tyco

Flow Control

KEYSTONE

- • **F611 Wafer style resilient seated bi-directional butterfly valve in sizes 50 - 300mm to 1600 kPa.**
- • **F612 Lugged style resilient seated bi-directional butterfly valve in sizes 50 - 300mm to 1600 kPa.**

Features

- ● Rounded polished disc edge gives full concentric sealing, lower torques, longer seat life and bubble-tight shut-off.
- ● The seat is field replaceable and fully isolates the body and stem from the flow.
- ● Primary stem sealing exceeds the pressure rating of the valve and prevents leakage through shaft area to atmosphere.
- ● A secondary shaft seal provides back-up safety.
- ● Top and bottom inboard shaft bearings for optimum support and minimum friction to prolong valve life.
- ● Top bushing absorbs actuator side thrust loads.
- ● Top seal prevents moisture penetrating into the shaft area.
- ● The thin disc provides minimum obstruction to flow, resulting in smooth flow characteristics.
- ● A molded-in O-ring in the seat for flange sealing eliminates the need for gaskets.
- ● Extended body neck allows pipe insulation.
- ● Body locating holes ease installation and centering between the flanges.
- ● Available approvals: PED (CE Mark), DNV, Lloyds.

General Applications:

These valves are ideally suited to many applications where tight shut-off is required, such as:
Industrial processing
Water & wastewater
Dry bulk conveying
Paper mills
Light slurry handling
Food & beverage.

Technical Data:

Size Range:
F611 (wafer style) 50-300 mm
F612 (lugged style) 50-300 mm
Pressure: 1600 kPa
End of line: up to 1200 kPa
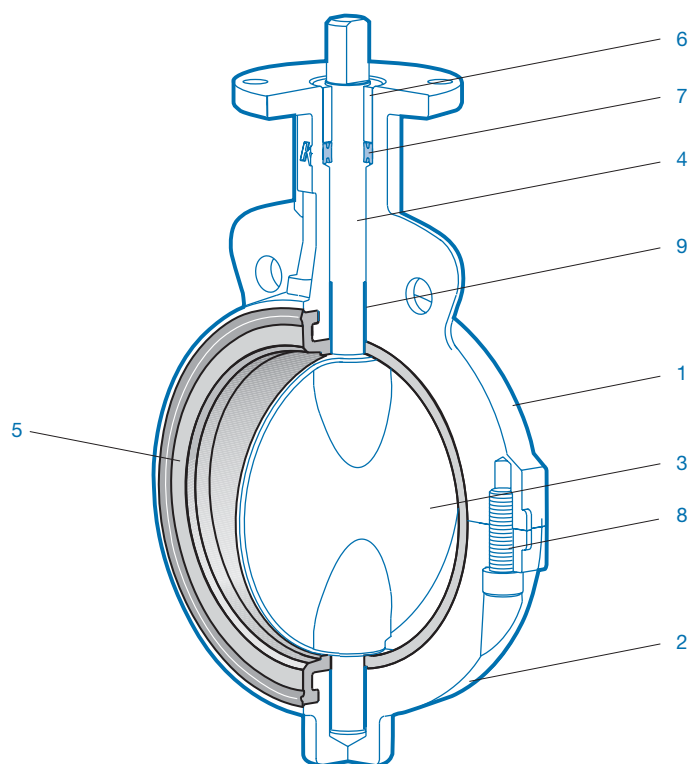**Temperature:** minus 40 to 150°C
End Connections:
AS 2129 C, D, E & F
ANSI 150
PN 6/10/16
JIS, 10K

A.B.N. 83 000 922 690

Note: F611 valve illustrated

Pressure Ratings:

End of Line Service

Standard Seat = 1000 kPa
Super Seat = 1200 kPa

Temperature Rating:

Minus 40°C to 120°C with EPDM & XEPDM
Minus 15°C to 100°C with Buna N & XBuna N
Minus 30°C to 150°C with HT EPDM

Note:
PED approved valves have a temperature limitation of minus 28°C due to body material.
Consult factory for available trims.

Parts List

No.	Description	Standard Material	Material Specification
1	Upper Body	Ductile Iron	ASTM A536 Gr 65-45-12
2	Lower Body	Ductile Iron	ASTM A536 Gr 65-45-12
3	Disc	316 Stainless Steel	ASTM A351 Gr CF8M
		Aluminium Bronze	ASTM B148 C95200
		Ductile Iron (ENP Coated)	ASTM A536 Gr 65-45-12
4	Shaft	316 Stainless Steel	EN10088-3 X5Cr NiMo 17-12-2
5	Seat	EPDM#	EM-D1-48
		Buna N#	EM-D1-49
		HT EPDM	EM-D1-50
		XEPDM	-
		XBuna N	-
6	Shaft Bush	Polyester	-
7	Shaft Seal	Buna N	-
8	Body Screws	Carbon Steel (Plated)	BS EN ISO898-1 Class 8.8
9	Bearings	Steel Backed PTFE	-

Note:
 # Food grade seat.
X = Super Seat version.
ENP = Electroless Nickel Plated (for corrosion resistance).
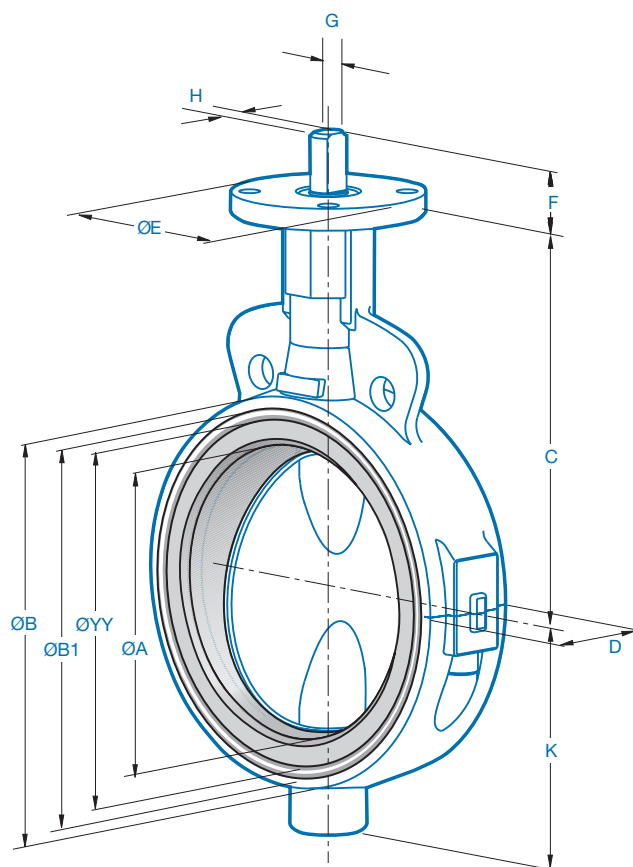
Note: F611 valve illustrated
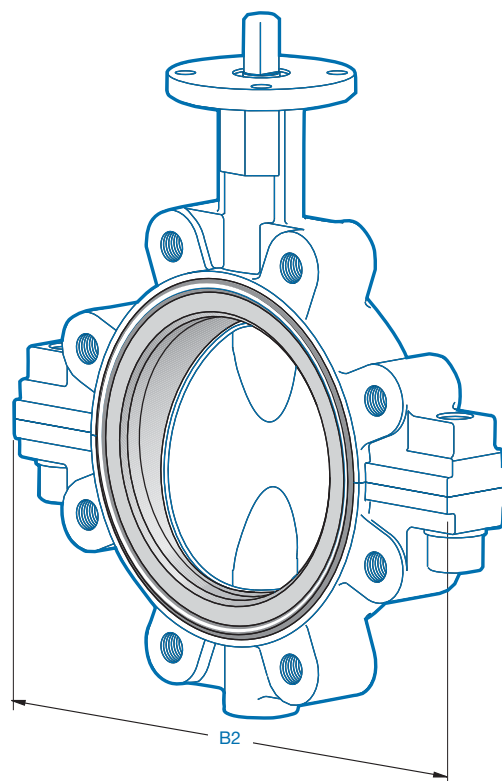
Note: F612 valve illustrated

Dimensions (mm)

Valve Size mm	Stem Conn. Code	ØA	ØB	ØB1	B2	C	D	ØE	F	K	Q	ØYY	Stem Conn. H x G inches	Key inches	Top Plate PCD. mm	Hole Dia. mm	Mass F611 kg	F612 kg
50	-	50	94	80	180	135	43	102	25	71	27	66	0.472 x 0.315		83	11	2.1	3.7
65	BAB	62	109	93	200	150	46	102	30	78	43	78	$9/16$ x $3/8$		83	11	3.2	5.0
80	BAB	78	126	112	240	160	46	102	30	101	64	97	$9/16$ x $3/8$		83	11	3.6	5.9
100	BAC	99	156	144	268	180	52	102	30	115	87	129	$5/8$ x $7/16$		83	11	5.2	8.3
125	BAD	124	189	175	300	195	56	102	30	119	113	160	$3/4$ x $1/2$		83	11	7.6	11.5
150	BAD	151	214	196	335	210	56	102	30	142	141	181	$3/4$ x $1/2$		83	11	8.5	13.0
200	CAE	195	267	248	397	240	60	152	32	179	188	233	$7/8$ x $5/8$		127	14	16.0	22.2
250	CAF	245	321	305	480	275	68	152	50	219	237	290	Ø$1^1/8$	$1/4$ x $1/4$	127	14	23.5	33.5
300	CAF	292	375	355	544	310	78	152	50	244	283	340	Ø$1^1/8$	$1/4$ x $1/4$	127	14	32.0	51.0

Notes:
"Q" dimension is the disc chordal dimension at face of valve for disc clearance into lined pipe or fittings.
"H" dimension is the stem connection.
"G" dimension is across the stem flats.
"ØB1" dimension is to the outside of the seat.
"ØYY" dimension is to the O-ring seal.
Mass may vary depending on trim materials used.
Dimensions are nominal to ±1mm.

Anticipated Seating & Unseating Torque Values - Nm (Standard Seats)

Valve Size mm	Shut Off Pressure kPa/(bar) Normal Service					
	0 (0)	350 (3.5)	700 (7)	1000 (10)	1400 (12)	1600 (16)
50	13	13	13	14	15	15
65	18	19	20	21	23	25
80	25	26	27	30	33	36
100	34	37	40	44	49	51
125	53	58	63	70	80	85
150	74	81	88	99	113	120
200	132	148	164	188	219	235
250	211	241	271	315	374	403
300	303	345	387	451	536	578

Note:

1. The charted seating and unseating torques are the sum of all friction and for opening and closing of the disc against the indicated pressure differential for normal service.
2. Normal Service: Clean liquid service at temperatures between minus 4.5°C to 93°C with no internal deposition or chemical attack.
   Operated a minimum of once per day.
3. The relationship between values are linear, therefore you can interpolate between nominated values.
4. The effect of dynamic torque is not considered in tabulation.
5. In sizing operators it is not necessary to include safety factors.

For conditions that vary from those noted, then apply the following Application Factor Multipliers:

Operated less than once per day	x 1.2
Dry Service with gas or air	x 1.5
Dry Service with abrasives, cement	x 1.7
Lubrication oils	x 0.5
Temperature - lower than minus 4.5°C	x 1.2
- higher than 93°C	x 1.2
Chemical attack: Consult factory	

Note:

To apply the as noted Application Factor Multipliers:
1. Find the base torque value by selecting the required valve size from the left hand column and read across to the intended line pressure column. Note the torque value. (You can interpolate between line pressure values.)
2. Find the zero pressure torque for the same valve on the same row and subtract this zero pressure torque from the value in step 1.
3. Multiply the zero pressure torque value by the expected Application Factors.
4. Add the difference between the zero pressure torque and the line pressure torque (value of step 2 plus value of step 3) to give the new torque value specific to the actual service conditions.

Example:

A 100mm Figure 611 DEE2 AS 2129 E valve is to be used in a clean water application. The line pressure is 1600 kPa (16 bar) @ 100°C. The valve may only cycle twice per month.
1. Using the Normal Service Torque Values table Base Torque value for 150mm @ 1600 kPa (16 bar) = 120Nm
2. Find torque value at zero kPa = 74 Nm
   Subtract 120 - 74 = 46Nm
3. Multiply zero pressure torque value by Application Factors
   Application Factors:
   Operated less than once per day = x 1.2
   Temperature higher than 93°C = x 1.2
    Multiply Application Factors 1.2 x 1.2 = 1.44 (round off to 1.4)
   74 x 1.4 = 104 Nm
4. Add the difference between zero pressure and line pressure, as per step 2 to the value determined in step 3.
   46 + 104 = 150Nm

The new torque value for this valve, specific to the actual service conditions is 150 Nm.

Notes:

As the Super Seat is intended for high pressure applications the base torque commences at 1000 kPa/10 bar. Superseats are suitable for:
- Severe vacuum applications.
- High line velocities up to 9 m/s for liquids.
- Slip-on flanges.
- Full rated end-of-line service.
- Pressure testing during erection and commissioning.

Anticipated Seating & Unseating Torque Values - Nm (Super Seat*)

Valve Size mm	Shut Off Pressure kPa/(bar) Normal Service		
	1000 (10)	1400 (12)	1600 (16)
50	18	19	19
65	28	30	31
80	40	43	44
100	59	64	67
125	95	104	109
150	134	148	155
200	250	281	297
250	412	471	501
300	591	676	719

For conditions that vary from those noted, then apply the following Application Factor Multipliers:

Operated less than once per day	x 1.2
Dry Service with gas or air	x 1.5
Dry Service with abrasives, cement	x 1.7
Lubrication oils	x 0.5
Temperature - lower than minus 4.5°C	x 1.2
- higher than 93°C	x 1.2
Chemical attack: Consult factory	

Note:

To apply the as noted Application Factor Multipliers:
1. Find the base torque value by selecting the required valve size from the left hand column and read across to the intended line pressure column. Note the torque value. (You can interpolate between line pressure values.)
2. Find the 1000 kPa/(10 bar) pressure torque for the same valve on the same row and subtract this zero pressure torque from the value in step 1.
3. Multiply the 1000 kPa/(10 bar) pressure torque value by the expected Application Factors.
4. Add the difference between the 1000 kPa/(10 bar) pressure torque and the line pressure torque (value of step 2 plus value of step 3) to give the new torque value specific to the actual service conditions.

Notes:

1. The charted seating and unseating torques are the sum of all friction and resistance for opening and closing of the disc against the indicated pressure differential for normal service.
2. Normal Service: Clean liquid service at temperatures between minus 4.5°C to 93°C with no internal deposition or chemical attack. Operated a minimum of once per day.
3. The relationship between values are linear, therefore you can interpolate between nominated values.
4. The effect of dynamic torque is not considered in tabulation.
5. In sizing operators it is not necessary to include safety factors.

Anticipated Seating & Unseating Torque Values - Nm (Undercut Valves)

Size mm	Shut Off Pressure kPa/(bar) Normal Service		
	350 (3.5)	700 (7)	1000 (10)
50	10	11	11
65	15	16	17
80	21	22	24
100	30	32	35
125	46	50	56
150	65	71	79
200	119	131	150
250	193	216	252
300	276	310	361

For conditions that vary from those noted, then apply the following Application Factor Multipliers:

Operated less than once per day	x 1.2
Dry Service with gas or air	x 1.5
Dry Service with abrasives, cement	x 1.7
Lubrication oils	x 0.5
Temperature - lower than minus 4.5°C	x 1.2
- higher than 93°C	x 1.2
Chemical attack: Consult factory	

Note:

To apply the as noted Application Factor Multipliers:
1. Find the base torque value by selecting the required valve size from the left hand column and read across to the intended line pressure column. Note the torque value. (You can interpolate between line pressure values.)
2. Multiply the noted value by the expected Application Factors.
3. The result provides the new torque value specific to the actual service conditions.

Maximum Allowable Shaft Torques (Nm)

Valve size	50	65	80	100	125	150	200	250	300
316 S/S	65	110	110	160	260	260	480	970	970

Notes:

The values listed represent the maximum torques which can be transmitted through the actuator flange. These values are based upon specific criteria and can be lower than the maximum allowable shaft torques. In this case the criteria can be changed in order to reach the maximum allowable shaft torques.

Flowrate Co-efficients - Kv Values (Nm)

Size (mm)	Disc Opening (Degrees)								
	10°	20°	30°	40°	50°	60°	70°	80°	90°
50	0	0.9	4.8	14	30	47	72	99	108
65	0	2.4	11	27	50	78	123	172	217
80	0	6.0	28	55	91	141	215	304	409
100	0	14	57	109	177	265	407	600	807
125	0	28	85	158	250	389	630	964	1251
150	7	52	130	226	367	578	987	1551	1946
200	22	115	231	405	646	1029	1773	2910	3516
250	34	173	339	641	980	1546	2677	4449	5806
300	49	253	495	935	1430	2255	3905	6710	8910

Note:

Kv = The volume of water in m³/hr that will pass through a valve with a pressure drop of 1 bar (100 kPa) @ 20°C.

Simplified Sizing Formulas

LIQUID

$$Kv = Q \sqrt{\frac{S.G.}{\Delta P}}$$

WHERE

Q = Flow through valve (m³/hr)
S.G. = Specific gravity (water = 1)
ΔP = Pressure drop across valve (bar)

GAS

$$Kv = \frac{Q}{28.5} \sqrt{\frac{S.G.}{P_2 \Delta P}}$$

WHERE

Q = Flow through valve (Nm³/hr)
S.G. = Specific gravity (air = 1)
ΔP = Pressure drop across valve (bar)
　　　[Less than $^1/_2$ inlet pressure (bar)]
P₂ = Outlet pressure (bar)

HEAD LOSS

$$HL = \frac{10.194 \, \Delta P}{S.G.}$$

WHERE

HL = Head Loss (m)
ΔP = Pressure drop across valve (bar)
S.G. = Specific gravity (water = 1)

Butterfly Valves - Figure 611 & 612
50mm - 300mm

Typical Specifying Sequence

Example:	100	F611	DEE2	AE
	Valve Size	Figure No.	Trim Code	End Connections

Valve Trims

Figure No.	Trim Code	Body	Disc	Shaft	Seat	Bush	Packing
F611/F612	DEE2	Ductile Iron	316 S/S	316 S/S	EPDM	Polyester	Buna N
F611/F612	DEE3	Ductile Iron	316 S/S	316 S/S	Buna N	Polyester	Buna N
F611/F612	DEEQ	Ductile Iron	316 S/S	316 S/S	XEPDM	Polyester	Buna N
F611/F612	DEER	Ductile Iron	316 S/S	316 S/S	XBuna N	Polyester	Buna N
F611/F612	DEET	Ductile Iron	316 S/S	316 S/S	HT EPDM	Polyester	Buna N
F611/F612	DLE2	Ductile Iron	Al Bronze	316 S/S	EPDM	Polyester	Buna N
F611/F612	DLE3	Ductile Iron	Al Bronze	316 S/S	Buna N	Polyester	Buna N
F611/F612	DLEQ	Ductile Iron	Al Bronze	316 S/S	XEPDM	Polyester	Buna N
F611/F612	DLER	Ductile Iron	Al Bronze	316 S/S	XBuna N	Polyester	Buna N
F611/F612	DLET	Ductile Iron	Al. Bronze	316 S/S	HT EPDM	Polyester	Buna N
F611/F612	DYE2	Ductile Iron	Ductile Iron	316 S/S	EPDM	Polyester	Buna N
F611/F612	DYE3	Ductile Iron	Ductile Iron	316 S/S	Buna N	Polyester	Buna N
F611/F612	DYEQ	Ductile Iron	Ductile Iron	316 S/S	XEPDM	Polyester	Buna N
F611/F612	DYER	Ductile Iron	Ductile Iron	316 S/S	XBuna N	Polyester	Buna N
F611/F612	DYET	Ductile Iron	Ductile Iron	316 S/S	HT EPDM	Polyester	Buna N

End Connections
- AE = AS 2129 table E
- AN = ANSI B16.5 Class 150
- Others available on request.

Note:
XEPDM & XBuna N denotes Super Seat option.
HT EPDM denotes high temperature EPDM.
Ductile iron discs are Electroless Nickel Plated (ENP).
Consult factory for available PED trims.

Available Actuators & Accessories

Figure No.	Description
F79U/E	Aluminium Pneumatic actuators, double acting or spring return.
F79B	Ductile Iron Pneumatic actuators, double acting or spring return.
F79S	Stainless Steel Pneumatic actuators, double acting or spring return.
F777	Electric actuators.
F77Q	Heavy Duty Electric actuators.
F791	Solenoid valves.
F792	Limit switches.
F793	Positioners.
F401	Manual Handle
F427	Gear operators.