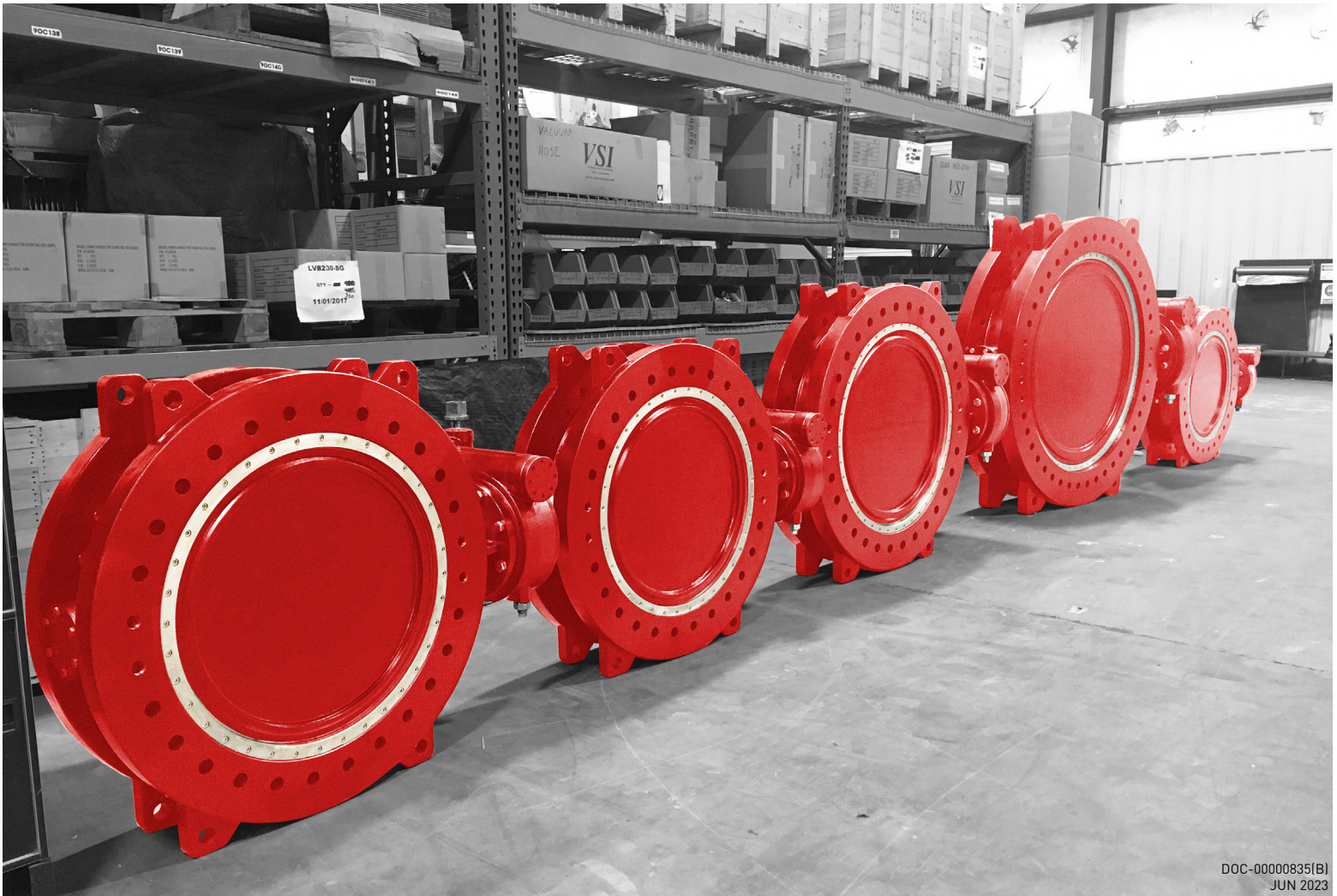


**SERIES BFVI  
AWWA C504  
BUTTERFLY VALVES  
24" AND LARGER**



# Series BFVI

Resilient Seated Butterfly  
Valves to AWWA C504



## TWO-PIECE SHAFT

The two piece shaft reduces flow interference in the valve to provide better flow characteristics.

## ADJUSTABLE/REPLACEABLE PACKING

The packing of the Series BFVI consists of multiple v-type packing rings and an adjustable gland. Open bonnet option available upon request.

## FLOW THROUGH TYPE DISC

The flow through design disc has a greater strength than lens or concave type discs while still maintaining free flow, high Cv values, and low head loss.

## MECHANICAL STOP

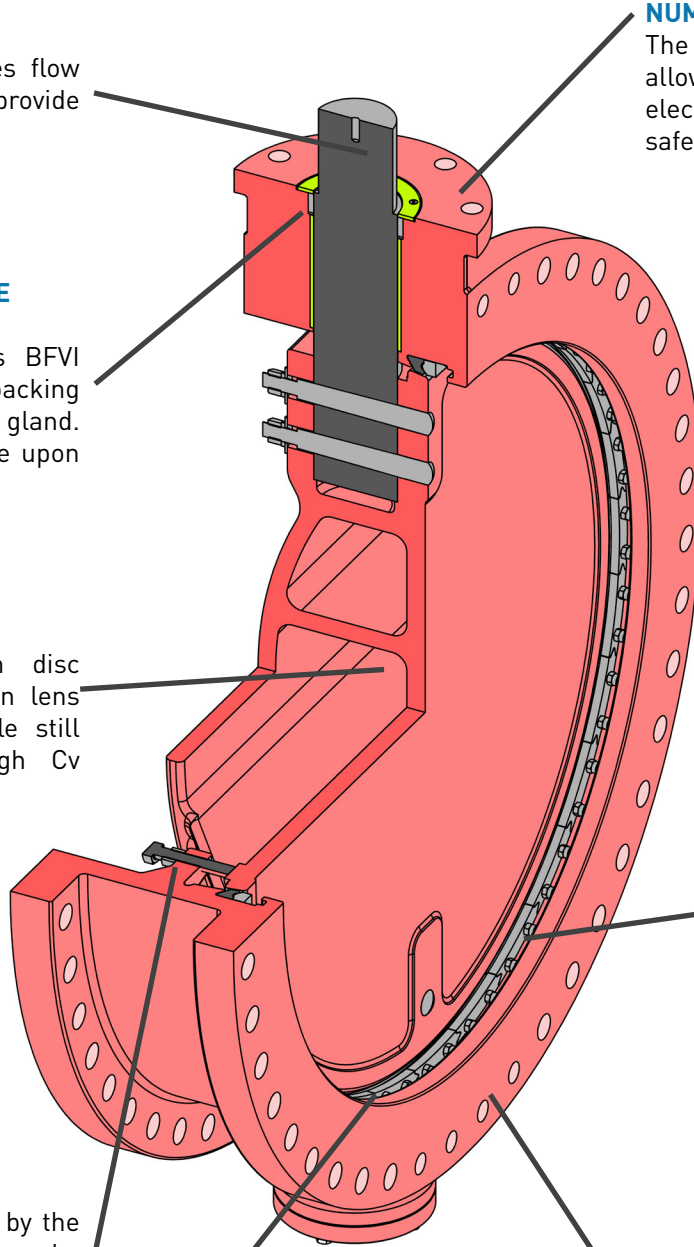
OPTIONAL - When specified by the engineer a mechanical stop can be supplied.

## ADJUSTABLE SEAT

The reliable, time tested design of the Series BFVI seat is simple and adjustable. No complicated epoxy injection or shims are needed - adjustment and replacement can be achieved with a common wrench.

## NUMEROUS ACTUATION OPTIONS

The standard ISO 5211 top mount allows VSI to offer a wide range of electric, pneumatic, hydraulic, fail-safe, and other actuation packages.



## BODY MOUNTED SEAT

The body mounted seat design ensures long term performance and extended life, minimizing the effects of abrasive corrosion and tuberculation buildup. Seat is recessed in body to minimize port reduction and turbulence.

## MULTIPLE COATING OPTIONS

The standard 2-part heavy duty coating can be optioned to a wide variety of coatings as required by the project requirements such as NSF 61 listed coatings, ceramic reinforced resin, glass or rubber lining, or coal-tar epoxy.

PAGE 2



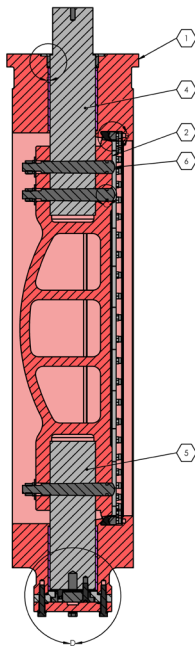
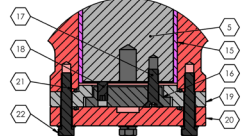
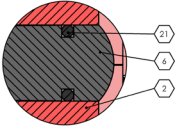
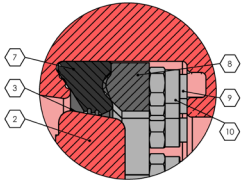
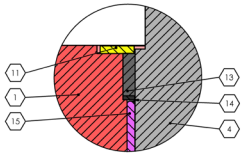
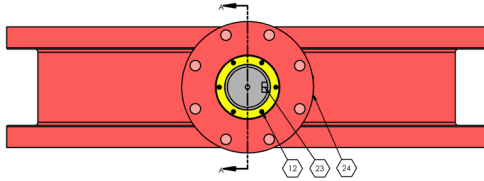
## Sample Specification

### 24 Inch and Larger Butterfly Valves for Waterworks Service

1. SCOPE
  - 1.1. This specification covers the design, manufacture, and testing of cast butterfly valves 24 inch (600 mm) and larger under service pressure of up to 250 psig (1725 kPa).
  - 1.2. Butterfly valves shall be resilient seated and of the quarter turn, single offset, mechanically retained seal in body type.
2. GOVERNING STANDARDS
  - 2.1. All butterfly valves shall be in full conformance with the design, manufacturing, and testing standards set forth by the American Water Works Association (AWWA) in Standard ANSI/AWWA C504.
  - 2.2. When requested, manufacturer shall provide an Affidavit of Proof of Design Testing in accordance with AWWA C504.
3. CONNECTIONS
  - 3.1. Flanged valves shall conform to all standards of ANSI B16.1, Class 125 or Class 250.
  - 3.2. Flanged valves' lay length shall conform to AWWA C504 Table 1, Short Body.
  - 3.3. Mechanical joint valves shall conform to all standards of ANSI/AWWA C111/A21.11.
4. MARKINGS
  - 4.1. Each valve shall be marked with the manufacturer's name, valve size, body material, and pressure rating cast into the body of the valve. Lettering shall be a minimum of 1/2 inch tall and project 1/10 inch from body.
  - 4.2. All butterfly valves, except buried or submerged valves, shall be equipped with a tag identifying body, disc, resilient seat, and stem material in addition to manufacturer's name, pressure rating, size, date of manufacturer, and date of testing.
5. DESIGN
  - 5.1. Valves shall be equipped with a seat directly welded to a machined finished surface on valve disc. Plated or removable seats are not acceptable.
  - 5.2. Valve shall have a field replaceable and adjustable body mounted resilient seal. The seal should be retained to the body by ring segments and hardware that pierces the seal in a clamping manner.
  - 5.3. Seat retaining segments and hardware shall be recessed within the valve body. Valve designs that have a design where the seat retaining hardware is exposed to the flow through the valve will not be accepted.
  - 5.4. Valve shall be equipped with a set of V-type stem packing with an adjustable gland.
  - 5.5. Radial shaft bushings shall be supplied in the upper and lower bearing journals. A thrust bearing shall be supplied acting on lower shaft section to center the disc in valve body.
  - 5.6. The valve shall be equipped with taper pins retaining the valve disc to the upper and lower shaft. There shall be a minimum of two pins for the upper shaft and one for the lower shaft. The pins shall be mechanically retained with a nut and washer. The taper pins shall be sealed with an o-ring. Tangential pins or plugs shall not be allowed.
  - 5.7. The valves shall be equipped with a mounting area for operators conforming to Manufacturers Standard Society(MMS) 101 or International Organization of Standardization(ISO) 5211. There shall be sufficient clearance to directly mount standardized operators with easily accessible fasteners.
  - 5.8. Valves shall provide a bubble-tight shutoff bi-directionally at rated working pressure.
6. MATERIALS
  - 6.1. The valve body, disc, and bonnet, if equipped, shall be constructed of ASTM A536 Ductile Iron.
  - 6.2. The valve seat shall be manufactured from a minimum of 95% nickel, type 316 stainless steel, or stellite.
  - 6.3. The valve seal shall be made from resilient NBR, EPDM, or FPM as specified.
  - 6.4. Radial and thrust bearings shall be made of permanently lubricated RTFE or lead free Bronze.
  - 6.5. All submerged coatings shall conform to AWWA C550, be holiday free, and have a minimum total dry film thickness of 10 mils.
  - 6.6. All wetted hardware should be of corrosion resistant type 304 or 316 stainless steel as specified.
  - 6.7. All uncovered, submerged, or buried valves shall have type 304 or 316 stainless steel exterior hardware. All others shall have zinc plated carbon steel hardware unless specified.
  - 6.8. All valves shall be ANSI/NSF 61 and ANSI/NSF 372 listed as a complete assembly. The manufacturer shall provide a certification from a third party ANSI certified laboratory. Listings for the component materials or listings in other contract manufacturer's names shall not be allowed. Listing must be for the complete valve assembly in the manufacturer's name.
7. OPERATORS
  - 7.1. All manually operated valves shall be equipped with a worm gear actuator with position indicator. Operator should be designed to hold the valve in any intermediate position without creeping or fluttering.
  - 7.2. All actuators shall be permanently sealed and suitable for buried service.
  - 7.3. All 2 inch square operating nuts, exposed hardware and shafts shall be made of corrosion resistant stainless steel.
  - 7.4. All actuators equipped with handwheels shall have a maximum rim pull of 50lbs plus 5%.
8. MANUFACTURER
  - 8.1. Single offset butterfly valves shall be VSI Series BFVI Butterfly Valve as manufactured by Valve Solutions, Inc., Alpharetta, GA USA.
  - 8.2. All valves shall be warranted by manufacturer for a minimum of 12 months.



### Materials of Construction



PAGE 4

Item	Description	Materials Available	Standard
1	Body	Ductile Iron* <sup>(1)</sup>	ASTM A536 65-45-12
		Cast Iron	ASTM A126 Class B
		Stainless Steel 304	ASTM A351 CF8
		Stainless Steel 316	ASTM A351 CF8M
2	Disc	Ductile Iron* <sup>(1)</sup>	ASTM A536 65-45-12
		Cast Iron	ASTM A126 Class B
		Stainless Steel 304	ASTM A351 CF8
		Stainless Steel 316	ASTM A351 CF8M
3	Disc Edge	Welded SS316*	
		Welded ≥95% Nickel	

Additional material options available as special order.

\* Standard Material

<sup>(1)</sup> When equipped with DI body/disc and 17-4PH shaft valves conform with AWWA Class 250B

<sup>(2)</sup> Optionally Available, not equipped as standard

Item	Description	Materials Available	Standard
4	Upper Shaft	Stainless Steel 304*	ASTM A276 304
		Stainless Steel 316	ASTM A276 316
		Stainless Steel 17-4PH <sup>(1)</sup>	ASTM A693 17-4PH
5	Lower Shaft	Same as Upper Shaft	
6	Shaft Pins	Same as Upper Shaft	
7	Seat	EDPM*	
		Buna-N (NBR)* Viton (FPM)	
8	Seat Retainers	Stainless Steel 304*	ASTM A276 304
		Stainless Steel 316 Steel	ASTM A276 316 ASTM A36
9	Seat Retainer Stud	Stainless Steel 304*	ASTM F593 Group 1
		Stainless Steel 316	ASTM F539 Group 2
		Zinc Plated Steel	ASTM A325 Type 1
10	Seat Retainer Locknut	Same as Seat Retainer Stud	
11	Packing Gland	Stainless Steel 304*	ASTM A276 304
12	Packing Gland Screw	Stainless Steel 304*	ASTM F593 Group 1
		Stainless Steel 316 Zinc Plated Steel	ASTM F539 Group 2 ASTM A325 Type 1
13	V-Packing Set	Same as Seat	
14	Ring	Nylon 101	
15	Radial Bearings	SS316 Reinforced PTFE* Bronze	ASTM B584
16	Thrust Plate	Bronze	ASTM B505 C93200
17	Retainer Bolt	Same as Seat Retainer Stud	
18	Jack Bolt	Same as Seat Retainer Stud	
19	Retainer Plate	Same as Body	
20	Cover Plate	Same as Body	
21	O-Ring	Same as Seat	
22	External Hardware	Stainless Steel 304*	ASTM F593 Group 1
		Stainless Steel 316 Zinc Plated Steel	ASTM F539 Group 2 ASTM A325 Type 1
23	Drive Key	Steel	
24	Tag	Aluminum* Stainless Steel	
NS	Bonnet <sup>(2)</sup>	Same as Body	
NS	Coating/Lining	Two-Part Epoxy* As Specified	
NS	Assembly Lubricant	ANSI/NSF 61 Listed Silicone Lubricant	
NS	Operator	Varies	



## Design Standards

Size Range	24"-144" Flanged End 24"-48" MJ End
Construction	AWWA C504 ASME B16.34 API 609
Coatings	AWWA C550* ANSI/NSF 61 Compliant
Connections	ANSI B16.1 Class 125/ANSI B16.5 Class 150* ANSI B16.1 Class 250/ANSI B16.5 Class 300 ANSI/AWWA C111/A21.11 (MJ)*
Lay Length	AWWA C504 Short* ISO 5752
Bonnet	MSS SP-101* ISO 5211
Classifications	150A 150B* 250B

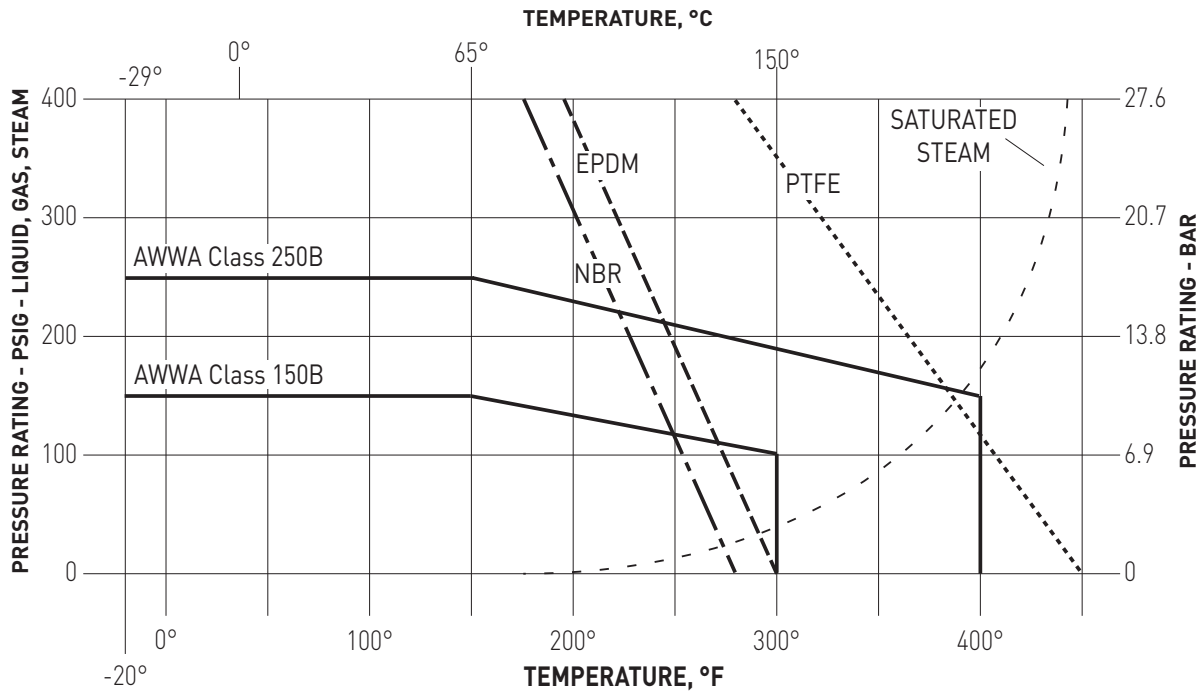
\*Standard Option

## Resistance Guide

Designation	Common Names	Composition	Min/Max Temperature Range	General Properties	Resistant to:	Attacked by:
EPDM	EPDM, EPM	Ethylene-propylene-diene Monomer	-40F/250F	Excellent ozone, chemical, and aging resistance. Poor resistance to petroleum-based fluids	Animal and vegetable oils, ozone, strong and oxidizing chemicals.	Mineral oils and solvents, aromatic hydrocarbons
NBR	NBR, Buna-N	Nitrile-butadiene	-30F/225F	Excellent resistance to petroleum-based fluids. Good physical properties	Many hydrocarbons, fats, oils, greases, hydraulic fluids, chemicals	Ozone, ketones, esters, aldehydes, chlorinated and nitro hydrocarbons
FPM	FPM, Viton®	Hexafluoropropylene-vinylidene fluoride	-10F/400F	Excellent oil and air resistances both at low and high temperatures. Very good chemical resistance	All aliphatic, aromatic, and halogenated hydrocarbons, acids, animal and vegetable oils	Ketones, low molecular weight esters and nitro containing compounds
PTFE	PTFE, Teflon®	Polytetrafluoroethylene	-100F/450F	Excellent abrasion resistance and chemically inert	Acids, harsh inorganic and organic chemicals, oils, oxidizing agents, and solvents	Molten alkali metals and fluorine at high temperatures



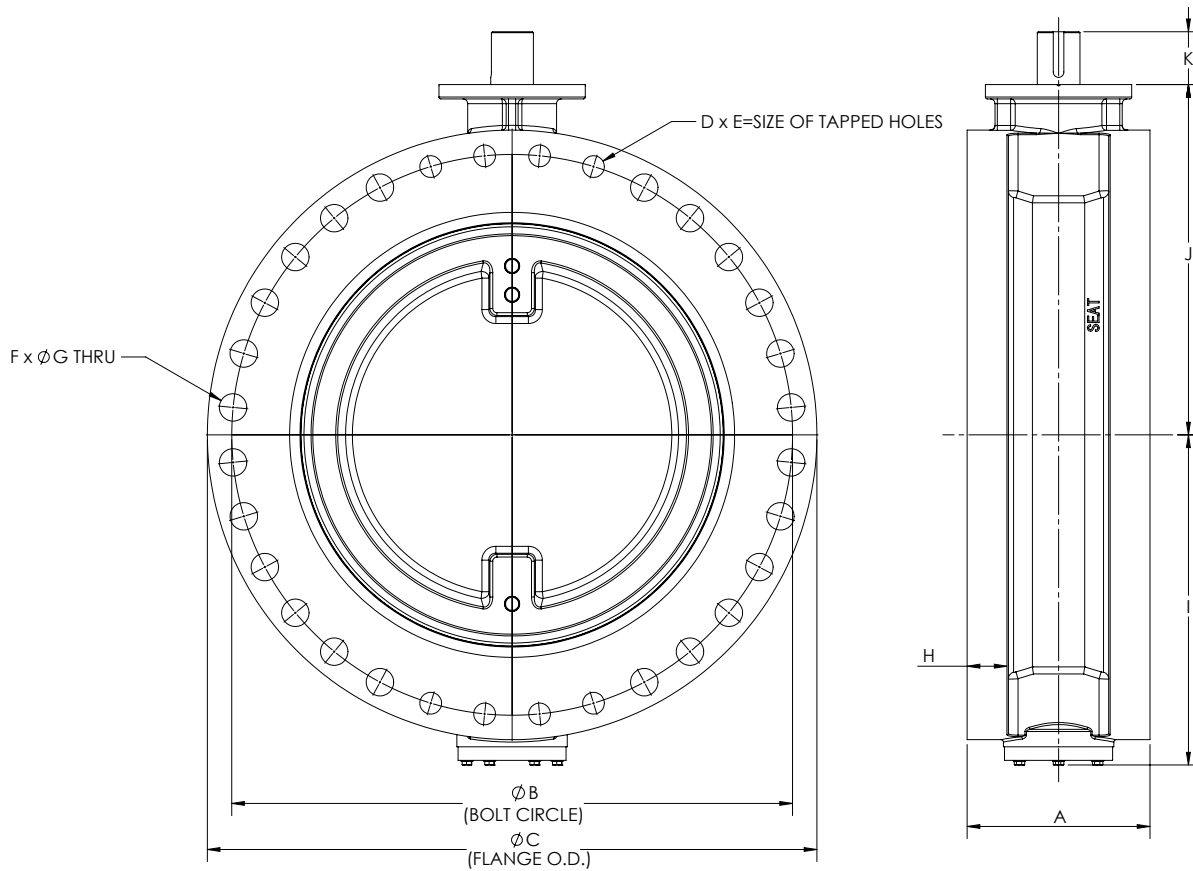
## Pressure/Temperature Ratings



In determining field pressure ratings for Series BFVI Butterfly Valves that are constructed of Ductile Iron, the above chart should be used. Pressure cast on valve represents maximum cold seating pressure; maximum hydrostatic pressure is temperature dependent, and may be higher than nominal pressure rating.



## 24"-96" FLANGED BARESTEM CL125



SIZE	A	B	C	D	E	F <sup>(1)</sup>	G	H	I	J	K
24"	8.00	29.50	32.0	4	1.25-7UNC	16	1.38	1.88	18.6	18.6	4.5
30"	12.00	36.00	38.8	8	1.25-7UNC	20	1.38	2.13	24.1	21.5	5.5
36"	12.00	42.75	46.0	8	1.5-6UNC	24	1.63	2.38	28.0	25.4	5.4
42"	12.00	49.50	53.0	8	1.5-6UNC	28	1.63	2.63	32.7	29.9	6.1
48"	15.00	56.00	59.5	8	1.5-6UNC	36	1.63	2.75	36.9	34.1	9.0
54"	15.00	62.75	66.3	8	1.75-5UNC	36	2.00	3.00	40.7	37.5	9.0
60"	15.00	69.25	73.0	8	1.75-5UNC	44	2.00	3.13	45.2	41.8	9.0
66"	18.00	76.00	80.0	8	1.75-5UNC	44	2.00	3.38	49.5	46.1	9.0
72"	18.00	82.50	86.5	8	1.75-5UNC	52	2.00	3.50	53.1	50.0	9.5
78"	18.00	89.00	93.0	8	2-4.5UNC	56	2.25	(2)	(2)	(2)	(2)
84"	24.00	95.50	99.8	12	2-4.5UNC	52	2.25	(2)	(2)	(2)	(2)
96"	24.00	108.5	113.3	12	2.25-4.5UNC	56	2.50	(2)	(2)	(2)	(2)

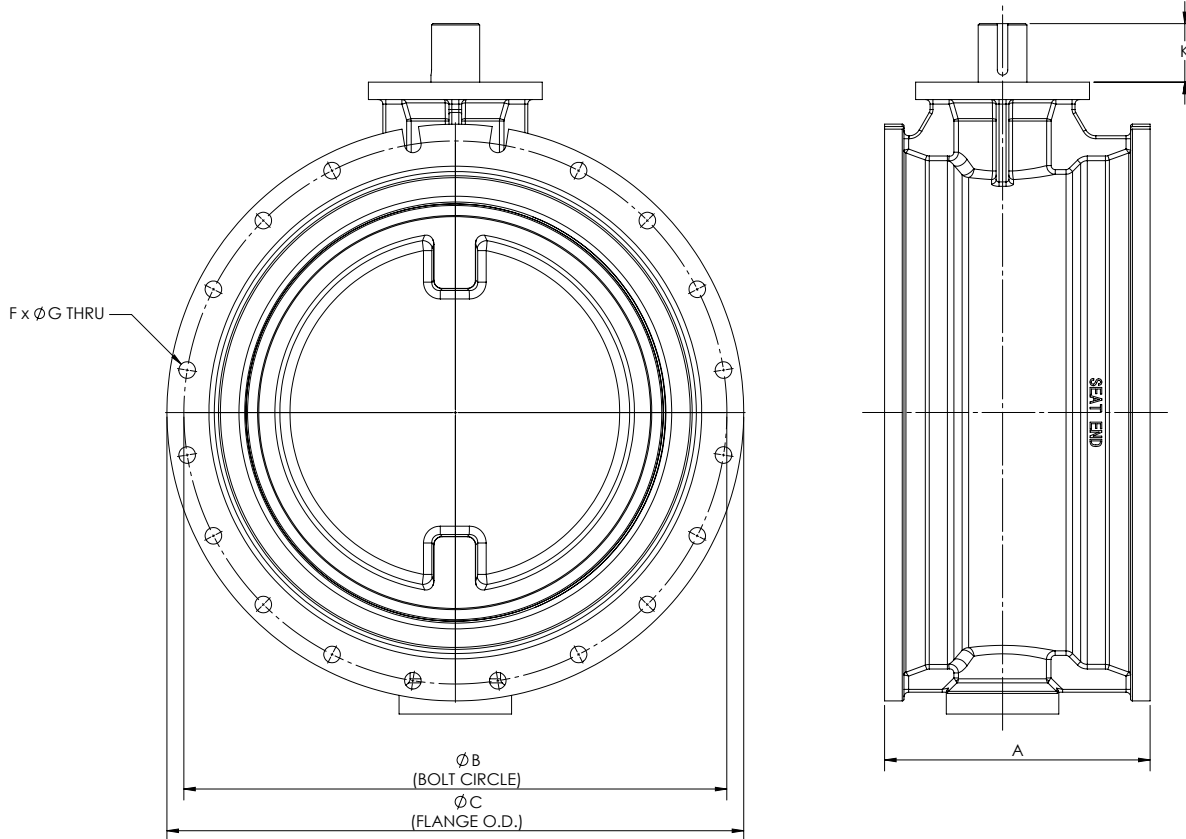
(1) Count for thru bolts ONLY, does not include tapped bolts. Bolt pattern per ANSI CL125

(2) Apply to factory

- Flanges drilling/bolting per ASTM/ANSI B16.1 Class 125 and AWWA C207 Class E



## 24"-48" MECHANICAL JOINT BARESTEM



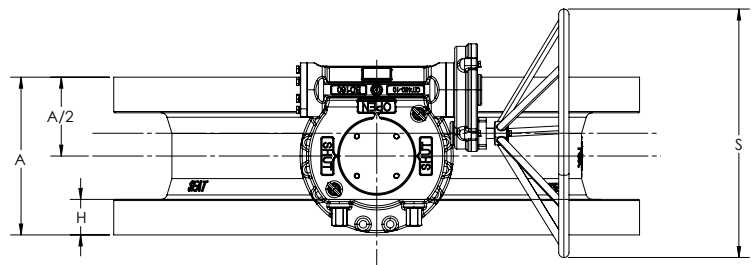
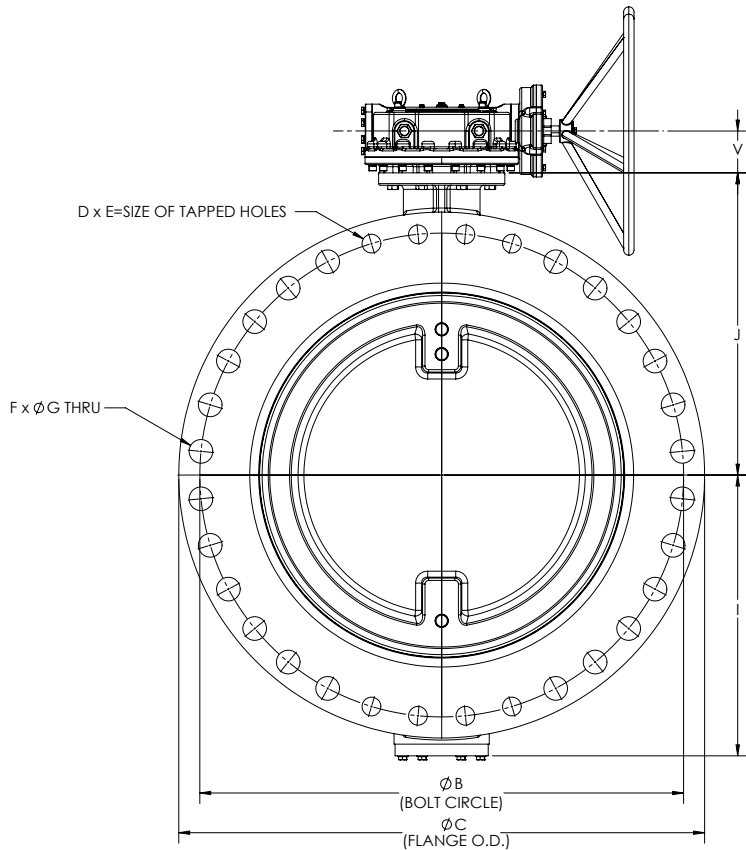
PAGE 8

SIZE	A	B	C	F	G <sup>(1)</sup>	K
24"	13.25	30.00	31.5	16	0.88	4.5
30"	18.00	36.88	39.1	20	1.13	5.5
36"	22.00	43.75	46.0	24	1.13	5.4
42"	22.00	50.62	53.1	28	1.38	6.1
48"	24.00	57.50	60.0	32	1.38	9.0

- (1) Hole size shown, bolt size is 1/8" smaller
- (2) Apply to factory
- Flanges drilling/bolting and bell end dimensions per AWWA C111



## 24"-96" FLANGED WORM GEAR WITH HANDWHEEL



PAGE 9

SIZE	A	B	C	D	E	F <sup>(1)</sup>	G	H	I	J	S	V
24"	8.00	29.50	32.0	4	1.25-7UNC	16	1.38	1.88	18.6	18.6	17.7	3.0
30"	12.00	36.00	38.8	8	1.25-7UNC	20	1.38	2.13	24.1	21.5	19.7	3.1
36"	12.00	42.75	46.0	8	1.5-6UNC	24	1.63	2.38	28.0	25.4	23.6	3.5
42"	12.00	49.50	53.0	8	1.5-6UNC	28	1.63	2.63	32.7	29.9	23.6	4.2
48"	15.00	56.00	59.5	8	1.5-6UNC	36	1.63	2.75	36.9	34.1	23.6	5.1
54"	15.00	62.75	66.3	8	1.75-5UNC	36	2.00	3.00	40.7	37.5	23.6	5.3
60"	15.00	69.25	73.0	8	1.75-5UNC	44	2.00	3.13	45.2	41.8	23.6	5.3
66"	18.00	76.00	80.0	8	1.75-5UNC	44	2.00	3.38	49.5	46.1	23.6	5.5
72"	18.00	82.50	86.5	8	1.75-5UNC	52	2.00	3.50	53.1	50.0	35.4	6.8
78"	18.00	89.00	93.0	8	2-4.5UNC	56	2.25	(2)	(2)	(2)	(2)	(2)
84"	24.00	95.50	99.8	12	2-4.5UNC	52	2.25	(2)	(2)	(2)	(2)	(2)
96"	24.00	108.5	113.3	12	2.25-4.5UNC	56	2.50	(2)	(2)	(2)	(2)	(2)

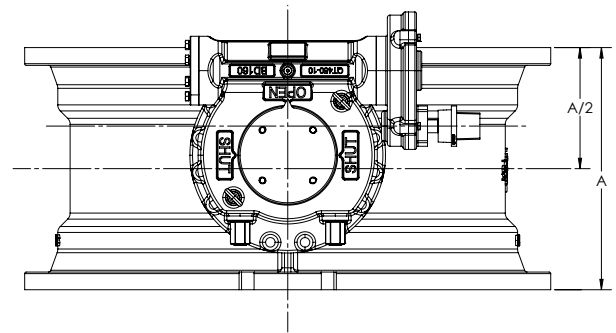
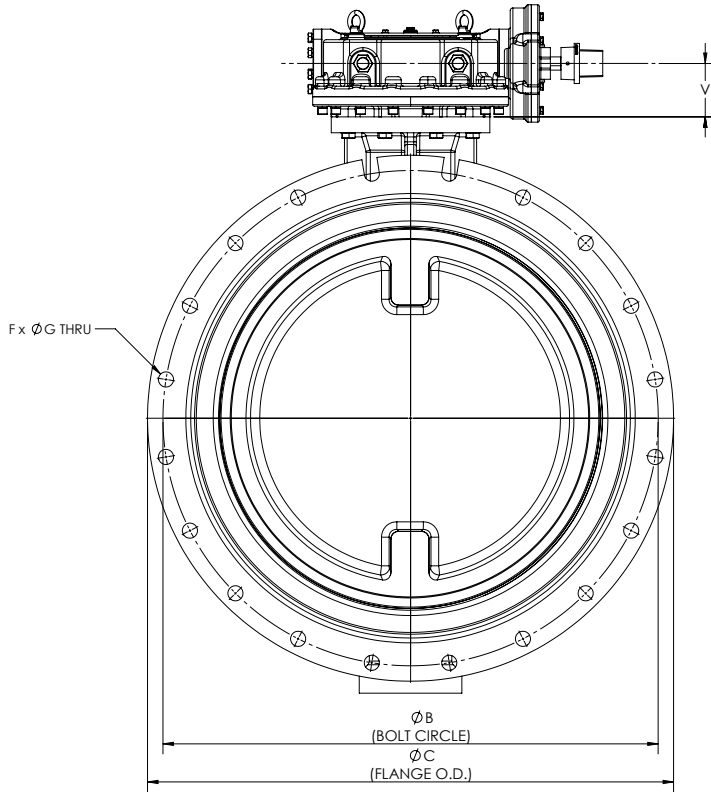
(1) Count for thru bolts ONLY, does not include tapped bolts. Bolt pattern per ANSI CL125

(2) Apply to factory

- Flanges drilling/bolting per ASTM/ANSI B16.1 Class 125 and AWWA C207 Class E



24"-48" MECHANICAL JOINT WORM GEAR WITH 2" NUT



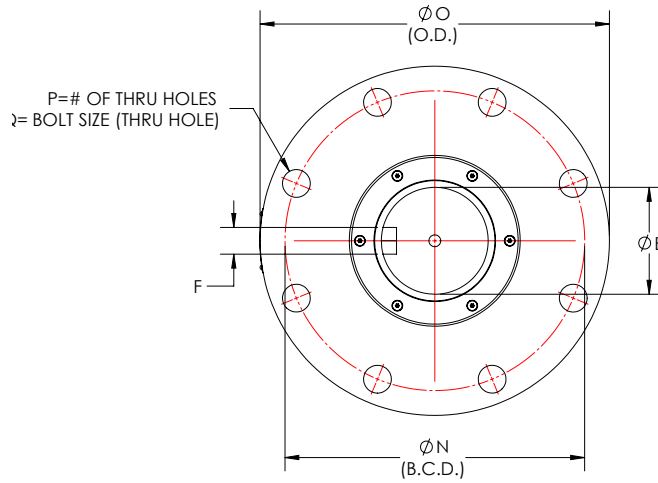
PAGE 10

SIZE	A	B	C	F	G <sup>(1)</sup>	V
24"	13.25	30.00	31.5	16	0.88	3.0
30"	18.00	36.88	39.1	20	1.13	3.1
36"	22.00	43.75	46.0	24	1.13	3.5
42"	22.00	50.62	53.1	28	1.38	4.2
48"	24.00	57.50	60.0	32	1.38	5.1

(1) Hole size shown, bolt size is 1/8" smaller  
 (2) Apply to factory - subject to change  
 - Flanges drilling/bolting and bell end dimensions per AWWA C111



## ISO ACTUATOR MOUNT DIMENSIONS



SIZE	ISO	E	F	N	O	P	Q <sup>(1)</sup>	Q <sup>(1)</sup>
24"	F16	3.00	0.75	6.50	8.3	4	M20	3/4-10UNC
30"	F25	3.50	0.875	10.00	11.8	8	M16	5/8-10UNC
36"	F30	3.50	0.875	11.73	13.8	8	M20	3/4-10UNC
42"	F30	5.00	1.25	11.73	13.8	8	M20	3/4-10UNC
48"	F35	5.00	1.25	14.02	16.3	8	M30	1-8UNC
54"	F35	5.75	1.50	14.02	16.3	8	M30	1-8UNC
60"	F40	6.75	1.75	15.98	18.7	8	M36	1 1/4-7UNC
66"	F40	6.75	1.75	15.98	18.7	8	M36	1 1/4-7UNC
72"	F40	8.00	2.00	15.98	18.7	8	M36	1 1/4-7UNC

(1) Holes are thru holes. Dimension is corresponding bolt size.

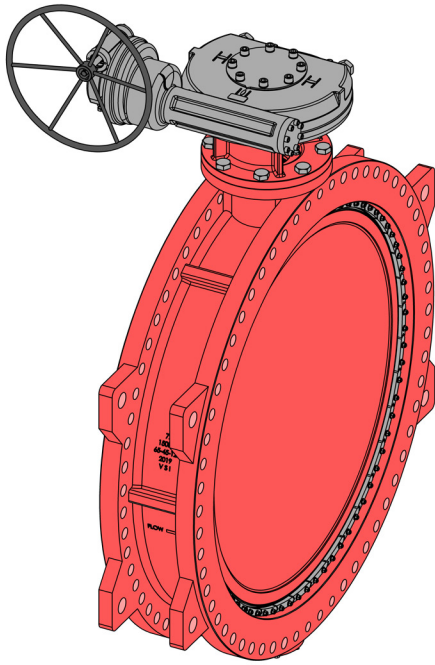
## OPERATING TORQUES

TORQUE CHART (INLBS)				
SIZE		PSI		
NPS	DN	50 PSI	150 PSI	250 PSI
24	600	19500	31500	37500
30	750	42500	70000	82500
36	900	52500	84500	100000
42	1050	65000	108000	125000
48	1200	140000	225000	270000
54	1350	160000	260000	310000
60	1500	225000	365000	435000
66	1650	275000	445000	531000
72	1800	475000	765000	910000
78" and Larger		Apply to VSI		

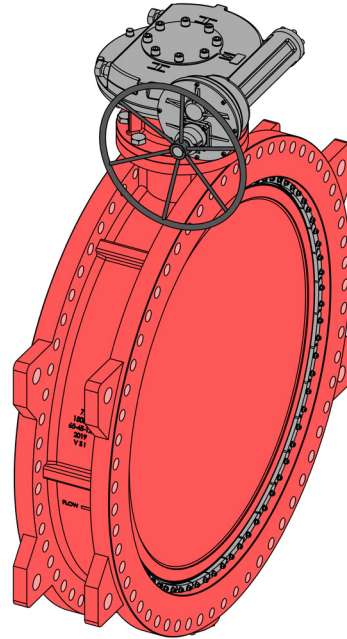


## STANDARD OPERATOR TYPES

### 2-STAGE WORM GEAR

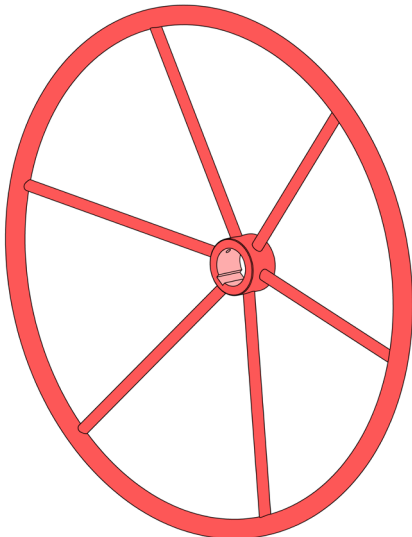


### SINGLE STAGE WORM GEAR

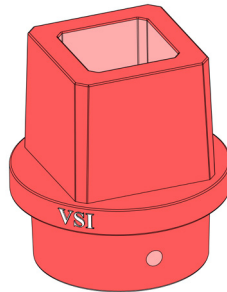


Single stage worm gear or worm gear with spur secondary gear

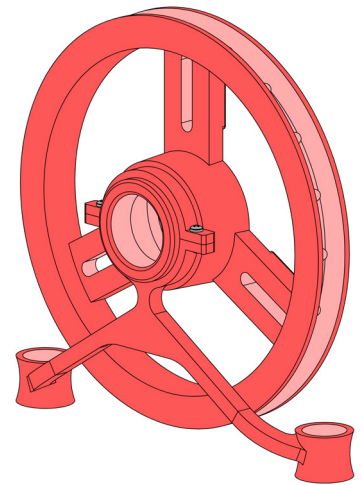
### HANDWHEEL



### 2-INCH NUT OP.

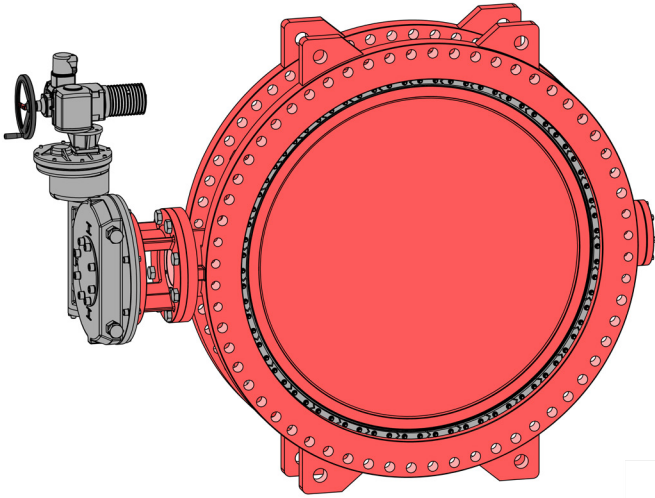


### CHAINWHEEL

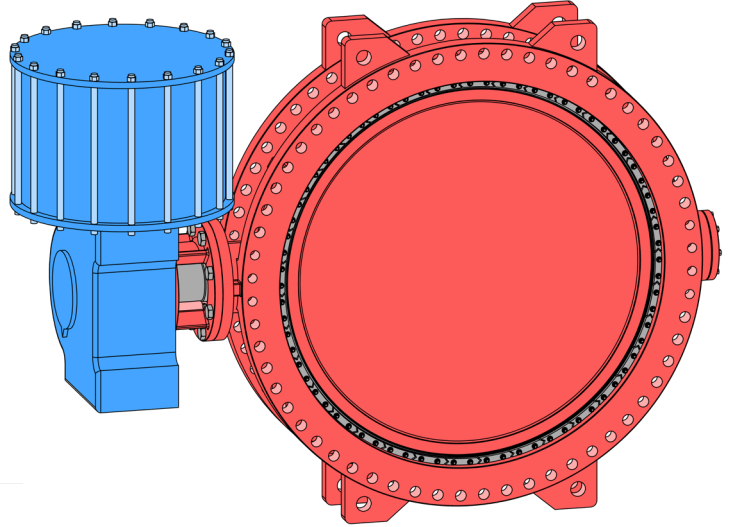


## SPECIAL CONFIGURATIONS

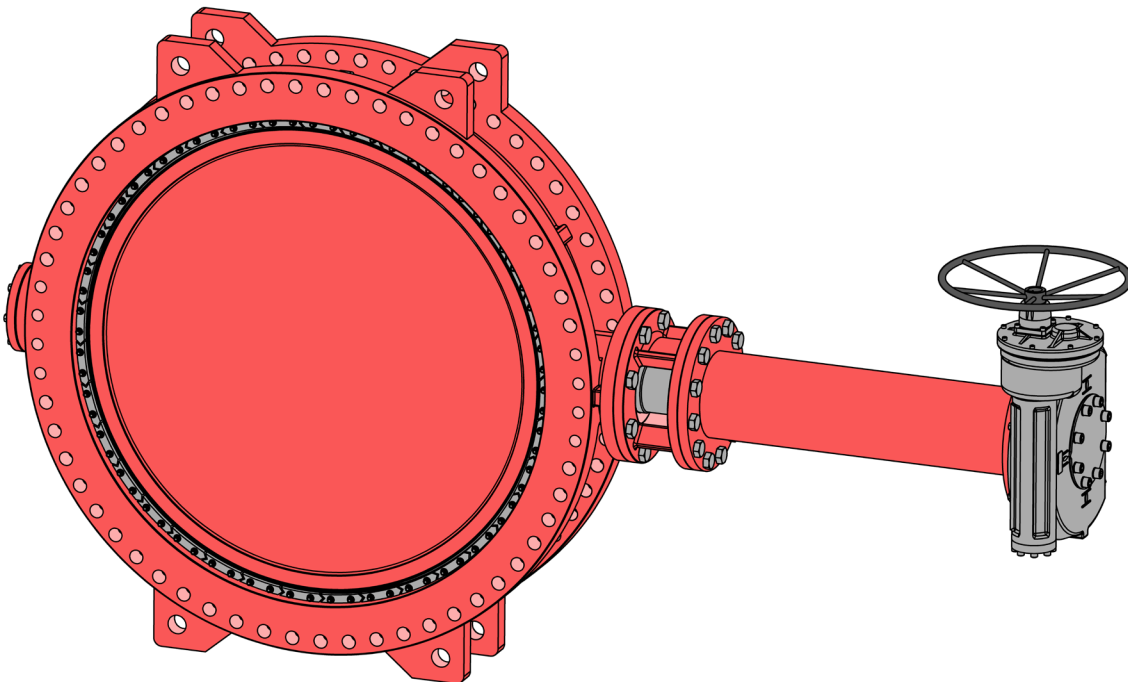
### ELECTRIC ACTUATORS



### PNEUMATIC/HYDRAULIC ACTUATORS



### BONNET EXTENSIONS

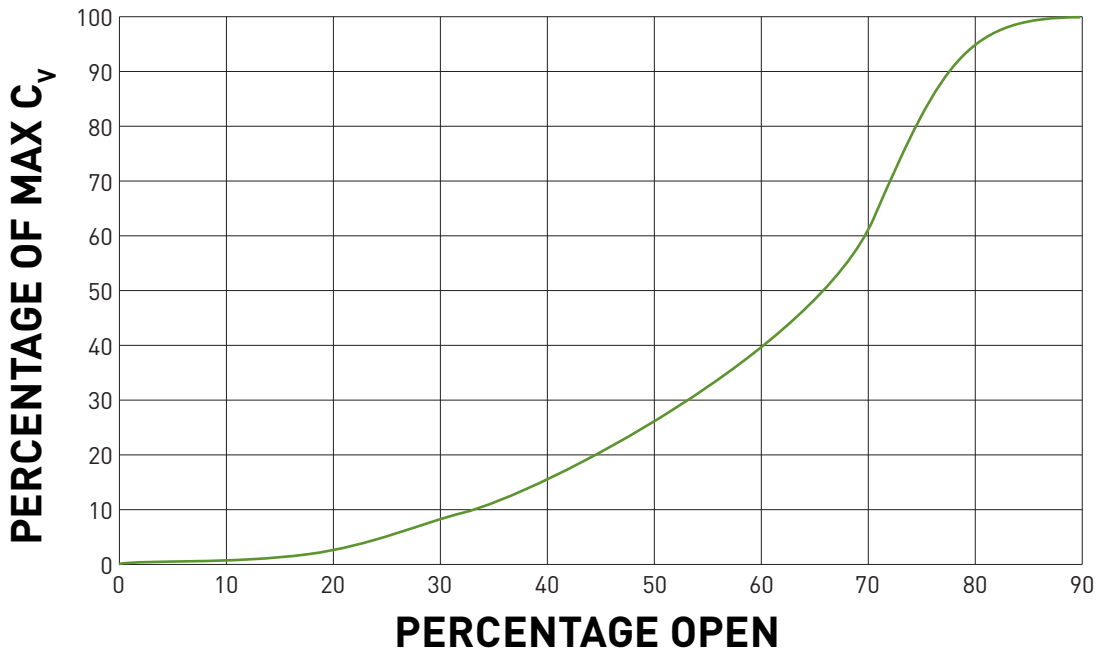




## Cv VALUES

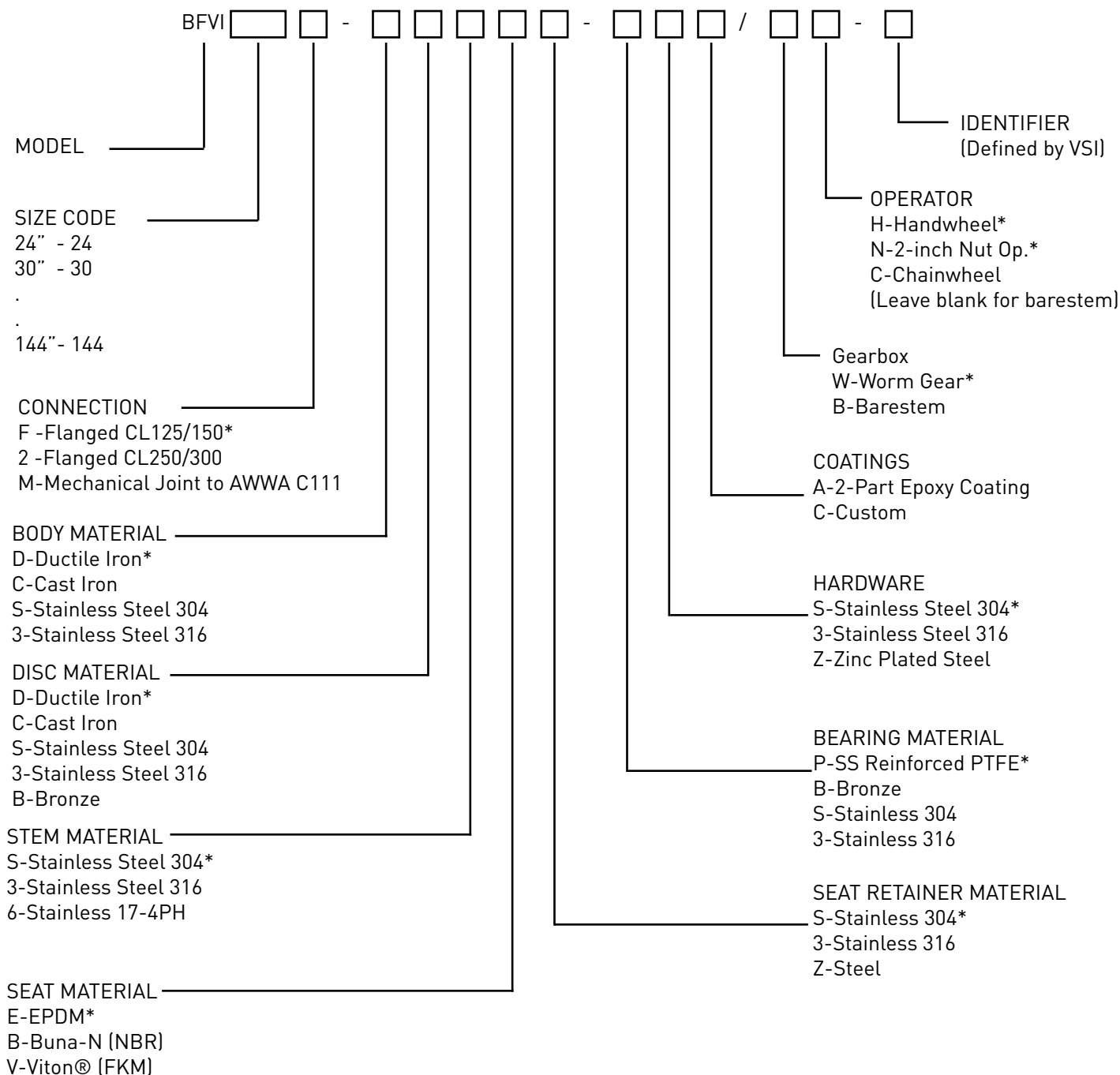
Cv Valve (100% Open)			
Size		C <sub>v</sub>	K <sub>v</sub>
DN	NPS		
600	24"	27889	23837
750	30"	39450	33720
900	36"	59520	50870
1050	42"	85740	73280
1200	48"	112000	95800
1350	54"	141700	121000
1500	60"	172800	147700
1650	66"	209100	178700
1800	72"	248900	212700
78" and Larger		Apply to VSI	

## FLOW CHARACTERISTICS





## PART NUMBER MATRIX

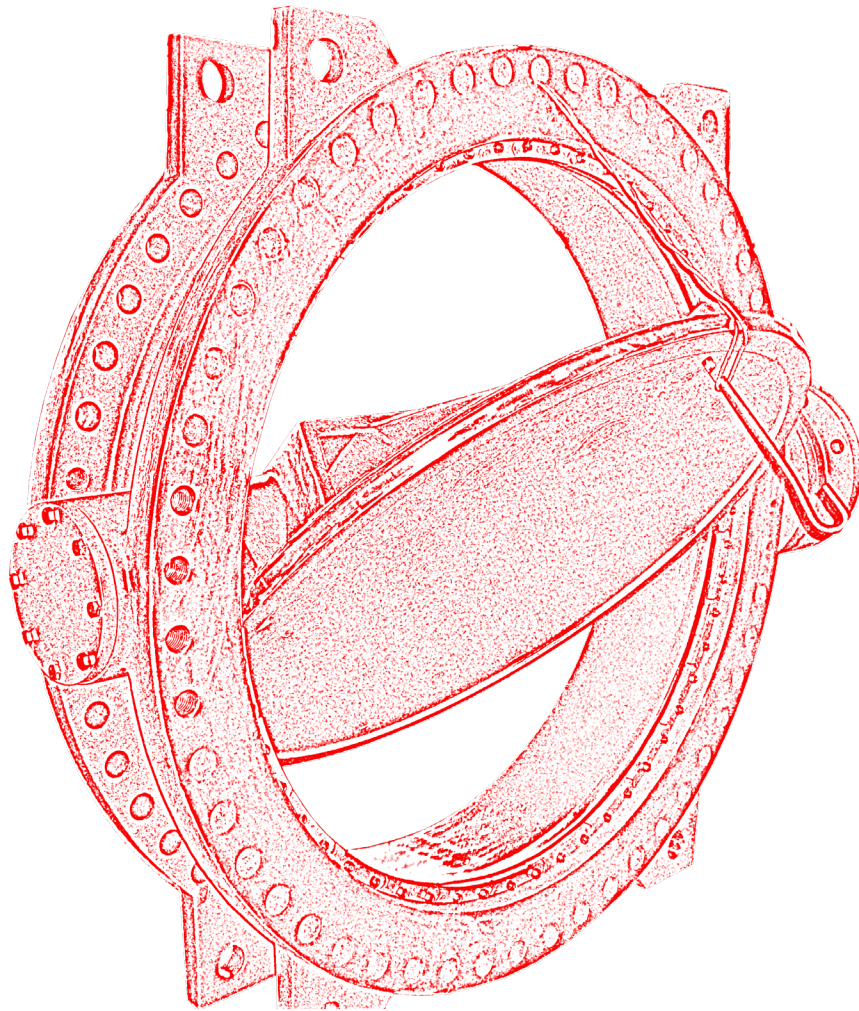


\* Standard Material

**EXAMPLE:**

BFVI30F-DDSES-PSA/WH-J

A 30" flanged butterfly valve with Ductile Iron body and disc, SS304 shaft, EPDM seat, SS304 seat retainers/hardware, PTFE bearings material, SS304 exterior hardware, 2-part epoxy coatings with worm gearbox, and handwheel operator



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As part of a process of on-going product development, VSI reserves the right to amend or change specifications without prior notice. Published data may be subject to change. For the latest version, visit our website at [www.vsiwaterworks.com](http://www.vsiwaterworks.com)