

MILLIKEN®

a MUELLER brand

BF SERIES WAFFER / LUG BUTTERFLY VALVES



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BF SERIES WAFER / LUG BUTTERFLY VALVES

We design, develop, manufacture and market plug, butterfly, and check valves and their respective controls and actuators. These valves are used primarily in the water, wastewater, and industrial markets.

We started over three decades ago manufacturing the eccentric plug valve for the waste water and HVAC marketplace. Growth has been constant with the addition of an AWWA butterfly valve, general service butterfly valve, swing check valve, rubber flapper check valve, double disc check valve, wafer (outside spring) check valve, globe style check valve and compact wafer check valve.

We believe that in order to satisfy customers, our products need to be considered the best design and the highest quality within the industry. All of our valves have had extensive testing before they are marketed or sold. Milliken quality standards are a step above the industry norm, and we are committed to standing behind our products in the field. All valves are tested in complete conformance to applicable standards before shipment. In addition, valve designs are routinely sent to independent testing facilities to ensure they meet or exceed expectations.

We offer the following for your water and wastewater needs:

- Eccentric Plug Valves
- Series 601 / 600 Flanged & MJ
- Series 601S Stainless Steel
- Series 601RL Rubber Lined
- Series 602 High Pressure
- Series 613A Threaded End
- Series 604E Three Way
- Series 606 Grooved End
- Series 611 / 610 Flanged & MJ
- Model 625 UL Listed
- Series 601FP / 600FP Flanged & MJ 100% / Full Port
- AWWA Swing Check Valves
- Wafer Check Valves
- Flex Check
- Spring Loaded Check Valves
- AWWA Butterfly Valves
- General Service Butterfly Valves

BF SERIES WAFER / LUG BUTTERFLY VALVES

Construction Specification

MILLIKEN BF SERIES BUTTERFLY VALVES



VALVE WITH ELECTRIC OPERATOR



VALVE WITH GEAR OPERATOR

SIZES

2" through 48"

BODY

Ductile Iron (65-45-12)

DISC

Ductile Iron Nickel Plated, Ductile Iron Nylon 11, CF8M Stainless Steel, Aluminum Bronze

STEM

416 S.S. Heat Treated

RESILIENT STEEL

EPDM, Buna-N, Viton

ACTUATION OPTIONS

Worm Gear, Lever, Pneumatic, Electric

PRESSURE RATINGS

2" - 12" 230 psi

14" - 48" 150 psi

* For installation between ANSI 125/150 flanges

** Substitute material may result in pressure rating change.
Contact factory for details.

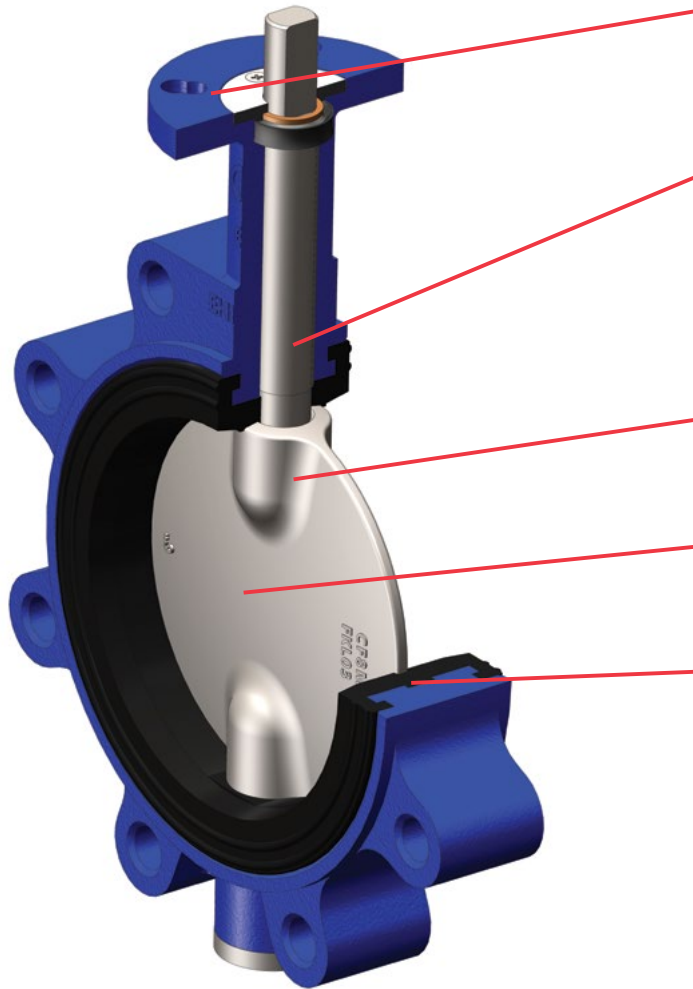
FEATURES

- Innovative 3 point connection, tongue and groove seat allows for higher pressure rating and full Vacuum service.
- Unique secondary shaft seals prevent leakage from shaft.
- Our two piece shaft design provides maximum strength and a high flow characteristic disc.

BF SERIES WAFER / LUG BUTTERFLY VALVES

Design Details

BUTTERFLY VALVE, SIZES 2" THROUGH 48", 2" - 12" 230 PSI, 14" - 48" 150 PSI



TOP FLANGE

Conforms to ISO 5211 and KV industrial standard allowing a universal mounting pad for automation requirements which is suitable for most actuators in the market.

BLOWOUT PROOF STEM

Meets all API 609 requirements. Our unique design also creates a secondary stem journal seal preventing leakage to atmosphere.

A FULL LENGTH NYLATRON® BUSHING

Reduces stem journal friction and reduces torque.

WE UTILIZE 2 INTERNALLY DRIVEN SHAFTS

Creating a strong drive connection and allowing for a thin profile disc creating high C_v 's.

THIN PROFILE, HIGH TENSILE STRENGTH DISC

Maximizes C_v 's and allows for 230 psi pressure rating (on 12" and smaller).

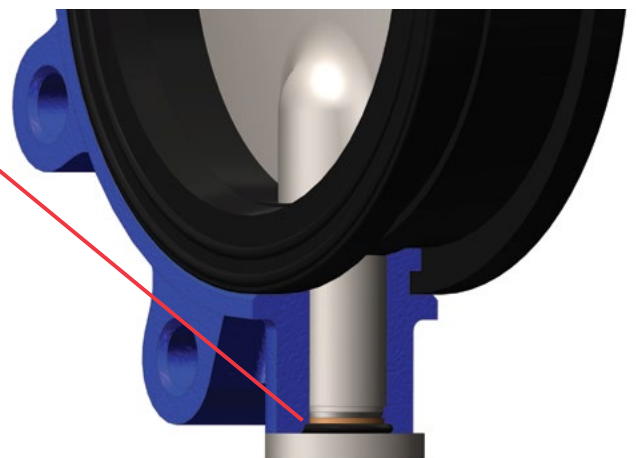
OUR UNIQUE SEAT DESIGN

Utilizes 3 tongue and groove connection points to the valve body. Seats remain secure and stable even under high dead-end pressure and full vacuum services. The center tongue not only locks the seat in place, but allows rubber material to flow into the center body groove when cycling the valve, drastically reducing the operating torque.

OUR BF SERIES BOTTOM CAP

Provides lower stem retention and also creates a secondary stem journal seal preventing external leakage to atmosphere. 2" - 12" lower shafts ride on a precision wear guide reducing shaft drag.

14" and larger utilizes an axial bearing to support the weight of the shaft and disc, providing a close to friction-free movement.



BF SERIES WAFER / LUG BUTTERFLY VALVES

Suggested Specifications

SIZES 2" THROUGH 48", 2" - 12" 230 PSI, 14" - 48" 150 PSI

GENERAL

Valves shall be of the Wafer or Lug design for installation between ANSI 125 / 150 flanges. All valves shall be capable of bi-directional, end of line, bubble tight service to rated pressure. Valves are also rated to full vacuum service. Design Standards: API 608 category A.

PRESSURE RATING

2" – 12" – 230 psi to fit between ANSI 125 / 150 flanges

14" – 48" – 150 psi to fit between ANSI 125 / 150 flanges

BODY

Valve body shall be a 1 piece Ductile Iron ASTM A-536 (65-45-12) construction with a laying length conforming to the latest revision of ISO 5752 and a flange connection B16.1 / B16.5.

DISC

Valve disc shall be Ductile iron ASTM A-536 Grade 65-45-12 with ENP plating or Nylon 11 coating, CF8M Stainless Steel, or Aluminum Bronze C954. Disc shall be designed to accommodate an upper and lower shaft with a thin center profile giving higher C_v values combined with strength.

SHAFT

Valve shaft shall be constructed of Heat Treated 416 Stainless Steel. Valve shall be designed to accommodate (2) shafts (1 upper and 1 lower). The upper shaft shall have a positive engagement in the disc utilizing an internal square drive and shall be retained by the body Top Cap and End Cap.

SEAT

Seat shall be EPDM, Buna-N or Viton. Seat design shall consist of 3 Tongues (2 located on the side walls and 1 located in the center bore) that engage into 3 grooves in the body. These 3 tongue and groove connection points prevent seat movement in a radial and axial direction. Seats shall be field replaceable.

SHAFT SEALS

Upper Shaft Seal shall be self-adjusting V-type and shall be suitable for Pressure or Vacuum service. Packing shall be located above the bushing and shall create a positive seal against the Top Cap. Bottom end cap contains a captive o-ring creating a positive seal against external leakage.

BUSHINGS

Hydrostatic and seat leakage tests shall be conducted in strict accordance with AWWA Standard C504.

TESTING

All valves shall be leak tested in the factory at their rated pressure per API 598.

BF SERIES WAFER / LUG BUTTERFLY VALVES

C_v Flow Data

During its product development phase, the BF Series Wafer / Lug Butterfly Valve was tested to ensure that it met our own rigorous standards for flow capacity. Throughout testing, the BF Series valve has consistently produced high C_v values which translates to lower flow resistance, and in turn, lowering system operating costs to the user over the life of the valve. The following C_v chart represents the flow characteristics for all sizes available.

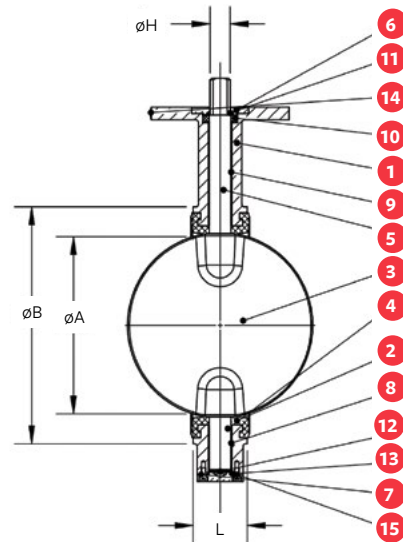
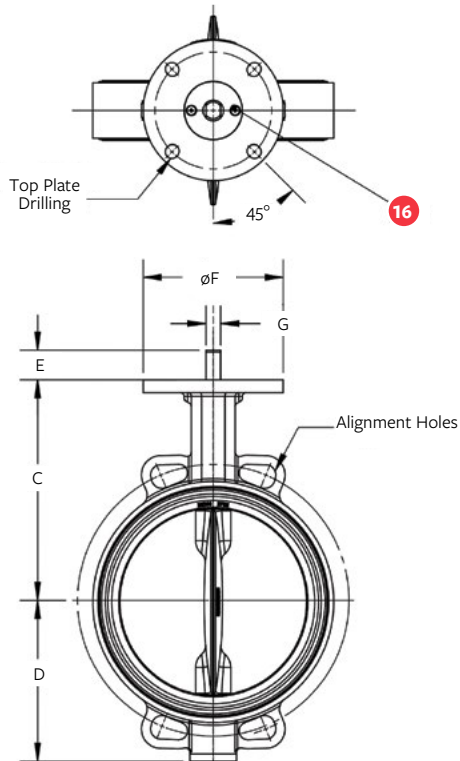
VALVE OPENING (DEG)	C _v BY VALVE SIZE													
	2"	2.5"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
10	1	2	3.5	6	8.5	14	18	28.1	40.5	55.1	72	91.1	112.5	162
20	1.8	2.9	4.1	7.4	11.5	16.5	29.4	185.5	267.1	363.6	474.9	601.1	742.1	1069
30	10.8	16.9	24.3	43.2	67.5	97.1	172.7	381.5	549.4	747.8	976.7	1236	1526	2198
40	22.1	34.5	49.7	88.4	138.1	198.8	353.4	683.1	983.6	1339	1749	2213	2732	3935
50	38.5	60.2	86.7	154.2	240.9	346.9	616.8	1161	1671	2275	2971	3761	4643	6685
60	65.3	102	146.9	261.1	408	587.6	1045	1944	2799	3810	4976	6298	7775	11196
70	111	173.5	249.8	444.1	693.9	999.2	1776	3232	4654	6335	8274	10472	12928	18617
80	176.2	275.2	396.3	704.6	1101	1585	2818	6215	8950	12182	15911	20138	24862	35801
90	206.4	322.5	464.4	825.6	1290	1858	3302	6420	9245	12583	16435	20801	25680	36979



BF SERIES WAFER / LUG BUTTERFLY VALVES BEING TESTED AT AN INDEPENDENT RESEARCH LABORATORY

BF SERIES WAFER / LUG BUTTERFLY VALVES

Dimensional Data - Wafer

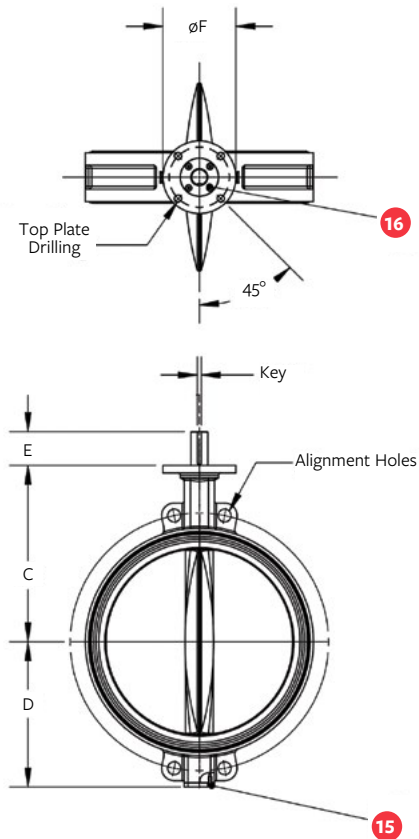


PART NO.	PART NAME	MATERIAL	QTY.
1	Wafer Body	DI	1
2	Seat	EPDM/NBR/Viton	1
3	Disc	CF8M/DI-NP/Al Bz C954/DI-Nylon 11	1
4	Lower Stem	SS416/SS316/SS630	1
5	Upper Stem	SS416/SS316/SS630	1
6	Top Cap	1020 Steel	1
7	End Cap	1020 Steel	1
8	Lower Bushing	Nylatron®	1
9	Upper Bushing	Nylatron®	1
10	V-packing	NBR	1
11	Washer	SS304	1
12	Wear Shim	SS304	1
13	O-ring	NBR	1
14	Data Plate	SS304	1
15	End Cap Bolt	SS304	2
16	Top Cap Bolt	SS304	2

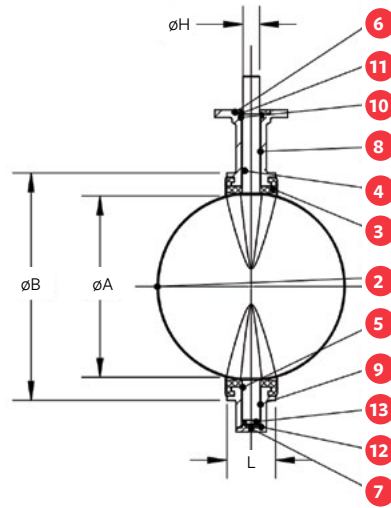
SIZE	ØA	ØB	C	D	E	ØF	G	ØH	L	KEY	MILLIKEN STANDARD TOP PLATE DRILLING			ISO 5211 TOP PLATE DRILLING			ALIGNMENT HOLES		
											BOLT CIRCLE	NO. OF HOLES	HOLE DIA.	BOLT CIRCLE	NO. OF HOLES	HOLE DIA.	BOLT CIRCLE	NO. OF HOLES	HOLE DIA.
2"	1.079	3.500	5.000	2.579	1.260	4.000	0.375	0.563	1.693	-	3.25	4	0.437	2.760	4	0.402	4.75	4	0.75
2.5"	1.862	4.094	5.500	2.854	1.260	4.000	0.375	0.563	1.811	-	3.25	4	0.437	2.760	4	0.402	5.5	4	0.75
3"	2.429	4.646	5.709	3.642	1.260	4.000	0.375	0.563	1.811	-	3.25	4	0.437	2.760	4	0.402	6	4	0.75
4"	3.500	5.827	6.496	4.429	1.260	4.000	0.437	0.625	2.047	-	3.25	4	0.437	2.760	4	0.402	7.5	4	0.75
5"	4.567	7.205	7.500	4.921	1.260	4.000	0.500	0.750	2.205	-	3.25	4	0.437	2.760	4	0.402	8.5	4	0.88
6"	5.433	7.992	7.874	5.433	1.260	4.000	0.500	0.750	2.205	-	3.25	4	0.437	2.760	4	0.402	9.5	4	0.88
8"	7.744	10.315	9.500	6.811	1.260	6.000	0.625	0.875	2.362	-	5	4	0.563	4.921	4	0.563	11.75	4	0.88
10"	9.646	12.598	10.866	8.110	2.000	6.000	-	1.125	2.677	1/4" * 1/4"	5	4	0.563	4.921	4	0.563	14.25	4	1
12"	11.339	14.567	12.205	9.713	2.000	6.000	-	1.125	3.071	1/4" * 1/4"	5	4	0.563	4.921	4	0.563	17	4	1

BF SERIES WAFER / LUG BUTTERFLY VALVES

Dimensional Data - Wafer



Section B-B



PART NO.	PART NAME	MATERIAL	QTY.
1	Wafer Body	DI	1
2	Disc	CF8M/DI-NP/Al Bz C954/DI-Nylon 11	1
3	Seat	EPDM/NBR/Viton	1
4	Upper Stem	SS416/SS316/SS630	1
5	Lower Stem	SS416/SS316/SS630	1
6	Top Cap	1020 Steel	1
7	End Cap	1020 Steel	1
8	Upper Bushing	Nylatron®	1
9	Lower Bushing	Nylatron®	1
10	V-packing	NBR	1
11	Washer	SS304	1
12	O-ring	NBR	1
13	Bearing	Steel	1
14	Top Cap Bolt	SS304	4
15	End Cap Bolt	SS304	4

MILLIKEN STANDARD TOP
PLATE DRILLING

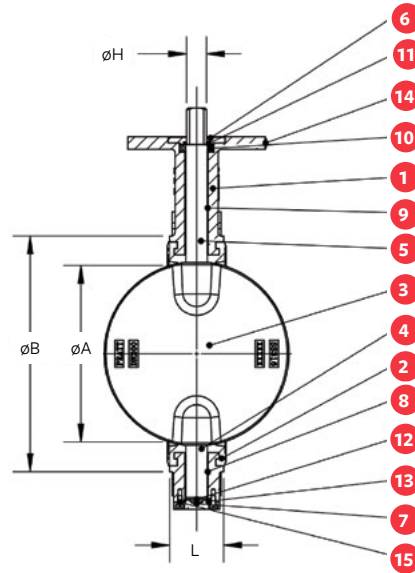
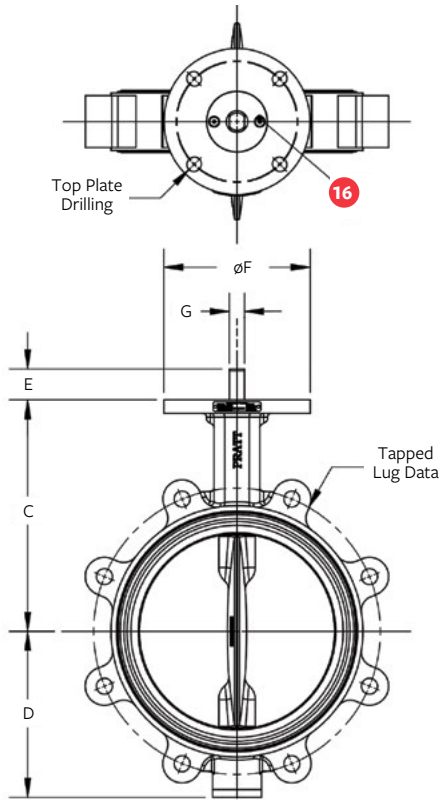
ISO 5211
TOP PLATE DRILLING

ALIGNMENT HOLES

SIZE	ϕA	ϕB	C	D	E	ϕF	ϕH	L	KEY	BOLT CIRCLE	NO. OF HOLES	HOLE DIA.	BOLT CIRCLE	NO. OF HOLES	HOLE DIA.	BOLT CIRCLE	NO. OF HOLES	HOLE DIA.
14"	12.677	16.772	12.992	10.984	2.760	6.000	1.374	3.071	5/16" * 5/16"	5	4	0.563	4.92	4	0.563	18.75	4	1.122
16"	14.921	18.748	14.567	11.969	2.760	6.000	1.374	4.016	5/16" * 5/16"	5	4	0.563	4.92	4	0.563	21.25	4	1.122
18"	16.693	20.945	15.551	13.189	3.000	8.000	1.626	4.488	3/8" * 3/8"	6.5	4	0.811	6.5	4	0.811	22.75	4	1.26
20"	18.504	23.189	16.850	14.528	3.500	8.000	1.874	5.000	1/2" * 1/2"	6.5	4	0.811	6.5	4	0.811	25	4	1.26
24"	22.480	27.008	19.685	16.693	3.500	8.000	1.874	6.063	1/2" * 1/2"	6.5	4	0.811	6.5	4	0.811	29.5	4	1.378

BF SERIES WAFER / LUG BUTTERFLY VALVES

Dimensional Data - Lug

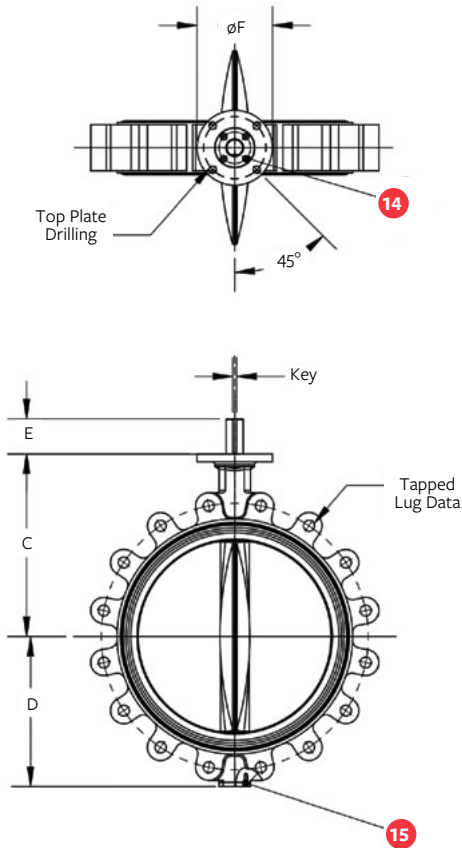


PART NO.	PART NAME	MATERIAL	QTY.
1	Lug Body	DI	1
2	Seat	EPDM/NBR/Viton	1
3	Disc	CF8M/DI-NP/Al Bz C954/DI-Nylon 11	1
4	Lower Stem	SS416/SS316/SS630	1
5	Upper Stem	SS416/SS316/SS630	1
6	Top Cap	1020 Steel	1
7	End Cap	1020 Steel	1
8	Lower Bushing	Nylatron®	1
9	Upper Bushing	Nylatron®	1
10	V-packing	NBR	1
11	Washer	SS304	1
12	Wear Shim	SS304	1
13	O-ring	NBR	1
14	Data Plate	SS304	1
15	End Cap Bolt	SS304	2
16	Top Cap Bolt	SS304	2

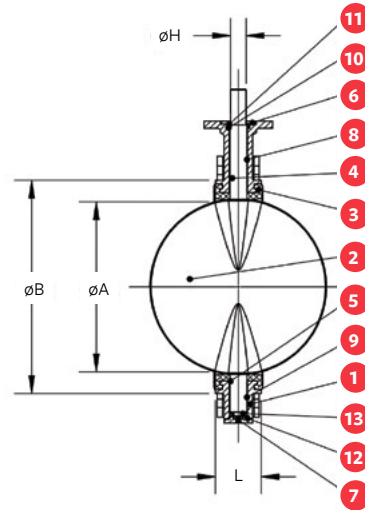
SIZE	ØA	ØB	C	D	E	ØF	G	ØH	L	KEY	MILLIKEN STANDARD TOP PLATE DRILLING			ISO 5211 TOP PLATE DRILLING			ALIGNMENT HOLES		
											BOLT CIRCLE	NO. OF HOLES	HOLE DIA.	BOLT CIRCLE	NO. OF HOLES	HOLE DIA.	BOLT CIRCLE	NO. OF HOLES	TAPPED
2"	1.079	3.500	5.000	2.579	1.260	4.000	0.375	0.563	1.693	-	3.25	4	0.437	2.760	4	0.402	4.75	4	5/8"
2.5"	1.862	4.094	5.500	2.854	1.260	4.000	0.375	0.563	1.811	-	3.25	4	0.437	2.760	4	0.402	5.5	4	5/8"
3"	2.429	4.646	5.709	3.642	1.260	4.000	0.375	0.563	1.811	-	3.25	4	0.437	2.760	4	0.402	6	4	5/8"
4"	3.500	5.827	6.496	4.429	1.260	4.000	0.437	0.625	2.047	-	3.25	4	0.437	2.760	4	0.402	7.5	8	5/8"
5"	4.567	7.205	7.500	4.921	1.260	4.000	0.500	0.750	2.205	-	3.25	4	0.437	2.760	4	0.402	8.5	8	3/4"
6"	5.433	7.992	7.874	5.433	1.260	4.000	0.500	0.750	2.205	-	3.25	4	0.437	2.760	4	0.402	9.5	8	3/4"
8"	7.744	10.315	9.500	6.811	1.260	6.000	0.625	0.875	2.362	-	5	4	0.563	4.921	4	0.563	11.75	8	3/4"
10"	9.646	12.598	10.866	8.110	2.000	6.000	-	1.125	2.677	1/4" * 1/4"	5	4	0.563	4.921	4	0.563	14.25	12	7/8"
12"	11.339	14.567	12.205	9.713	2.000	6.000	-	1.125	3.071	1/4" * 1/4"	5	4	0.563	4.921	4	0.563	17	12	7/8"

BF SERIES WAFER / LUG BUTTERFLY VALVES

Dimensional Data - Lug



Section A-A



PART NO.	PART NAME	MATERIAL	QTY.
1	Wafer Body	DI	1
2	Disc	CF8M/DI-NP/Al Bz C954/DI-Nylon 11	1
3	Seat	EPDM/NBR/Viton	1
4	Upper Stem	SS416/SS316/SS630	1
5	Lower Stem	SS416/SS316/SS630	1
6	Top Cap	1020 Steel	1
7	End Cap	1020 Steel	1
8	Upper Bushing	Nylatron®	1
9	Lower Bushing	Nylatron®	1
10	V-packing	NBR	1
11	Washer	SS304	1
12	O-ring	NBR	1
13	Bearing	Steel	1
14	Top Cap Bolt	SS304	4
15	End Cap Bolt	SS304	4

SIZE	ØA	ØB	C	D	E	ØF	ØH	L	KEY	MILLIKEN STANDARD TOP PLATE DRILLING			ISO 5211 TOP PLATE DRILLING			ALIGNMENT HOLES		
										BOLT CIRCLE	NO. OF HOLES	HOLE DIA.	BOLT CIRCLE	NO. OF HOLES	HOLE DIA.	BOLT CIRCLE	NO. OF HOLES	HOLE DIA.
14"	12.677	16.772	12.992	10.984	2.760	6.000	1.374	3.071	5/16" * 5/16"	5	4	0.563	4.92	4	0.563	18.75	4	1.122
16"	14.921	18.748	14.567	11.969	2.760	6.000	1.374	4.016	5/16" * 5/16"	5	4	0.563	4.92	4	0.563	21.25	4	1.122
18"	16.693	20.945	15.551	13.189	3.000	8.000	1.626	4.488	3/8" * 3/8"	6.5	4	0.811	6.5	4	0.811	22.75	4	1.26
20"	18.504	23.189	16.850	14.528	3.500	8.000	1.874	5.000	1/2" * 1/2"	6.5	4	0.811	6.5	4	0.811	25	4	1.26
24"	22.480	27.008	19.685	16.693	3.500	8.000	1.874	6.063	1/2" * 1/2"	6.5	4	0.811	6.5	4	0.811	29.5	4	1.378

MILLIKEN® Product Guide



SERIES 600/601
Eccentric Plug Valve
Flanged and MJ

- Welded Nickel Seat
- Stainless Steel Bearings
- ANSI-B16.1 Flanges
- Solid Ductile Iron Plug
- Low Pressure Drop
- Flanged & MJ Ends
- Sizes 2" - 72" FL
- Sizes 3" - 48" MJ



SERIES 601SS
Eccentric Plug Valve

- Integral Stainless Seat
- Stainless Bearings
- Stainless Steel Body
- ANSI B16.5 Class 150 Flanges
- Solid Stainless Steel Plug
- Low Pressure Drop
- Size: 1/2" - 24"



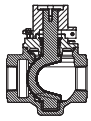
SERIES 601RL
Eccentric Plug Valve
Rubber Lined

- Soft or Hard Rubber Lining
- Stainless Steel Bearings
- ANSI B16.1 Flanges
- Solid Ductile Iron Plug
- Low Pressure Drop
- Sizes 3" - 54"
- Metal Plugs Available - Consult Factory



SERIES 602
Eccentric Plug Valve
High Pressure

- Ductile Iron Body
- ANSI B16.1 Flanges
- MJ AWWA C111
- Welded Nickel Seat
- Solid Ductile Iron Plug
- Low Pressure Drop
- Sizes 2" - 72" FL
- Sizes 3" - 48" MJ



SERIES 613A
Eccentric Plug Valve
Threaded End

- Ductile Iron Construction
- Round Port
- Stainless Steel Bearings
- Low Pressure Drop
- Memory Stop
- NPT End Connections
- Sizes 1/2" - 2"



SERIES 604E
Eccentric Plug Valve
Three Way Valve

- Epoxy Seat
- Solid Ductile Iron Plug
- Stainless Steel Bearings
- Low Pressure Drop
- Lift & Turn NOT Required
- High Solids & Flow Capacity
- Sizes 3" - 16"



SERIES 606
Eccentric Plug Valve
Grooved End

- Welded Nickel Seat
- Stainless Steel Bearings
- AWWA C-606 Grooved
- Solid Ductile Iron Plug
- Low Pressure Drop
- Ductile or Steel Pipe
- Sizes 3" - 24"



SERIES 611/610
Eccentric Plug Valve
Flanged and MJ

- Ductile Iron Body
- ANSI B16.1 Flanges
- MJ AWWA C111
- Welded Nickel Seat
- Solid Ductile Iron Plug
- Low Pressure Drop
- Sizes 2" - 72" FL
- Sizes 3" - 48" MJ



MODEL 625
Eccentric Plug Valve

- Available in Threaded and Flanged Ends
- Rated for 175 psi
- Sizes 1/2" - 4"
- UL / CGA Listed



SERIES 600FP/601FP
Eccentric Plug Valve

- Full / 100% PORT
- Welded Nickel Seat
- Stainless Steel Bearings
- ANSI-B16.1 Flanges
- Solid Ductile Iron Plug
- Low Pressure Drop
- Flanged & MJ Ends
- Sizes 2" - 48" FL
- Sizes 3" - 48" MJ



FIGURE 396/397
General Service Butterfly Valve

- Meets MSS SP 67
- Ductile Iron Body
- D1-NP Disc
- Other Materials Upon Request
- Wrench or Gear Operated Available
- 2" - 48" Size Range



FIGURE 510A/511A
AWWA Butterfly Valve

- Complies with AWWA C-504
- Class 150B Flanged or MJ
- Cast Iron Body and Disc
- Seat in Body
- Flow Through Disc on 24" and Larger
- Epoxy Paint on All Sizes Standard
- 3" - 72"



SERIES 8500
AWWA Swing Check

- Full Waterway
- Ductile Iron Construction
- Weight or Spring
- Air Cushion
- SS Body Seat Ring
- Buna Disc Insert
- Sizes 3" - 24"



SERIES 8000
AWWA Swing Check

- Full Waterway
- Weight or Spring
- Bronze / SS Body Seat Ring
- Bronze / Buna / EPDM Disc Insert
- Sizes 2" - 36"



SERIES 9000
AWWA Swing Check

- Clear Waterway
- Weight or Spring
- Air or Oil Cushion
- Bronze / SS Body Seat Ring
- Bronze / Buna / EPDM Disc Insert
- Sizes 3" - 72"



SERIES 720A
Wafer Check Valve

- Center Guided
- Check Valve
- Rated for 250 psi
- SS Disc / EPDM Seat
- Sizes 2" - 12"



SERIES 700
Wafer Check Valve

- ANSI Class 125 / 150
- High Flow Capacity
- Narrow Face-to-Face
- Sizes 3" - 12"
- 316 SS Internals
- Disc Position Indicator

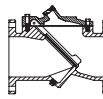


FIGURE 851
Flex Check

- Million Cycle Certification
- Complete Ductile Iron Construction
- 250 psi Pressure Rating
- Fully Epoxy Lined Interior
- No Internal Shafts, Bearings or Bushings
- No External Levers, Weights or Springs
- Mechanical Indicator (3" - 16")
- 2" - 24" Size Range
- Backflush Devices
- Proximity Switches



FIGURE 740A
Double Disc Check Valve

- Wafer Pattern Check Valve Rated for 250 psi
- Available in Sizes 2" - 36" With a SS Disc / EPDM Seat



FIGURE 821A
Global Style Check Valve

- Center Guided Check Valve
- SS Disc / EPDM Seat and is Available in Sizes 2" - 24"

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