

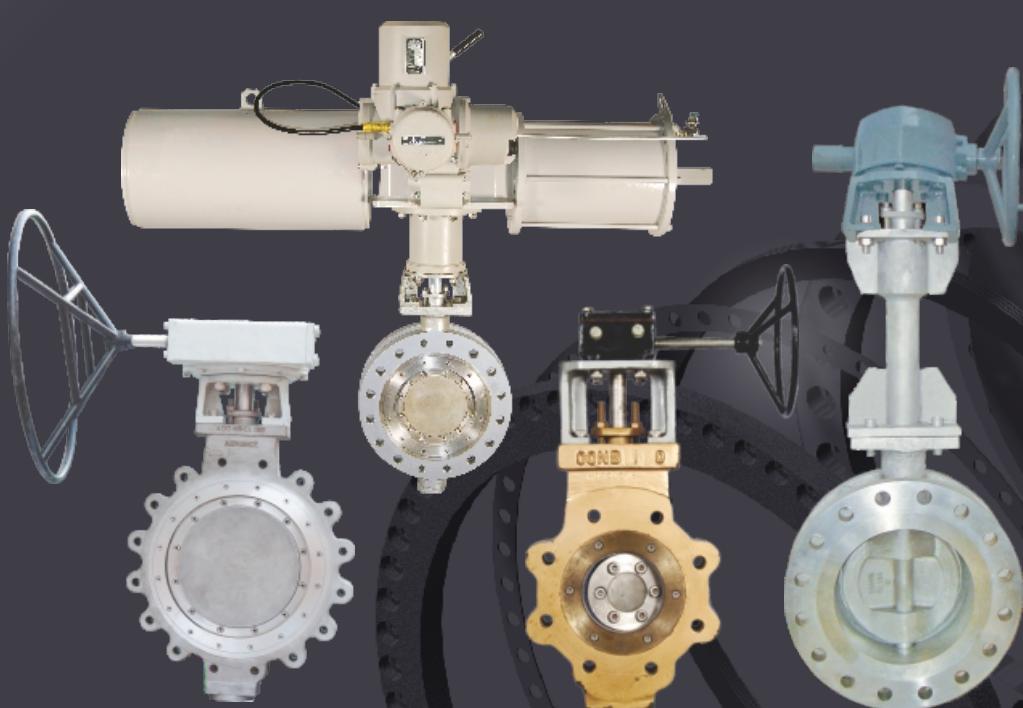


Changing the way you think about valves

advancevalves.com

# HIGH PERFORMANCE Triple Offset Valves

SERIES  
BT



ACTUATED

CRYOGENIC

FIRE SAFE

FUGITIVE EMISSION COMPLIANT



More than 3  
Decades



Changing the way you think about valves

Having commenced manufacturing over 25 years ago, in 1986, Advance has become a qualified and trusted name. Advance Valves recognized the leap in technology and the wide spectrum of services where customers needed a reliable rotary valve solution, having started with the Triple Offset Butterfly Valves in the late '90s. A similar scenario occurred when Advance introduced the Dual Plate Check Valves and Balancing Valves. Today, Advance Valves is widely specified by all major end-users, process licensors, EPCs, and consultants globally, having serviced more than 40 countries.

Impetus on innovation, quality control systems, up-to-date manufacturing setup and investment in talent has provided sustainable thrust to the group's growth chart. On top of this, customers remain the most valued stakeholders, where meeting and exceeding their expectation on project requirements is the topmost priority and effort.

Advance Valves is considered by its clients to be among the top few vendors globally with the ability to:

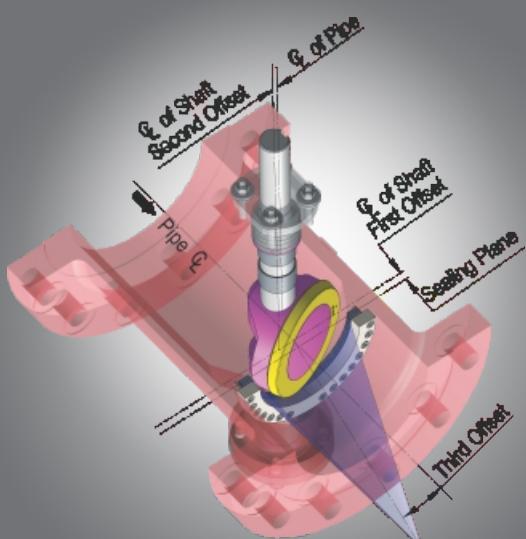
- Supply valves of exotic metallurgies, including Alloy Steels, Duplex & Super Duplex, Inconel, and other superior Nickel and Copper alloys;
- Supply valves of sizes between DN 50 (NPS 2) to DN 3000 (NPS 120);
- Supply Dual Plate Check Valves up to ASME CL 2500 and Triple Offset Valves up to ASME CL 900;
- Meet clients stringent quality requirements, including zero leakage;
- Supply valves for Cryogenic applications down to -196°C;
- Supply valves for Fire-Safe applications up to 550°C;
- Supply valves complying with Fugitive Emission standards.
- Supply UL Certified Butterfly Valves;

# Triple Offset Valves

Advance Valves' High Performance Triple Eccentric Butterfly Valves (BT Series) are complete metal-to-metal seated valves suitable for both Throttling and Positive Isolation applications. These valves are capable of Bi-Directional Flow Control, Zero Leakage, Low Fugitive Emissions, Steam-Based Applications (up to 550°C) and for Cryogenic Applications (down to -196°C).

Due to the triple offset sealing system, the disc moves smoothly and free of friction at all points along the specially designed body seal. This is because the third offset completely eliminates rubbing. When the disc is closed, the seat ring (on the disc) energises the seal (on the body), thereby providing a snug-tight high-performance fit.

The laminar seal is constructed with Grafoil layers sandwiched between metal laminations. This resiliency of the seal flexes and energizes according to the compressive forces generated, and allows for minor body deformation due to temperature fluctuations without the risk of jamming. This provides a uniform wedging effect and ensures "Zero" leakage of the valve.



**The First Offset:** The axis of the shaft is moved behind the disc from the seating plane. This effectively allows complete sealing contact around the entire seal area, as the shaft is not in the sealing area.

**The Second Offset:** The axis of the shaft is shifted from the pipe and valve centre-line. This reduces interference and releases the seat after a few degrees of rotation only, resulting in a minimal seat-seal rubbing due to camming action. This increases seal-seal life and therefore valve life.

**The Third Offset:** The centre line of the seat-seal cone is tilted away from the valve centre-line resulting in an ellipsoidal profile producing a wedging effect. This results in a frictionless seating with uniform compressive sealing around the entire seal.

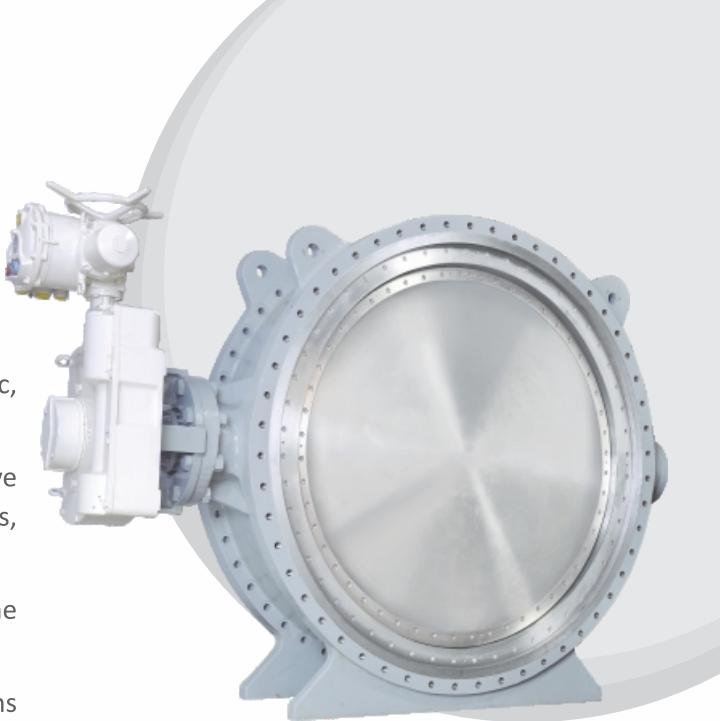
The unique Replaceable Seat & Seal configuration of Advance BT Series minimizes shut down time & requirement of spare valves, making this product an attractive option for Plant & Project Managers optimizing TCO – Total Cost of Ownership. These valves are now replacing traditional Gate and Ball valves in many applications also because of their compact & light weight construction.

Design	: API 609, ASME B16.34
Face to Face	: API 609, ISO 5752, ASME B16.10
End Connection	: Wafer, Lugged, Double Flanged, Double Flanged Long (Gate valve face to face), Hub Ends, Butt weld
Testing	: API 598, EN 12266, ISO 5208, BS 6364 (Cryogenic upto -196°C)
Fire Safe Testing	: API 607, ISO 10497
Fugitive Emission Testing	: ISO 15848, TA Luft, VDI 2440



## Actuated

- Established and repeated supplies with electric, pneumatic, hydraulic and other hybrid automation systems.
- Suitable for diverse spectrum of services from positive isolation ON/OFF to finely controlled throttling services, safety applications including ESD (Emergency Shut Down).
- Complete in-house function and performance testing done to provide a fully validated system.
- Full compatibility with wide variety of automation options for on-site actuation.
- Supplied extensively for large size flare gas systems with high end automation for system integration.



## Jacketed Valves

- Successful elimination of fluid crystallization with excellent temperature manipulation throughout the valve, including seating areas.
- Suitable for Sulphur Recovering Units compliant with tracing requirement of most superior Oil & Gas industry users.



## Cryogenics

- Valves are validated in-house at fully equipped test facilities up to NPS 48, testing valves down to -196°C (-350°F) up to 100 bar of sensitive Helium pressure.
- Nitronic provided as the standard seat and laminated seal material to handle cryo conditions over repeated use.
- Extended bonnets provided as a standard, keeping the packing away from sensitive temperatures, ensuring consistent fugitive emissions compliance.
- Suitable for low-temperature media like LNG, LPG, liquid oxygen, and liquid nitrogen.



## High Temperature & Steam Services

- Compatible thermal properties of materials to maintain consistent performance at extreme temperature.
- Suitable for high pressure steam and process gases, in turbine and process industries respectively. Compliant & certified by the Indian Boiler Regulation.



## Regulating Application Valves

- ◆ Replaceable seal and seat design as standard for the ease of replacement at site where necessary.
- ◆ Special laminated seal design provided where the valves have shut off requirement in addition to Control.
- ◆ Reduced trim are available in order to cover low flow control requirement.
- ◆ Hardened Trim is available to cover Throttling application.

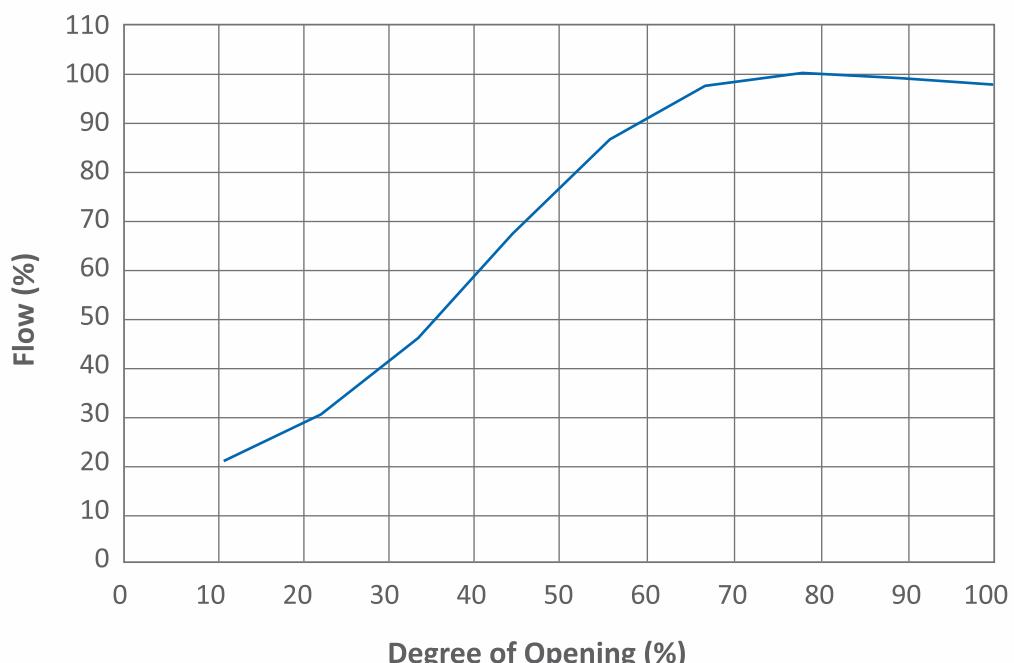
- ◆ Control valves have modified equal percentage or modified linear characteristics to cover variety of Control application.
- ◆ Control-cum-shut off application where Control is not acceptable for the specified process, double offset valves with Teflon seals are available.
- ◆ Available in various material of construction which may suit the service process application.

## Control Valve Sizing

- ◆ Advance Valves carries out control valve sizing for compressible and incompressible fluids as per IEC 60534 part 2.
- ◆ Noise prediction is also carried out as a part of sizing as per IEC 60534 Part 3.
- ◆ Where predicted noise level exceeds 85 dbs. Advance Valve recommends use of DB plate which is also provided as part of the Control Valves assembly.

## Control Valve Operating Characteristics

Typical the Advance Valve Triple Offset Control Valve shall have the characteristics as under:



(Note: Actual flow characteristics shall be supplied as part of valve sizing)

## Control Valve Flow Coefficient (Cv) Table

Control Valve Size (in DN – in NPS)	FLOW COEFFICIENT (Cv)_REPLACEABLE DESIGN			
	CL 150	CL 300	CL 600	CL 900
80 (3)	46	41	23	*
100 (4)	114	99	41	*
150 (6)	285	146	75	60
200 (8)	507	524	283	188
250 (10)	972	890	606	245
300 (12)	2209	1521	810	726
350 (14)	2328	1564	1042	570
400 (16)	3187	2809	1694	762
450 (18)	4026	3909	2048	1624
500 (20)	4642	4431	2338	1614
600 (24)	6560	5034	4942	4374
650 (26)	6758	5211	*	*
700 (28)	13251	9856	7169	8061
750 (30)	17542	10932	9645	7920
800 (32)	22795	14324	*	*
900 (36)	24321	18089	16473	*
1000 (40)	32548	30671	*	*

Control Valve Size (in DN – in NPS)	FLOW COEFFICIENT (Cv)_INTEGRAL DESIGN			
	CL 150	CL 300	CL 600	CL 900
80 (3)	128	99	81	75
100 (4)	216	293	70	*
150 (6)	664	873	314	*
200 (8)	1505	1220	1085	350
250 (10)	2406	2481	2406	520
300 (12)	4547	3990	2633	*
350 (14)	5755	5042	4639	1932
400 (16)	8081	6099	5145	2429
450 (18)	10988	8859	8837	*
500 (20)	13156	11603	11497	*
600 (24)	17617	17462	14955	7510
650 (26)	16436	17663	16790	*
700 (28)	27003	20786	23619	*
750 (30)	27917	23649	*	*
800 (32)	30764	26391	*	*
900 (36)	41792	34091	33744	23429
1000 (40)	52656	57280	*	*

Note: For sizes higher than 36" and rating higher than ANSI # 900, Contact Advance Valves for data.

\* Contact Advance Valves for Data.



**Oil & Gas**

## Applications

**Oil & Gas** – Refining, Crude Oil, Gas Hydrocarbons & Fuel Applications, Flare Gas Systems, Tank Farms & Transportation, Onshore & Offshore.

**LNG & Cryogenic** – Liquid Oxygen, Nitrogen and LNG handling across gasification, liquefaction & transportation.

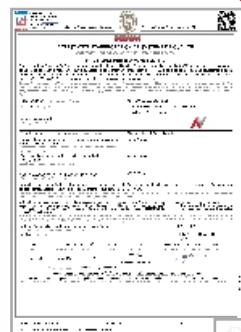
**Fertilizer & Chemical** – Polyethylene, Monomer, Catalysts, Ammonia.

**Mining & Metallurgical** – Water flush lines, Vent gas lines, Acid injection, Steam spurge.

**Power & Nuclear Plants** – Cooling Water, Fire Water, DM Water, Heavy Water and steam services including boiler applications.

**Water Desalination & Management Systems** – Water and Desalination plants, Sea Water Applications, Effluent Treatment.

**Heating Ventilation & Air Conditioning** – Cooling Water, Chilled Water, Glycol or Brine Solution, District Cooling & Heating.



**Mining & Metallurgical**



**Fertilizer & Chemical**



**Water & Waste Water**



**HVAC**



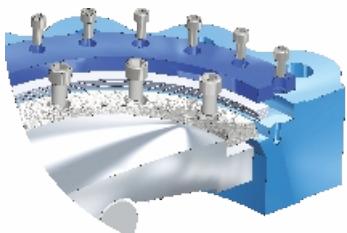
## Quality Capabilities

Advance Valves products have, over the years, been rigorously tested for various parameters including Fire-Safe, Bubble-tight, Vacuum, and Cryogenic tests by various Third Party agencies. Quality is an integral component of Advance Valve's philosophy, certified as per ISO 9001-2015, having API Spec Q1 & 609 Monograms, CE, and PED accreditation. Besides the usual hydrostatic and pneumatic tests, we conduct the following additional tests:

- ◆ High pressure helium testing (up to 100 bar / 1419 psi);
- ◆ Cryogenic testing down to -196° C (per BS 6364);
- ◆ Fire-safe testing (as per ISO 10497 / API 607);
- ◆ High temperature testing up to +550° C;
- ◆ Fugitive Emission testing (as per ISO 15848 / Ta Luft).

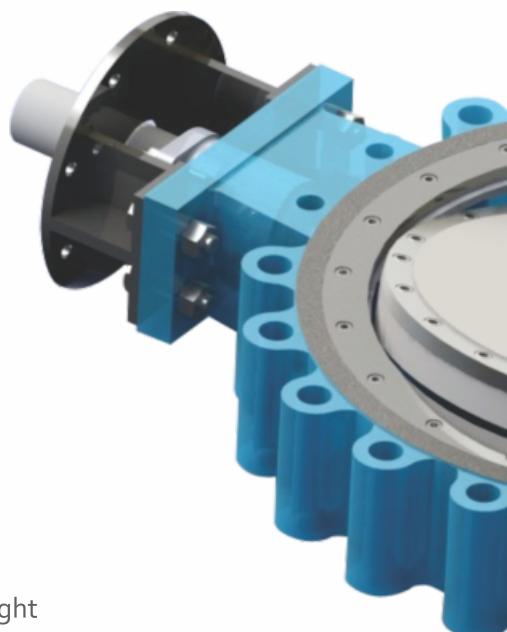
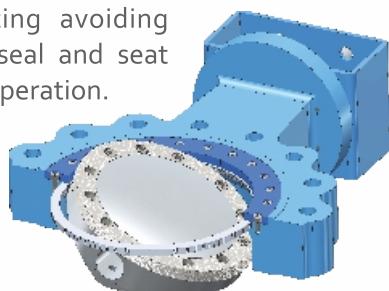
### Fully Replaceable seal seat

The seal set (laminated seal and the seat) are field replaceable with proven ease of serviceability and handling at site.



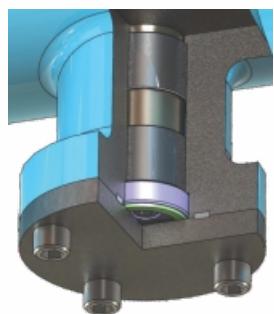
### Friction Free Operation

The triple offset design ensures friction free seating avoiding rubbing between seal and seat during the closing operation.



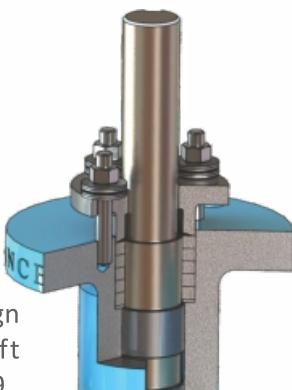
### Flexibility of Installation

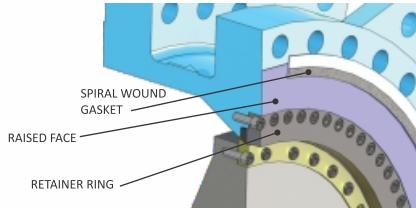
Thrust washer supports the weight of the disc and shaft assembly. The valves are thus suitable for both vertical and horizontal installation.



### Anti-Blow Out Design

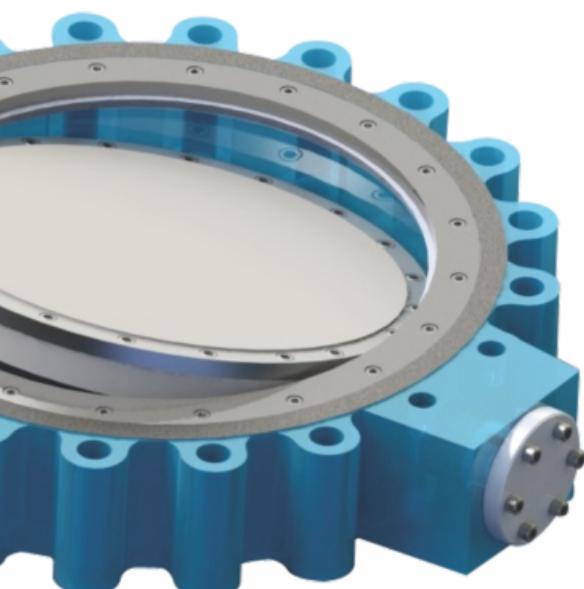
Inherent anti-blow out design provides safety from shaft ejection. Meets norms of API 609.





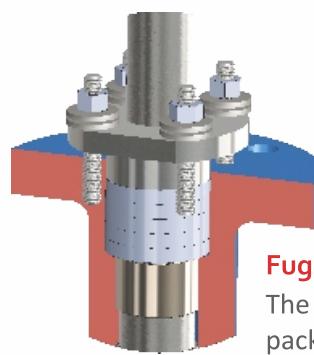
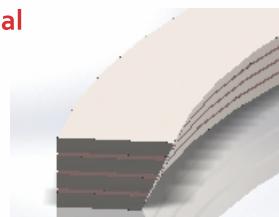
### Suitable for Dead End Service

Fully self supported retaining ring with uninterrupted gasket face, makes the valve fully suitable for Dead End Service without any supporting flange.



### Laminated Solid-flexible Seal

The seal is of thin metal lamination interlaid with high density Grafoil bringing resiliency in the metal seal.

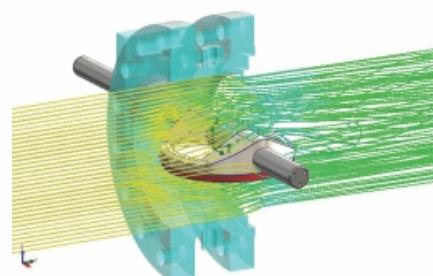


### Fugitive Emissions

The valve with special gland packing & live loading through Belleville springs satisfies the fugitive emission standard ISO 15848 & TA Luft. Validated from -196°C to 450°C.

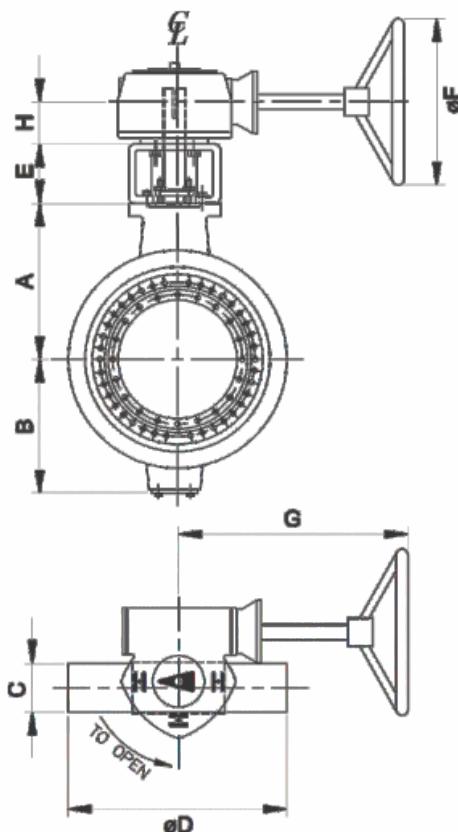
### Laminated seal out of Fluid Path

The design of the valve with laminated seal on the body ensures that the seal is not directly exposed to the high velocity fluid infringement.



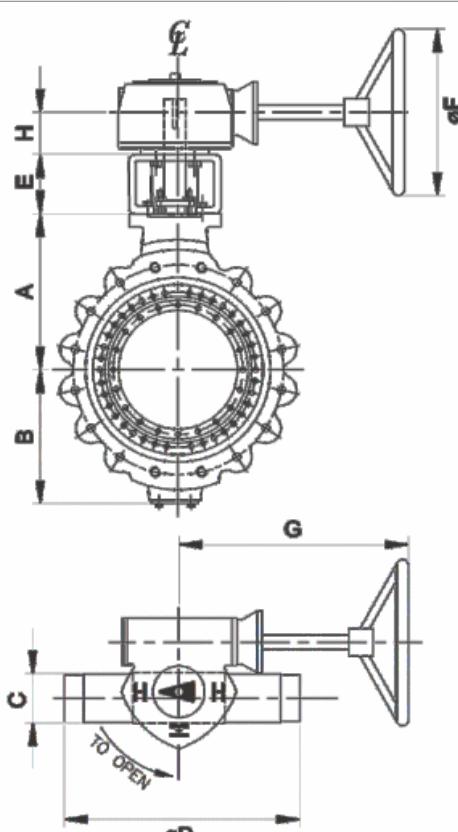
### Wide range of flow control

Flow characteristics ideal for modulation over a wide range of operation. Suitable for control valve service with positive isolation capabilities.



CL 150 ASME B 16.5 WAFER (M-11)									
(DN)	(NPS)	A	B	C	D	E	F	G	H
80	3	155	125	48	N/A	70	175	196	50
100	4	165	140	54	N/A	90	175	260	65
150	6	215	180	57	N/A	100	350	260	65
200	8	245	210	64	N/A	120	600	325	85
250	10	270	240	71	N/A	120	600	325	85
300	12	310	275	81	N/A	120	600	353	125
350	14	335	309	92	N/A	120	500	404	125
400	16	370	346	102	N/A	120	500	404	125
450	18	400	365	114	N/A	120	600	423	115
500	20	440	396	127	N/A	120	600	454	133
600	24	500	480	154	N/A	120	750	478	155

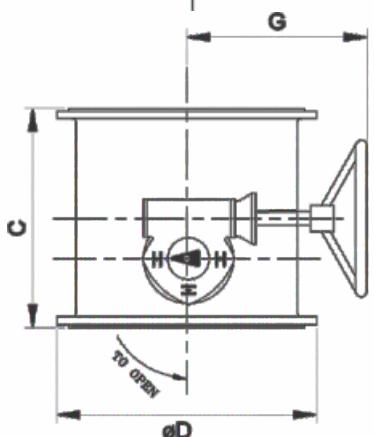
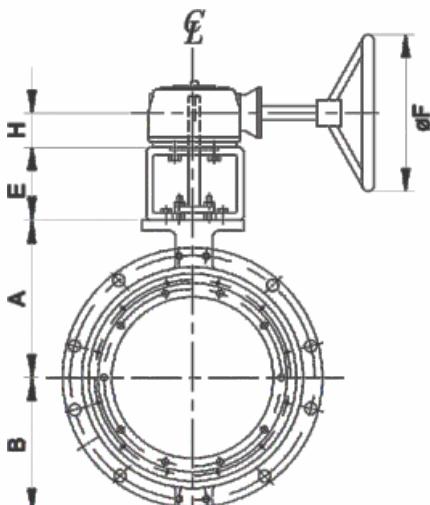
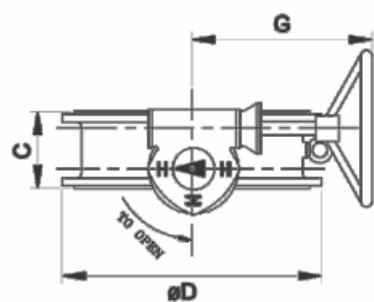
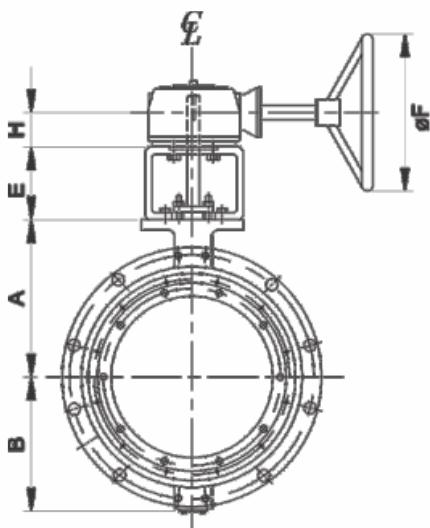
CL 300 ASME B 16.5 WAFER (M-11)									
(MM)	(INCH)	A	B	C	D	E	F	G	H
80	3	155	125	48	N/A	70	175	196	50
100	4	175	150	54	N/A	90	350	260	65
150	6	235	202	59	N/A	100	600	326	85
200	8	275	222	73	N/A	120	600	380	115
250	10	305	271	83	N/A	120	750	513	135
300	12	345	310	92	N/A	120	500	405	125
350	14	395	330	117	N/A	120	600	456	135
400	16	425	355	133	N/A	120	750	526	155
450	18	460	405	149	N/A	150	750	526	155
500	20	515	440	159	N/A	150	750	601	160
600	24	550	520	181	N/A	200	750	601	160



CL 150 ASME B 16.5 LUGGED (M-21)									
(DN)	(NPS)	A	B	C	D	E	F	G	H
80	3	135	115	48	190	70	175	196	50
100	4	165	140	54	230	90	175	260	65
150	6	215	180	57	280	100	350	260	65
200	8	245	210	64	345	120	600	325	85
250	10	270	240	71	405	120	600	325	85
300	12	310	275	81	485	120	600	353	125
350	14	335	309	92	535	120	500	404	125
400	16	370	346	102	595	120	500	404	125
450	18	420	367	114	635	120	600	423	115
500	20	440	396	127	700	120	600	454	133
600	24	500	480	154	815	120	750	478	155

CL 300 ASME B 16.5 LUGGED (M-21)									
(DN)	(NPS)	A	B	C	D	E	F	G	H
80	3	135	115	48	190	70	175	196	50
100	4	175	150	54	255	90	350	260	65
150	6	240	202	59	320	100	600	326	85
200	8	275	222	73	380	120	750	380	115
250	10	305	271	83	445	120	750	513	135
300	12	345	310	92	520	120	500	405	125
350	14	395	330	117	585	120	600	456	135
400	16	425	355	133	650	120	750	526	155
450	18	460	405	149	710	150	750	526	155
500	20	515	440	159	775	150	750	601	160
600	24	550	520	181	915	200	750	601	160

CL 600 ASME B 16.5 LUGGED (M-21)									
(DN)	(NPS)	A	B	C	D	E	F	G	H
150	6	240	202	59	320	100	600	326	85
250	10	340	320	117	N/A	150	750	526	155
300	12	380	350	140	N/A	120	750	525	155
400	16	462	400	178	N/A	150	750	526	155
500	20	550	480	216	N/A	150	750	526	155
600	24	550	520	181	915	200	750	601	160



CL 150 ASME B 16.5 FLANGED (M-31)									
(DN)	(NPS)	A	B	C	D	E	F	G	H
80	3	135	115	114	190	70	175	196	50
100	4	165	140	127	230	90	175	260	65
150	6	215	180	140	280	100	350	260	65
200	8	245	210	152	345	120	600	325	85
250	10	270	240	165	405	120	600	325	85
300	12	310	275	178	485	120	600	353	125
350	14	335	309	190	535	120	500	404	125
400	16	335	309	216	595	120	500	404	125
450	18	400	365	222	635	120	600	423	115
500	20	440	396	229	700	120	600	454	133
600	24	500	480	267	815	120	750	478	155
650	26	500	480	292	785	120	750	525	155
700	28	570	550	292	387	200	750	525	155
750	30	600	570	318	985	200	750	560	160
800	32	675	645	318	820	200	750	560	160
900	36	710	650	330	1057	200	750	601	160
1050	42	795	775	410	1047	200	900	749	210
1100	44	795	760	410	1047	200	900	786	210
1200	48	940	855	470	1390	200	900	786	210
1350	54	995	920	470	1685	200	900	786	210
1400	56	1100	1041	530	1745	200	900	786	210
1600	64	1215	1090	600	900	250	900	749	210
1650	66	1215	1090	660	2032	250	900	1029	320
1700*	68	1125	1090	600	1864	200	900	749	210
1900*	76	1245	1170	670	2068	250	900	749	210
2200*	88	1395	1280	770	2355	250	900	1029	320

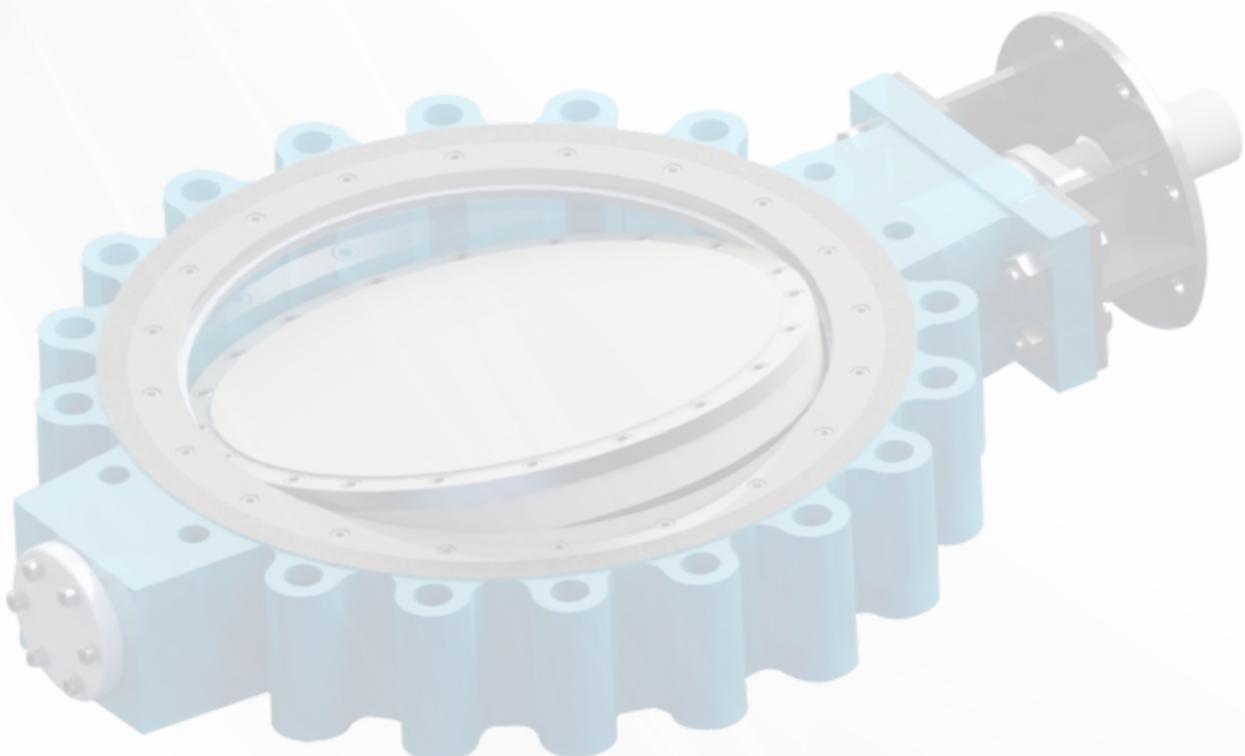
CL 300 ASME B 16.5 FLANGED (M-31)									
(DN)	(NPS)	A	B	C	D	E	F	G	H
80	3	135	115	114	190	70	175	196	50
100	4	175	150	127	255	90	350	260	65
150	6	240	202	140	320	100	600	326	85
200	8	275	222	152	380	120	750	380	115
250	10	305	271	165	445	120	750	513	135
300	12	345	310	178	520	120	500	405	125
350	14	395	330	190	585	120	600	456	135
400	16	425	355	216	650	120	750	526	155
450	18	460	405	222	710	150	750	526	155
500	20	515	440	229	775	150	750	601	160
600	24	550	520	267	915	200	750	601	160
750	30	640	620	318	990	200	900	749	210
800	32	700	665	318	1055	200	900	695	210
900	36	815	773	330	1170	200	900	1029	320
1000	40	850	755	410	1275	250	900	786	210
1050	42	850	725	410	1335	250	900	786	210
1200	48	940	835	470	1515	250	900	1029	320

CL 150 ASME B 16.5 FLANGED (M-51) LONG PATTERN									
(DN)	(NPS)	A	B	C	D	E	F	G	H
80	3	135	115	203	190	70	175	196	50
100	4	165	140	229	230	90	175	260	65
150	6	215	180	267	280	100	350	260	65
200	8	245	210	292	345	120	600	325	85
250	10	270	240	330	405	120	600	325	85
300	12	310	275	356	485	120	600	353	125
350	14	335	309	381	535	120	500	404	125
400	16	335	309	406	595	120	500	404	125
450	18	400	365	432	635	120	600	423	115
500	20	440	396	457	700	120	600	454	133
600	24	500	480	508	815	120	750	478	155

\*Manufacturer's Standard  
For additional range in higher sizes and pressure ratings in any models please contact Advance Valves.  
All dimensions are in mm.  
Content may change without notice.

## How to Enquire and Order ?

	B	T																		
Pressure Rating																				
Body Material																				
Disc Material																				
Body Seal																				
Disc Seat																				
Shaft																				
Operator																				
Size (in inches)																				
Facing																				
Flange Std																				
Model																				
Special Service																				



**Example :** BT15.LC999G.20.DA.31L

Valve Type	Pressure Rating	Body Material	Disc Material	Body Seal	Disc Seat	Shaft	Operator	Size	Facing	Flange Std.	Model	Special Service
BT	15	L	C	9	9	9	G	20	D	A	31	L
	ANSI #150	LCB ASTM A352	CF8M ASTM A351	Nitronic 50	Nitronic 50	XM 19	Gear Box	500 mm	Raised Face serrated	ANSI B 16.5	Double Flanged	Low Temp.

Pressure Rating	
Rating	Code
PN 6	06
PN 10	10
PN 16	16
# 125	12
# 150	15
# 300	30
# 600	60
# 900	90

Body & Disc Material	
Material	Code
WCB ASTM A216	S
LCB ASTM A352	L
LCC ASTM A352	M
WCC ASTM A217	W
WC6 ASTM A217	6
CA-15 ASTM A217	E
C5 ASTM A217	2
C12 ASTM A217	I
CF8M ASTM A351	C
CF3M ASTM A351	F
CF8C ASTM A351	8
Duplex Gr 4A ASTM 890/995	4
Duplex Gr 5A ASTM 890/995	5
Duplex Gr 6A ASTM 890/995	Z
Inc 825 ASTM A494 CU5MCuC	U
Inc 625 ASTM A494 CW_6MC	N
ASTM B367 GRC2 (Titanium)	T
Hastelloy B ASTM A494 N7M	I
Hastelloy C ASTM A494 CW12MW	V
ASTM A494 GR M35-1 N24020	Q
ASTM A494 GR M25-5 N24025	P
WC9 ASTM A217	9
CF8 ASTM A351	A
CF3 ASTM A351	3
ASTM A351 GR CN7M N08007	7
D2 ASTM A439	K
ASTM B148 AB2 C 95800	B
ASTM A148 AB2 C 95500	R
CF3MN ASTM A351	0
CK3MCuN ASTM A351	O

Body Seal / Disc Seat	
Material	Code
SS-316 Gr.18.8.2	C
Duplex Gr 4A ASTM 890 - J92205	4
Duplex Gr 5A ASTM 890 - J93404	5
Inc. 625	N
Inc. 825	U
Nitronic 50/XM 19	9
SS 410	E
PTFE with metal backing seal	T
BT ASTM A351 Gr. CK3MCuN	K
BT Hastelloy	V

Shaft	
Material	Code
SS-431	K
17-4PH/17-7PH	H
Duplex 4A	4
Duplex 5A	5
Duplex 6A	Z
Inc. 625	N
Inc. 825	U
Inc. 718	I
Monel 500	P
Monel 400	Q
Titanium	T
CK3MCuN ASTM A 479	O
Hastelloy C	V
Ferrallium	0
Nitronic 50 / XM 19	9
SS-316	C

Operator	
Material	Code
Gear Box	G
Electric Actuator	E
Hydraulic Actuator	H
Pneumatic Actuator	P
Electro Hydraulic Actuator	S
Bareshaft	B
BT Special Gear Box	R

Sizes			
MM	Code	MM	Code
80	03	1050	42
100	04	1100	44
150	06	1150	46
200	08	1200	48
250	10	1250	50
300	12	1300	52
350	14	1350	54
400	16	1400	56
450	18	1500	60
500	20	1600	64
600	24	1650	66
650	26	1700	68
700	28	1800	72
750	30	1900	76
800	32	2000	80
850	34	2200	88
900	36	2400	96
1000	40	2500	A0

*For additional range  
please contact Advance Valves.*

Facing	
Material	Code
Flat Face Smooth	A
Flat Face Serrated	B
Raised Face Smooth	C
Raised Face Serrated	D
Ring Joint	E

Flange Std	
Standard	Code
ANSI B16.5/ANSI B16.47 A /	A
MSS-SP-44	
ANSI B16.47B	B
AWWA C 207	C
EN 1092	E
IS 6392	F
BS 4504	H
ANSI B16.1	K
BS 10 E	S
BS 10 D	T
BT Others / Customer specified	X

Model	
Model	Code
Wafer	11
Wafer Cladded	14
Lugged	21
Lugged Cladded	24
Double Flanged	31
Double Flanged Cladded	34
Butt Weld	41
Double Flanged Long Pattern	51
Hub End	71

Special Service	
Service	Code
Oxygen	O
Bi-directional Testing	Q
Jacketed	J
ENP Coating	T
Stelliting on Seat	Y
Nace	N
IBR	I
Extended Bonnet	B
Vacuum	V
CE	P
Low Temp	L
Hydrogen	H
GOST Certified	G
Cryogenic	C
Fugitive Emission	E



Changing the way you think about valves

**Table 3a - Face-to-face Dimensions for Category B Valves (Lug-and-Wafer-type)**

Valve Size	CL 150		CL 300		CL 600		Maximum Variance $\pm$	
(NPS)	DN	NPS	DN	NPS	DN	NPS	DN	NPS
2				— <sup>a</sup>			3.3	0.13
2½	48	1.88	48	1.88	— <sup>a</sup>		3.3	0.13
3	48	1.88	48	1.88	54	2.12	3.3	0.13
4	54	2.12	54	2.12	64	2.50	3.3	0.13
6	57	2.25	59	2.31	78	3.06	3.3	0.13
8	64	2.50	73	2.88	402	4.00	3.3	0.13
10	71	2.81	83	3.25	117	4.62	3.3	0.13
12	81	3.19	92	3.62	140	5.50	3.3	0.13
14	92	3.62	117	4.62	155	6.12	3.3	0.13
16	102	4.00	133	5.25	178	7.00	3.3	0.13
18	114	4.50	149	5.88	200	7.88	3.3	0.13
20	127	5.00	159	6.25	216	8.50	3.3	0.13
24	154	6.06	181	7.12	232	9.13	3.3	0.13
24 to 60			— <sup>a</sup>				6.4	0.25

<sup>a</sup> Dimensions shall be manufacturer's standard or as agreed between purchaser and manufacturer.

**Table 3b - Face-to-face Dimensions for Category B Valves (Double-Flanged Long Pattern)**

Valve Class	CL 150 <sup>a</sup>		CL 300 <sup>a</sup>		CL 600 <sup>a</sup>		Maximum Variance $\pm$	
(NPS)	DN	NPS	DN	NPS	DN	NPS	DN	NPS
3	203	8.00	282	11.12	356	14.00	3.3	0.13
4	229	9.00	305	12.00	432	17.00	3.3	0.13
6	267	10.50	403	15.88	559	22.00	3.3	0.13
8	292	11.50	419	16.50	660	26.00	3.3	0.13
10	330	13.00	457	18.00	787	31.00	3.3	0.13
12	356	14.00	502	19.75	838	33.00	3.3	0.13
14	381	15.00	762	30.00	889	35.00	3.3	0.13
16	406	16.00	838	33.00	991	39.00	3.3	0.13
18	432	17.00	914	36.00	1092	43.00	3.3	0.13
20	457	18.00	991	39.00	1194	47.00	3.3	0.13
24	508	20.00	1143	45.00	1397	55.00	4	0.16
26	559	22.00	1245	49.00	1448	57.00	4	0.16
28	610	24.00	1346	43.00	1549	61.00	4	0.16
30	610	24.00	1397	55.00	1651	65.00	4	0.16
32	660	26.00	1524	60.00	1778	70.00	4	0.16
36	711	28.00	1727	68.00	2083	82.00	5	0.19
38-60			— <sup>b</sup>				5	0.19

**Table 3c - Face-to-face Dimensions for Category B Valves (Double-Flanged Short Pattern)**

Valve Class	CL 150 <sup>a</sup>		CL 300 <sup>a</sup>		CL 600 <sup>a</sup>		Maximum Variance $\pm$	
(NPS)	DN	NPS	DN	NPS	DN	NPS	DN	NPS
3	114	4.50	180	7.09	180	7.09	3.3	0.13
4	127	5.00	190	7.48	190	7.48	3.3	0.13
6	140	5.50	210	8.27	210	8.27	3.3	0.13
8	152	6.00	230	9.06	230	9.06	3.3	0.13
10	165	6.50	250	9.84	250	9.84	3.3	0.13
12	178	7.00	270	10.63	270	10.63	3.3	0.13
14	190	7.50	290	11.42	290	11.42	3.3	0.13
16	216	8.50	310	12.20	310	12.20	3.3	0.13
18	222	8.75	330	12.99	330	12.99	3.3	0.13
20	229	9.00	350	13.78	350	13.78	3.3	0.13
24	267	10.50	390	15.35	390	15.35	4	0.16
26	292	11.50	410	16.14	— <sup>c</sup>		4	0.16
28	292	11.50	430	16.93	— <sup>c</sup>		4	0.16
30	318	12.52	450	17.72	— <sup>c</sup>		4	0.16
32	318	12.52	470	18.50	— <sup>c</sup>		4	0.16
36	330	12.99	510	20.08	— <sup>c</sup>		5	0.19
38	410	16.14	530	20.87	— <sup>c</sup>		5	0.19





## PRODUCT RANGE & APPLICATIONS

Type	Size Range	Rating	Design & Qualification	Application
Dual Plate Check Valve - Retainerless Wafer, Lugged, Flanged	DN 50 - 2000 NPS 2 - 80	ASME CL 125 - 2500	API 594, API 6D, API 6FA, BS 6364 / ISO 5752, ISO 28921, ISO 10497	All Services including Cryogenic & Fire Safe, -196°C (-321°F) to 750°C (1382°F)
Axial Flow Check Valve Flanged	DN 25 - 1600 NPS 2 - 64	ASME CL 150 - 1500	ASME B16.34, API 6D	All Services including Cryogenic & Fire Safe, -196°C (-321°F) to 750°C (1382°F)
Butterfly Valve - Triple Offset Metal Seated Wafer, Lugged, Flanged	DN 80 - 3000 NPS 3 - 120	ASME CL 150 - 1500	API 609 Category B, API 607, API 641 ISO 5752, ISO 15848, BS 6364, ISO 28921, ISO 10497, SIL 3	All Services including Cryogenic & Fire Safe, -196°C (-321°F) to 750°C (1382°F)
Butterfly Valve - Double Offset High Performance Wafer, Lugged, Flanged	DN 80 - 3000 NPS 3 - 120	PN 10 - 25 ASME CL 150 - 300	API 609 Category B, BS EN 593, ISO 5752, IS 13095, AWWA C504/516	Water, Chemicals, Air, Oil, Gases up-to 200°C (392°F), Vacuum
Butterfly Valve - Concentric Integrally Molded Liner	DN 50 - 1200 NPS 2 - 48	PN 10 - 20 ASME CL 150	API 609 Category A, BS EN 593, IS 13095, UL 1991	Water, Chemicals, Air, Oil, Gases up-to 200°C (392°F), Vacuum
Butterfly Valve - Concentric Low Torque Replaceable Liner	DN 50 - 300 NPS 2 - 12	PN 10	API 609 Category A, BS EN 593 IS 13095	Water, Chemicals, Air, Oil, Gases -20°C to 120°C
Actuated Butterfly On-Off / Modulating	DN 50 - 3000 NPS 2 - 120	PN 10 - 16 ASME CL 150 - 1500	API 609 Category A & B, SIL 3	Electric, Pneumatic, Electro-Hydraulic Hydraulic, Controls & Accessories
Balancing Valve	DN 25 - 1200 NPS 1 - 48	PN 10 - 25	DIN 3202, BS 7350, BS EN 593 Face to Face - ISO 5752 Table 8	Water, Glycol, Brine Solution

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