



ABO



SERIES 3E

Class 150/300 // PN 6/10/16/25/40

NPS 3–16 (DN 80–400)

-148°F to 932°F (-100°C to 500°C)

Oil and Gas

Power Generation

Processing Industry



CE

TRIPLE OFFSET BUTTERFLY VALVES

WWW.ABOCONTROLS.COM

GENERAL INFORMATION

GENERAL CHARACTERISTICS

- NPS 3-16 (DN 80 – 400)
- Triple offset design
- Minimal opening, closing friction
- Metal / metal seat
- High temperature applications
- Shut-off and regulating device
- Easy repair and maintenance
- High-performance applications
- Fire-safe and ATEX versions available
- Reliability and long service life

WHY CHOOSE A TRIPLE OFFSET VALVE?

- Valves can be used for demanding long-term applications up to 932°F (500°C)
- Valves designed to withstand high pressures up to 725 psi (50 bar).
- Friction in the seat is almost eliminated during the control cycle, which significantly improves service life of the device.
- Simple maintenance and repairs thanks to a replaceable sealing ring in the closure/body and a removable seat ring*.

* Only available for F body type NPS 6 (DN150) and above

APPLICATIONS

High performance applications such as steam, chilled water, gasoline, oil, jet fuels, natural gas, utility lines, process lines and in industries such as:

- Power Generation
- Oil and Gas
- Refineries
- Chemical and Petrochemical
- Steel and Mining
- Pulp and Paper
- Food and Beverage

STANDARDS

LEAK TEST:

- ANSI/FCI 70-2, Class VI
- API 598, Table 5
- ISO 5208, Rate A/B*
- EN 12266-1, Rate A/B*

* For tightness rate A, please consult with the manufacturer.

FACE TO FACE DIMENSIONS:

Body type B and T (wafer and lug):

- API 609, Category B
- ISO 5752, Series 20
- EN 558, Series 20

Body type F (double flanged):

- API 609, Category B (short pattern)
- ISO 5752, Series 13
- EN 558, Series 13

CONNECTION BETWEEN FLANGES:

- ASME B16.5
- EN 1092-1

ATEX OPTION:

- Zone - 0, 1, 20, 21
- Mining area Group I Category M1
- Group II Category 1G/2GD TX

WORKING STANDARD:

- API 609
- EN 593 + A1

TOP FLANGE:

- EN ISO 5211

MARKING:

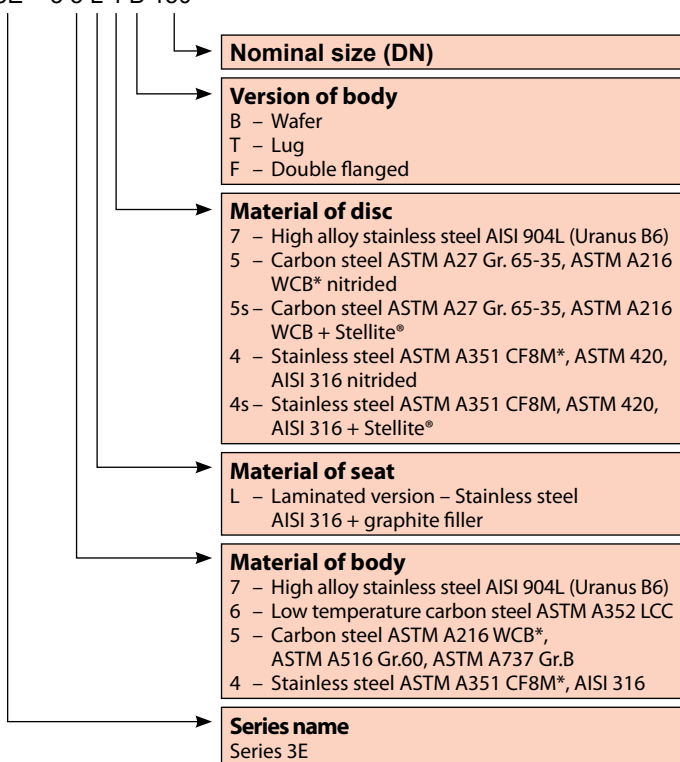
- MSS SP-25
- EN 19

FIRE-SAFE OPTION:

- API 607
- ISO 10497

TYPE DESIGNATION

3E – 3 5 L 4 B 150



* Material options for double flanged (F type) body valves

MODELS

Wafer type B



Lug type T



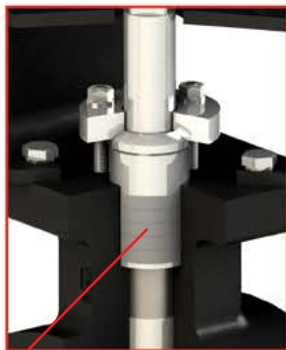
Double flanged type F



PRODUCT QUALITY AND CONTROL

- ABO production facilities are certified in accordance to ISO 9001 (ISO 14001, OHSAS 18001) quality system
- Test procedures are established according to: ANSI/FCI 70-2, API 598, ISO 5208, EN 12266-1
- Manufacture according to the requirements of the European Directive 2014/68/EU – Equipment under pressure (Category III, Module H)
- All ABO valves pass pressure tests to 110% of rated pressure to ensure bubble tight shutoff
- All actuators are calibrated and cycle tested before shipment
- Material Traceability Rule – Certification is provided for all supplied valves on customer request
- Positive Material Identification – All materials are subjected to PMI testing in order to verify Material Traceability
- API 609 Monogram can be placed on the valve upon request
- Certificates – A complete list of certificates can be found on www.abovalve.com.

DESIGN BENEFITS OF WAFER AND LUG TRIPLE OFFSET VALVES



GRAPHITE RING PACKING SYSTEM

The packing system consists of a series of soft graphite sealing rings preventing leakage around the shaft. Graphite is a material which perfectly seals and resists high temperatures. Optimization of the ratio between tightness around the shaft and the actuating torque can be easily achieved by tightening or loosening the nuts holding the packing flange.



INTERNATIONAL STANDARD COMPATIBILITY

Top flange according to ISO 5211 enables direct mounting of manual operators and actuators. Longer neck of ABO butterfly valves results in insulation of ISO top flange, for protection of mounted actuator and meeting heating system requirements.

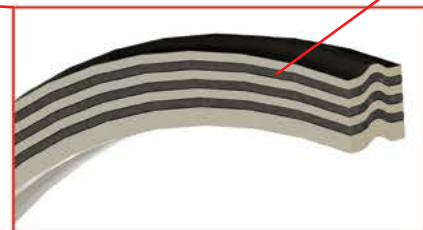


LAMINATED SEAT

A sealing ring, ensuring tightness in the seat, forms a sandwich of stainless steel sheets layered with a soft filler of graphite. This composition is able to withstand high temperatures and ensures excellent resilience of the sealing element even during significant fluctuations of medium temperature and pressure.

SPIRAL GASKET

Spirally wound stainless steel band with a soft graphite filler guarantees a perfect seal even with large temperature and pressure fluctuations inside the pipe.

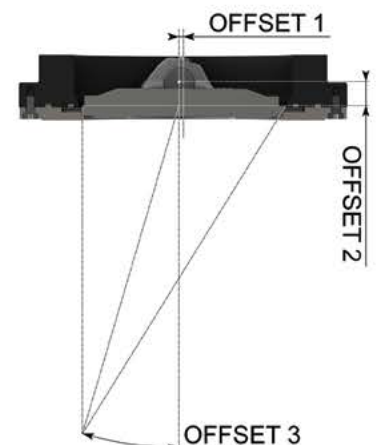


SPLIT SHAFT

The split shaft significantly reduces pressure drops and provides favorable Cv (Kv) values. Lower pressure losses mean lower energy consumption, which leads to savings.

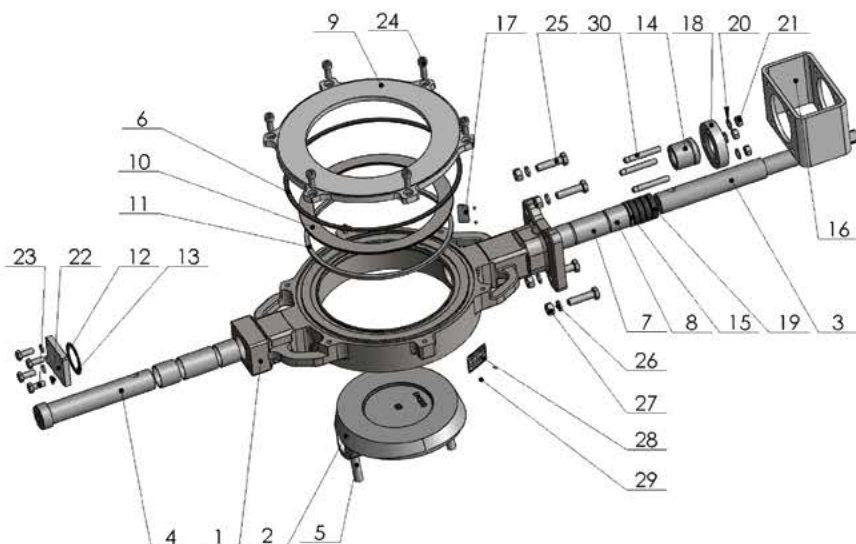
TRIPLE OFFSET

The ABO triple offset design ensures safe function and tightness even in case of changing temperatures or in case of pressure peak. It also eliminates friction in the seat area when opening and closing the valve, minimizing wear of the sealing elements, and significantly prolonging the service life of the valve. The first offset shifts the axis of the shaft rotation off the plane that lies on the pipeline axis. The second offset moves the center plane of the closing element parallel to its flat surface outside of the axis perpendicular to the flat surface of the disc, running through its center. A set of all these offsets results in specific valve properties such as friction elimination during opening/closing cycle, ideal contact of disc and seat in closed position and its sophisticated geometry naturally prevents the disc from moving beyond the safe limit and directly defines the correct alignment of sealing elements.



MATERIALS AND TECHNICAL INFORMATION

DRAWING AND MATERIALS



Execution in other material types can be provided upon request. Choice of the seat and disc materials for various media will be recommended upon specific inquiry.

Item	Name	Material
1	Body	7 – High alloy stainless steel AISI 904L (Uranus B6)
		6 – Low temperature carbon steel ASTM A352 LCC
		5 – Carbon Steel ASTM A216 WCB
		4 – Stainless Steel ASTM A351 CF8M
2	Disc	7 – High alloy stainless steel AISI 904L (Uranus B6)
		5 – Carbon steel ASTM A27 Gr. 65-35 / ASTM A216 WCB nitrided
		5s – Carbon steel ASTM A27 Gr. 65-35 / ASTM A216 WCB + Stellite®
		4 – Stainless steel AISI 316 – for stainless steel body up to NPS 12
		Stainless steel AISI 420 – for WCB body NPS 14–16
		Stainless steel ASTM A351 CF8M – for stainless steel body NPS 14–16
		– all discs are nitrided (on request can be coated with Stellite®)
3	Shaft	Stainless steel AISI 420/ UNS S32205 (2205 Duplex)
4	Pivot	Stainless steel AISI 420/ UNS S32205 (2205 Duplex)
5	Pin	Stainless steel AISI 420/ UNS S32205 (2205 Duplex)
6	Flange seal	Graphite
7	Sleeve	Stainless steel AISI 316L
8	Sleeve	Stainless steel AISI 316L nickel coated
9	Flange	Carbon steel ASTM A441 zinc coated / stainless steel AISI 316L
10	Seat	Laminated stainless steel AISI 316 + graphite filler
11	Seal	Graphite

Item	Name	Material
12	Cover	Carbon steel ASTM A441 / Stainless steel AISI 316
13	Cover seal	Graphite
14	Packing gland	Stainless steel AISI 316
15	Lock washer	Stainless steel AISI 316
16	Bracket	Carbon steel ASTM A441
17	Plate	-
18	Gland flange	Stainless steel ASTM A351 CF8
19	Packing	Graphite
20	Washer	Stainless steel AISI 316
21	Hex nut	Stainless steel AISI 316
22	Washer	Stainless steel AISI 316
23	Bolt	Stainless steel AISI 316
24	Screw	Stainless steel AISI 316
25	Bolt	Stainless steel AISI 316
26	Washer	Stainless steel AISI 316
27	Hex nut	Stainless steel AISI 316
28	Name plate	-
29	Rivet	Stainless steel AISI 316
30	Stud	Stainless steel AISI 316

Other materials upon request.

INSTALLATION BETWEEN FLANGES NPS 3–16 (DN 80–400) TYPE B

NPS	3	4	5	6	8	10	12	14	16
DN	80	100	125	150	200	250	300	350	400
Class 150									
Class 300					x	x	x	x	x
PN10								*	*
PN16									
PN25									
PN40									
JIS 10K					*		*	*	*
JIS 16K				*					

For lug type (T) and double flanged type (F) installation, please specify in the inquiry.

COATING

- Black paint Celerol® Decklack 962-15, min. layer thickness 2.4–3 mil (60–80 µm)
- Based on customer request, different types of coating can be provided

	standard
*	suitable with additional machining
x	not available

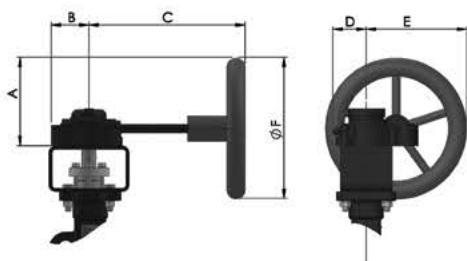
ACTUATION AND TORQUES

ACTUATION POSSIBILITIES

All ABO manual gear operators, pneumatic and electric actuators can be mounted directly to ABO butterfly valves, as brackets are already installed at the factory. This allows for simple installation in the field and minimizes possible misalignment.

MANUAL GEARBOX WITH HANDWHEEL

ABO gearbox series of manual actuators combines state of art production technology, with cast iron and pressed steel construction, to provide a smooth and trouble-free operation for heavy duty on-off and throttling service of ABO valves. The rugged, cast iron body seal is weatherproof to IP67 (IP 68 is also an option). A self-locking gearing holds the valve in the desired position. Further features include a readily accessible handwheel, adjustable stop crew for closed position, removable splined drive bush with indexing facility and a facility to lock handwheel with padlock and chain. Gearboxes, as well as hand levers, can be supplemented with contacts for signalization of endpoints.



NPS	3	4	5	6	8	10	12	14	16
DN	80	100	125	150	200	250	300	350	400
A	5.0/127.5		7.2/183.5			13.3/337.5		11.7/298	17.6/448
B	1.9/47		2.3/58			2.8/72		4.5/115	
C	5.4/138		8.2/209			10.6/270.5		13.4/341	
D	1.9/47.5		2.4/62			2.8/70		4.3/110	
E	5.5/140		8.0/202.5			14.5/369		14.0/354.5	19.9/504.5
F	7.9/200		11.8/300			23.6/600		19.7/500	31.5/800
Weight	6.4/2.9		12.1/5.5			22.7/10.3		57.3/26	63.9/29
Wheel	CD200		SG300			SG600		SG500	SG800
Gearbox	242-20M		242-30M			242-40M		AB1250	

Dimensions mentioned in in/mm, weight in lbs/kg. Weight is approximate – total weight depends on the customer's selection of gearbox.

ACTUATORS

- **ELECTRIC ACTUATORS** – ABO series 97 electric actuators are designed for quarter turn operating application. Electric actuators of 110VAC/60Hz, 230VAC/50Hz, 3PH 440VAC/60Hz and 3PH 380VAC/50Hz can be installed on ABO butterfly valves.
- **PNEUMATIC ACTUATORS** – ABO pneumatic actuators Series 95 are rack and pinion, opposed-piston design actuators available in two versions: single acting and double acting

OPERATING TORQUES VS. WORKING PRESSURE (LBF.IN / NM)

Opening torques (lbf.in / Nm)

NPS	3	4	5	6	8	10	12	14	16
DN	80	100	125	150	200	250	300	350	400
145 psi/10 bar	310/35	575/65	487/55	974/110	2478/280	2505/283	5310/600	9736/1100	14161/1600
232 psi/16 bar	372/42	620/70	531/60	1239/140	2921/330	3700/418	7966/900	13276/1500	20091/2270
290 psi/20 bar	504/57	620/70	628/71	1682/190	3275/370	4071/460	9116/1030	16816/1900	21507/2430
363 psi/25 bar	620/70	752/85	752/85	1859/210	4337/490	5806/656	10178/1150	22127/2500	27437/3100
435 psi/30 bar	752/85	558/100	859/97	2310/261	4691/530	-	-	-	-
580 psi/40 bar	805/91	1106/125	1062/120	3098/350	-	-	-	-	-
725 psi/50 bar	929/105	1328/150	1239/140	-	-	-	-	-	-

Operating torques are mentioned in lbf.in/Nm and without safety reserve.

NPS	3	4	5	6	8	10	12	14	16
DN	80	100	125	150	200	250	300	350	400
Closing torques (water)	558/63	1239/140	1549/175	1947/220	3983/450	3717/420	3540/400	3983/450	4425/500
Closing torques (air)	558/63	1239/140	1549/175	1947/220	3983/450	5001/565	4868/550	8851/1000	11506/1300
Max. torque on shaft – 35Lx	1770/200	3036/343	4054/458	5620/635		9709/1097	15462/1747	24782/2800	44944/5078
Max. torque on shaft – 34Lx	1328/150	2275/257	2868/324	4213/476		7275/822	11506/1300	20357/2300	33633/3800

Operating torques are mentioned in lbf.in/Nm and without safety reserve.

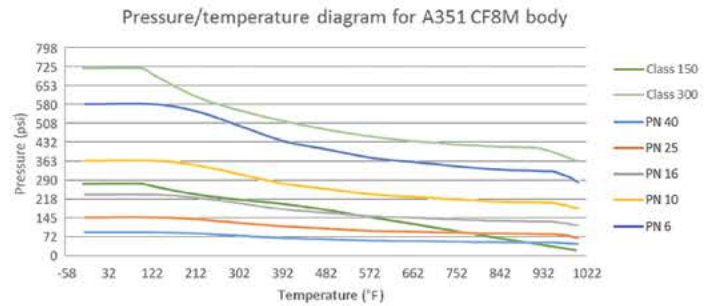
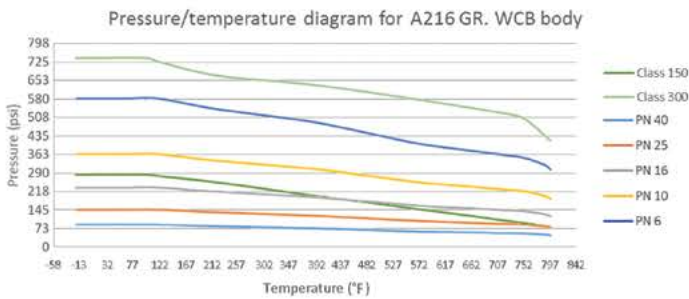
WORKING CONDITIONS AND DIMENSIONS

WORKING CONDITIONS

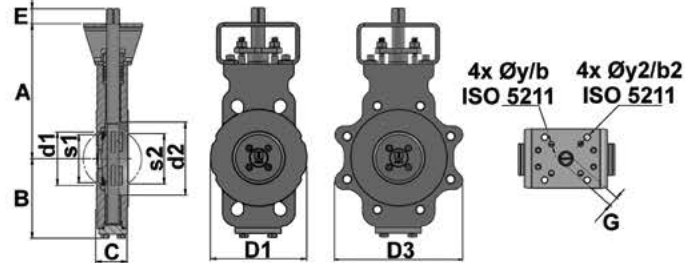
Maximum working pressure	NPS 3–5 (DN 80–125): 725 psi (50 bar)	Working temperature range	Cast ASTM A216 WCB body: -20 °F to 797 °F (-29 °C to 425 °C)
	NPS 6 (DN 150): 580 psi (40 bar)		Cast ASTM A351 CF8M body: -148 °F to 932 °F (-100 °C to 500 °C)
	NPS 8 (DN 200): 435 psi (30 bar)		Plasma cut ASTM A516 Gr. 60 body: -4 °F to 797 °F (-20 °C to 425 °C)
	NPS 10–16 (DN 250–400): 363 psi (25 bar)		Plasma cut ASTM A737 Gr. B body: -40 °F to 797 °F (-40 °C to 425 °C)
			Plasma cut AISI 316 body: -4 °F to 797 °F (-20 °C to 425 °C)

Maximum temperatures for each seat material are accepted only for a specific medium and limited time exposure. Please consult with our engineers for details about your application.

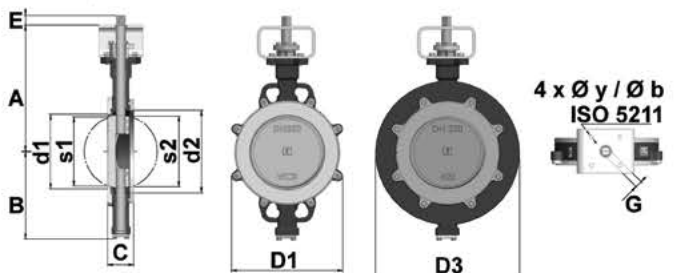
Pressure/temperature diagrams according to ASME B16.34 and EN 12516-1



Plasma cut body



Cast body



NPS	DN	d1	d2	A	B	C	D1	D3	S1	S2	E	G	ISO flange	y	b	Weight	
																B type body	T type body
3	80	3.0/77	3.9/100	6.8/173.5	4.7/119.9	1.9/47	5.5/139.5	7.6/193	2.4/61	2.8/70.8	1.0/25	0.6/14	F07	0.35/9	2.8/70	17.6/8	33.1/15
4	100	3.5/90	4.9/123.5	9.0/228.5	5.3/134.4	2.1/53	6.4/163	8.6/217.6	2.9/73	3.3/83.2	1.0/25	0.7/17	F07 & F10	0.35&0.43/9&11	2.8 & 4/70 & 102	26.5/12	33.1/15
5	125	4.3/110	5.7/146	9.8/148	6.1/155.2	2.2/57	7.6/193	9.8/250	3.8/96	4.2/106	1.0/25	0.7/17	F07 & F10	0.35&0.43/9&11	2.8 & 4/70 & 102	37.5/17	44.1/20
6	150	5.7/146	6.1/155	12.1/307	8.4/213.4	2.2/57	10.0/253	12.5/318	5.4/136	5.6/143	1.0/25	0.7/17	F10	0.43/11	4/102	46.3/21	66.1/30
8	200	7.6/194	8.0/204	13.3/228.5	9.7/245.8	2.4/61	12.0/305	15.0/381	7.3/185	7.6/193	1.0/25	0.7/17	F10	0.43/11	4/102	61.7/28	101.4/46
10	250	9.4/238	10.2/259	15.6/395	10.8/274.3	2.7/69	13.7/349	17.7/450	8.8/224	9.3/236	1.2/31	0.9/22	F12	0.51/13	4.9/125	101.4/46	154.3/70
12	300	11.3/287	12.2/309	18.1/459.5	12.3/312.8	3.1/79	15.5/393	20.5/521	10.6/270	11.2/284	1.2/31	1.1/27	F14	0.67/17	5.5/140	147.7/67	231.5/105
14	350	12.7/323	13.5/342	19.9/506	14.0/354.9	3.6/92	17.6/448	21.9/557	11.8/300	12.1/308	1.8/45	1.1/27	F16	0.87/22	6.5/165	220.5/100	326.3/148
16	400	15.2/385	15.9/405	21.9/556	15.8/401	4.1/103	21.3/542	25.9/657	13.5/342	14.2/360	2.3/58	1.4/36	F16	0.87/22	6.5/165	288.8/131	440.9/200

Dimensions mentioned in in/mm, weight in lbs/kg. Other dimensions upon request.

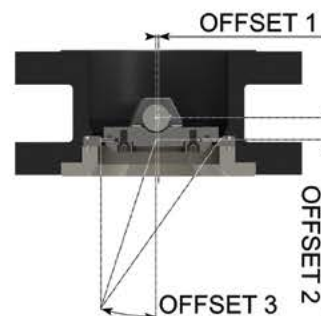
DOUBLE FLANGED TRIPLE OFFSET VALVES

GENERAL CHARACTERISTICS OF DOUBLE FLANGED TRIPLE OFFSET VALVE

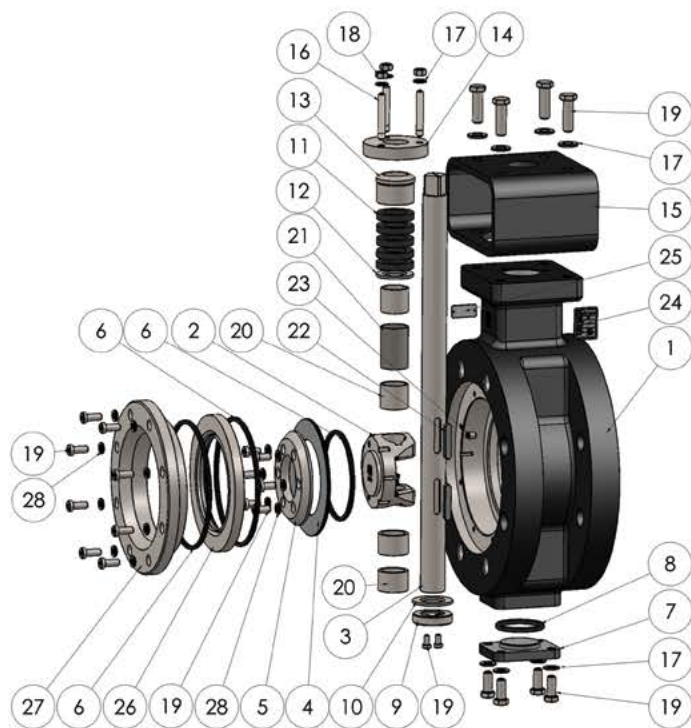
ABO Series 3E double flanged high-performance butterfly valves with triple offset are designed for demanding industrial applications. Thanks to their design, ABO series 3E double flanged butterfly valves provide excellent performance in applications such as transport of steam, chilled water, gasoline, jet fuel, oil, gas, pulp and paper. The sophisticated triple offset system eliminates friction in the seat area when opening and closing the valve, minimizing wear of the sealing elements, and significantly prolonging the service life of the valve. The seat is machined into an oblique truncated conical shape directly defining the correct alignment of the disc. Its geometry naturally prevents its movement beyond the safe limit. The seat surface is provided with a weld / thermal spray coating of Stellite®, which ensures its long-term tightness and minimal maintenance cost due to its hardness and wear resistance characteristics. The sealing elements are made only of metallic materials and graphite filler in order to withstand long-term exposure to high temperatures (up to 932°F). ABO series 3E butterfly valves have been designed with the maximal respect to the simplicity of repairs and maintenance. Therefore, it is possible to replace the laminated seat ring in the disc and seat surface in the body by simply unscrewing the bolts and dismounting the flange rings that are holding them (interchangeable part with Stellite® thermal sprayed seat surface available from NPS 6 and above). The double flanged version of ABO triple offset valves is available in NPS 3, 4, 5, 6, 8 (DN 80, 100, 125, 150, 200).

TRIPLE OFFSET

Triple offset design ensures safe function and tightness even in case of changing temperatures, or in case of pressure peak. It also eliminates friction in the seat area when opening and closing the valve, minimizing wear of the sealing elements, and significantly prolonging the service life of the valve. The first offset shifts the axis of the shaft rotation off the plane that lies on the pipeline axis. The second offset moves the center plane of the closing element parallel to its flat surface outside of the axis of its rotation. The third offset deflects the axis of rotational symmetry of the seat surface outside of the axis perpendicular to the flat surface of the disc, running through its center. A set of all these offsets results in specific valve properties such as friction elimination during opening/closing cycle and ideal contact of the disc and seat in closed position. Further, its sophisticated geometry naturally prevents the obturator from moving beyond the safe limit and directly defines the correct alignment of sealing elements.



DRAWING AND MATERIALS



Item	Name	Material
1	Body	5 – Carbon steel ASTM A216 WCB
		4 – Stainless steel ASTM A351 CF8M
2	Disc	5 – Carbon steel ASTM A216 WCB nickel plated
		4 – Stainless steel AISI 316 / ASTM A351 CF8M
3	Shaft	Stainless steel AISI 420 / UNS S32205 (2205 Duplex)
4	Seal ring (laminated)	Stainless steel AISI 316 + graphite filler
5	Retainer flange	Stainless steel AISI 304
6	Spiral gasket (laminated)	Stainless steel AISI 321 + graphite filler
7	Cover	Carbon steel ASTM A441 / AISI 316
8	Cover seal	Stainless steel AISI 321 + graphite filler
9	Bottom	Stainless steel AISI 316
10	Spacer ring	Stainless steel AISI 316
11	Packing	Graphite
12	Packing ring	Stainless steel AISI 316L
13	Packing gland	Stainless steel AISI 316
14	Gland flange	Stainless steel AISI 304
15	Bracket	Carbon steel ASTM A441
16	Stud	Stainless steel AISI 316
17	Washer	Stainless steel AISI 316
18	Hex nut	Stainless steel AISI 316
19	Bolt	Stainless steel AISI 316
20	Sleeve	Stainless steel AISI 316L nickel coated
21	Sleeve	Stainless steel AISI 316L
22	Disc key	Stainless steel AISI 316 / ASTM 6150
23	Retaining screw	Stainless steel AISI 316
24	Name plate	Stainless steel
25	Delta plate	Stainless steel
26	Seat	Duplex stainless steel AISI 316 LN + Stellite sealing surface
27	Flange ring	Carbon steel ASTM A441
28	Wedge lock washer	Stainless steel AISI 316

Other materials upon request.

COATING

- Black paint Celerol® Decklack 962-15, min. layer thickness 2.4–3 mil (60–80 µm)
- Based on customer request, different types of coating can be provided

DESIGN BENEFITS OF DOUBLE FLANGED TRIPLE OFFSET VALVES

STEM SEALING SYSTEM

Stem sealing system consists of a series of soft graphite sealing rings preventing leakage around the shaft. Graphite is a material which perfectly seals and resists high temperatures. Optimization of the ratio between tightness around the shaft and the actuating torque can be easily achieved by tightening or loosening the nuts holding the packing flange.

SHAFT BEARINGS

Durable slide bearings center the shaft in the body and define its precise location, thereby minimizing unwanted backlash and ensuring proper alignment of the sealing ring on the seat surface.

SEAT FLANGE RING

A flange ring holds the interchangeable seat in the body in its place. Removal of the flange allows for an easy maintenance and repairs of seat surface (available from NPS 6 and above).



INTERCHANGEABLE SEAT

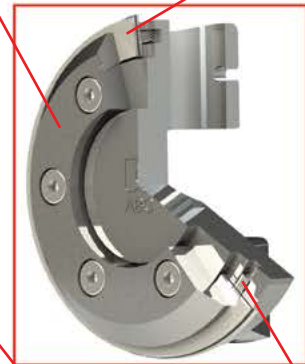
The seat coated with Stellite® is inserted into the body as a separate part (available from NPS 6 and above), which can be easily replaced in case of wear or damage. This design simplifies maintenance and significantly reduces the cost of repairs.

LAMINATED SEALING RING

The sealing ring is formed by a sandwich of stainless steel sheets layered with soft filler of graphite. This composition is able to withstand high temperatures and ensures excellent resilience of the sealing element even during significant fluctuations of medium temperature and pressure. In case of damage or wear, the laminated sealing ring can be easily replaced by removing the flange that holds it in place.

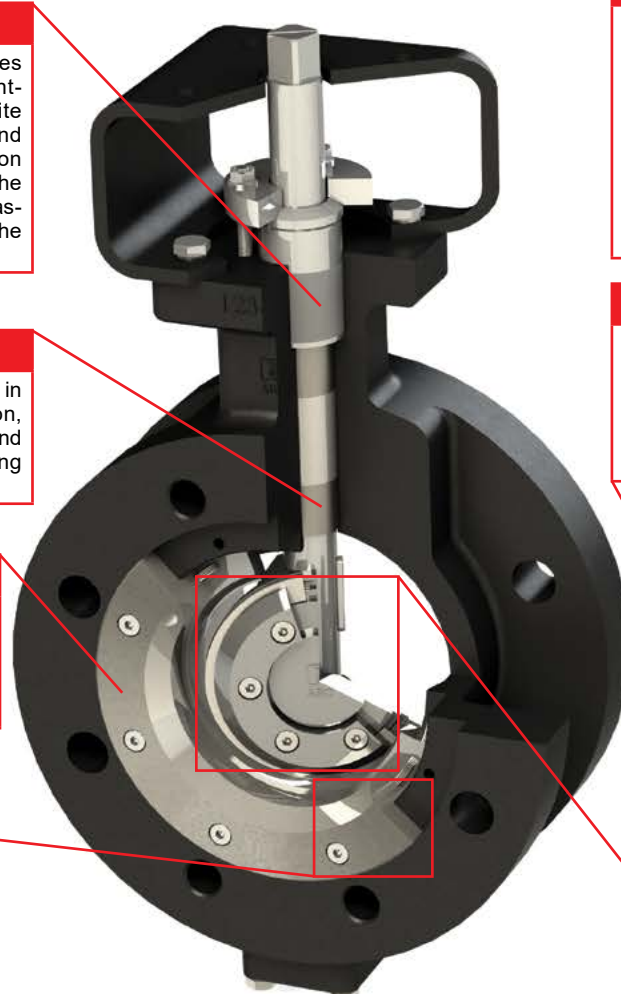
DISC FLANGE RING

The flange ring that provides the alignment of the laminated sealing ring in the disc, combined with the spiral seal, ensures perfect tightness. Thanks to this design, the laminated sealing ring can be easily replaced at any time.



SPIRAL GASKET

Spirally wound stainless steel band with a soft graphite filler guarantees a perfect seal, even under the circumstance of large fluctuations of temperature and pressure inside the pipe.



EUROPEAN UNION
European Regional Development Fund
Operational Programme Enterprise
and Innovations for Competitiveness

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Data subject to change.

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