ABO valve

we make processes work

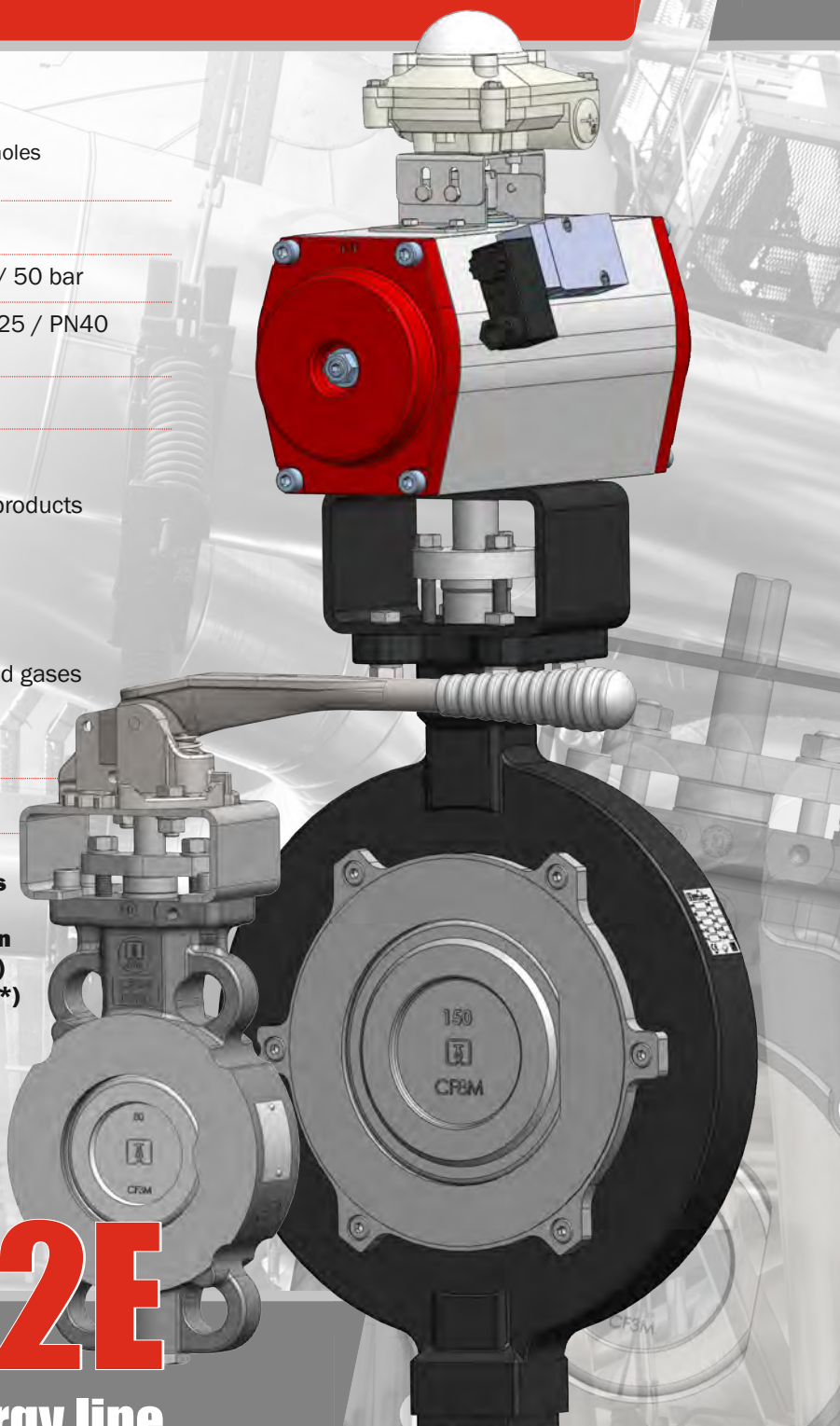
DOUBLE OFFSET BUTTERFLY VALVES

Body design	**WAFER** type with through holes **LUG** with tapped holes
Nominal size	DN50 - DN600
Working pressure	16 bar / 25 bar / 40 bar / 50 bar
Flange connection	PN6 / PN10 / PN16 / PN25 / PN40 Class 150 / Class 300
Working temperature	-55 °C / +325 °C *)
Working media	Waste / Supply water Hot industrial water Crude oil and petroleum products Fuel / Oil / Oil derivatives Pulp Paper stock Natural gas Coke oven gas, stack gas Non-aggressive liquids and gases Steam / Condensate Air Bitumen (asphalt)
Tightness	Class A **)
Features / Options	**Excentric seat design** **Bi-directional tightness** (RS design) **SIL2 / SIL3 certification** **ATEX performance ***)** **TA-Luft stuffing box ***)**

*) higher working temperatures upon request according to the material performance of the valve body

**) Metal-Metal seat tightness Class C

***) upon request



SERIES 2E

energy line

www.abovalve.com

GENERAL VALVE DESCRIPTION

Czech Industrial Valve Manufacturer

The 2E-series double offset butterfly valves are industrial fittings intended for full opening or closing flow. They may be also used for a rough flow control. The valves are designed for operation with very hard industrial conditions demanding safety, reliability and minimum maintenance like for example:

- nuclear energy industry
- water treatment
- gas pipe-works
- chemical industry
- metallurgy (and heavy industry in general)
- pulp and paper-making industry
- shipbuilding industry
- oil and petrochemical industry
- heat recovery, steam heating
- processing hydrocarbons
- fuel storage in aviation industry

Basic properties

- double offset design
- eccentric disc position in the body, precise connection of the disc with the stem and pivot, exact shaft and pivot bearing in the slide bushings
- split sealed stem - bigger Kv
- high efficiency of opening and closing valve
- easy operation
- easy assembly and installation
- vacuum max. 0,01 bar abs. (version R-PTFE)
- standardized top flange according to ISO 5211 enabling mount various types of actuator (electric, pneumatic, hydraulic)
- ATEX certified for explosive atmosphere
- option: TA-Luft sealed valve - control stem is sealed with a special graphite gland

Type designation

5 5 9 0 B 100

- **Nominal size (DN)**
- **Body design**
  B - WAFER body type with through holes
  T - LUG body type with tapped holes
- **Disc material**
  0 - stainless steel 1.4408 (CF8M)
  stainless steel 1.4409 (ASTM A351 CF3M)
  stainless steel 1.4027 (ASTM CA-40)
- **Seat material**
  9 - R-PTFE (PTFE reinforced by 25% glass fibre)
  8 - FIRE SAFE (R-PTFE + INCONEL)
  7 - INCONEL 718 2.4668
- **Body material**
  6 - low carbon steel 1.1156 (A352 LCC)
  5 - carbon steel 1.0625 (A216 WCB)
  4 - stainless steel 1.4408 (A351 CF8M)
- **Series designation**
  Series 2E

Standards

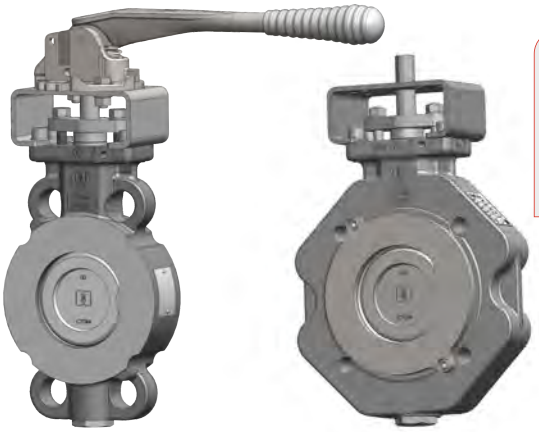
Leak test	**Design „R-PTFE"** **Design „ Fire Safe"** EN 12266-1, Class A ISO 5208, Class A API 598 **Design „Metal-Metal"** DN 50-DN125 EN 12266-1, Class C ISO 5208, Class C API 598
Face to face length	EN 558, Series 20 ISO 5752, Series 20 API 609, Table 3
ATEX performance	according to 2014/34/EU
Flange connection	EN 1092-1, 2 DIN 26312-35
Top flange	ISO 5211
Working standard	EN 593+A1
Marking	EN19

VALVE MODELS

ABO valve

B **WAFER** DESIGN

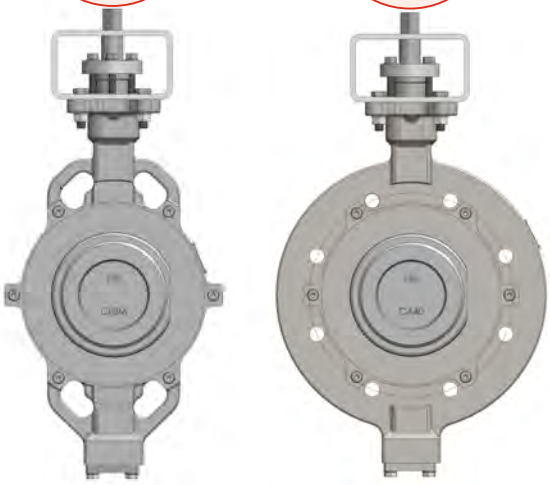
T **LUG** DESIGN



Standard line
DN50-DN400
Bi-directional line (RS design)
DN50-DN600

B **WAFER** DESIGN

T **LUG** DESIGN



DN50-DN125

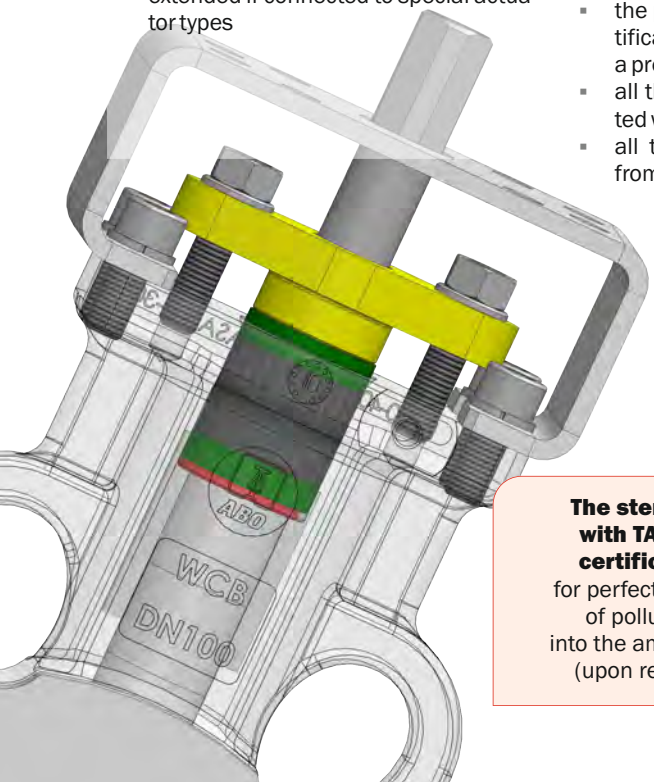
DN150-DN600

Advantages of double offset valves

- split stem - large flow zone
- higher Kv/Cv values
- lower pressure loss
- guaranteed tightness in both directions at nominal working pressure (RS version)
- sealing ring and seat come to contact only nearly after the valve is entirely shut
- low closing torque
- the seal guarantees perfect upper stem tightness
- water and air tightness
- actuator connection can be modified by means of a bracket or the stem can be extended if connected to special actuator types

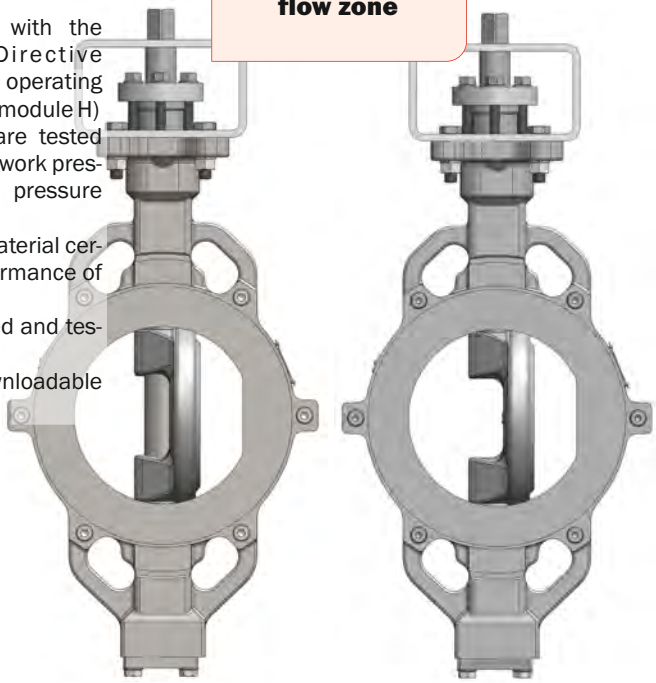
Quality control

- ABO valve production facilities are certified in accordance with ISO 9001:2015 (14001, 18001) quality control standards
- tightness test procedures according to standards EN 12266-1, ISO 5208, ANSI/FCI 70-2, API598
- production in accordance with the Pressure Equipment Directive 2014/68/EU - Equipment operating under pressure (Category III, module H)
- all the ABO valve fittings are tested under the pressure of 110% work pressure according to relevant pressure standards
- the possibility of issuing a material certificate 3.1, 3.2 on the performance of a pressure test
- all the actuators are adjusted and tested while assembled
- all the certificates are downloadable from **www.abovalve.com**



The stem seal with TA-LUFT certification
for perfect leakage of pollutants into the ambient air (upon request)

Split stem / **Large flow zone**



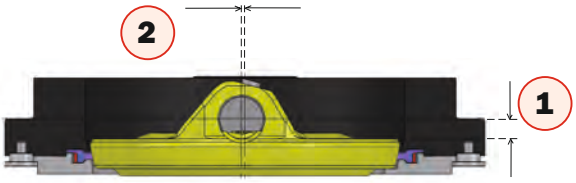
One piece design **ABO design**

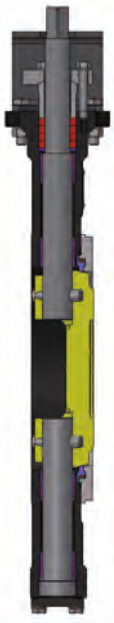
DESIGN ADVANTAGES

Double offset

- the double offset design provides a safe function and tightness even after a sudden temperature or pressure change. It reduces seat wear and ensures perfect tightness. The first offset **(1)** shifts the axis of the rotation off the sealing surface and thus provides tightness between the seat and the sealing ring around the entire disc circumference. The second offset **(2)** moves the the axis of the disc rotation off the valve (pipeline) axis and thus releases the ring from the seat after a few degrees of opening movement. The reason of the second offset is to quickly relieve the seal from compression between the disc and the seat.
- the design extends the seal lifetime and the torques are lower. When shutting valve, the rotating movement is changed to the linear one and the disc is effectively pressed into the seal. The design also prevents undesirable agglomerating e. g. undissolved substances in the area of disc and seal contact.

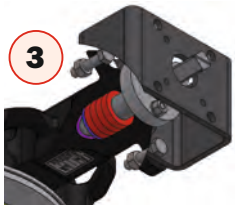
(1) - stem axis
is off the sealing surface
(2) - stem offset
off the pipeline axis





Stem and seal (3)

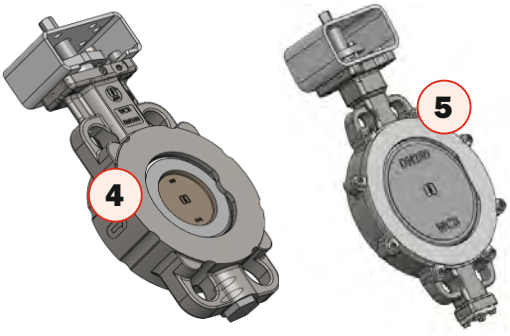
- **two-piece stem** - owing to the split stem the valve attains higher values of Kv/Cv and related low pressure loss. The pins exactly fall into the reamed holes
- **adjusting seal according to the customers' requirements** - the seal can be tightened/loosened to the parameters prescribed by customers. Thus maximum tightness can be achieved around the stem and the actuation torque for low-pressure applications can be decreased.
- **adjustable seal** - enables simple approach to and and adjustment of the seal without dismantling the actuator
- **stem assembly** - upper and lower bushings made from TP Igus provides high abrasion resistance and prolongs valve lifespan

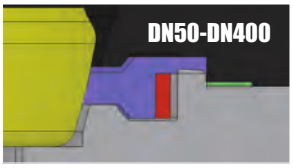


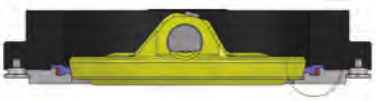
- **extended neck** - enables to insulate piping incl. the valve
- **easy service and seal replacement** - easy assembly and replacement
- **upper flange according to ISO 5211** - enables to directly install a manual handle or an actuator

Seal design

- **R-PTFE** - suitable seal geometry ensures full tightness and a high number of cycles. The PTFE seal is reinforced with 25% glass fibres, reducing wear and and increasing valve thermal stability. Longer lifespan of the valve and lower maintenance demand are guaranteed.
- **end-stops** - are designed to avoid twisting the disc. Thus the seal is not damaged nor overloaded and the valve lifespan is extended. The version with R-PTFE up to DN125 has the end-stop in the body **(4)**, above DN125 a pressure flange **(5)** is used.



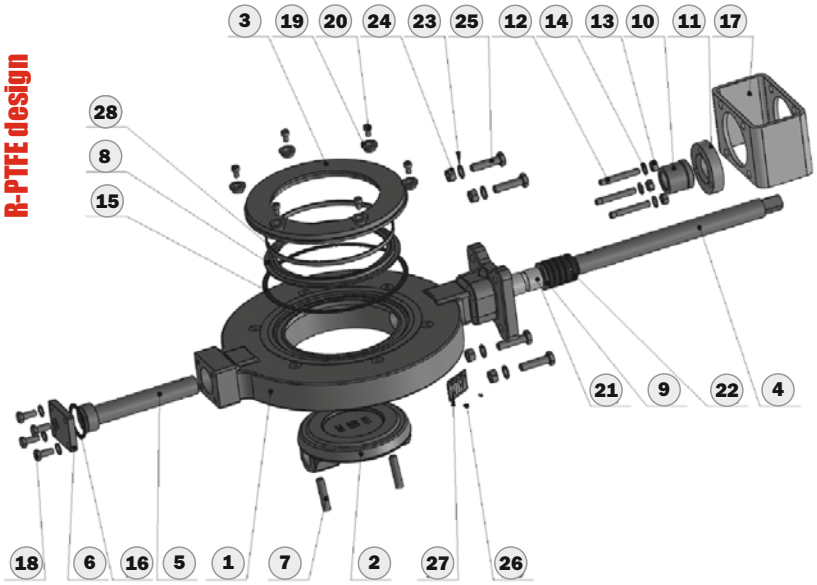




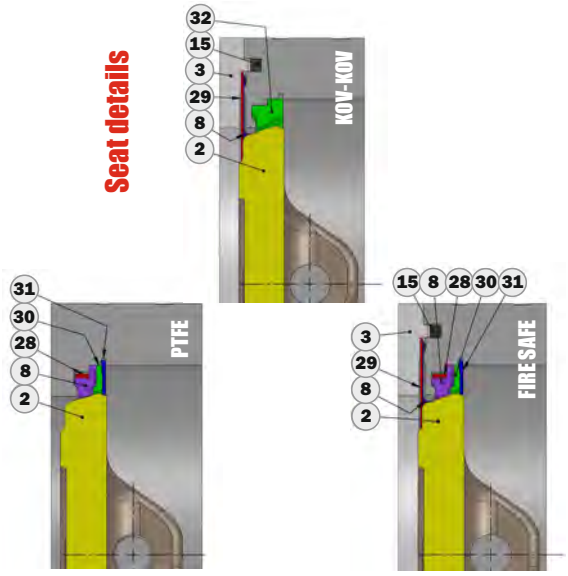
MATERIAL PERFORMANCE

ABO valve

R-PTFE design



Seat details



Pos.	Name	Material
1	**Body**	6 - low carbon steel 1.1156 (A352 LCC) 5 - carbon steel 1.0625 (A216 WCB) 4 - stainless steel 1.4408 (A351 CF8M)
2	**Disc**	DN50-DN125: stainless steel 1.4409 (ASTM A351 CF3M) DN150-DN400: stainless steel 1.4027 (ASTM CA-40) RS design: DN50-DN125: stainless steel 1.4409 (ASTM A351 CF3M) DN150-DN600: stainless steel 1.4027 (ASTM CA-40)
3	**Pressure flange**	Carbon steel 1.0425 Stainless steel 1.4404 (AISI 316L)
4	**Stem**	54XX, 56XX: stainless steel 1.4462 55XX: stainless steel 1.4021 (AISI 420)
5	**Pivot**	DN50-125: stainless steel 1.4404 (AISI 316L) DN150-600: stainless steel 1.4021 (AISI 420)/1.4462
6	**Cover**	DN50-125: - DN150-600: carbon steel 1.4025 / stainless steel 1.4401 (AISI 316)
7	**Pin**	DN50-125: - 54XX, 56XX DN150-600: stainless steel 1.4462 55XX DN150-600: stainless steel 1.4021 (AISI 420)
8	**Seat**	Xx70 DN50-125: INCONEL 718 2.4668 XX80: FIRE SAFE (R-PTFE + INCONEL) XX90: R-PTFE (PTFE reinforced by 25% glass fiber)
9	**Washer**	Stainless steel 1.4404 (AISI 316L)
10	**Stuffing box**	DN50-125: - 54XX, 55XX DN150-600: stainless steel 1.4401 (AISI 316) 56XX DN150-300: stainless steel 1.4401 (AISI 316) 56XX DN350-600: stainless steel 1.4404 (AISI 316L)
11	**Sealing flange**	54XX, 55XX, 56XX DN50-125: stainless steel 1.4308 (CF8) 54XX, 55XX, 56XX DN150-600: stainless steel 1.4301 (AISI 304)
12	**Bolt**	Stainless steel A4
13	**Nut**	Stainless steel A4

Pos.	Name	Material
14	**Washer**	Stainless steel A4
15	**Flange sealing**	Graphite min. 98%
16	**Těsnění víka**	Graphite
17	**Bracket**	DN50-125, 500, 600: carbon stell 1.0553 DN150-400: carbon stell 1.0576
18	**Bolt**	Stainless steel A4
19	**Retaining sleeve**	Stainless steel 1.4404 (AISI 316L)
20	**Bolt**	Stainless steel A4
21	**Bushing**	Xx70, Xx80: stainless steel 1.4404 (AISI 316L) + nickel plated XX90: TP IGUS
22	**Sealing**	Graphite min. 98%
23	**Washer**	Stainless steel A4
24	**Nut**	Stainless steel A4
25	**Bolt**	Stainless steel A4
26	**Rivet**	Stainless steel A4
27	**Label**	Stainless steel
28	**Seat O-ring**	Stainless steel 1.4404 (AISI 316L) - only for „R-PTFE" and „FIRE SAFE" version
29	**Sealing**	INCONEL - only for „METAL-METAL" and „FIRE SAFE" version
30	**Suport ring**	Stainless steel 1.4404 (AISI 316L)
31	**Retaining ring**	Stainless steel 1.4401
32	**Suport ring**	Stainless steel 1.4404 (AISI 316L)

Working pressure max.
R-PTFE seat - tightness A
DN50-DN125: 50 bar
DN150-DN200: 40 bar
DN250-DN450: 25 bar
Kov-Kov seat - tightness C
Fire Safe seat - tightness A
DN50-DN125: 25 bar

Temperature rating *)
-29 °C do 200 °C (R-PTFE) - 5590
-55 °C do 325 °C (Inconel) - 5470

Coating
RAL 9005 - standard
Coating resistant to high temperatures (up to +600 °C) upon request

*) *depending on the material performance of the valve body (will be specified - please consult with ABO)*

Other material performance on request. To select a suitable material solution please contact ABO valve company. Maximum temperatures for each seats are only permitted for specific media and short-term use.

OPERATING TORQUES / FLANGE CONNECTION

Operating torques (Nm) vs. working pressure (bar) R-PTFE seat (standard line DN50-DN400)

DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600
NPS	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
PS 16 bar	19	35	50	77	110	145	278	567	650	1378	2248	2569	3090	4300
PS 25 bar	22	45	58	79	120	185	366	732	900	1900	3483	3925	5340	6250
PS 40 bar	32	53	62	90	150	242	485	-						
PS 50 bar	35	60	65	105	-									

Operating torques are mentioned without safety reserve.

Metal-metal seat and Fire Safe seat

DN	50	65	80	100	125
NPS	2"	2½"	3"	4"	5"
p_{MAX} 16 bar	50	70	100	150	220
p_{MAX} 25 bar	50	70	100	150	220

Operating torques are mentioned without safety reserve.

Installation between flanges DN50 - DN600

DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600
NPS	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
PN6	•	•		•	•	•	•	•	•	•	•	x	x	x
PN10														
PN16														
PN25														
PN40														
ANSI150														
ANSI300										x	x	x		
JIS 10K			•		•		•		•	x	•	•		
JIS 16K		•	•			•				•				

For Lug type (T) installation, please specify in the inquiry.

standard • on request x impossible

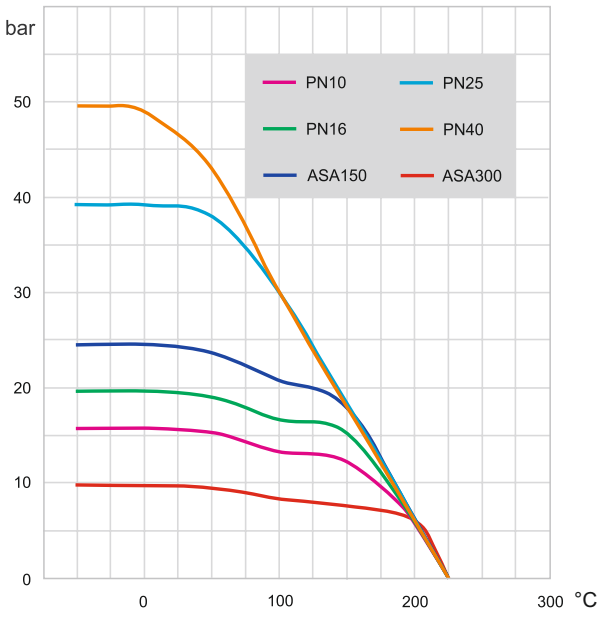
KV (CV) coefficient

DN	50	65	80	100	125	150	200	250	300	350	400	450	500	600
NPS	2"	2½"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
KV	87	148	312	456	750	1125	1950	3100	4510	6120	8605	9419	11674	16914
CV	102	173	364	532	876	1313	2277	3619	5265	7145	10046	10926	13542	19620

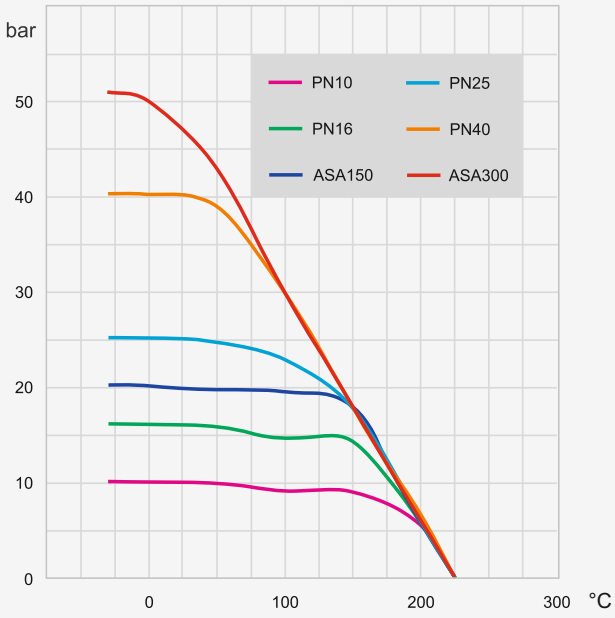
PRESSURE AND TEMPERATURE CURVES

ABO valve

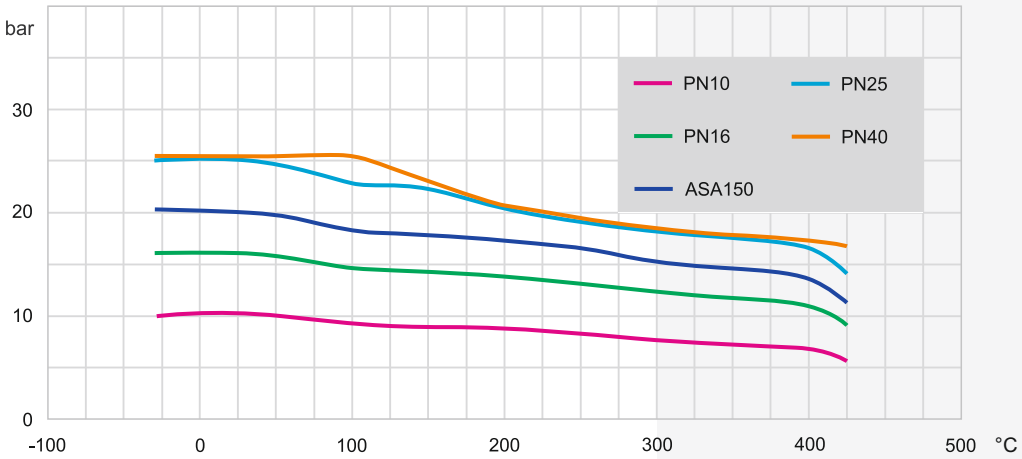
Body A351 CFM / PTFE seat



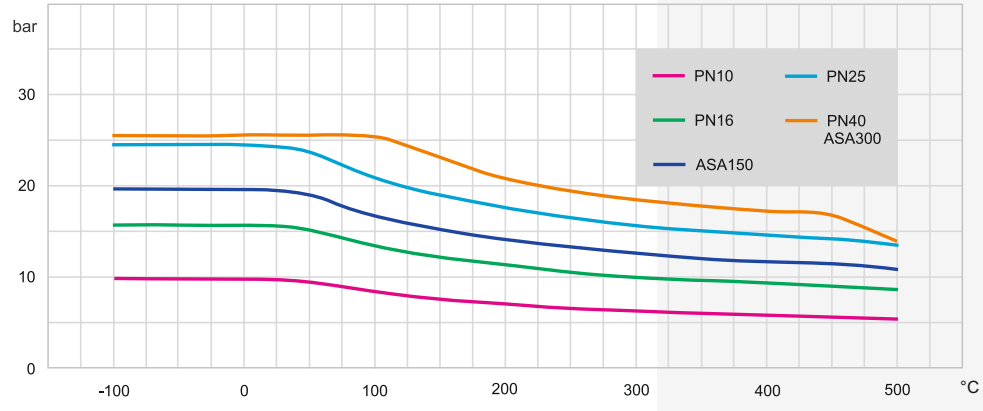
Body A216 WCB / PTFE seat



Body A216 WCB / Metal-Metal seat

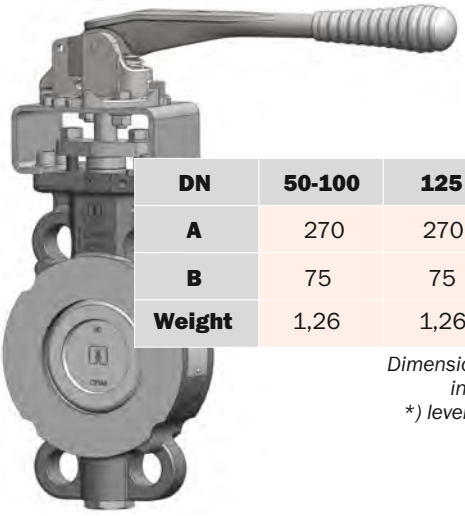


Body A351 CFM / Metal-Metal seat



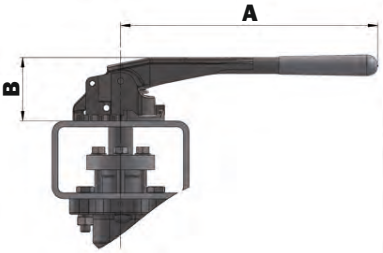
VALVE ACTUATION

All the ABO valves can be equipped with hand levers (up to DN150), worm gears, pneumatic and electric actuators. The upper flange design according to the standard ISO 5211 enables to directly assemble actuators on valves.



Handlever

For manual actuation ABO valve offers carbon steel lever suitably painted to improve resistance to corrosion and abrasion. Stainless lever on request. Top flange connection according to ISO standards F07 for DN50 to DN125 and F10 for DN150. Controlled lever on request. The levers can be equipped with a lock to ensure an optimized position, can be equipped with end position sensors.



DN	50-100	125	150*)
A	270	270	362
B	75	75	75
Weight	1,26	1,26	1,40

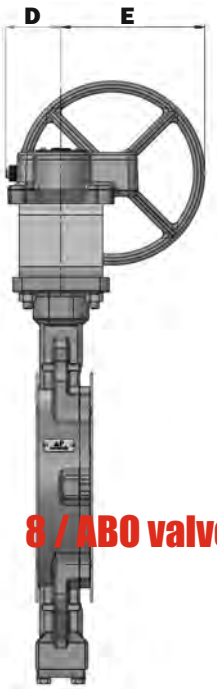
Dimensions are mentioned in mm, weight in kg.
**) lever only for PS16 bar*

Worm gear with handwheel

Manual gearbox casing is made from cast iron with suitable surface treatment and protection degree class IP 67. Self-locking design of the worm gear enables both to adjust basic positions open/shut and to control (throttle) media flow. The worm gearbox is simply actuated by means of a handwheel of a suitable diameter. End-limit positions of the worm gearbox are set by means of stop screws. The gearbox can be equipped with a lockable system secured by a padlock. Another way how to handle worm gearbox is using a chain. The worm gearbox as well as the hand lever can be completed with end-limit position sensors.

DN	PS	ISO FLANGE	SHAFT	A	B	C	D	E	F	Kg
50	50	F07	14x14	127	46	139	59	141	200	2,9
65	50	F07	14x14	127	46	139	59	141	200	2,9
80	50	F07	14x14	127	46	139	59	141	200	2,9
100	50	F07	14x14	127	46	139	59	141	200	2,9
125	40	F07	14x14	127	46	139	59	141	200	2,9
150	40	F10	17x17	133	59	154	60	155	200	4,6
200	40	F10	17x17	133	59	154	60	155	200	4,6
250	25	F12	22x22	287	67	275	181	319	500	10
300	25	F14	27x27	287	67	275	181	319	500	10
350	25	F16	27x27	352	78	275	219	381	600	13
400	25	F16	36x36	398	110	346	245	454	700	24,6
450	25	F16	ø55	408	142	400	120	480	700	50
500	25	F25	ø64	255	142	378	142	330	400	40
600	25	F25	ø75	363	175	429	175	440	500	50

Dimensions are mentioned in mm.



Actuators

Pneumatic actuators

Pneumatic actuators ABO Series 95 can be assembled to valves in two options: single-acting or double-acting.

Electric actuators

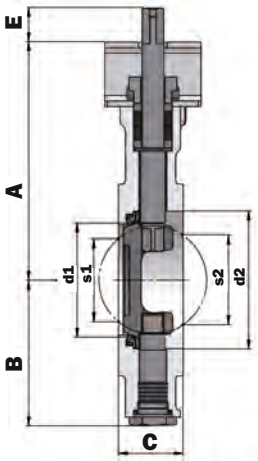
Electric drives ABO Series 97 are designed quarter-turn. Electric actuators can be installed on ABO valves for volta-ges of 24 V, 230 V or 400 V.

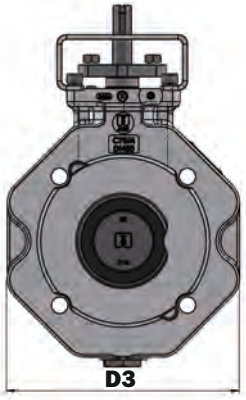
Special actuators types

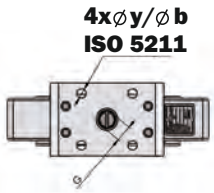
Valves are equipped with special actuator types from ma-jor world suppliers (Auma, Regada, Valpes, etc.).

BASIC DIMENSIONS

ABO valve

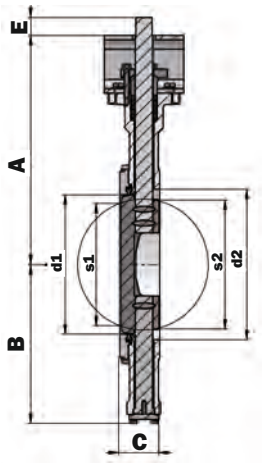


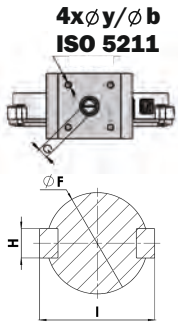




Dimensions are mentioned in mm, weight in kg.

DN	d1	d2	A	B	C	D1	D3	s1	s2	E	G	ISO FLANGE	y	b	DESIGN B (kg)	DESIGN T (kg)
50	49	68	163	93	44	104	154	12	37	25	14	F07	9	70	5,1	7,3
65	65	82	170	100	47	123	178	39	55	25	14	F07	9	70	5,8	9,0
80	81	100	174	106	47	140	196	65	72	25	14	F07	9	70	6,8	10,1
100	100	123	206	123	53	163	225	85	91	25	14	F07	9	70	8,5	12,2
125	123	146	215	137	57	193	260	113	110	25	14	F07	9	70	11,8	16,5





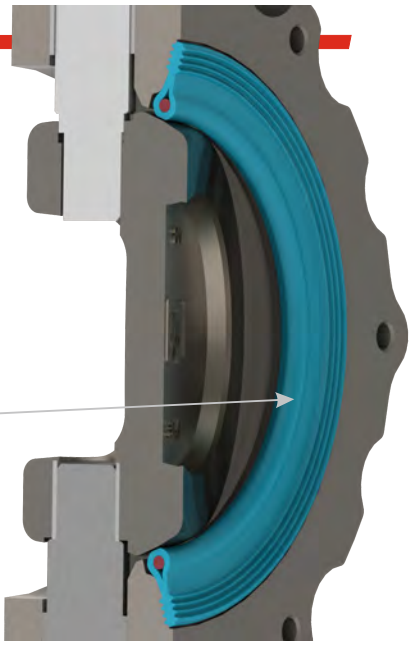
DN450/DN500/DN600

DN	d1	d2	A	B	C	D1	D3	s1	s2	E	G/H/I	ISO FLANGE	y	b	n	DESIGN B (kg)	DESIGN T (kg)
150	146	155	307	214	57	252	318	136	143	25	17	F10	11	102	4	21	28
200	194	204	339	246	61	307	381	185	193	25	17	F10	11	102	4	29	41
250	240	259	395	275	69	349	450	224	236	31	22	F12	13	125	4	46	70
300	287	309	460	313	79	393	521	270	284	31	27	F14	17	140	4	67	105
350	313	342	508	355	92	448	577	300	308	45	27	F16	22	165	4	91	140
400	364	405	556	402	103	542	657	342	360	58	36	F16	22	165	4	132	211
450	420	450	567	395	114	565	-	400,5	419	80	⍉55/16 /62,6	F16	22	165	4	165	-
500	452	500	625	431	127	593	707	434	454	100	⍉64/16 /72,4	F25	17,5	254	8	241	282
600	547	600	698	491	154	695	830	524	546	110	⍉75/20 /84,2	F25	17,5	254	8	367	478

Dimensions are mentioned in mm, weight in kg.

BIDIRECTIONAL TIGHTNESS / -RS- VERSION (DN50-DN600)

Czech Industrial Valve Manufacurer



Butterfly valves of 2E series (RS version) are delivered in nominal sizes of DN50 to DN600. Their make provides bidirectional tightness of the valve. On the circumference the valve is sealed with a special RTFE seal filled with 25% glass fibres and silicone filling.

Body material:

- carbon steel 1.0625 (A216 WCB) / 1.0425 (P265 GH)
- low carbon steel 1.1156 (A352 LCC) / 1.0566 (P355 NL1)
- stainless steel 1.4409 (CF3M) / 1.4401 (AISI 316)
- **Disc material:**
- stainless steel DN50-DN125: stainless steel 1.4409 (ASTM A351 CF3M)
- DN150-DN600: stainless steel 1.4027 (ASTM CA-40)

Valve features

- bidirectional tight and control butterfly valve with all-stainless disc
- double offset design
- sizes DN50 to DN600
- tightness class A (EN 12266-1)
- better flow rate due to split stem
- the seat is adapted to large temperature changes
- delivered for manual, electric or pneumatic control
- suitable for heat and power plants, steam and hot water pipework systems
- the valves may be delivered with a special surface protection (f.e. RILSAN)