. As end of the line valve max. 10 bar
Seat tightness	Bi-directional tight shut off acc. ISO 5208, Rate A
Face to face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	PED, Kitemark, KIWA, DVGW gas & water, SVGW, WRAS, LRS, DNV, ABS, BV, RINa, NKK, RMRS, CCS, CRS, GOST, LR, FM, UL, VdS, CSTB, GL, USCG, APSAD
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

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

CONSTRUCTION DETAILS:

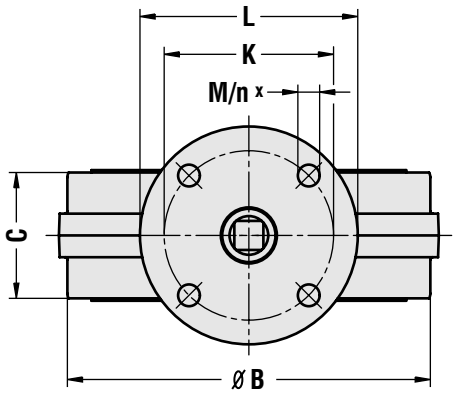


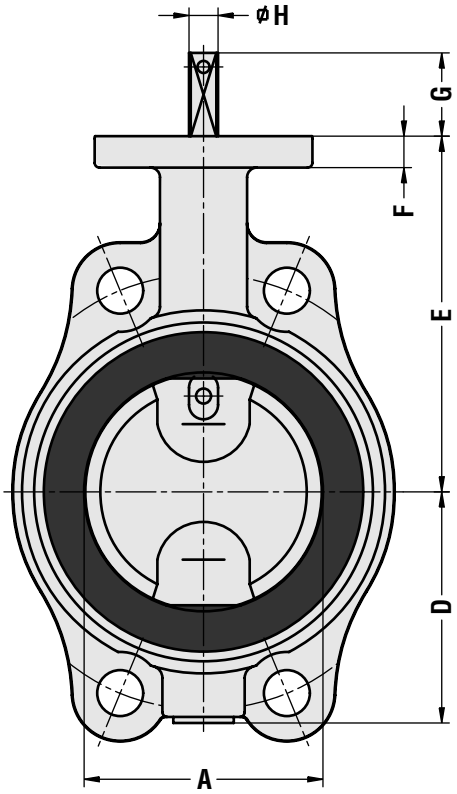
PARTS LIST:

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

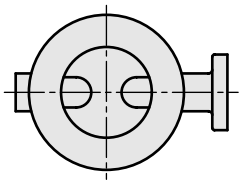
CENTRIC RUBBERLINED BUTTERFLY VALVES

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

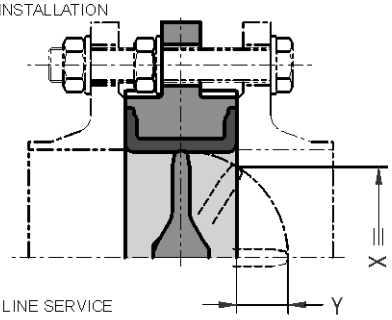




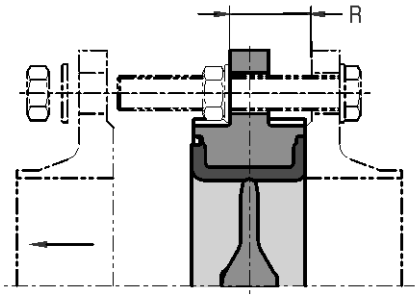
PREFERRED POSITION
WHEN INSTALLED IN
HORIZONTAL PIPELINE



IN LINE INSTALLATION



END OF LINE SERVICE



for bolt lengths see pag. 19

Max. torque to tighten the flange bolts
- M16: 45 Nm
- M20: 90 Nm

DIMENSIONS:

DN	NPS	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211	X	Y	±kg
50	**2**	50	100	43	63	118	12	34	10	70	90	9	4	F07	25	4	2.8
65	**2½**	65	115	46	71	126	12	34	10	70	90	9	4	F07	46	10	3.6
80	**3**	80	130	46	78	133	12	34	10	70	90	9	4	F07	66	17	3.9
100	**4**	100	150	52	98	147	12	34	12	70	90	9	4	F07	86	24	5.1
125	**5**	125	182	56	109	160	12	34	12	70	90	9	4	F07	112	35	7.0
150	**6**	150	210	56	133	180	14	34	16	70	90	9	4	F07	140	47	9.5
200	**8**	200	262	60	158	204	14	34	16	70	90	9	4	F07	191	70	14
250	**10**	250	315	68	194	245	15	45	24	102	125	11	4	F10	241	91	24
300	**12**	300	371	78	219	270	15	45	24	102	125	11	4	F10	290	111	36

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

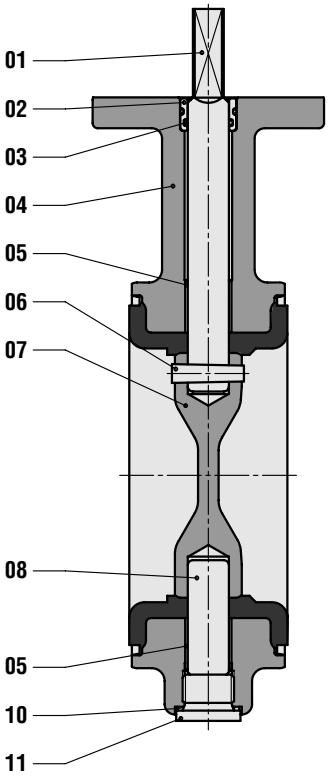
PRODUCT SHEET

General specification, construction details, parts list and dimensions

General Specification:	
Body type	Semi-lug wafer short type with long neck for insulation
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between flanges with through bolting. As end of line valve
Flange connections*	PN 10 / 16
Valve shut off pressure*	6 / 10 / 16 bar. As end of the line valve max. 10 bar
Seat tightness	Bi-directional tight shut off acc. ISO 5208, Rate A
Face to face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	PED, Kitemark, BV, CCS, CRS, LRS, NKK, RMRS, DVGW water, SVGW, WRAS, GOST, LR, FM, USCG, VDS
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

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

CONSTRUCTION DETAILS:

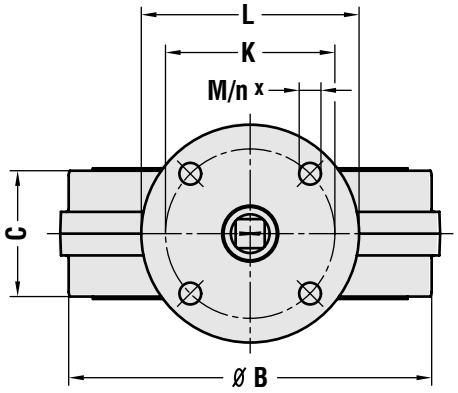


PARTS LIST:

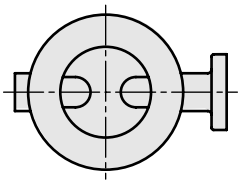
ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

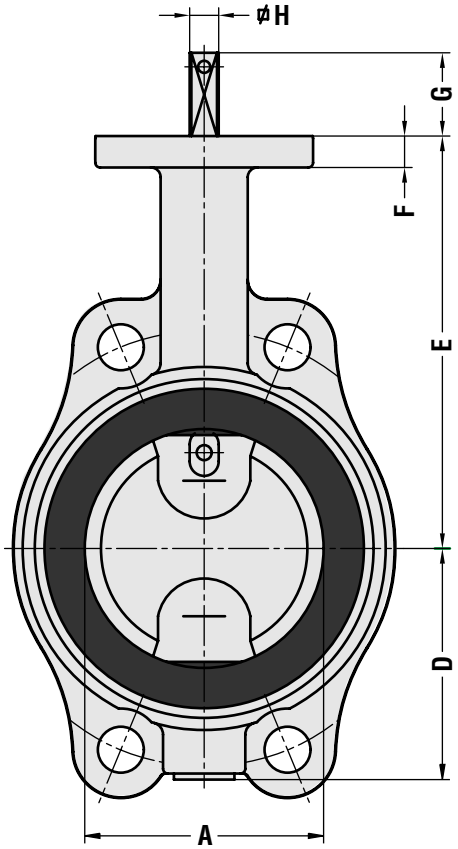
CENTRIC RUBBERLINED BUTTERFLY VALVES

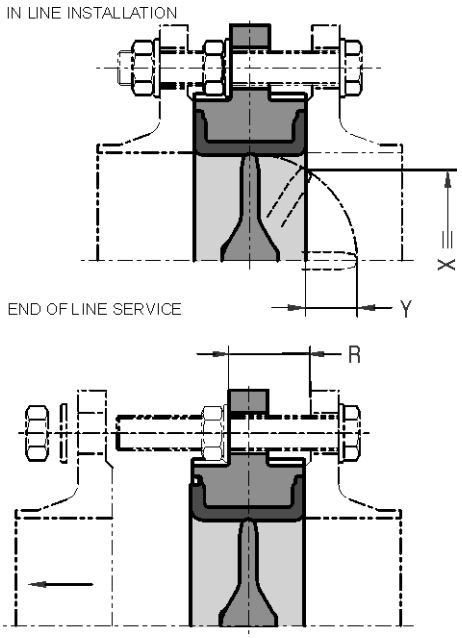
RANGE EVBLS DN 50 - 200 (2" - 8")



PREFERRED POSITION
WHEN INSTALLED IN
HORIZONTAL PIPELINE







for bolt lengths see pag. 19

Max. torque to tighten the flange bolts
- M16: 45 Nm
- M20: 90 Nm

DIMENSIONS:

DN	NPS	A	B	C	D	E	F	G	H	K	L	M	n	R	ISO 5211	X	Y	±kg
50	**2**	50	100	43	63	152	12	34	10	70	90	9	4	30	F07	25	4	3.1
65	**2 1/2**	65	115	46	71	160	12	34	10	70	90	9	4	32	F07	46	10	3.9
80	**3**	80	130	46	78	167	12	34	10	70	90	9	4	32	F07	66	17	4.2
100	**4**	100	150	52	98	189	12	34	12	70	90	9	4	35	F07	86	24	5.5
125	**5**	125	182	56	109	202	12	34	12	70	90	9	4	39	F07	112	35	7.5
150	**6**	150	210	56	133	224	14	34	16	70	90	9	4	39	F07	140	47	10
200	**8**	200	262	60	158	248	14	34	16	70	90	9	4	44	F07	191	70	14

6.1.2.3 BUTTERFLY VALVE - RANGE EVTLS DN 50 - 1200 (2˝ - 48˝)

PRODUCT SHEET

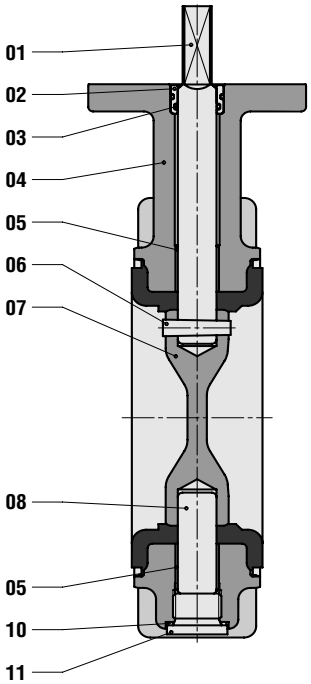
General specification, construction details, parts list and dimensions

General Specification:	
Body type	Lugged wafer short type with tapped or through flange holes
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Bolting between flanges. As end of line valve when holes are tapped
Flange connections*	PN 6 / 10 / 16 / ANSI Class 150 (JIS 5/10 on request)
Valve shut off pressure*	2,5 / 6 / 10 / 16 / 20 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*	PED, Kitemark, KIWA, DVGW water, SVGW, WRAS, DNV, ABS, BV, CCS, CRS, GL, LRS, RiNa, NKK, RMRS, UL, FM, GOST, LR, USCG, Advantica, VDS
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

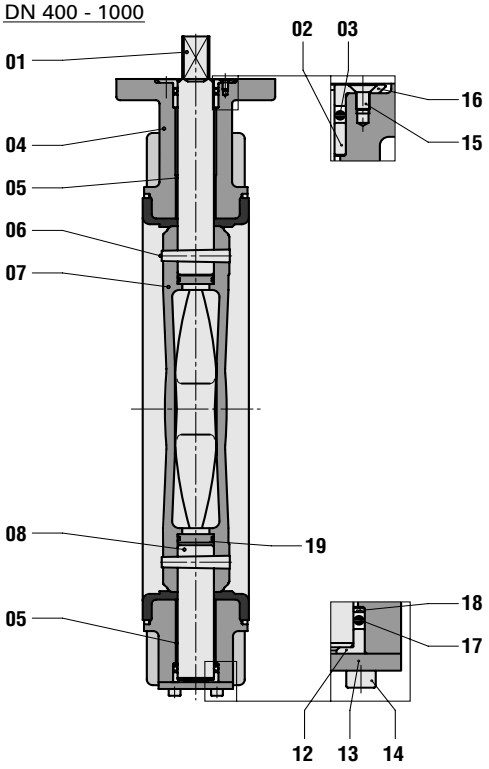
* Needs to be specified when ordering. Contact Wouter Witzel EuroValve for detailed advice

CONSTRUCTION DETAILS:

DN 50 - 350



DN 400 - 1000



PARTS LIST:

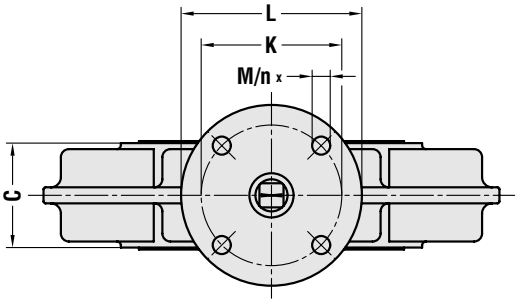
ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

PARTS LIST:

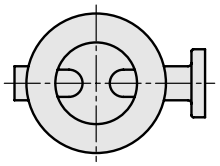
ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

CENTRIC RUBBERLINED BUTTERFLY VALVES

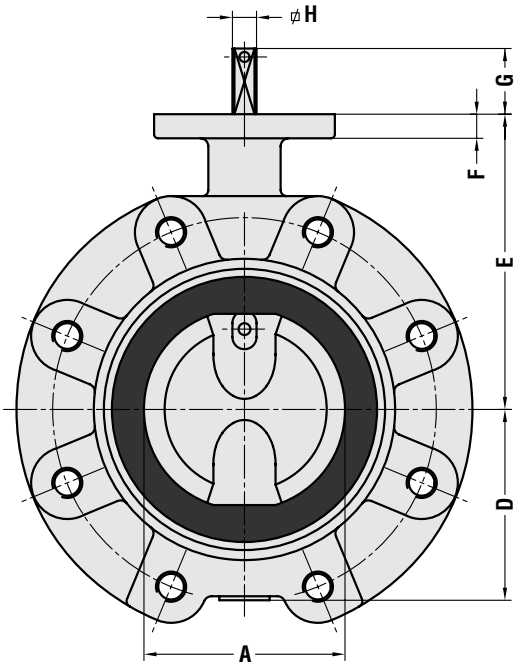
RANGE EVTLS DN 50 - 1200 (2"- 48")



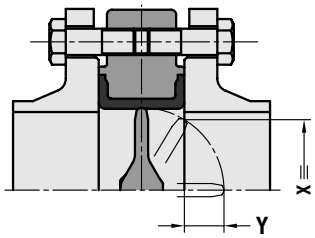
PREFERRED POSITION
WHEN INSTALLED IN
HORIZONTAL PIPELINE

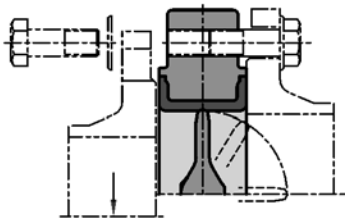


DEAD END SERVICE



IN LINE INSTALLATION





BOLTING BY HEXAGON HEAD BOLTS,
STUDS OR THREADED ENDS

for bolt lengths see pag. 19

* F30 (Pcd. 298 – 8 x Ø 21) at Δp max = 16 bar
** F35 (Pcd. 356 – 8 x Ø 31) at Δp max = 16 bar

DIMENSIONS:

DN	NPS	A	C	D	E	F	G	H	K	L	M	n	ISO 5211	X	Y	±kg
50	**2**	50	43	63	118	12	34	10	70	90	9	4	F07	25	4	8
65	**2½**	65	46	71	126	12	34	10	70	90	9	4	F07	46	10	9
80	**3**	80	46	78	133	12	34	10	70	90	9	4	F07	66	17	10
100	**4**	100	52	98	147	12	34	12	70	90	9	4	F07	86	24	12
125	**5**	125	56	109	160	12	34	12	70	90	9	4	F07	112	35	16
150	**6**	150	56	133	180	14	34	16	70	90	9	4	F07	140	47	20
200	**8**	200	60	158	204	14	34	16	70	90	9	4	F07	191	70	25
250	**10**	250	68	194	245	15	45	24	102	125	11	4	F10	241	91	28
300	**12**	300	78	219	270	15	45	24	102	125	11	4	F10	290	111	36
350	**14**	336	78	256	315	15	45	24	102	125	11	4	F10	327	129	50
400	**16**	386	102	308	363	25	50	30	140	175	17	4	F14	373	142	85
450	**18**	436	114	334	388	25	50	30	140	175	17	4	F14	421	161	105
500	**20**	486	127	360	413	25	50	30	140	175	17	4	F14	470	180	130
600	**24**	586	154	426	510	25	50	40	140	175	17	4	F14	566	216	205
700	**28**	686	165	480	560	25	60	46	165	210	21	4	F16	666	261	325
750	**30**	736	190	520	585	25	60	46	165	210	21	4	F16	711	278	385
800	**32**	786	190	525	610	25	60	46	165	210	21	4	F16	763	298	625
900	**36**	886	203	635	690	30	90	60	254	300	17	8	F25	863	342	625
1000	**40**	986	216	685	740	30	90	60	*254	350	*17	8	*F25	973	390	950
1200	**48**	1186	254	870	855	35	85	75	**298	415	**21	8	**F30	1159	466	1400

6.1.2.4 BUTTERFLY VALVE - RANGE EVUS DN 600 - 2200 (24˝ - 88˝)

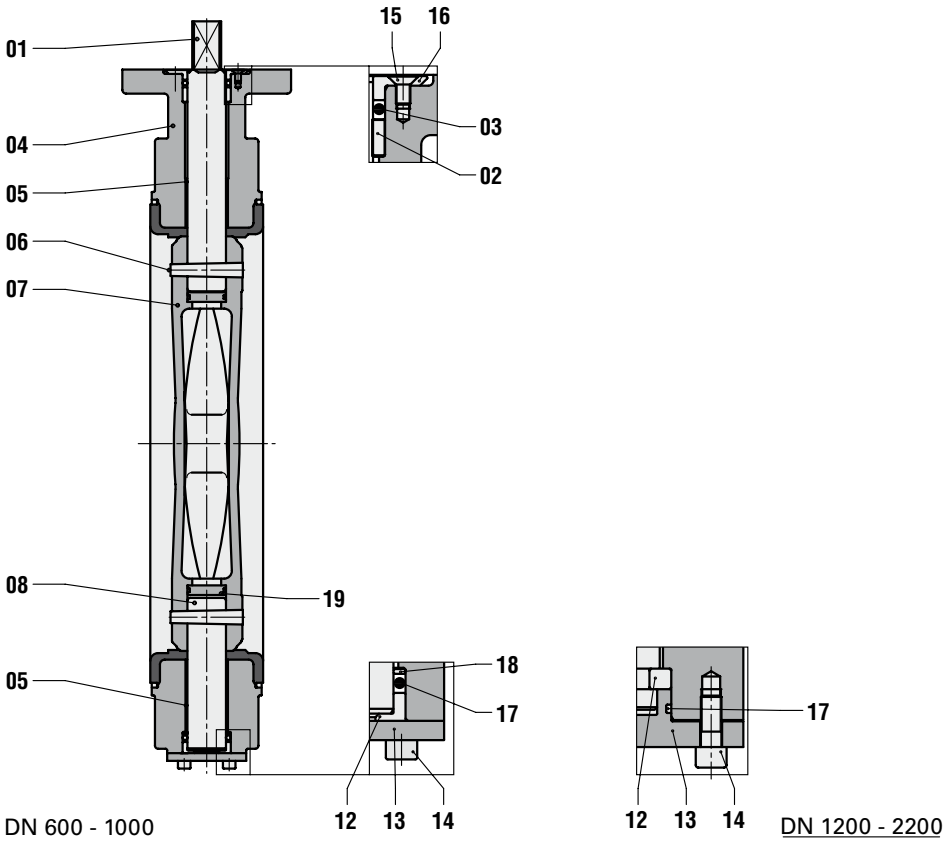
PRODUCT SHEET

General specification, construction details, parts list and dimensions

General Specification:	
Body type	U-section wafer short type with drilled and tapped flange holes
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between flanges with through bolting and with possibility for end of line service.
Flange connections*	PN 10 / ASME Cl 150 (casting PN10)
Valve shut off pressure*	2,5 / 6 / 10 bar
Seat tightness	Bi-directional tight shut off acc. ISO 5208, Rate A
Face to face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	PED, CCS, CRS, LRS, WRAS, GOST, LR, Kitemark, DNV, NKK, RMRS, USCG, Kiwa
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

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

CONSTRUCTION DETAILS:



DN 600 - 1000

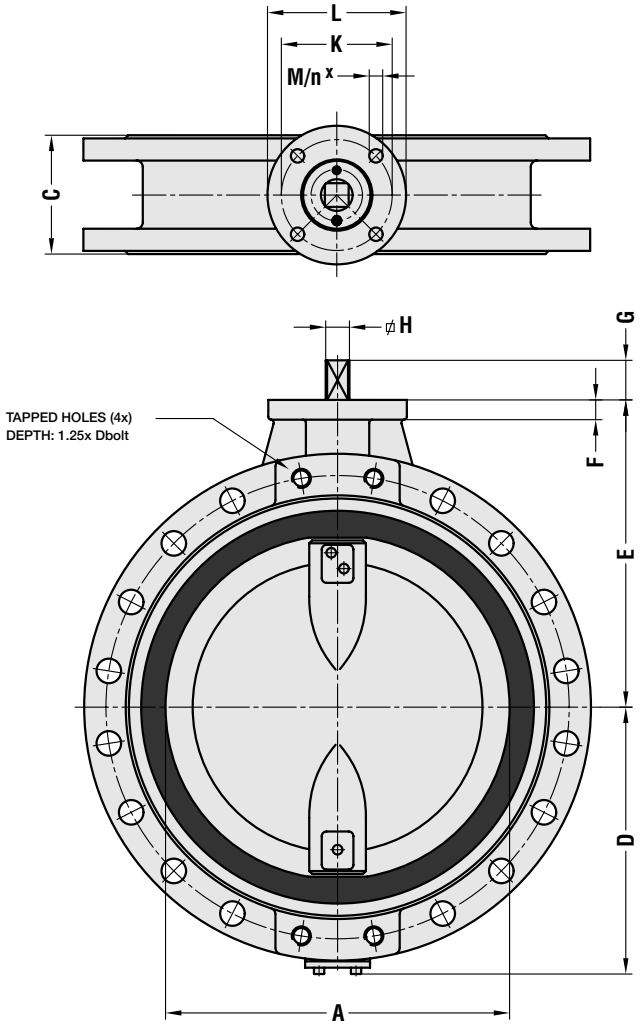
DN 1200 - 2200

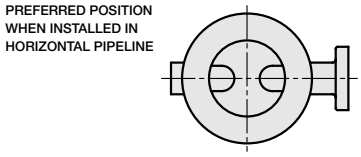
PARTS LIST:

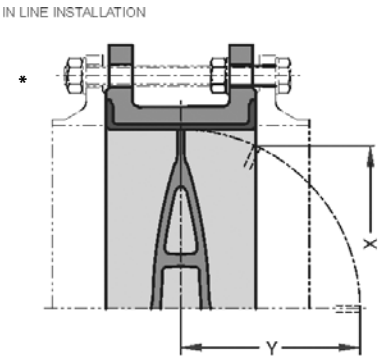
ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

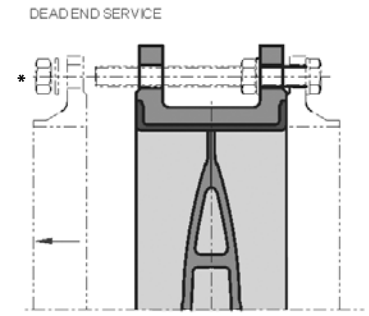
CENTRIC RUBBERLINED BUTTERFLY VALVES

RANGE EVUS DN 600 - 2200 (24" - 88")









for bolt lengths
see pag. 19

***** Also with
EVFS and EVFL

DIMENSIONS:

DN	NPS	ΔP_{max}	A	C	D	E	F	G	H	K	L	M	n	ISO 5211	X	Y	±kg
600	**24**	**10 bar**	586	154	430	510	25	50	40	140	175	17	4	F14	528	216	285
700	**28**	**10 bar**	686	165	480	560	25	60	46	165	210	21	4	F16	666	261	323
750	**30**	**10 bar**	736	190	520	585	25	60	46	165	210	21	4	F16	711	273	375
800	**32**	**10 bar**	786	190	525	610	25	60	46	165	210	21	4	F16	763	298	425
900	**36**	**10 bar**	886	203	635	690	30	90	60	254	300	17	8	F25	863	342	560
1000	**40**	**10 bar**	986	216	685	740	30	90	60	254	350	17	8	F25	973	390	760
1100	**44**	**10 bar**	1084	235	810	805	35	85	75	298	415	21	8	F30	1059	425	900
1200	**48**	**10 bar**	1186	254	870	855	35	85	75	298	415	21	8	F30	1159	466	1100
1300	**52**	**10 bar**	1283	279	910	905	35	85	75	298	415	21	8	F30	1253	502	1250
1400	**56**	**6 bar**	1386	279	980	955	35	85	75	298	415	21	8	F30	1364	568	1800
1400	**56**	**10 bar**	1386	279	980	955	35	100	75	356	415	31	8	F35	1364	568	1800
1500	**60**	**6 bar**	1484	318	1030	1034	50	85	75	298	425	21	8	F30	1450	583	2180
1500	**60**	**10 bar**	1484	318	1030	1034	50	100	75	356	425	31	8	F35	1450	583	2180
1600	**64**	**6 bar**	1586	334	1096	1137	50	100	90	298	495	21	8	F30	1364	626	2450
1600	**64**	**10 bar**	1586	334	1096	1137	50	120	105	356	495	31	8	F35	1364	626	2450
1700	**68**	**10 bar**	1676	337	1144	1126	50	120	105	406	480	37	8	F40	1642	670	2500
1800	**72**	**6 bar**	1775	356	1190	1176	50	100	90	356	560	31	8	F35	1739	710	3200
1800	**72**	**10 bar**	1775	356	1190	1176	50	120	105	406	560	37	8	F40	1739	710	3200
2000	**80**	**6 bar**	1975	406	1290	1319	50	120	105	356	560	31	8	F35	1933	785	3400
2000	**80**	**10 bar**	1975	406	1290	1319	50	140	120	406	560	37	8	F40	1933	785	3400
2100	**84**	**6 bar**	2078	406	1350	1399	50	140	120	406	560	37	8	F40	2038	836	4800
2200	**88**	**6 bar**	2178	406	1400	1419	50	140	120	483	560	37	12	F48	2140	836	4470

6.1.3. FLANGED VALVES

PRODUCT SHEET

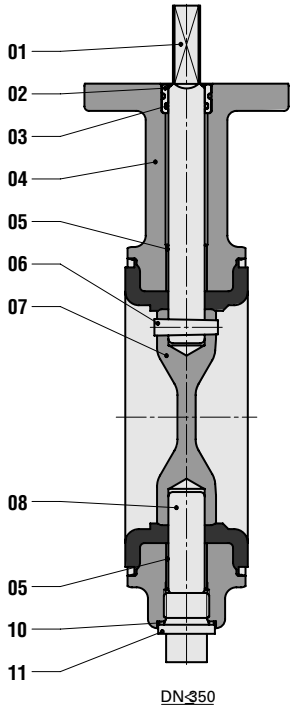
6.1.3.1 BUTTERFLY VALVE - RANGE EVML DN 80 - 800 (3˝ - 32˝)

General specification, construction details, parts list and dimensions

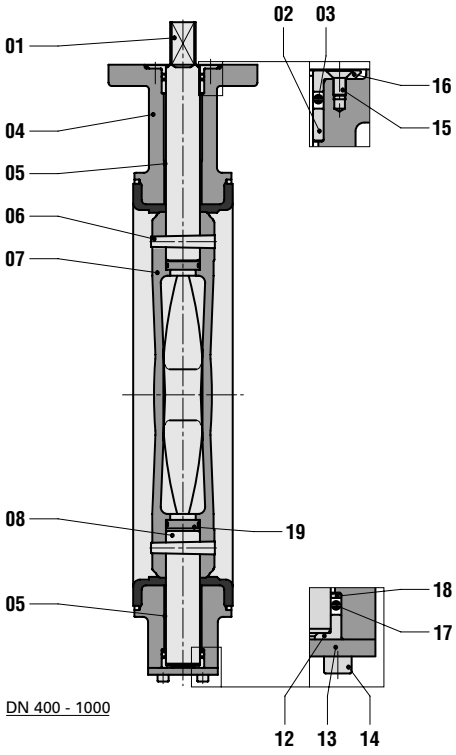
General Specification:	
Body type	Single flange wafer long type
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between flanges with through bolting and with possibility for end of line service
Flange connections*	PN 10 / PN 16
Valve shut off pressure*	2,5 / 6 / 10 / 16 bar
Seat tightness	Bi-directional tight shut off acc. ISO 5208, Rate A
Face to face dimension	ISO 5752 / EN 558, basic series 16 (wafer long), DIN 3202 k3
Available type approvals*	PED, KIWA, DVGW gas & water, SVGW, WRAS, LRS, DNV, ABS, BV, CCS, CRS,GL, NKK, RINa, RMRS, GOST, LR, FM, Kitemark, USCG, VDS
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

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

CONSTRUCTION DETAILS:



DN 350



DN 400 - 1000

PARTS LIST:

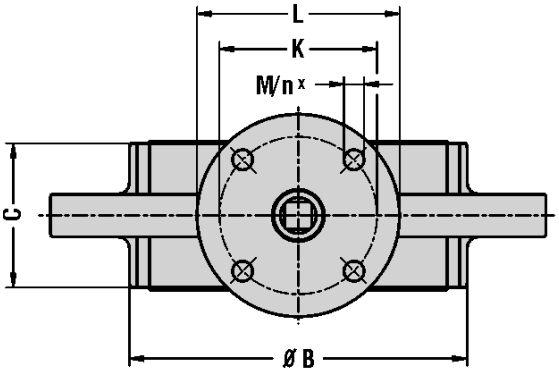
ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

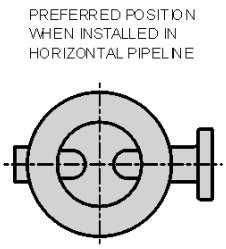
PARTS LIST:

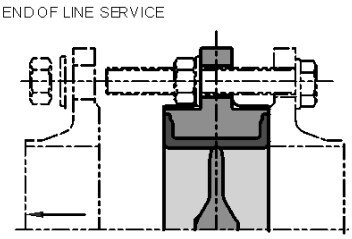
ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

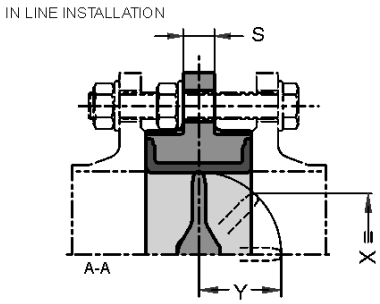
CENTRIC RUBBERLINED BUTTERFLY VALVES

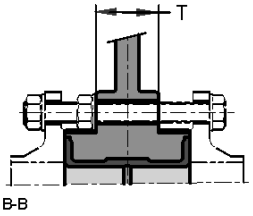
RANGE EVML DN 80 - 800 (3" - 32")

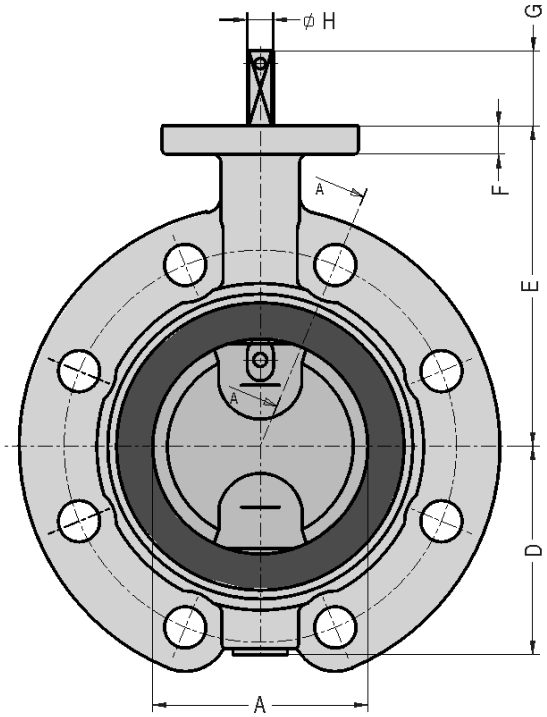




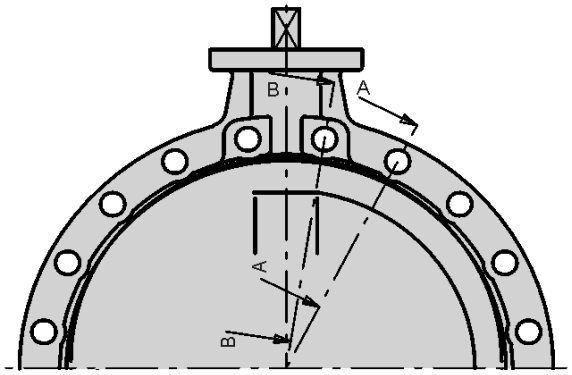








for bolt lengths see pag. 19



DIMENSIONS:

DN	NPS	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211	S	T	X	Y	±kg
50	**2**					ALTERNATIVE SEE EVBS									–	–	–	–	–
65	**2 1/2**					ALTERNATIVE SEE EVBS									–	–	–	–	–
80	**3**	80	130	64	78	133	12	34	10	70	90	9	4	F07	19	–	48	8	6.5
100	**4**	100	150	64	98	147	12	34	12	70	90	9	4	F07	19	–	77	18	7.5
125	**5**	125	182	70	109	160	12	34	12	70	90	9	4	F07	20	–	104	28	11
150	**6**	150	210	76	133	180	14	34	16	70	90	9	4	F07	20	–	130	37	14
200	**8**	200	262	89	158	204	14	34	16	70	90	9	4	F07	21	–	179	56	18
250	**10**	250	315	114	194	245	15	45	24	102	125	11	4	F10	23	–	223	68	28
300	**12**	300	371	114	219	270	15	45	24	102	125	11	4	F10	24	–	278	93	39
350	**14**	336	405	127	256	315	15	45	24	102	125	11	4	F10	26	–	311	105	50
400	**16**	386	470	140	308	363	25	50	30	140	175	17	4	F14	28	43	360	123	95
450	**18**	436	522	152	334	388	25	50	30	140	175	17	4	F14	28	54	409	142	115
500	**20**	486	576	152	360	413	25	50	30	140	175	17	4	F14	32	60	462	167	155
600	**24**	586	672	178	426	510	25	50	40	140	175	17	4	F14	35	76	559	204	230
700	**28**	686	776	229	480	560	25	60	46	165	210	21	4	F16	37	115	647	229	330
750	**30**	763	826	229	520	585	25	60	46	165	210	21	4	F16	37	115	699	253	380
800	**32**	786	880	241	525	610	25	60	46	165	210	21	4	F16	40	115	749	273	430

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

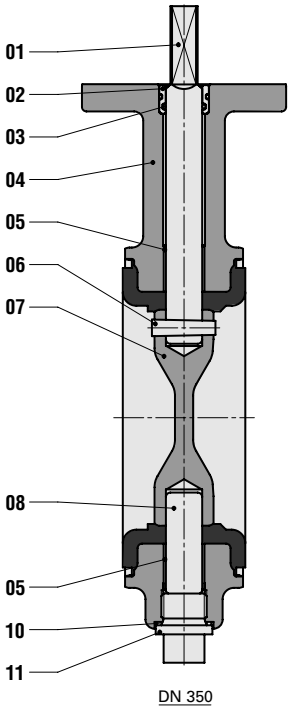
PRODUCT SHEET

General specification, construction details, parts list and dimensions

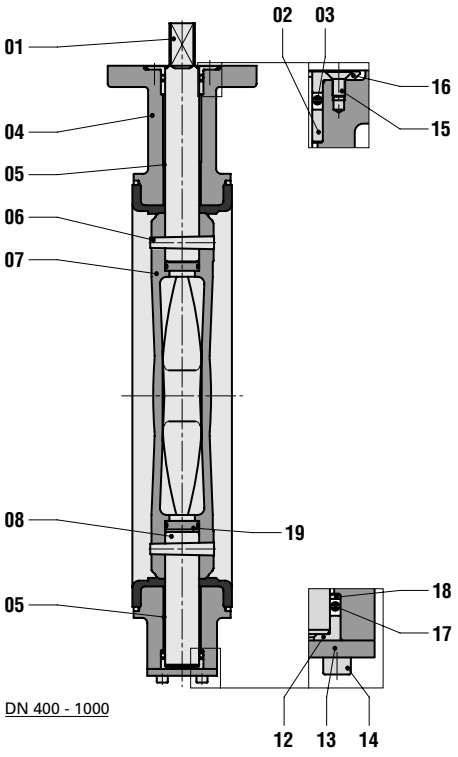
General Specification:	
Body type	Single flange wafer short type
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Clamping between flanges with possibility for end of line service.
Flange connections*	PN 10 / 16
Valve shut off pressure*	2,5 / 6 / 10 / 16 bar
Seat tightness	Bi-directional tight shut off acc. ISO 5208, Rate A
Face to face dimension	ISO 5752 / EN 558, basic series 20 (wafer short)
Available type approvals*	PED, BV, CCS, CRS, DNV, ABS, LRS, NKK, RINa, NKK, RMRS, DVGW gas & water, SVGW, WRAS, GOST, LR, FM, Kitemark, BV, USCG, Kiwa
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

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

CONSTRUCTION DETAILS:



DN 350



DN 400 - 1000

PARTS LIST:

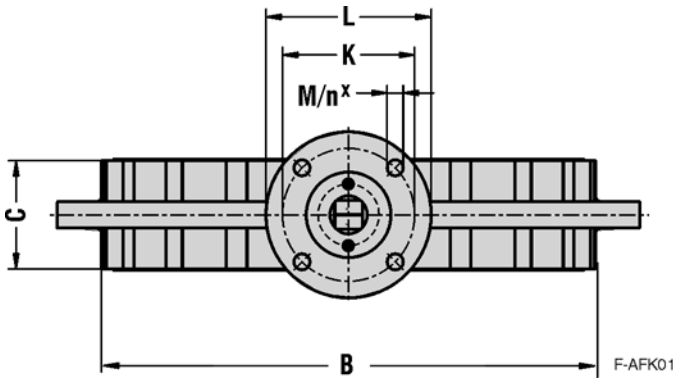
ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

PARTS LIST:

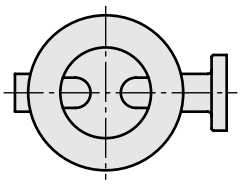
ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

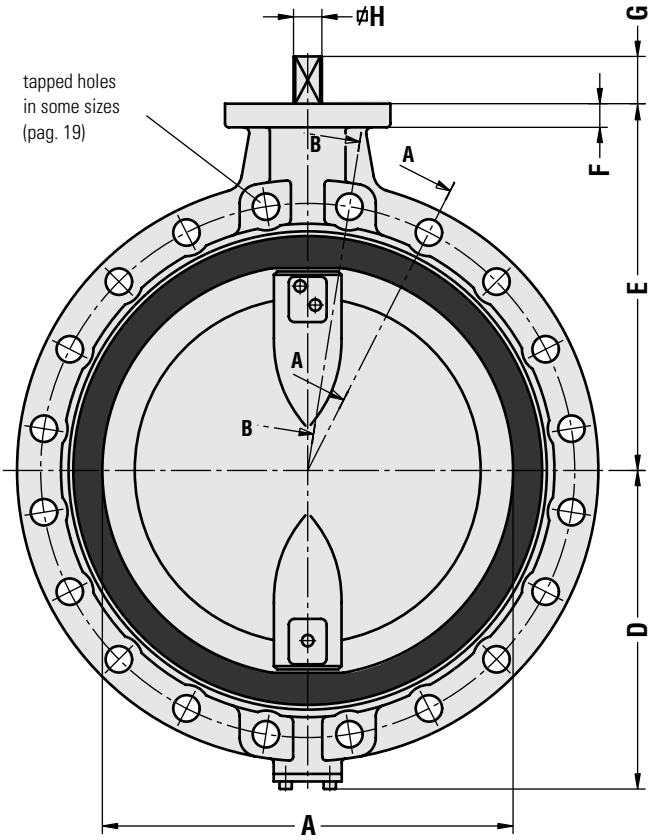
CENTRIC RUBBERLINED BUTTERFLY VALVES

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

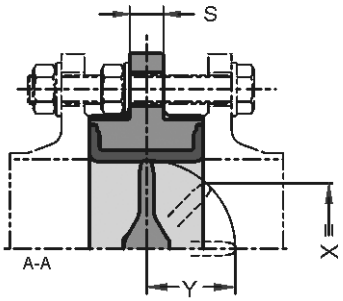


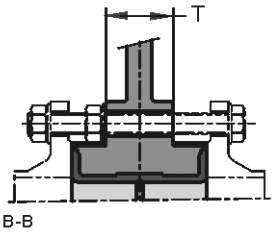
PREFERRED POSITION
WHEN INSTALLED IN
HORIZONTAL PIPELINE



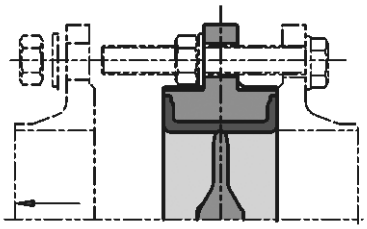


IN LINE INSTALLATION





DEAD END SERVICE



DIMENSIONS:

DN	NPS	A	B	C	D	E	F	G	H	K	L	M	n	ISO 5211	S	T	X	Y	±kg
350	**14**	336	405	78	256	315	15	45	24	102	125	11	4	F10	26	–	327	129	45
400	**16**	386	470	102	308	363	25	50	30	140	175	17	4	F14	28	43	373	142	85
450	**18**	436	522	114	334	388	25	50	30	140	175	17	4	F14	28	54	421	161	100
500	**20**	486	576	127	360	413	25	50	30	140	175	17	4	F14	32	60	470	180	135
600	**24**	586	672	154	426	510	25	50	40	140	175	17	4	F14	35	76	566	216	200
700	**28**	686	776	165	480	560	25	60	46	165	210	21	4	F16	37	115	666	261	315
800	**32**	786	880	190	525	610	25	60	46	165	210	21	4	F16	40	115	763	298	365
900	**36**	886	980	203	635	690	30	90	60	254	300	17	8	F25	40	190	863	342	500
1000	**40**	986	1085	216	685	740	30	90	60	*254	350	*17	8	*F25	50	200	973	390	670

*) F30 (pcd 298.8 x Ø 21) at ΔP_{max} = 16 bar

6.1.3.3 BUTTERFLY VALVE - RANGE EVFS DN 40 - 1000 ($1^1/_2$˝ - 40˝)

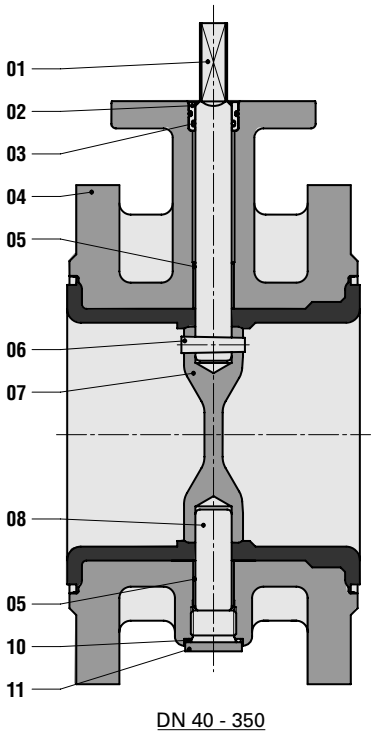
PRODUCT SHEET

General specification, construction details, parts list and dimensions

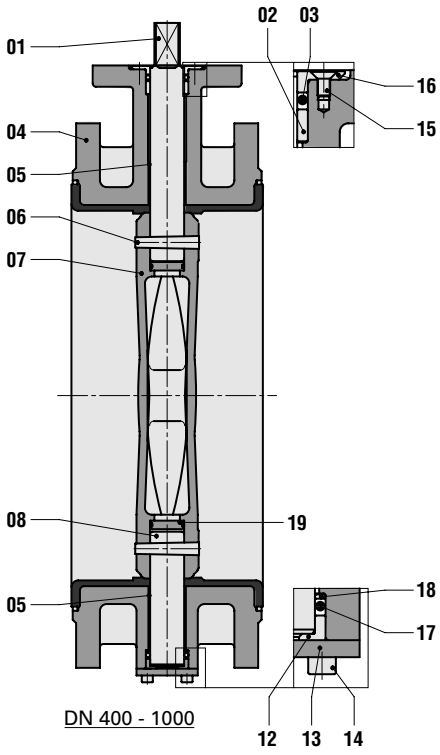
General Specification:	
Body type	Double flanged short type
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Installation between flanges and with possibility for end of line service.
Flange connections*	PN 6 / 10 / 16 / ANSI Class 150 / JIS 5 / 10 / 16
Valve shut off pressure*	2,5 / 6 / 10 / 16 / 20 bar
Seat tightness	Bi-directional tight shut off acc. ISO 5208, Rate A
Face to face dimension	ISO 5752 / EN 558, basic series 13 (double flanged short)
Available type approvals*	PED, Kitemark, KIWA, DVGW, WRAS, DNGW gas & water, SVGW, LRS, DNV, ABS, BV, CCS, CRS, GL, RINa, NKK, RMRS, GOST, LR, FM
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

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

CONSTRUCTION DETAILS:



DN 40 - 350



DN 400 - 1000

PARTS LIST:

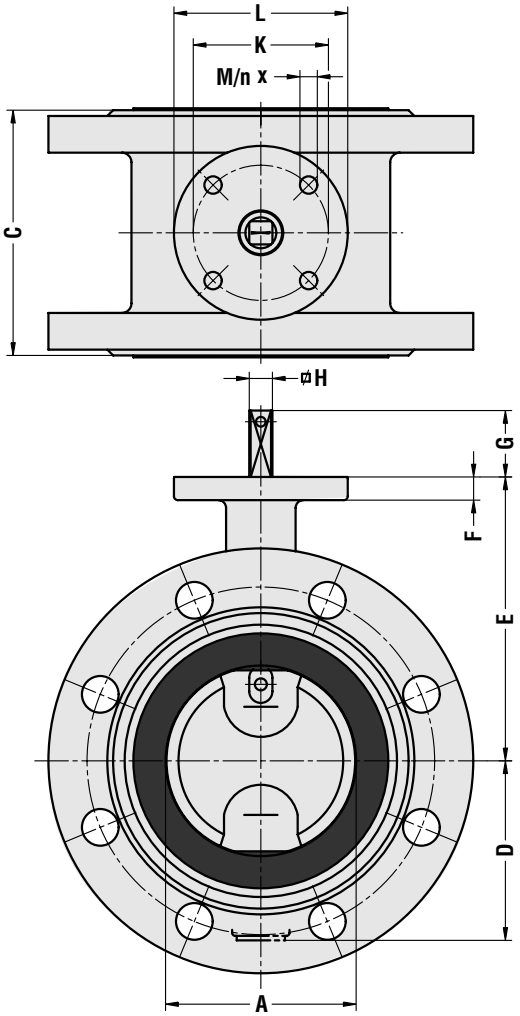
ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

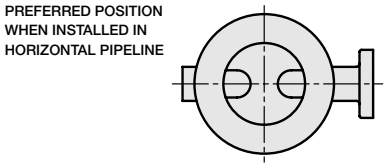
PARTS LIST:

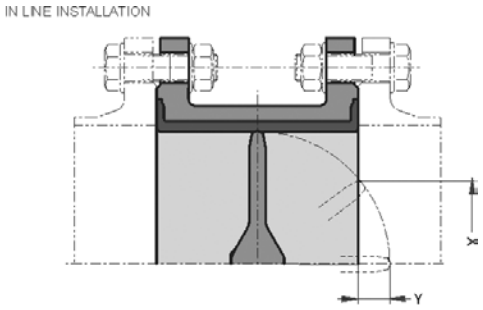
ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

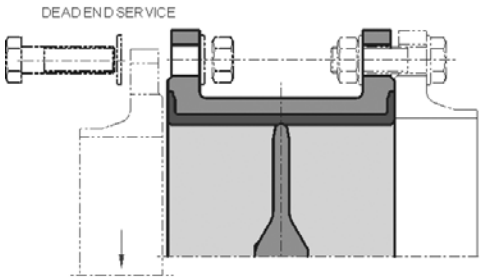
CENTRIC RUBBERLINED BUTTERFLY VALVES

RANGE EVFS DN 40 - 1000 ($1^1/_2$" - 40")









for bolt lengths see pag. 19

DIMENSIONS:

DN	NPS	A	C	D	E	F	G	H	K	L	M	n	ISO 5211	X	Y	±kg
40	**$1^1/_2$**	40	106	58	113	12	34	10	70	90	9	4	F07	–	–	7
50	**2**	50	108	63	118	12	34	10	70	90	9	4	F07	–	–	8
65	**$2^1/_2$**	65	112	71	126	12	34	10	70	90	9	4	F07	–	–	9
80	**3**	80	114	78	133	12	34	10	70	90	9	4	F07	–	–	11
100	**4**	100	127	98	147	12	34	12	70	90	9	4	F07	–	–	13
125	**5**	125	140	109	160	12	34	12	70	90	9	4	F07	–	–	17
150	**6**	150	140	133	180	14	34	16	70	90	9	4	F07	53	5	23
200	**8**	200	152	158	204	14	34	16	70	90	9	4	F07	130	24	32
250	**10**	250	165	194	245	15	45	24	102	125	11	4	F10	188	43	50
300	**12**	300	178	219	270	15	45	24	102	125	11	4	F10	242	61	65
350	**14**	336	190	256	315	15	45	24	102	125	11	4	F10	277	73	95
400	**16**	386	216	308	363	25	50	30	140	175	17	4	F14	320	85	130
450	**18**	436	222	334	388	25	50	30	140	175	17	4	F14	376	107	150
500	**20**	486	229	360	413	25	50	30	140	175	17	4	F14	429	129	200
550	**22**	536	267	395	485	25	50	40	140	175	17	4	F14	480	145	260
600	**24**	586	267	426	510	25	50	40	140	175	17	4	F14	522	160	300
650	**26**	636	292	456	535	25	60	46	165	210	21	4	F16	575	180	350
700	**28**	686	292	480	560	25	60	46	165	210	21	4	F16	621	197	380
750	**30**	736	318	520	585	25	60	46	165	210	21	4	F16	665	210	440
800	**32**	786	318	525	610	25	60	46	165	210	21	4	F16	719	234	500
900	**36**	886	330	635	690	30	90	60	254	300	17	8	F25	823	278	660
1000	**40**	986	410	685	740	30	90	60	*254	350	*17	8	*F25	897	288	900

*) F30 (pcd 298.8 x Ø 21) at ΔPmax = 16 bar)

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

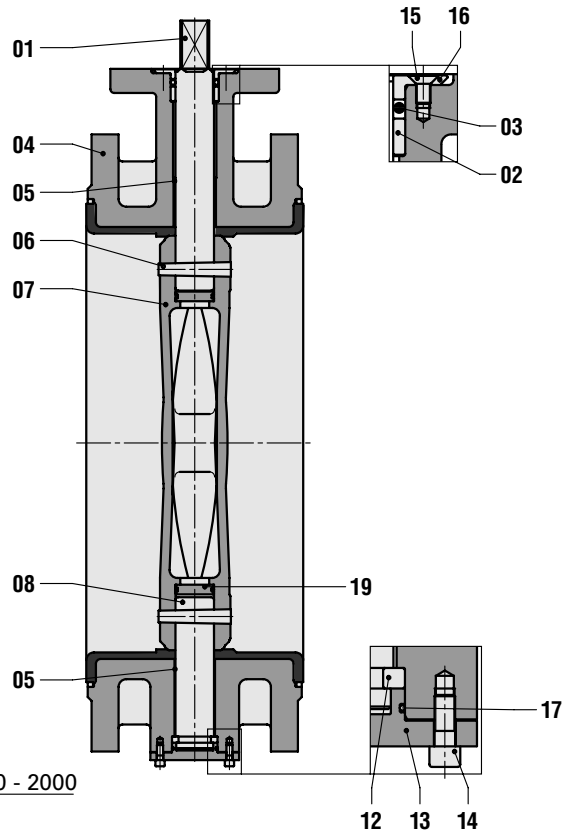
PRODUCT SHEET

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	Installation between flanges and with possibility for dead end service.
Flange connections*	PN 6 / 10 / 16 / ANSI Class 150 / JIS 5 / 10 / 16
Valve shut off pressure*	2,5 / 6 / 10 / 16 bar
Seat tightness	Bi-directional tight shut off acc. ISO 5208, Rate A
Face to face dimension	ISO 5752 / EN 558, basic series 13 (double flanged short)
Available type approvals*	PED, KIWA, DVGW gas & water, SVGW, WRAS, CCS, CRS, LRS, DNV, ABS, BV, GL, RINa, NKK, RMRS, GOST, LR
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

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

CONSTRUCTION:



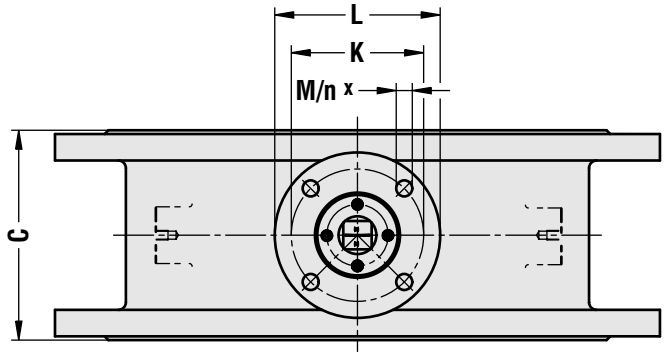
DN 1200 - 2000

PARTS LIST:

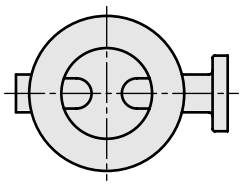
ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

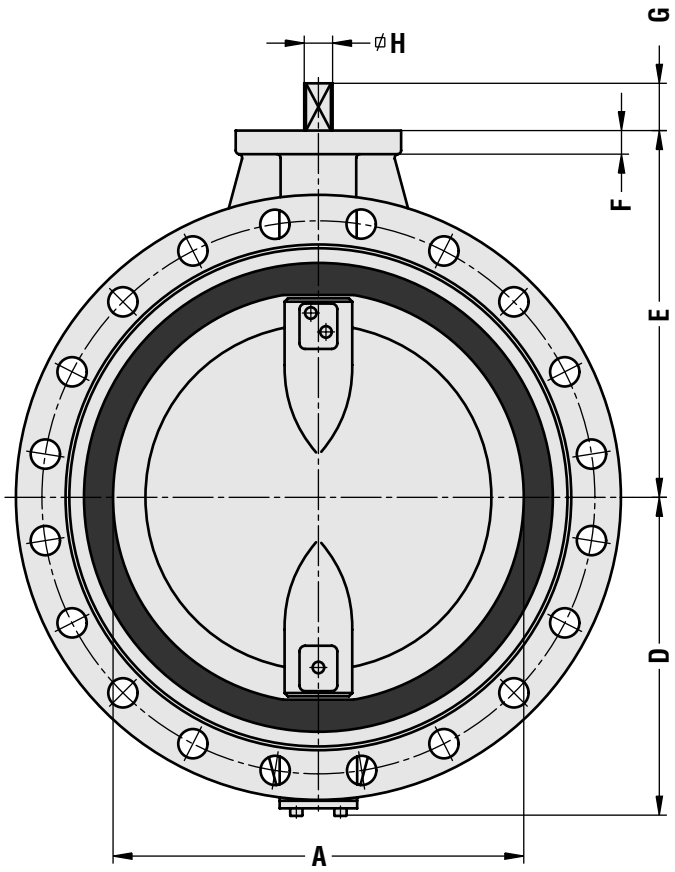
CENTRIC RUBBERLINED BUTTERFLY VALVES

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

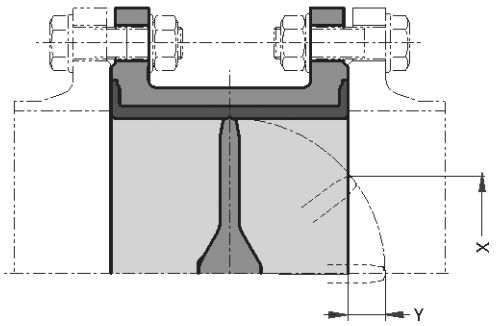


PREFERRED POSITION
WHEN INSTALLED IN
HORIZONTAL PIPELINE

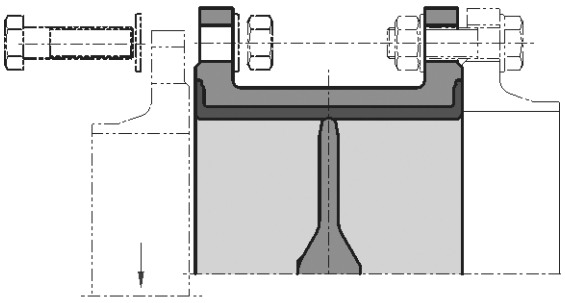




IN LINE INSTALLATION



DEAD END SERVICE



DIMENSIONS:

DN	NPS	ΔP_{max}	A	C	D	E	F	G	H	K	L	M	n	ISO 5211	X	Y	±kg
1200	**48**	**10 bar**	1186	470	870	855	35	85	75	298	415	21	8	F30	1089	358	1300
1200	**48**	**16 bar**	1186	470	870	855	35	85	75	356	415	31	8	F35	1089	358	1300
1400	**56**	**6 bar**	1386	530	970	955	35	85	75	298	415	21	8	F30	1281	428	1700
1400	**56**	**10 bar**	1386	530	970	955	35	85	75	356	415	31	8	F35	1281	428	1700
1400	**56**	**16 bar**	1386	530	980	955	35	100	90	356	415	31	8	F35	1281	428	1700
1500	**60**	**10bar**	1484	600	1037	1029	50	100	90	356	475	31	8	F35	1360	443	2100
1500	**60**	**16bar**	1484	600	1037	1029	50	120	105	406	475	37	8	F40	1360	443	2100
1600	**64**	**10 bar**	1586	600	1096	1079	50	100	90	356	475	31	8	F35	1469	493	2500
1600	**64**	**16 bar**	1586	600	1096	1079	50	120	105	406	475	37	8	F40	1469	493	2500
1800	**72**	**6 bar**	1776	670	1187	1176	50	100	90	356	415	31	8	F35	1642	550	3500
1800	**72**	**10 bar**	1776	670	1187	1176	50	120	105	406	475	37	8	F40	1642	550	3500
2000	**80**	**6 bar**	1976	760	1287	1276	50	120	105	356	475	31	8	F35	1822	606	4000
2000	**80**	**10 bar**	1976	760	1287	1276	50	140	120	406	475	37	8	F40	1822	606	4000

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

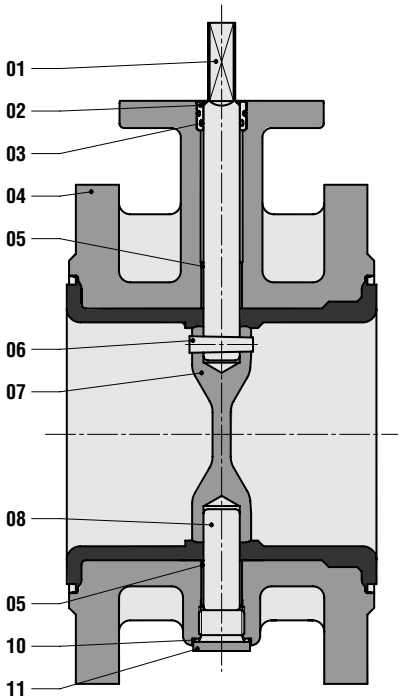
PRODUCT SHEET

General specification, construction details, parts list and dimensions

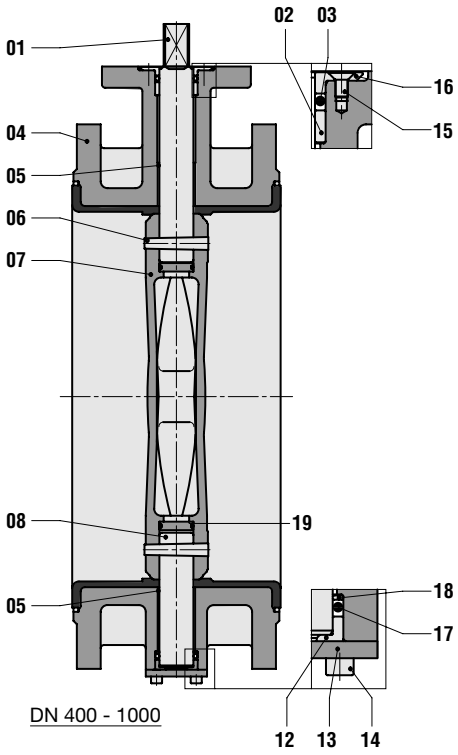
General Specification:	
Body type	Double flanged long type, centric, rubberlined
Valve function*	Isolating valve (on/off) and/or regulating valve
Installation	Installation between flanges and with possibility for dead end service.
Flange connections*	PN 10 / PN 16 / ANSI Class 150
Valve shut off pressure*	2.5 / 6 / 10 / 16 bar
Seat tightness	Bi-directional tight shut off acc. ISO 5208, Rate A
Face to face dimension	ISO 5752 / EN 558, basic series 14 (double flanged long)
Available type approvals*	PED, KIWA, DVGW gas & water, SVGW, WRAS, LRS, ABS, BV, CCS, CRS, NKK, GL, RINa, RMRS, GOST, LR, FM
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

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

CONSTRUCTION DETAILS:



DN 50 - 350



DN 400 - 1000

PARTS LIST:

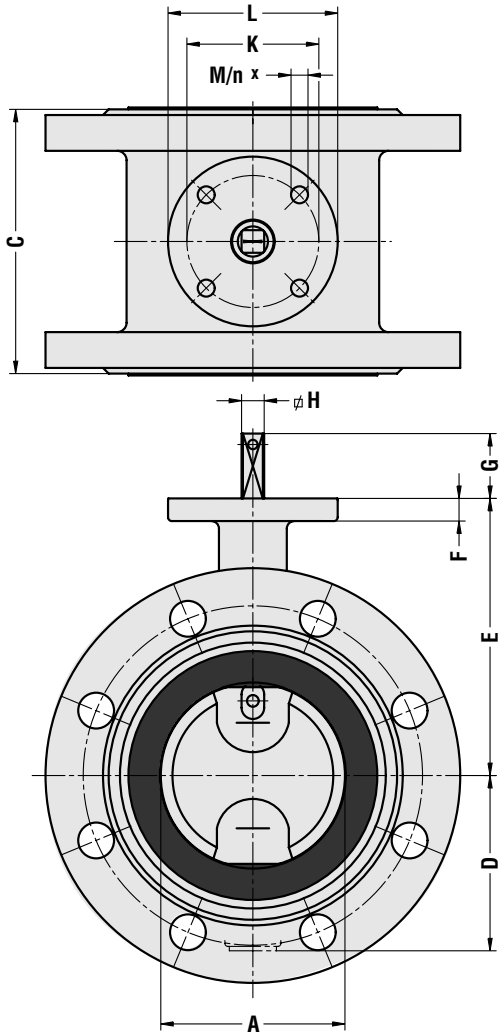
ITEM	DESCRIPTION
01	shaft
02	bush
03	o-ring
04	body rubber lined
05	bearing
06	conical pin
07	disc
08	shaft
10	sealing ring
11	plug

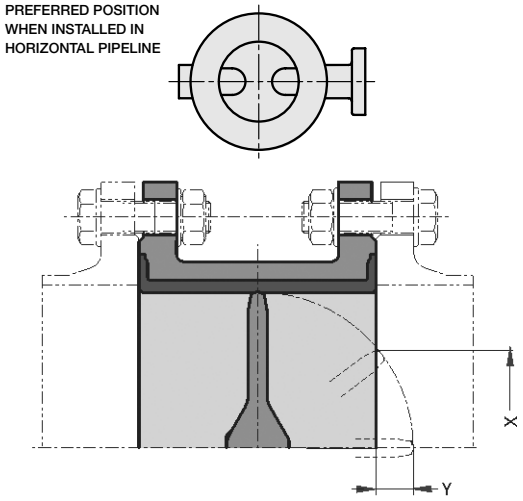
PARTS LIST:

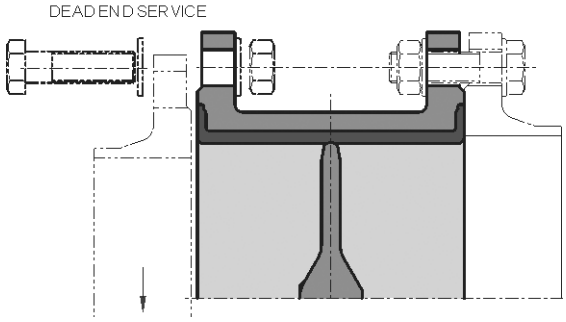
ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

CENTRIC RUBBERLINED BUTTERFLY VALVES

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







for bolt lengths see pag. 19

DIMENSIONS:

DN	NPS	A	C	D	E	F	G	H	K	L	M	n	ISO 5211	X	Y	±kg
50	**2**	50	150	63	118	12	34	10	70	90	9	4	F07	–	–	11
65	**2½**	65	170	71	126	12	34	10	70	90	9	4	F07	–	–	13
80	**3**	80	180	78	133	12	34	10	70	90	9	4	F07	–	–	17
100	**4**	100	190	98	147	12	34	12	70	90	9	4	F07	–	–	20
125	**5**	125	200	109	160	12	34	12	70	90	9	4	F07	–	–	26
150	**6**	150	210	133	180	14	34	16	70	90	9	4	F07	–	–	31
200	**8**	200	230	158	204	14	34	16	70	90	9	4	F07	–	–	45
250	**10**	250	250	194	245	15	45	24	102	125	11	4	F10	–	–	70
300	**12**	300	270	219	270	15	45	24	102	125	11	4	F10	131	15	90
350	**14**	336	290	256	315	15	45	24	102	125	11	4	F10	170	23	120
400	**16**	386	310	308	363	25	50	30	140	175	17	4	F14	230	38	165
450	**18**	436	330	334	388	25	50	30	140	175	17	4	F14	285	53	200
500	**20**	486	350	360	413	25	50	30	140	175	17	4	F14	337	68	230
600	**24**	586	390	426	510	25	50	40	140	175	17	4	F14	438	98	320
700	**28**	686	430	480	560	25	60	46	165	210	21	4	F16	535	128	420
800	**32**	786	470	525	610	25	60	46	165	210	21	4	F16	630	158	610
900	**36**	886	510	635	690	30	90	60	254	300	17	8	F25	725	188	820
1000	**40**	986	550	685	740	30	90	60	*254	350	*17	8	*F25	819	218	1130

*) F30 (pcd 298.8 x Ø 21) at ΔP_{max} = 16 bar)

6.1.3.6 BUTTERFLY VALVE - RANGE EVFL DN 1200 - 1500 (48″ - 60″)

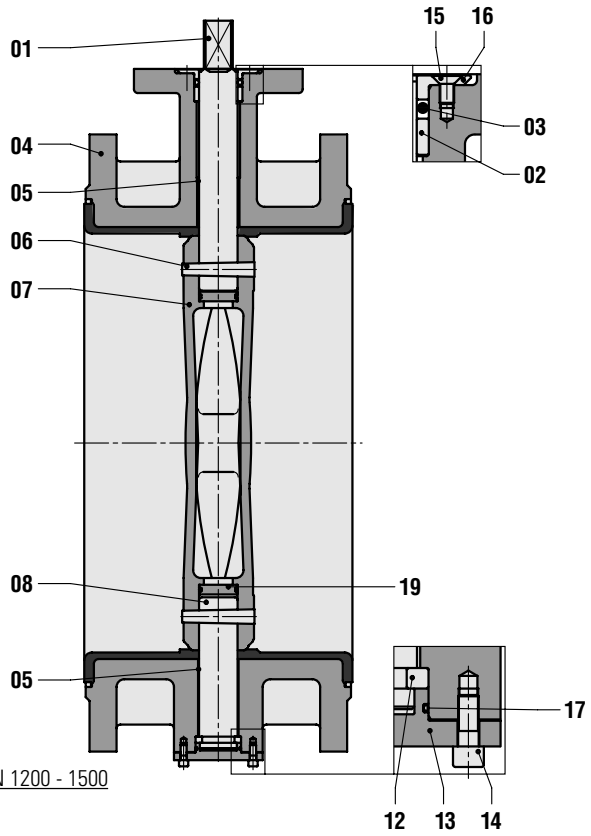
PRODUCT SHEET

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	Installation between flanges and with possibility for end of line service
Flange connections*	PN 10 / PN 16 / ANSI Class 150
Valve shut off pressure*	2,5 / 6 / 10 / 16 bar
Seat tightness	Bi-directional tight shut off acc. ISO 5208, Rate A
Face to face dimension	ISO 5752 / EN 558, basic series 14 (double flanged long)
Available type approvals*	PED, KIWA, DVGW gas & water, SVGW, WRAS, LRS, ABS, BV, CCS, CRS, GL, NKK, RINa, RMRS, GOST, LR
Actuation possibilities*	Manual, electric, pneumatic or hydraulic

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

CONSTRUCTION DETAILS:



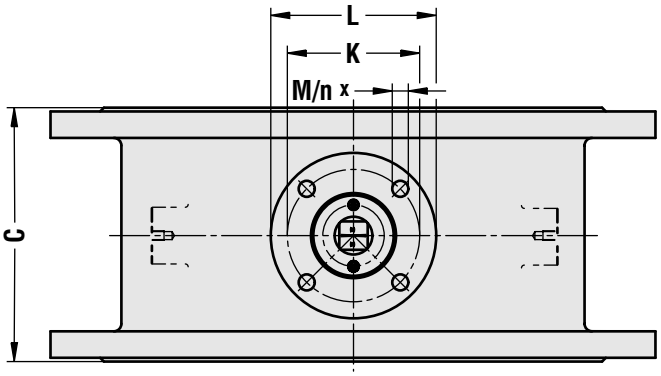
DN DN 1200 - 1500

PARTS LIST:

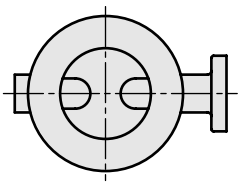
ITEM	DESCRIPTION	ITEM	DESCRIPTION
01	shaft	12	axial bearing
02	bush	13	cover plate
03	o-ring	14	screw
04	body rubber lined	15	screw
05	bearing	16	flanged bush
06	conical pin	17	o-ring
07	disc	18	ring
08	shaft	19	sealing plate

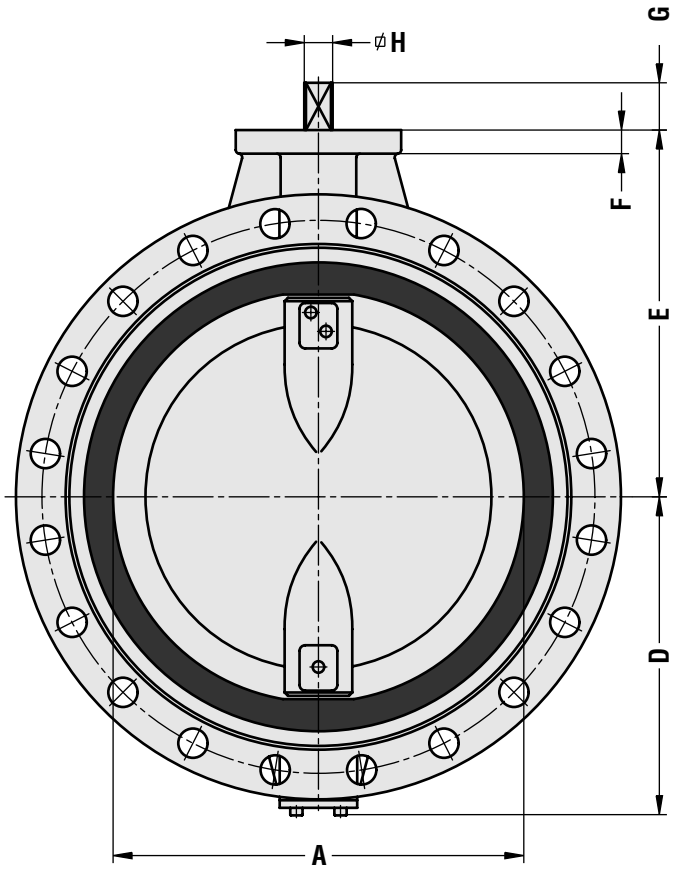
CENTRIC RUBBERLINED BUTTERFLY VALVES

RANGE EVFL DN 1200 - 1500 (48" - 60")

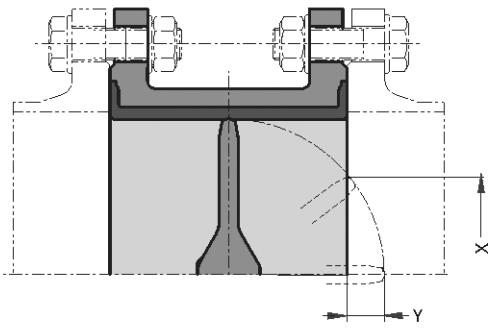


PREFERRED POSITION
WHEN INSTALLED IN
HORIZONTAL PIPELINE

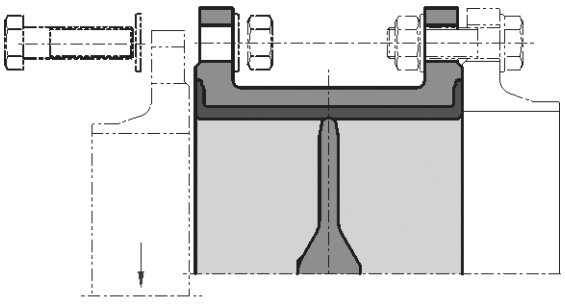




IN LINE INSTALLATION



DEAD END SERVICE



DIMENSIONS:

DN	NPS	ΔP_{max}	A	C	D	E	F	G	H	K	L	M	n	ISO 5211	X	Y	±kg
1200	**48**	**10 bar**	1186	630	870	855	35	85	75	298	415	21	8	F30	1005	315	1600
1200	**48**	**16 bar**	1186	630	870	855	35	85	75	356	415	31	8	F35	1005	315	1600
1400	**56**	**6 bar**	1386	530	970	955	35	85	75	298	415	21	8	F30	1184	330	2100
1400	**56**	**10 bar**	1386	710	970	955	35	85	75	356	415	31	8	F35	1184	330	2100
1400	**56**	**16 bar**	1386	710	980	955	35	100	90	356	415	31	8	F35	1184	330	2100
1500	**60**	**10 bar**	1484	750	1037	1029	50	100	90	356	475	81	8	F35	1283	368	2500
1500	**60**	**16 bar**	1484	750	1037	1029	50	120	105	406	475	37	8	F40	1283	368	2500

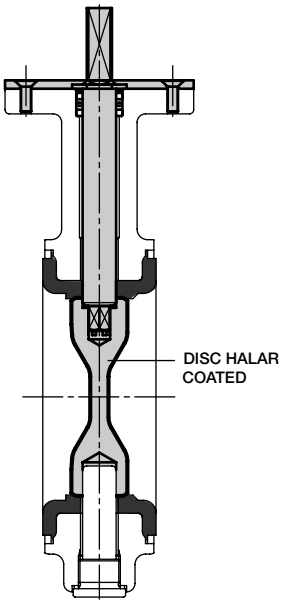
6.2 SPECIAL EXECUTIONS AND ACCESSORIES

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

6.2.1 VALVE WITH HALAR® COATED DISC FOR CORROSIVE FLUIDS

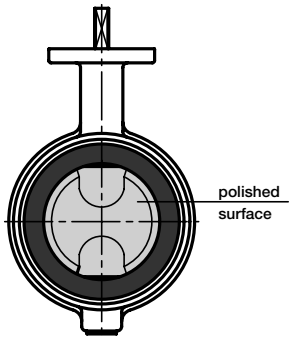
Specification	
Application	In extremely corrosive fluids e.g. most technical acids, alkalies and organic solvents where stainless steel discs are not resistant. Also for sticky fluids. Max. temperature: 90 °C.
Description	The disc surface is fully coated with Halar® (ECTFE). The disc/shaft connection is by inner hexagon or square. Only the disc and body lining are wetted by the process fluid.
Available on	All Wouter Witzel product lines. 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.

Note: Shaft square may be different from standard



6.2.3 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 steel discs in all Wouter Witzel product lines DN 50 - 2200 (2"- 88").

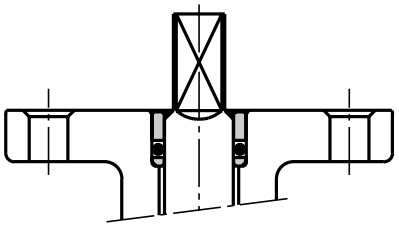


6.2.4 SILICONE FREE VALVES FOR COATING INSTALLATIONS

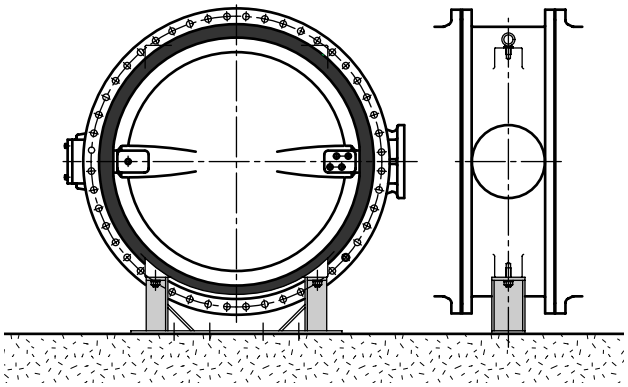
Specification	
Application	Valves used in silicone free processes e.g.coating systems for car manufacturers
Description	All valve parts are cleaned before assembly in the clean room where no grease is used. Valves are marked with the letter 'R' and specially packed in sealed plastic bags.
Available on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

6.2.5 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 Wouter Witzel product lines and sizes.

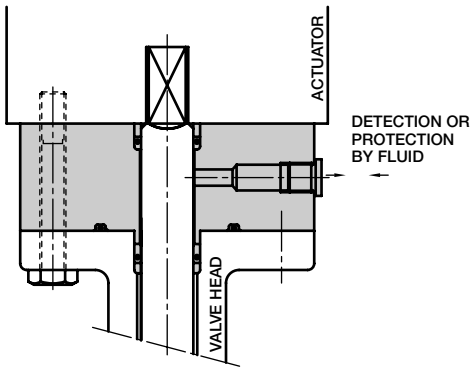


6.2.6 SUPPORT LEGS (ACCESSORY)



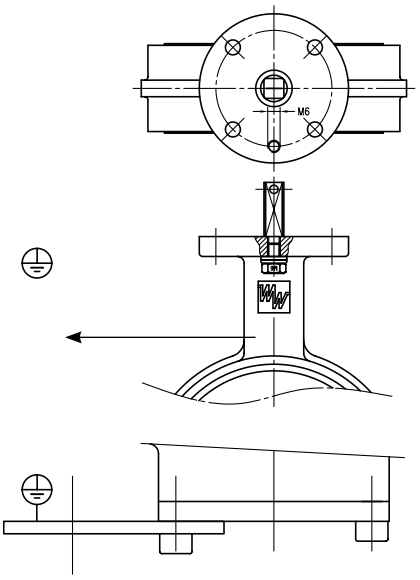
Specification	
Application	When the valve is to be set on a fixed base to support the valve. Note: not intended as pipeline support.
Description	Steel welded structure, connected to the valve body by bolting; tailor made.
Available on	EVFL / EVFS DN 1200 - 2000 (48"- 80")
Optional	Other sizes and flange types support legs on flanges
Lifting eyes	Valves from DN 1200 and above..

6.2.7 LEAKAGE DETECTION/PROTECTION (ACCESSORY)



Specification	
Application	– Extra environmental protection of the shaft passage out of the pressure containing cavity in case of harmfull 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 R1/4 threaded connection for detection, draining or emergency sealing of leakage. TÜV approved.
Available on	All Wouter Witzel product lines. Extended shaft necessary.

6.2.8 VALVES AND ACTUATORS WITH ATEX 95 APPROVAL FOR APPLICATION IN POTENTIALLY EXPLOSIVE ATMOSPHERES.



Specification	
Application	In potentially explosive atmospheres.
Description	Valves are provided with a connection device for earthing (see fig). The end user should make and test this earth connection after installation of the valve. Actuators (when applied) are delivered with the appropriate Atex Zone certification.
Available on	All Wouter Witzel product lines. The appropriate Atex zone should be specified when ordering.

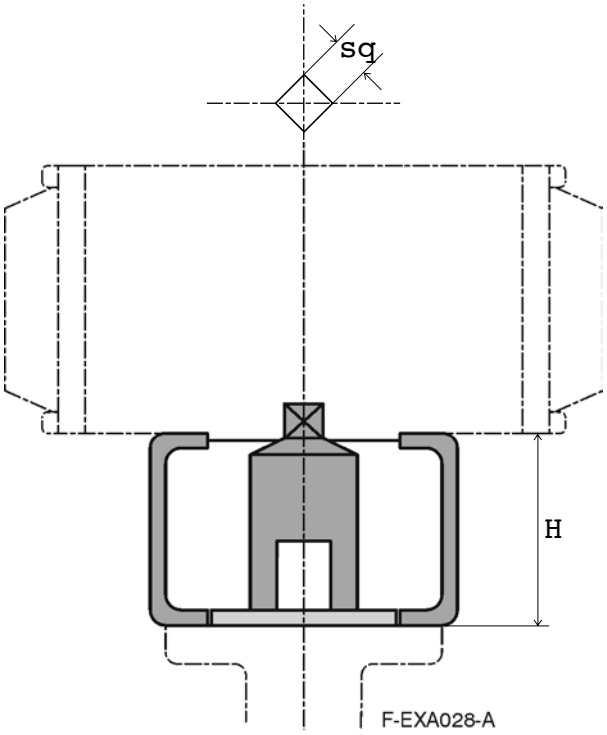
6.2.9 INDIRECT MOUNTING KIT FOR ACTUATORS

Specification

Application	• As intermediate parts for mounting an actuator with another flange type. • To protect the actuator against heat from high temperature valves. • Where direct mounting of actuators is not allowed eg. in the chemical industries
Description	Bracket for actuator mounting. Shaft coupling for torque transmission and with position indicator. Spigot on valve for centring the bracket. Materials: • Bracket: (stainless) steel • Shaft coupling: stainless steel
Available on	All Wouter Witzel product lines.

Valve flange	Actuator flange and (diagonaal) square					
	F05 Sq.14	F07 Sq.17	F10 Sq.22	F12 Sq.27	F14 Sq.36	F16 Sq.46
F05						
F07	•	•	•			
F10			•	•	•	
F12						
F14			•	•	•	
F16						•
H (mm)	60	60	80	80	90	

• Standardized options



6.3 MANUAL OPERATORS

6.3.1 GENERAL

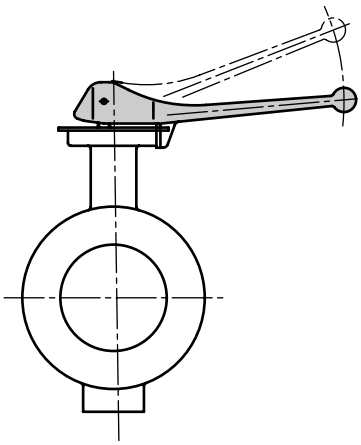
Wouter Witzel EuroValve supplies a wide selection of manual operators: lever and wormgear in different executions. Shaft extensions and other options are available.

Lever

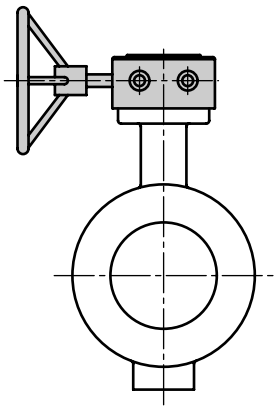
The basic manual operator for Wouter Witzel valves up to DN 200 (8") is the 10 position spring loaded lever with notch plate which provides quick operation, economy and simplicity. When the lever is not in manual control it always returns to a latched position. It is designed to open or close the valve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

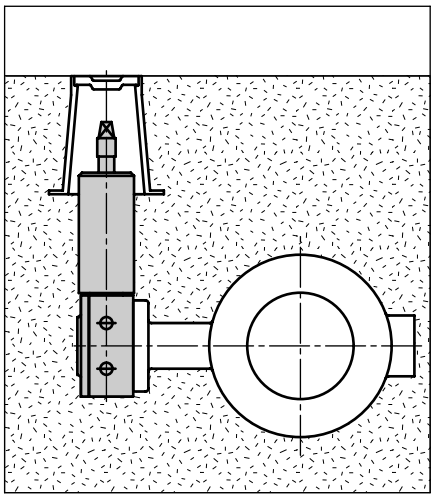
To reduce the required manual effort applied or to minimize the pressure shocks a wormgear is preferred. A wormgear allows greater ease of operation and gives a better protection against system damage caused by waterhammer due to quick closing.
For regulating valves with a wormgear the system can be 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

CENTRIC RUBBERLINED BUTTERFLY VALVES

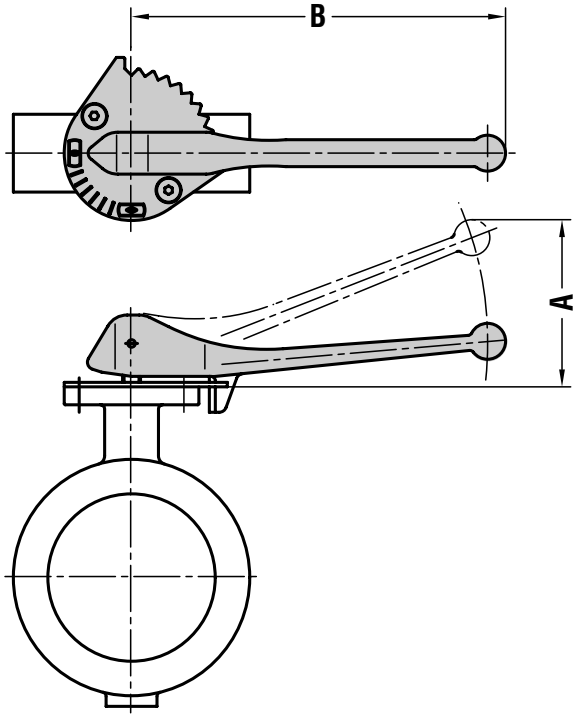
6.3.2 LEVER, TYPE L

Application:
For the quick manual operation of Wouter Witzel valves up to and including DN 300 (12''). For open/close or regulating purposes.

Product description:
- Fits to all Wouter Witzel valves up to and including DN 300 (above DN 200 for low pressure applications only)
- Length depending on valve size
- Easy operating
- Lever made of ductile cast iron
- 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)
- Lever made of malleable iron bending possible by heating

Figure:



Options:

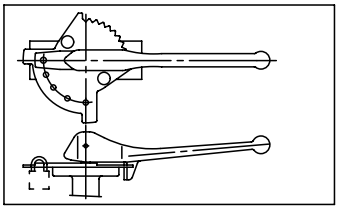


FIG. 1: LEVER + PADLOCK FACILITY

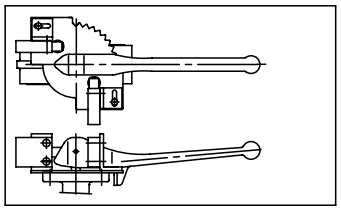


FIG. 2: LEVER + SWITCHES

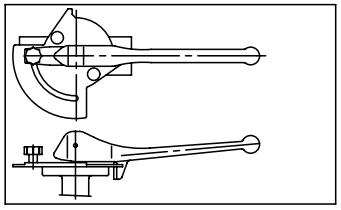


FIG 3: LEVER FOR REGULATING

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:

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

6.3.3 GEARBOX, ALUMINIUM CASTING

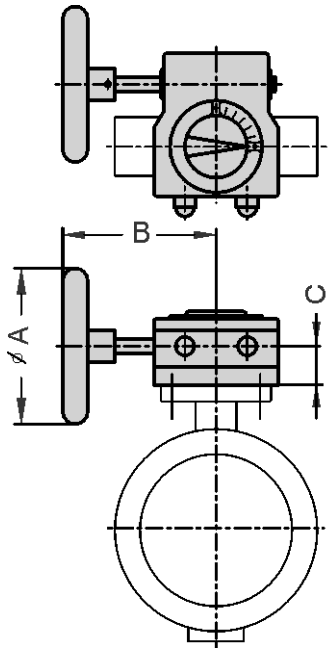
Application:
For the manual operation of Wouter Witzel valves up to and including DN 500 (20''). General purpose applications.

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
- 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
232 - 05 / PS 100	100	116	27	1
232 - 07 / PS 125	125	121	28	2
232 - 10 / SG 315	300	269	39	5
232 - 12 / SG 400	400	296	40	8

Option:

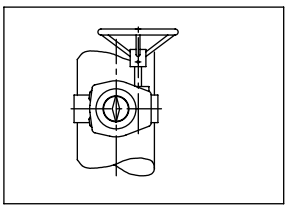


FIG.1: HANDWHEEL IN LINE WITH PIPELINE

CENTRIC RUBBERLINED BUTTERFLY VALVES

6.3.4 GEARBOX, CAST IRON CASING

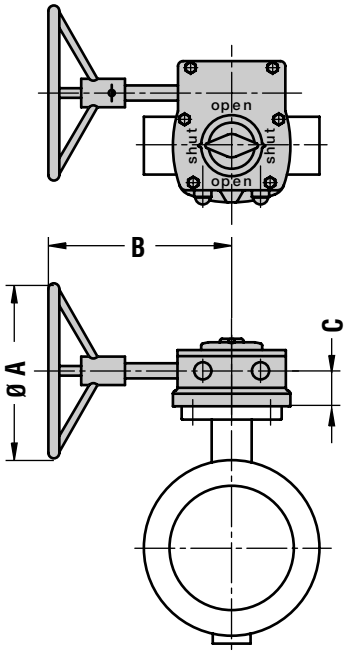
Application:
For the manual operation of Wouter Witzel valves up to and including DN 2200 (88''). Heavy duty applications.
Bigger sizes on request.

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 : IP 67
  acc. to DIN 40050 / IEC 529 / EN 60529
- Temperature : –20° to 80 °C

Options:
- Body of ductile cast iron
- IP68 executions for buried or immersed exposure
- Limit switches (figure 1)
- Vane position indicator (figure 2)
- Various locking possibilities
- Shaft extension possibilities
- Memory stop
- FM approved wormgear (special execution)
- Handwheel in line with pipeline (figure 3)

Figure:



Available types and dimensions:

Non standard gear box:	A	B	C	KG
AB 210 / SG 200	200	238	29	4
AB 550 / SG 300	300	295	41	11
AB 880 / SG 400	400	383	42	18
AB 1250 / SG 500	500	428	48	27
AB 1950 / SG 500	500	469	55	37
AB 6800 / SG 600	600	544	59	61
A 250 / SP9 / SG 600	600	743	85	235

Options:

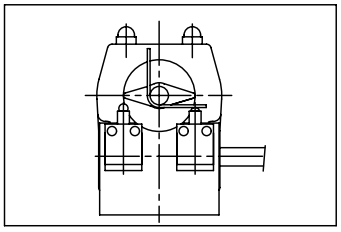


FIG. 1: LIMITSWITCHES

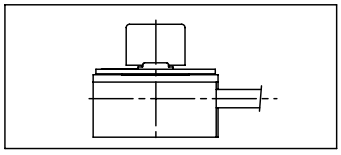


FIG. 2: VANE POSITION INDICATOR

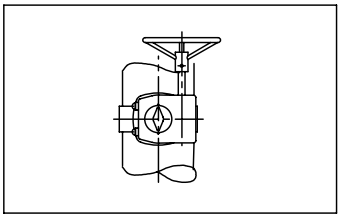


FIG. 3: HANDWHEEL IN LINE WITH PIPELINE

6.3.5 GEARBOX FOR BURIED SERVICE WITH INPUT SHAFT EXTENSION

Application:

For the manual operation (open/close) by T-key of Wouter Witzel valves butterfly valves in 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 : IP68 according IEC 529 / EN 60529
- Temperature : –20° to 80 °C
- Input : max. 250 Nm (EN 1074)

Product description extension type B3T

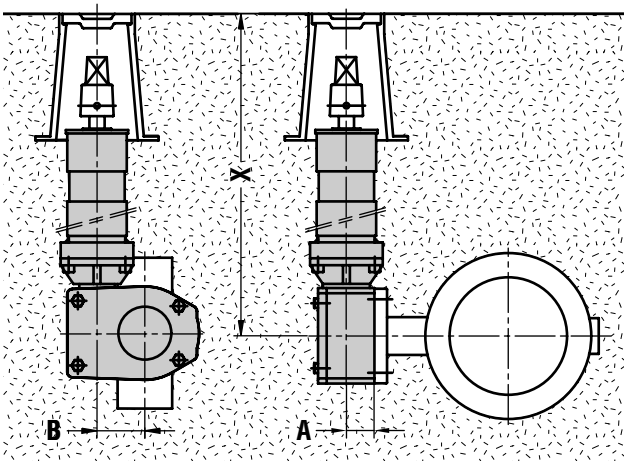
- Square (30 mm) for T-key operation (DIN 3223)
- In 5 sizes with telescopic length adjustment
- Plastic (polythene) protection pipe
- Internal fracture pin against overloading of wormgear
- Options: position indicator, position indicator with limit switches

Wormgear 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

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

Figure: EXTENSION B3T

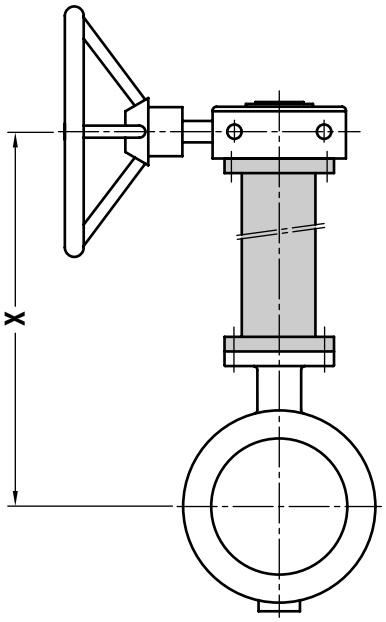


6.3.6 EXTENSIONS FOR GEARBOXES

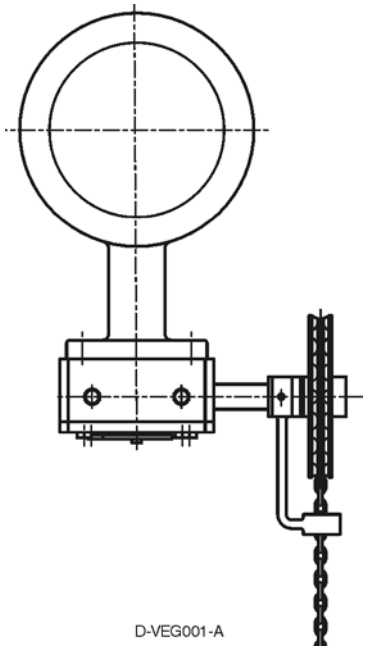
Wouter Witzel EuroValve supplies different types of wormgear extensions for remote operation of butterfly valves.

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

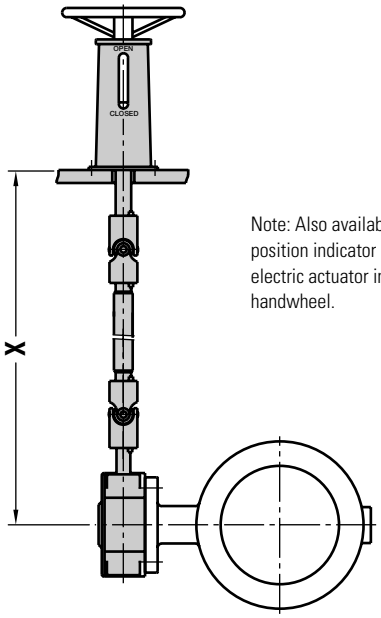
Extension type B3E
for remote operation.
A steel extension to extend the valve shaft to fit a lever, any type of wormgear or power actuator.
Maximum length 3 m.



Extension type B3D for overhead installations.
Execution with a chainwheel and chain.

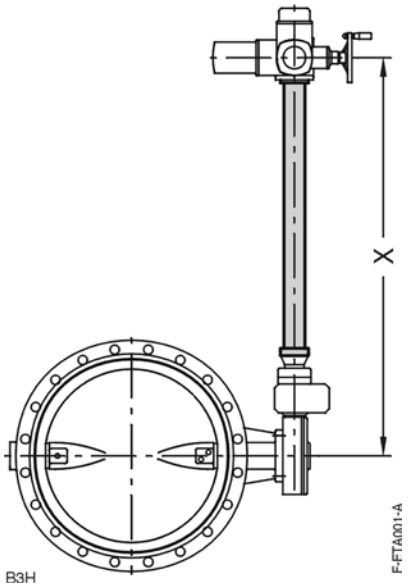


Extension type B3F for operation from another floor level.
Extension arrangement which allows up to 35° misalignment of the universal coupling.



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

Extension type B3H



Extension B3H
for remote operation.
- Carbon steel spindle extension between wormgear and electric actuator.
- Suitable for buried service.

Options,
Spindle extension of stainless steel.

6.4 CHECK VALVES ECV 50 - 600

PRODUCT SHEET

6.4.1 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	to 110 °C
	NBR	to 90 °C

Pipe connection
The ECV check valve has been designed for installation in flanged piping systems (PN 10, PN 16, etc.). Other flange connections on request.
The flangeless wafer type body shall be clamped between two flanges with flat or raised faces (welding neck or slip on flanges). Suitable gaskets shall be used for sealing between valve and flanges.

6.4.2 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 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.

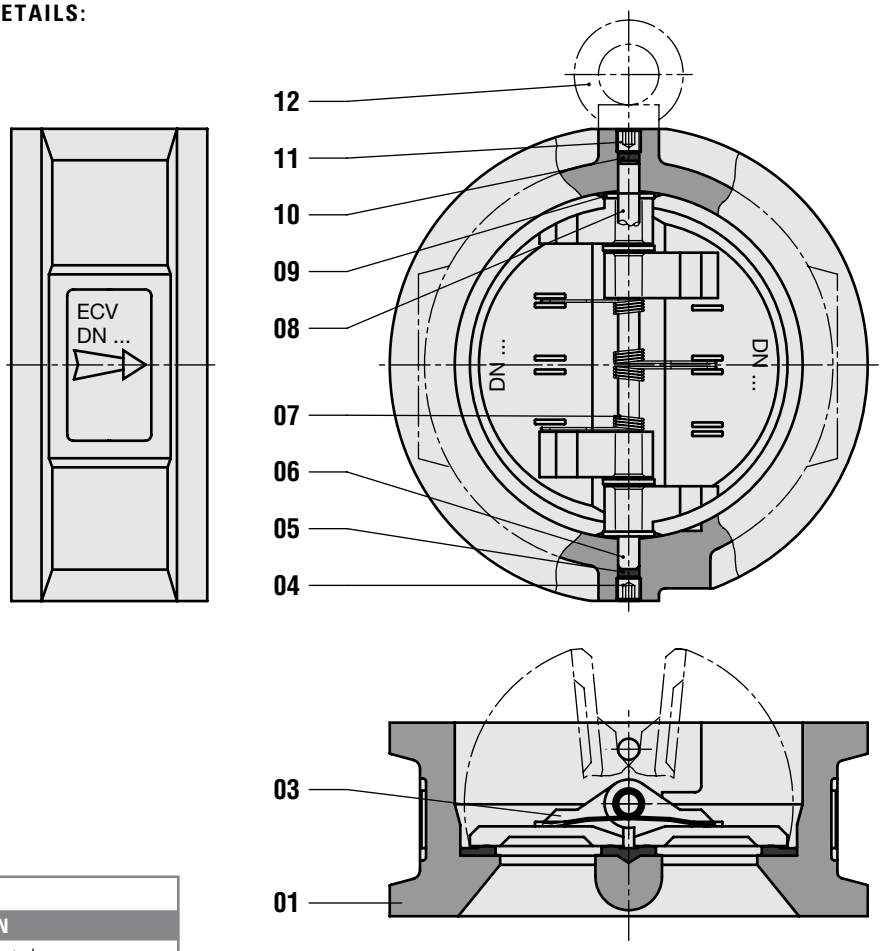
Attention paid to the streamlining of the flow path is paramount if good flow characteristics are to be achieved.
The saving of energy costs by selecting a Wouter Witzel EuroValve check valve may be several times the initial cost of the valve (ask Wouter Witzel EuroValve for an energy calculation).
The use of these design features together with careful material selection makes the ECV a product with a high reliability and a low operating costs.

CENTRIC RUBBERLINED BUTTERFLY VALVES

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, basis series 16 (wafer long)
Available type approvals*	PED, BV, CSS, CRS, LRS, GL, NKK, RINa, RMRS, GOST, LR
Body and trim materials*	See material table

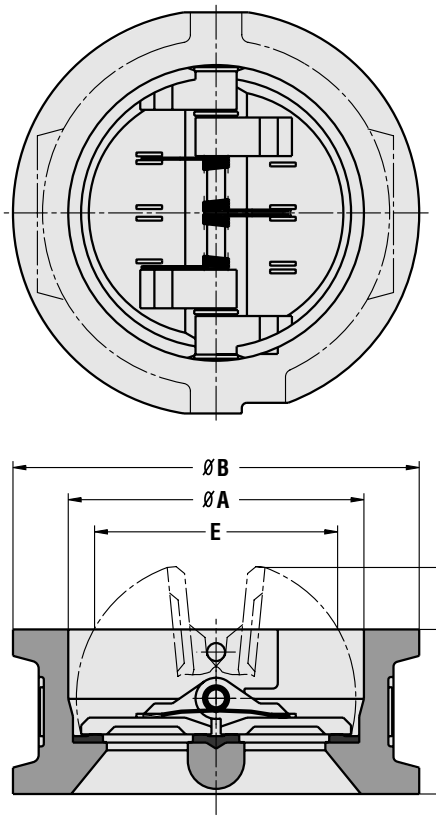
* Needs to be specified when ordering

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")



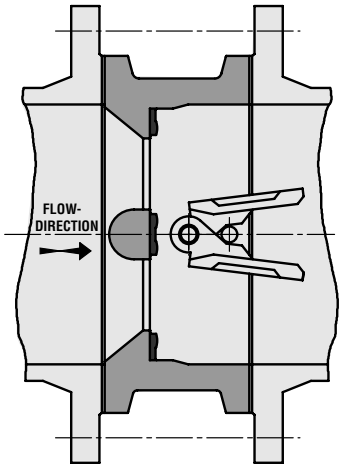
DIMENSIONS:							
DN	NPS	A	B*	C	D	E	±kg
50	**2**	67	100	43	8	41	1.3
65	**2 1/2**	84	118	46	14	59	1.8
80	**3**	100	140	64	16	69	3.5
100	**4**	115	158	64	25	90	4.5
125	**5**	135	188	70	34	110	6.5
150	**6**	160	212	76	43	136	8.5
200	**8**	210	268	89	61	185	13
250	**10**	256	325	114	72	225	24
300	**12**	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

*) Note: Dimension B is given for PN 16 flanges and may be different for other flange connections.

6.4.3 INSTALLATION

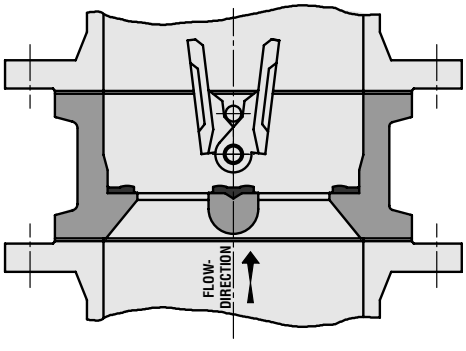
The ECV check valve has been designed for steady flow conditions and can be installed in horizontal and vertical pipelines.
The valve must not be installed in pipelines with pulsating flow or near to reciprocating pumps.
The instructions shown below must be adhered to.

Installation in a horizontal pipeline:



The disc shaft must be in the **vertical** position.
Note: Additional pressure drop can be expected due to the weight of the discs.

Installation in a vertical pipeline:



As standard the valve must be installed with flow up.

CENTRIC RUBBERLINED BUTTERFLY VALVES

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	Ductile cast iron	GGG 40, DIN 1693	*60-40-18, ASTM A395*	*GJS 400-15, EN 1563*
	Aluminium bronze:	G-CuAl10Ni, DIN 1714	*C95800, ASTM B148*	*AB2, BS 1400*
Disc	Aluminium bronze:	G-CuAl10Ni, DIN 1714	*C95800, ASTM B148*	*AB2, BS 1400*
Shaft / stop pin	Stainless steel:	X5CrNiMo 17 12 2	*AISI 316*	*316S16, BS 970*
Spring	Stainless steel:	X5CrNiMo 17 12 2	*AISI 316*	*316S16, BS 970*
	Inconel:	*NiCrMo9Nb, DIN 17744*	UNS N06625, ASTM B446	*NA 21, BS 3076*
Seat	Rubber:	EPDM, NBR, FPM		
Shaft	Aluminium bronze:	1.4462		

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	Orange	Indoor and outside exposure. Light and normal
	Thickness 100 mµ	RAL 2000	circumstances
EP-W-2	Epoxy coating	Grey	Potable water systems
	Thickness 350 mµ	RAL 7038	

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

6.4.5 FLOW CHARACTERISTICS

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 mount up to many times the initial cost of the valve. Wouter Witzel EuroValve 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**	**K_V values**
50	**2**	55
65	**$2^1/_2$**	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 size 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:

K_V	=	Valve flow coefficient in m^3/h water (5 – 30 °C) at pressure drop of 1 bar across the valve.
Q	=	Flow capacity (m^3/h).
Δp	=	Pressure drop across the valve (bar).
ρ	=	Density of fluid (kg/m^3).
ρ_0	=	Density of water at 288 K = 1000 (kg/m^3).
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 EuroValve 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.

7 INFORMATION TO BE GIVEN WHEN ORDERING

CHECKLIST

Checklist centric butterfly valves with minimum information to be given when ordering:

Valve:
- Valve type
- Valve size
- Flange connection (PN / Class / JIS)
- Fluid handling
- Materials (body, lining, disc)
- Required shut off pressure (bar)
- PED category (when applicable)

Options:
- Inspection certificates (material or pressure test)
- Polished stainless steel disc
- Silicone free assembly
- Special coating
- Copper free materials
- etc.

Operation:
- Type of actuator (lever, wormgear, pneumatic, electric, hydraulic)
- Power supply (AC/DC – V/Hz/Ph) or supply pressure (bar)

Options:
- Actuator sizing based on severe valve torque (eg. Dry or contaminating fluid)
- Spring return actuator
- Non standard IP protection class
- Indirect mounting kit
- Stainless steel bolting
- Explosion proof
- Limit switches
- Position transmitter
- Positioner (signal valve open:.....mA/bar; valve closed:..... mA/bar)
- Wormgear with body of Ductile iron
- Wormgear with square for T-key operation
- Wormgear chainwheel operation
- Extensions

Note: Depending on type of valve or actuator more options may be available. See the product data sheets.

WOUTER WITZEL®
VALVE TECHNOLOGY

always in touch

Wouter Witzel EuroValve B.V. • Industrieterrein De Pol 12 • 7581 CZ Losser • P.O. Box 54, 7580 AB Losser • The Netherlands
T +31 53 53 69 536 • F +31 53 53 69 500 • E info@wouterwitzel.nl • www.wouterwitzel.nl