



**BF Series  
Wafer/Lug Butterfly Valves**



Milliken Valve offers 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

Milliken Valve designs, develops, manufactures and markets plug, butterfly, and check valves and their respective controls and actuators. These valves are used primarily in the water, wastewater, and industrial markets.

Milliken Valve was 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.

Milliken believes 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's quality standards are a step above the industry norm, and Milliken is committed to standing behind its 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.

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**BF Series Butterfly Valves – 2" to 48"**

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## 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 Seat:** EPDM, Buna-N, Viton

**Actuation Options:** Worm Gear, Lever,  
Pneumatic, Electric

**Pressure Ratings:** 2" – 12" 230psi  
14" – 48" 150psi

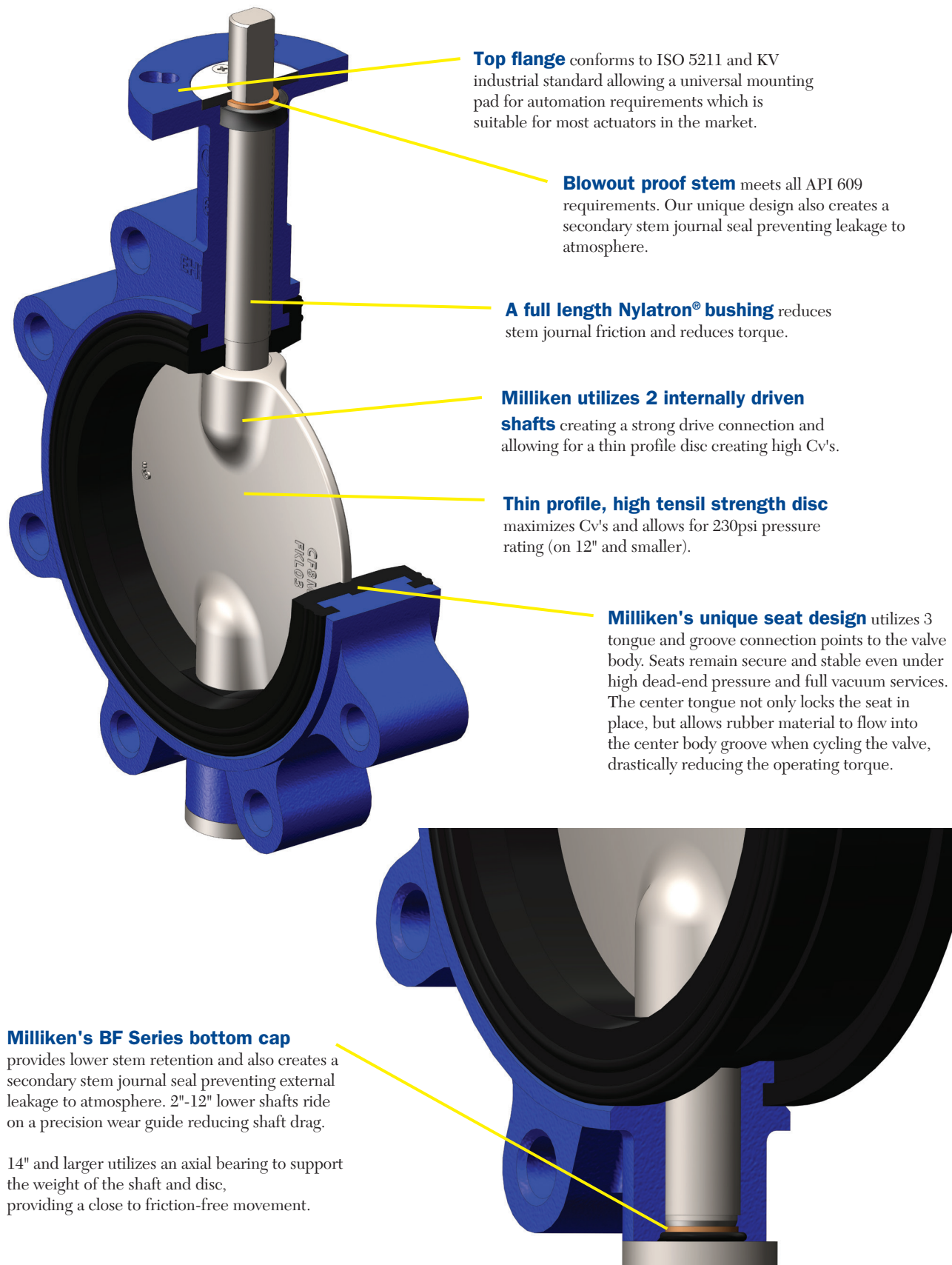
° For installation between ANSI 125/150 flanges

\*\* 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.

# Milliken BF Series Butterfly Valve Design Details: Butterfly Valve, sizes 2" through 48" 2"-12" 230psi, 14"-48" 150psi



**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.

**Milliken utilizes 2 internally driven shafts** creating a strong drive connection and allowing for a thin profile disc creating high Cv's.

**Thin profile, high tensile strength disc** maximizes Cv's and allows for 230psi pressure rating (on 12" and smaller).

**Milliken's 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.

**Milliken's 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.

# Suggested Specifications: Milliken BF Series Wafer/Lug Butterfly Valve, Sizes 2" through 48" 2"-12" 230psi, 14"-48" 150psi

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

14" – 48" – 150psi 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 Cv 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

Valve shall consist of (2) full length Nylatron® bushings (upper and lower) offering superior protection against friction, corrosion and impacts. Milliken's unique bushings design provides protection against shaft side loading.

## Testing

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

# CV Flow Data: BF Series BFV

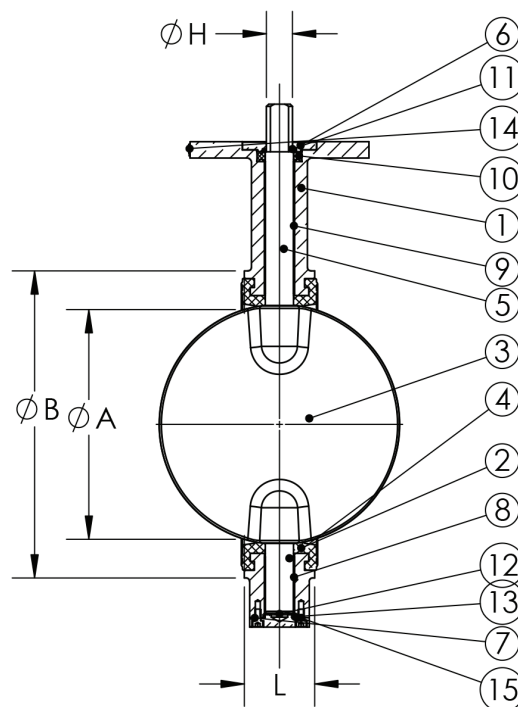
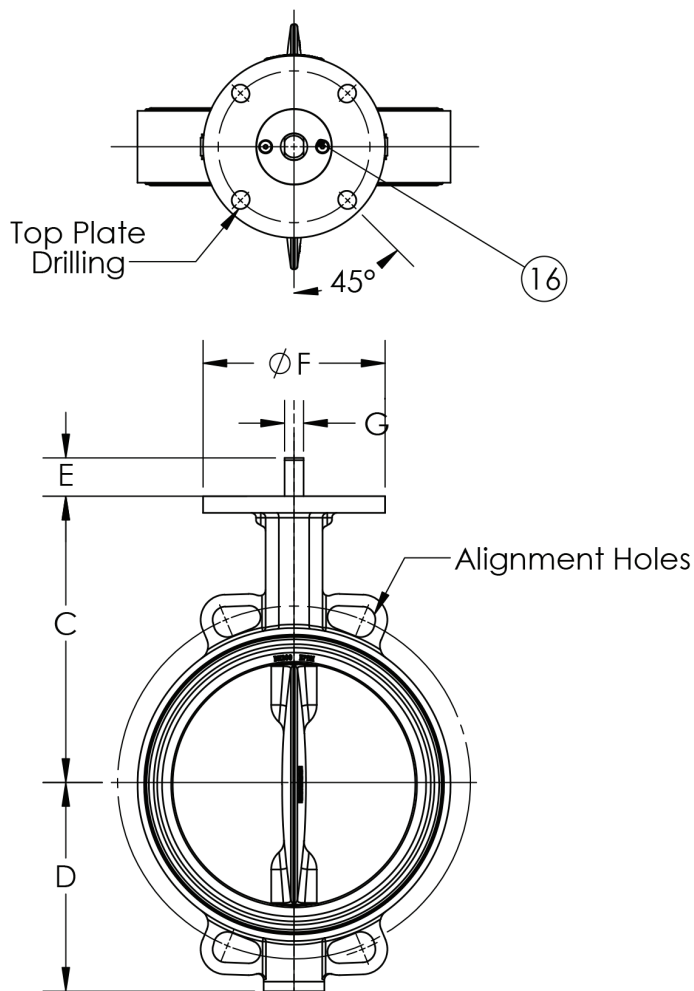
During its product development phase, the BF Series Wafer/Lug Butterfly Valve was tested to ensure that it met our own rigorous standards for flow capacity. Throughout testing, the BF Series valve has consistently produced high Cv values which translates to lower flow resistance, and in turn, lowering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

Valve Opening (deg)	Cv 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**



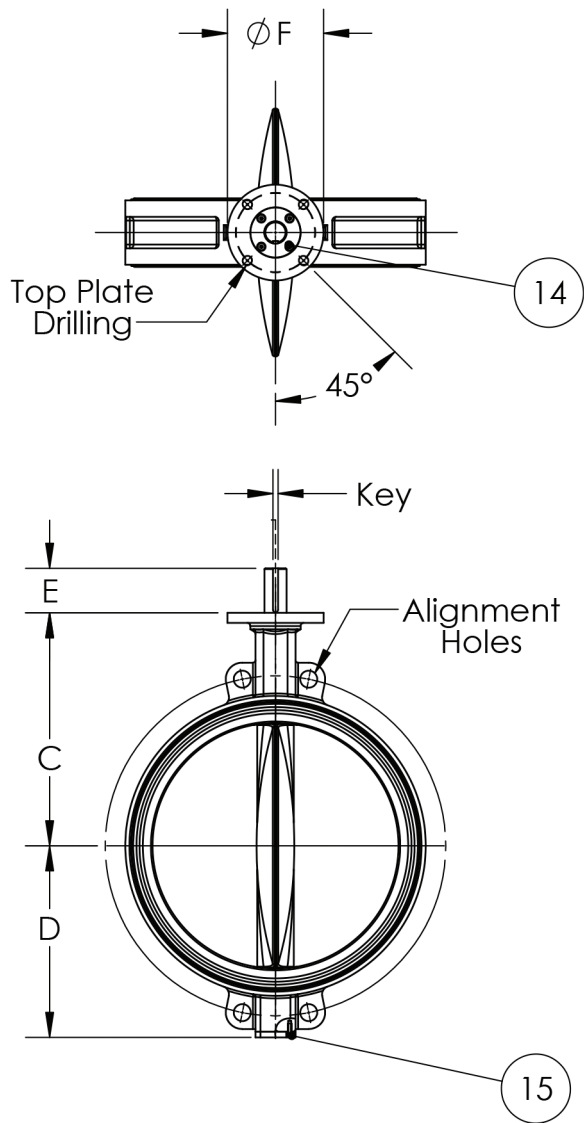
## Dimensional Data: BF Series BFV, Wafer



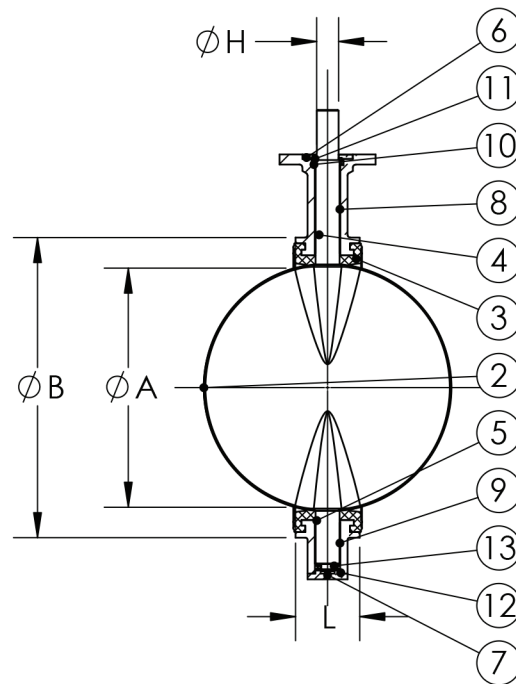
Part No.	Part Name	Material	Qty.
1	Wafer Body	DI	1
2	Seat	EPDM/NBR/Viton	1
3	Disc	CF8M/DI-NP/Al Bz C954/DI-Nylon 11	1
4	Lower Stem	SS416/SS316/SS630	1
5	Upper Stem	SS416/SS316/SS630	1
6	Top Cap	1020 Steel	1
7	End Cap	1020 Steel	1
8	Lower Bushing	Nylatron®	1
9	Upper Bushing	Nylatron®	1
10	V-packing	NBR	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	ΦA	ΦB	C	D	E	ΦF	G	ΦH	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" x 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" x 1/4"	5	4	0.563	4.921	4	0.563	17	4	1





SECTION B-B

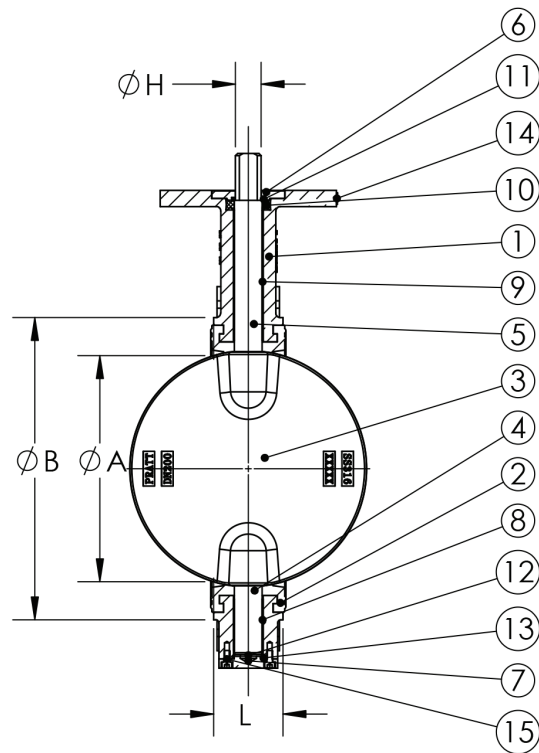
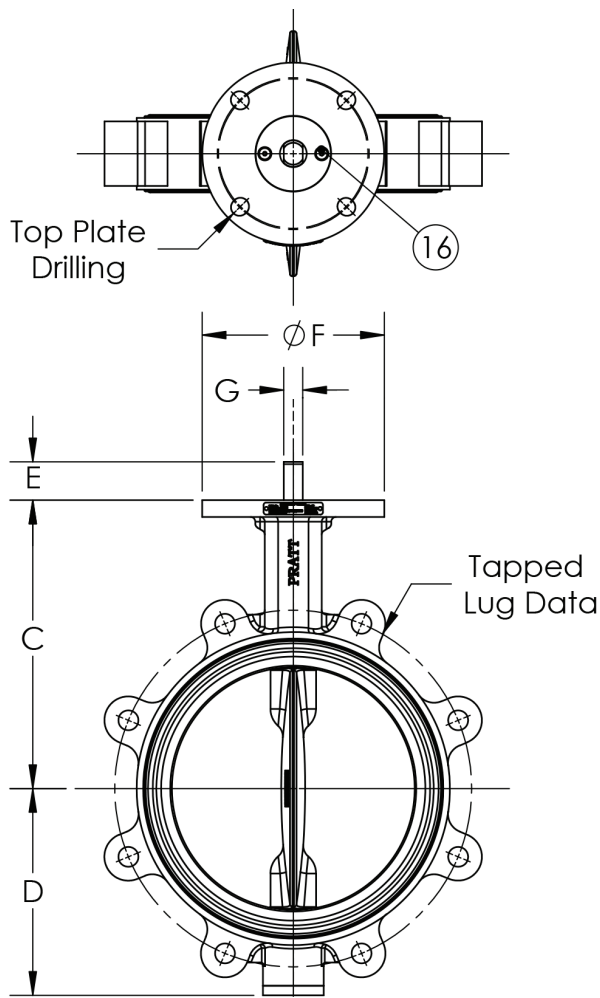


Part No.	Part Name	Material	Qty.
1	Wafer Body	DI	1
2	Disc	CF8M/DI-NP/Al Bz C954/DI-Nylon 11	1
3	Seat	EPDM/NBR/Viton	1
4	Upper Stem	SS416/SS316/SS630	1
5	Lower Stem	SS416/SS316/SS630	1
6	Top Cap	1020 Steel	1
7	End Cap	1020 Steel	1
8	Upper Bushing	Nylatron®	1
9	Lower Bushing	Nylatron®	1
10	V-packing	NBR	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

Size	$\phi A$	$\phi B$	C	D	E	$\phi F$	$\phi H$	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" $\times$ 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" $\times$ 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" $\times$ 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" $\times$ 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" $\times$ 1/2"	6.5	4	0.811	6.5	4	0.811	29.5	4	1.378

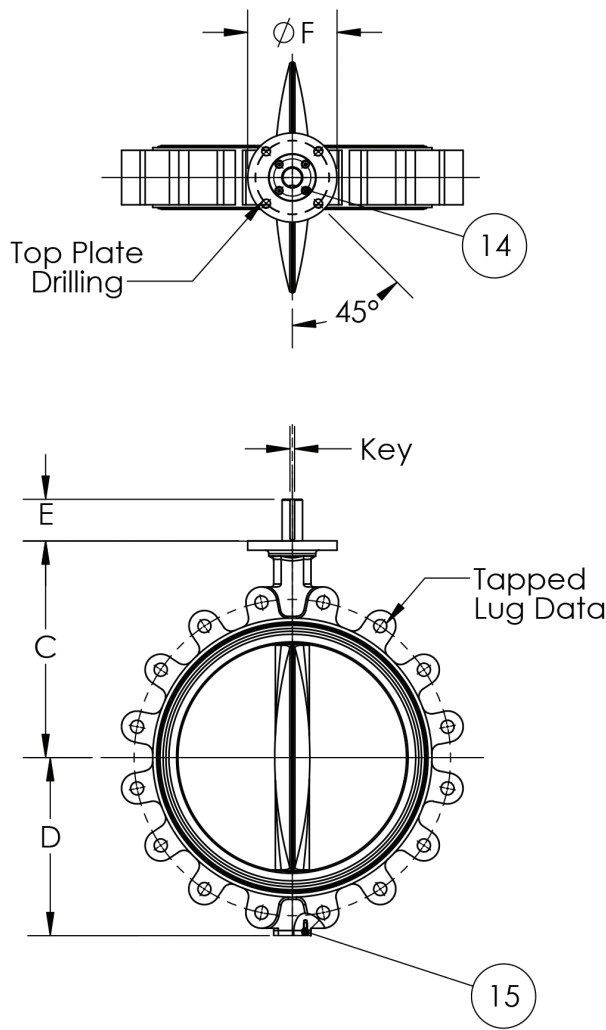
Contact factory for larger sizes

# Dimensional Data: BF Series BFV, Lug

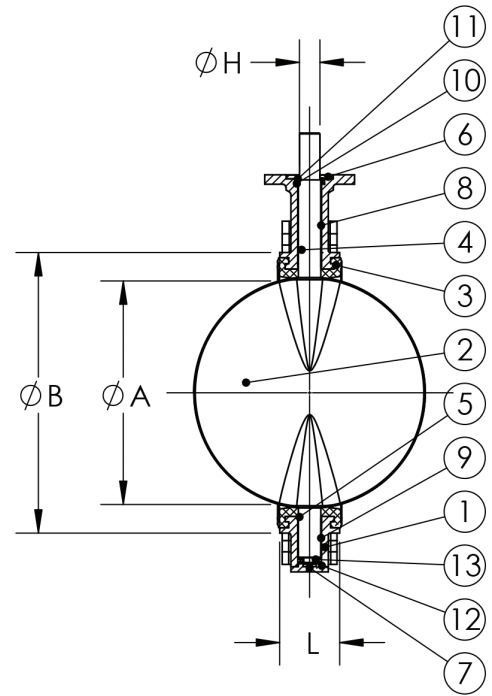


Part No.	Part Name	Material	Qty.
1	Lug Body	DI	1
2	Seat	EPDM/NBR/Viton	1
3	Disc	CF8M/DI-NP/Al Bz C954/DI-Nylon 11	1
4	Lower Stem	SS416/SS316/SS630	1
5	Upper Stem	SS416/SS316/SS630	1
6	Top Cap	1020 Steel	1
7	End Cap	1020 Steel	1
8	Lower Bushing	Nylatron®	1
9	Upper Bushing	Nylatron®	1
10	V-packing	NBR	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	Milliken Standard Top Plate Drilling										ISO 5211 Top Plate Drilling			Tapped Lug Data					
	ΦA	ΦB	C	D	E	ΦF	G	ΦH	L	Key	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" x 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" x 1/4"	5	4	0.563	4.921	4	0.563	17	12	7/8"



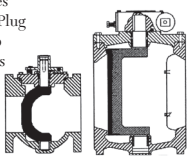
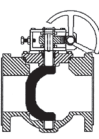
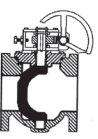
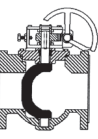
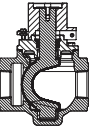



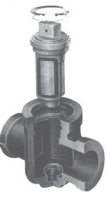
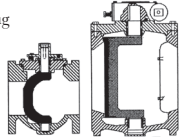
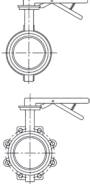
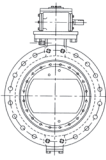




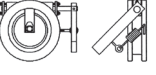

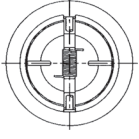
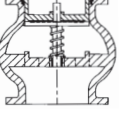
SECTION A-A



Part No.	Part Name	Material	Qty.
1	Lug 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	ΦA	ΦB	C	D	E	ΦF	ΦH	L	Key	Milliken Standard Top Plate Drilling			ISO 5211 Top Plate Drilling			Tapped Lug Data		
										Bolt Circle	No. of Holes	Hole Dia.	Bolt Circle	No. of Holes	Hole Dia.	Bolt Circle	No. of Holes	Tapped
14"	12.677	16.772	12.992	10.984	2.760	6.000	1.374	3.071	5/16" x 5/16"	5	4	0.563	4.92	4	0.563	18.75	12	1"
16"	14.921	18.748	14.567	11.969	2.760	6.000	1.374	4.016	5/16" x 5/16"	5	4	0.563	4.92	4	0.563	21.25	16	1"
18"	16.693	20.945	15.551	13.189	3.000	8.000	1.626	4.488	3/8" x 3/8"	6.5	4	0.811	6.5	4	0.811	22.75	16	1 1/8"
20"	18.504	23.189	16.850	14.528	3.500	8.000	1.874	5.000	1/2" x 1/2"	6.5	4	0.811	6.5	4	0.811	25	20	1 1/8"
24"	22.480	27.008	19.685	16.693	3.500	8.000	1.874	6.063	1/2" x 1/2"	6.5	4	0.811	6.5	4	0.811	29.5	20	1 1/4"

Contact factory for larger sizes

<p><b>Series 600/601</b> Eccentric Plug Valve</p> <p>Welded Nickel Seat Stainless Steel Bearings ANSI-B16.1 Flanges Solid Ductile Iron Plug Low Pressure Drop Flanged &amp; MJ Ends Sizes 2"-72" FL Sizes 3"-48" MJ</p> <p>Flanged and MJ</p> 	<p><b>Series 601S</b> Eccentric Plug Valve</p> <p>All Stainless Steel Construction ANSI B16.5 Class 150 Flanges Low Pressure Drop Size: 1/2"-24"</p> 	<p><b>Series 601RL</b> Eccentric Plug Valve</p> <p>Soft Rubber Lining Stainless Steel Bearings ANSI B16.1 Flanges Solid Ductile Iron Plug Low Pressure Drop Sizes 3"-54"</p> <p>Rubber Lined</p> 	<p><b>Series 602</b> Eccentric Plug Valve</p> <p>Welded Nickel Seat Stainless Steel Bearings ANSI B16.1 Class 250 Flanges Solid Ductile Iron Plug Low Pressure Drop Sizes 2-1/2"-54"</p> <p>High Pressure</p> 
<p><b>Series 613A</b> Eccentric Plug Valve</p> <p>Ductile Iron Construction Round Port Stainless Steel Bearings Low Pressure Drop Memory Stop NPT End Connections Sizes 1/2"-2"</p> <p>Threaded End</p> 	<p><b>Series 604</b> 100% Port 3 Way Plug Valve</p> <p>Solid Ductile Iron Plug Stainless Steel Bearings Low Pressure Drop Lift &amp; Turn NOT Required High Solids &amp; Flow Capacity Sizes 3"-16"</p> <p>Three Way Valve</p> 	<p><b>Series 606</b> Eccentric Plug Valve</p> <p>Welded Nickel Seat Stainless Steel Bearings AWWA C-606 Grooved Solid Ductile Iron Plug Low Pressure Drop Ductile or Steel Pipe Sizes 3"-24"</p> <p>Grooved End</p> 	<p><b>Series 611/610</b> Eccentric Plug Valve</p> <p>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</p> <p>Flanged and MJ</p> 
<p><b>Model 625</b> Eccentric Plug Valve</p> <p>Available in Threaded and Flanged Ends Rated for 175 psi Sizes 1/2"-4" UL Listed</p> 	<p><b>Series 600FP/601FP</b> Eccentric Plug Valve</p> <p>Full/100% Port Welded Nickel Seat Stainless Steel Bearings ANSI-B16.1 Flanges Solid Ductile Iron Plug Low Pressure Drop Flanged &amp; MJ Ends Sizes 2"-48" FL Sizes 3"-48" MJ</p> 	<p><b>Figure 396/397</b> General Service Butterfly Valve</p> <p>Complies with MSS SP 67 Ductile Iron Body DI-NP Disc Other Materials Upon Request Wrench or Gear Operated Available 2"-48" Size Range</p> 	<p><b>Figure 510A/511A</b> AWWA Butterfly Valve</p> <p>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"</p> 
<p><b>Series 8500</b> AWWA Swing Check</p> <p>Full waterway Ductile Iron Construction Weight or Spring Air Cushion SS body seat ring Buna disc insert Sizes 3"-24"</p> 	<p><b>Series 8000</b> AWWA Swing Check</p> <p>Full waterway Weight or Spring Bronze/SS Body Seat Ring Bronze/Buna/EPDM disc insert Sizes 2"-36"</p> 	<p><b>Series 9000</b> AWWA Swing Check</p> <p>Clear waterway Weight or Spring Air or Oil Cushion Bronze/SS Body seat ring Bronze/Buna/EPDM disc insert Sizes 3"-72"</p> 	<p><b>Model 720A</b> Wafer Check Valve</p> <p>Center Guided Check Valve Rated for 250 psi SS Disc/EPDM Seat Sizes 2"-12"</p> 
<p><b>Series 700</b> Wafer Check Valve</p> <p>ANSI Class 125/150 High Flow Capacity Narrow Face-to-Face Sizes 3"-12" 316 SS Internals Disc Position Indicator</p> <p>Wafer Check Valve</p> 	<p><b>Figure 851</b> Flex Check</p> <p>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"-24") 2"-24" Size Range Backflush Devices Proximity Switches</p> 	<p><b>Figure 740A</b> Double Disc Check Valve</p> <p>Wafer pattern check valve rated for 250 psi. Available in sizes 2"-48" with a SS Disc/EPDM Seat</p> 	<p><b>Figure 821A</b> Globe Style Check Valve</p> <p>Center guided check valve. SS Disc/EPDM Seat and is available in sizes 2"-36".</p> 

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