





### TOP FLANGE

Conforms to ISO 5211 for ease of automation

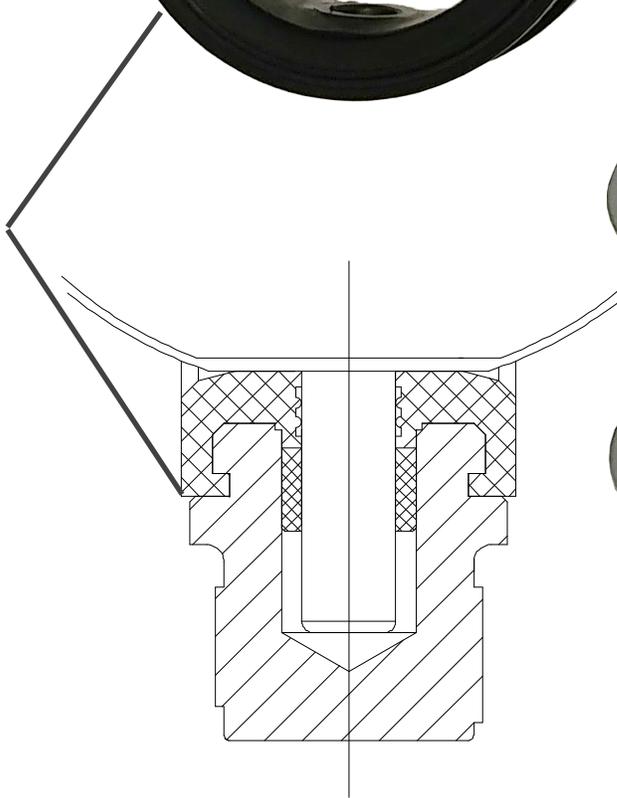
### MULTIPLE SEAT OPTIONS

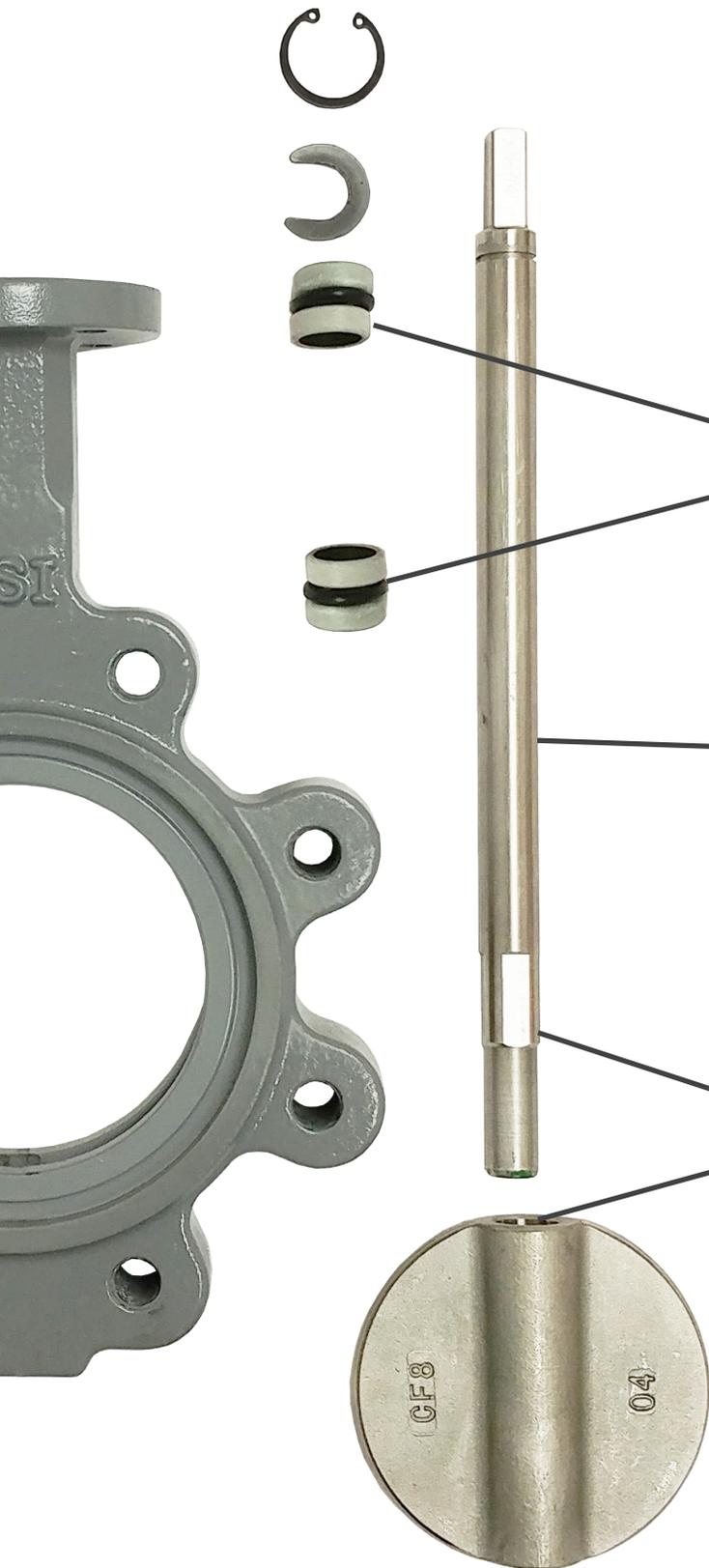
VSI offers various seat options including EPDM, NBR, Viton, and others to match the requirements of most all line media

### REPLACEABLE SEAT DESIGN

The molded replaceable seat can easily be removed and replaced with common hand tools

- Features built in shaft seals
- Bi-directional sealing
- Suitable for dead end service
- Serves as a flange seal/gasket





#### TRIPLE SEALED STEM

The stem features 3 separate seals to prevent leakage and ensure a long service free life

#### CORROSION RESISTANT SHAFT

Shafts are made of corrosion resistant Stainless 416 and fully isolated from the line media to provide extended service life. Other materials available on request.

#### POSITIVE STEM/DISC CONNECTION

The connection between the disc and stem is an accurately machined square that eliminates pin connections. This minimizes leakage paths and corrosion points

### TOP FLANGE

Conforms to ISO 5211 for the mounting of a wide range of actuators, levers, and gear operators

### BUSHINGS

Five separate bushings provide correct alignment of the shaft through the body and reduces operating torque

### REMOVEABLE STEM

Single piece shaft can be removed for inspection or service, in the field, with no special tools required

### BLOWOUT PROOF

The Series 2200 stem is retained by a gland plate and retaining ring to form a blowout proof valve design.

### MULTIPLE STEM SEALS

The stem is sealed by two separate o-rings and an integral seal in the seat to ensure absolutely no external leakage for the life of the valve.

### NO-PIN CONSTRUCTION

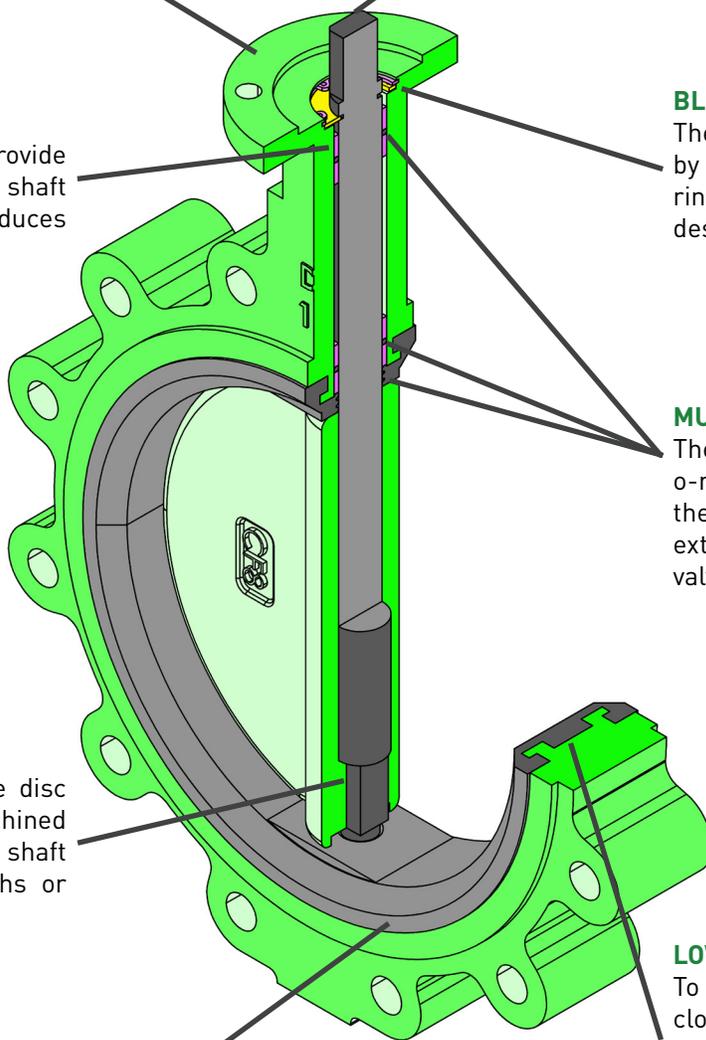
The stem is secured to the disc with an accurately machined square broach - there are no shaft pins to create leakage paths or corrosion points.

### RESILIENT SEAT SURFACE

The replaceable resilient seat surface extends past the valve face to eliminate the need for gaskets on flanged installations. Installation time is greatly reduced by this feature

### LOW TORQUE DESIGN

To reduce the operating and closing torque the Series 2200 is designed with an extra thick seat at the fully closed position. This design allows for more seat compression - reducing operating torque without limiting long term close-off ratings



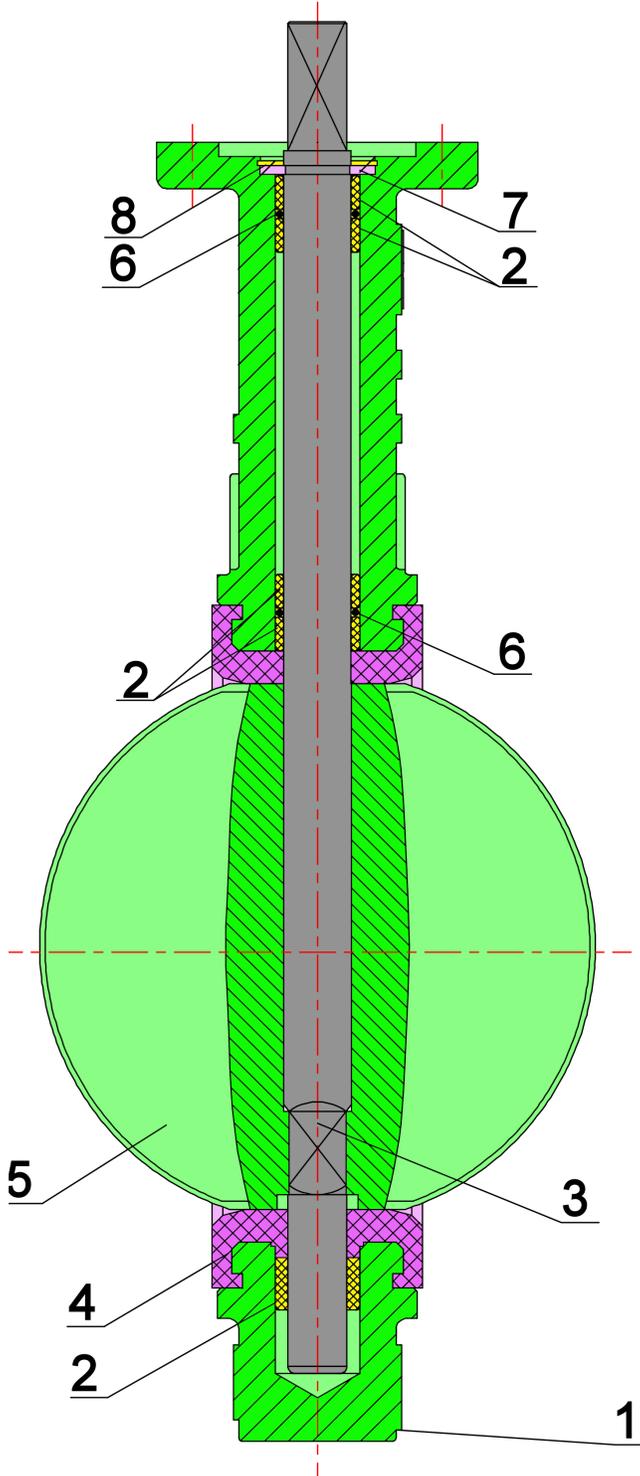
## DESIGN STANDARDS

Size Range	2" -12" Lugged CL125/150
Connections	ANSI B16.1 Class 125/ANSI B16.5 Class 150
Design	API 609
Lay Length	API 609
Testing	API 598 MSS SP-67
Leakage	100 PSIG ANSI FCI 70-2 Class VI 200 PSIG ANSI FCI 70-2 Class VI
Shutoff	Maximum Allowable 250psig CWP
Temperature	-30°F to 375°F
Bonnet	ISO 5221

## 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™	Polytetrafluoro-ethylene	-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

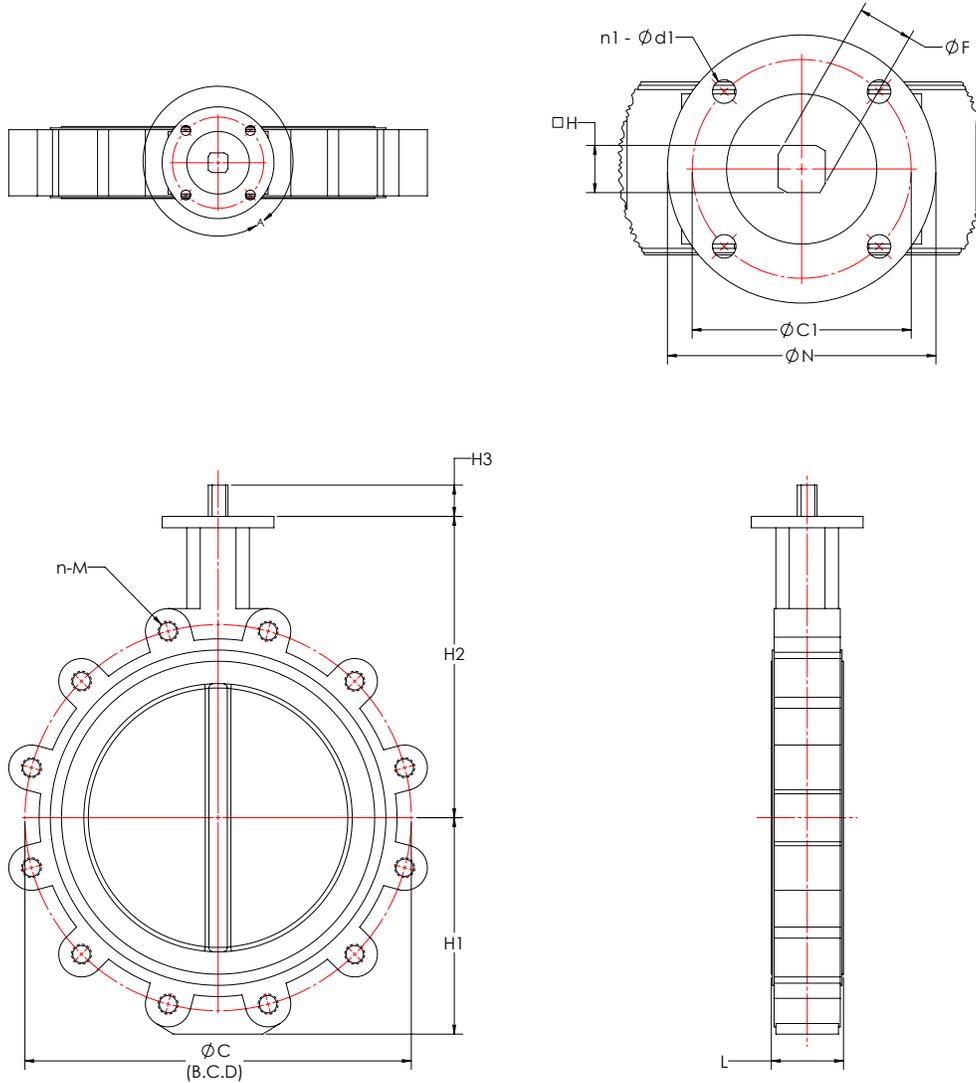
## MATERIALS OF CONSTRUCTION



Item	Description	Materials Available	Standard
1	Body	Ductile Iron*	ASTM A536 65-45-12
		Cast Iron	ASTM A126 Class B
2	Bushings	PTFE*	
		Lubricated Bronze	
3	Shaft	Stainless 416*	ASTM A276 416
		Stainless 316	ASTM A276 316
		Stainless 304	ASTM A276 304
4	Seat	EPDM*	
		Buna-N*	
		Neoprene	
		Hypalon	
		Viton	
5	Disc	High Temp Viton	
		Stainless 304*	ASTM A351 CF8
		Stainless 316	ASTM A351 CF8M
		Aluminum Bronze	ASTM B148 C95400
		Ductile Iron	ASTM A536 65-45-12
6	O-Rings	Nylon Coated Ductile Iron	ASTM A536 65-45-12
		Same as Seat	
7	Shaft Retainer	Zinc Plated Steel*	
8	Retaining Clip	Spring Steel*	
NS	Tag	Aluminum*	UV Screen Printed

\* Standard Material Option

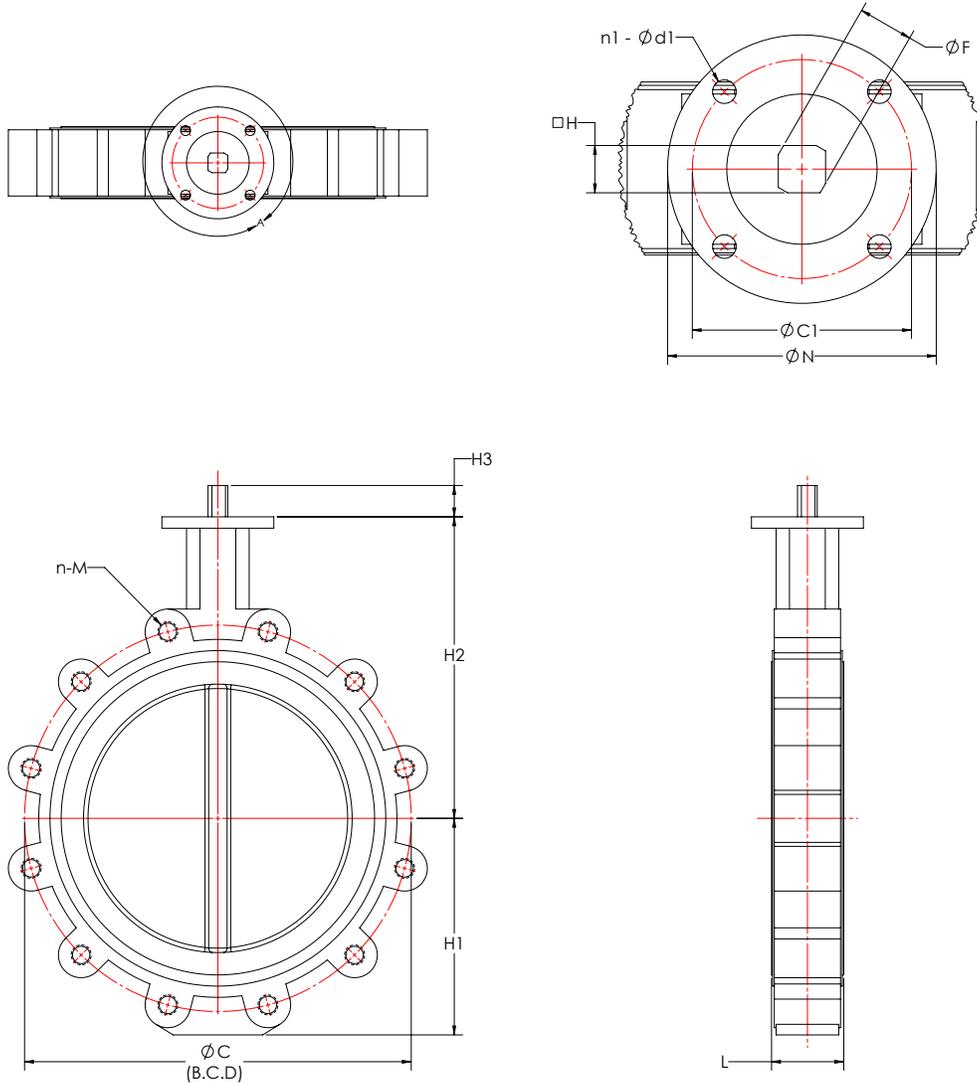
## BARESTEM DIMENSIONS (IMPERIAL)



SIZE	H1	H2	H3	L	C	n	M	ISO	C1	N	F	H
2"	3.15	6.34	1.142	1.693	4.75	4	5/8"-11UNC	F05	1.97	2.6	0.476	0.354
2.5"	4.53	6.89	1.142	1.811	5.50	4	5/8"-11UNC	F05	1.97	2.6	0.476	0.354
3"	4.53	7.13	1.142	1.811	6.00	4	5/8"-11UNC	F05	1.97	2.6	0.476	0.354
4"	4.53	8.03	1.142	2.047	7.50	8	5/8"-11UNC	F07	2.76	3.5	0.555	0.433
5"	5.00	8.39	1.142	2.205	8.50	8	3/4"-10UNC	F07	2.76	3.5	0.713	0.551
6"	5.47	9.06	1.142	2.205	9.50	8	3/4"-10UNC	F07	2.76	3.5	0.713	0.551
8"	6.89	10.24	1.378	2.362	11.75	8	3/4"-10UNC	F10	4.02	4.9	0.870	0.669
10"	7.99	11.50	1.378	2.677	14.25	12	7/8"-9UNC	F10	4.02	4.9	1.106	0.866
12"	9.52	13.27	1.378	3.071	17.00	12	7/8"-9UNC	F10	4.02	4.9	1.106	0.866



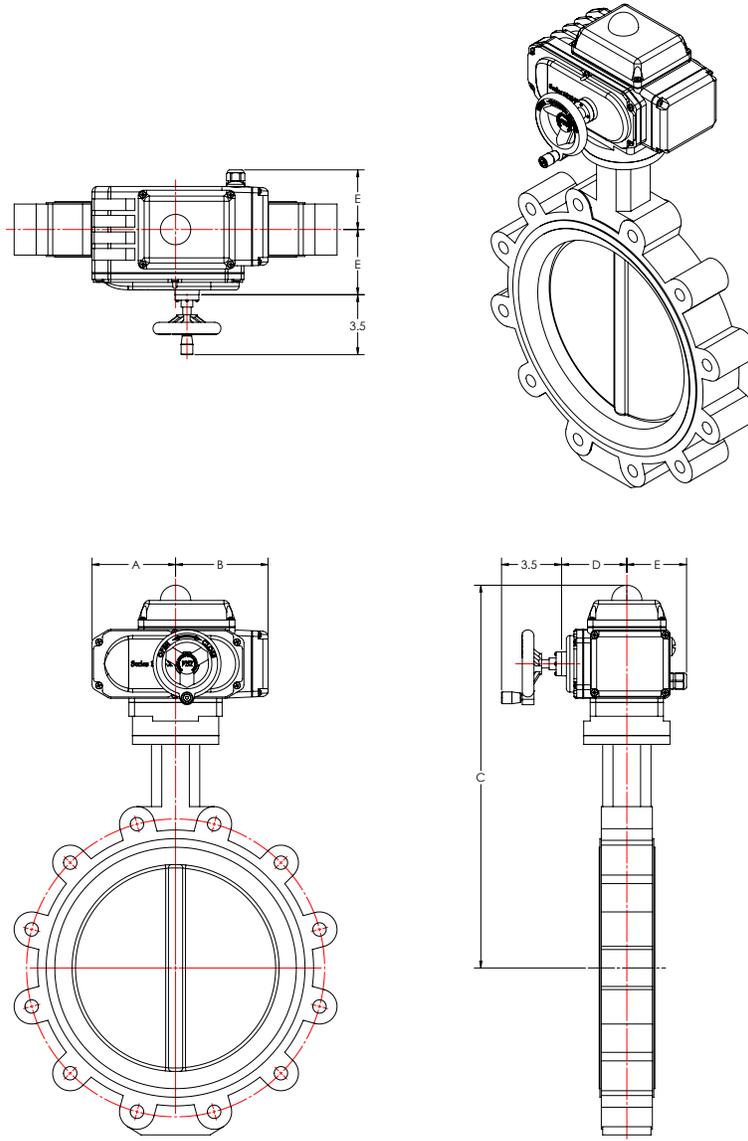
**BARESTEM DIMENSIONS (METRIC)**



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SIZE	H1	H2	H3	L	C	n	M	ISO	C1	N	F	H
2"	80	161	29	43	120.6	4	5/8"-11UNC	F05	50	65	12.1	9
2.5"	115	175	29	46	139.7	4	5/8"-11UNC	F05	50	65	12.1	9
3"	115	181	29	46	152.4	4	5/8"-11UNC	F05	50	65	12.1	9
4"	115	204	29	52	190.5	8	5/8"-11UNC	F07	70	90	14.1	11
5"	127	213	29	56	215.9	8	3/4"-10UNC	F07	70	90	18.1	14
6"	140	230	29	56	241.3	8	3/4"-10UNC	F07	70	90	18.1	14
8"	175	260	35	60	298.4	8	3/4"-10UNC	F10	102	125	22.1	17
10"	203	292	35	68	361.9	12	7/8"-9UNC	F10	102	125	28.1	22
12"	242	337	35	78	431.8	12	7/8"-9UNC	F10	102	125	28.1	22

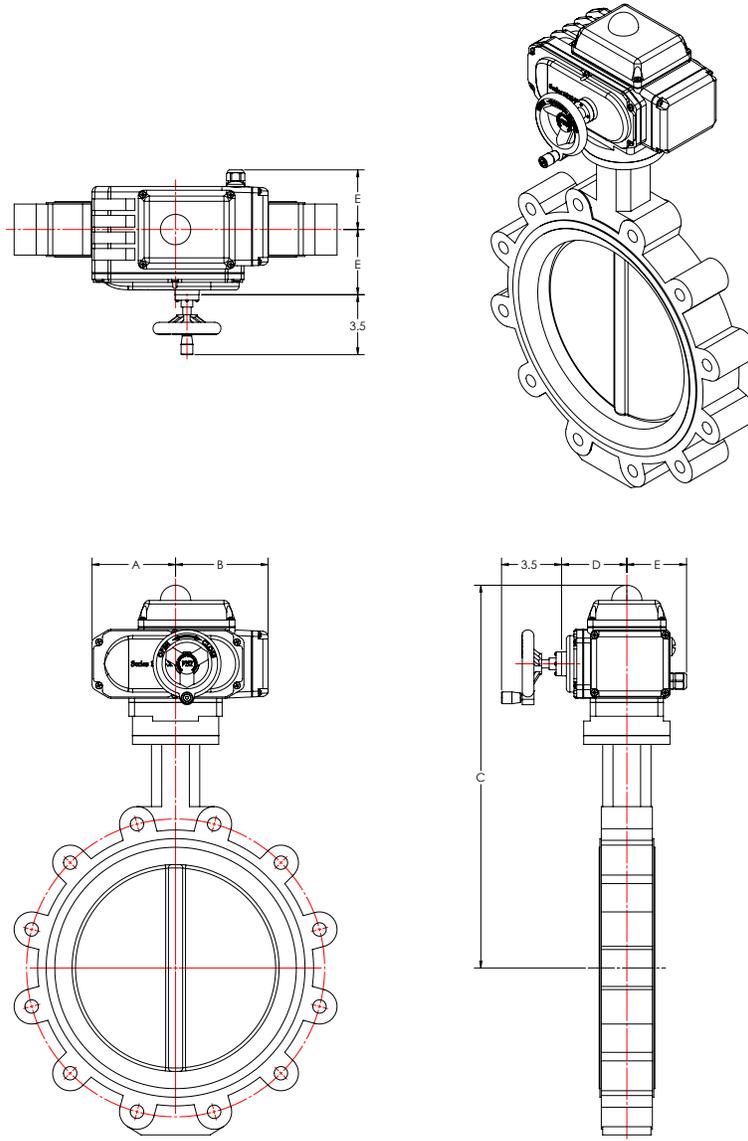
## 100 PSI VALVES WITH SERIES 1000-X ELECTRIC ACTUATOR



SIZE	2-POS ACTUATOR	MODULATING ACTUATOR	A	B	C	D	E
2"	1005-X*	1005/S-X*	3.27	3.03	12.7	2.48	2.87
2-1/2"	1005-X*	1005/S-X*	3.27	3.03	13.2	2.48	2.87
3"	1005-X*	1005/S-X*	3.27	3.03	13.5	2.48	2.87
4"	1005-X*	1005/S-X*	3.27	3.03	14.4	2.48	2.87
5"	1005-X*	1005/S-X*	3.27	3.03	14.7	2.48	2.87
6"	1010-X	1010/S-X	3.86	3.86	15.8	2.81	2.90
8"	1020-X	1020/S-X	4.76	5.28	18.8	3.72	3.40
10"	1020-X	1020/S-X	4.76	5.28	20.1	3.72	3.40
12"	1040-X	1040/S-X	4.76	5.28	21.9	3.72	3.40

\*HANDWHEEL NOT AVAILABLE ON 1005-X OR 1005/S-X; 1010-X OR 1010/S-X MAY BE USED WHERE HANDWHEEL IS NEEDED. CONSULT FOR DIMENSIONS.

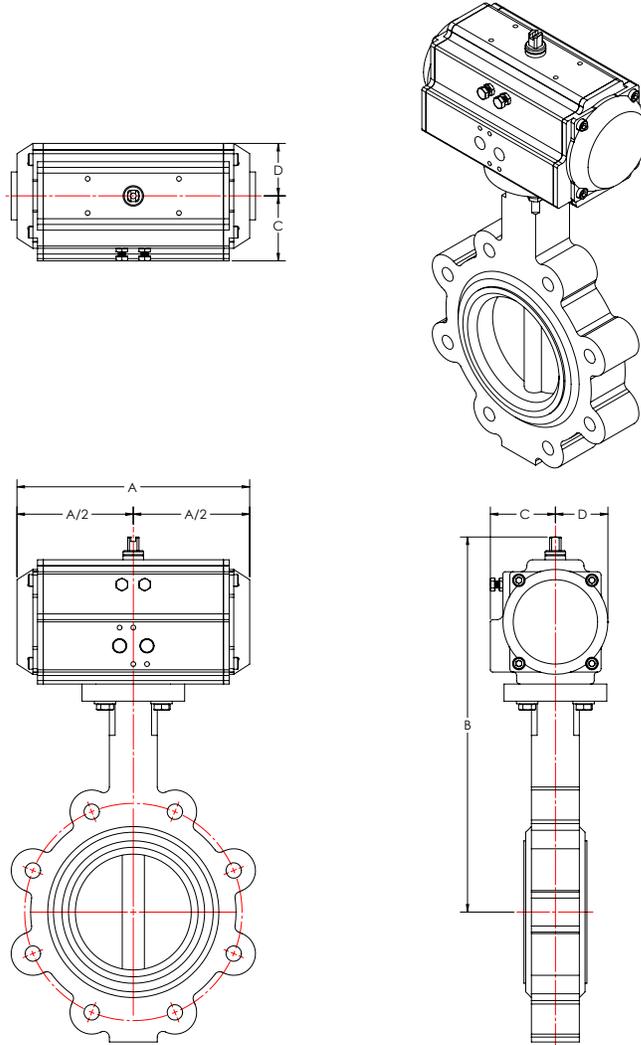
200 PSI VALVES WITH SERIES 1000-X ELECTRIC ACTUATOR



SIZE	2-POS ACTUATOR	MODULATING ACTUATOR	A	B	C	D	E
2"	1005-X*	1005/S-X*	3.27	3.03	12.7	2.48	2.87
2-1/2"	1005-X*	1005/S-X*	3.27	3.03	13.2	2.48	2.87
3"	1005-X*	1005/S-X*	3.27	3.03	13.5	2.48	2.87
4"	1005-X*	1005/S-X*	3.27	3.03	14.4	2.48	2.87
5"	1010-X	1010/S-X	3.86	3.86	15.1	2.81	2.90
6"	1010-X	1010/S-X	3.86	3.86	15.8	2.81	2.90
8"	1020-X	1020/S-X	4.76	5.28	18.8	3.72	3.40
10"	1040-X	1040/S-X	4.76	5.28	20.1	3.72	3.40
12"	1040-X	1040/S-X	4.76	5.28	21.9	3.72	3.40

\*HANDWHEEL NOT AVAILABLE ON 1005-X OR 1005/S-X; 1010-X OR 1010/S-X MAY BE USED WHERE HANDWHEEL IS NEEDED. CONSULT FOR DIMENSIONS.

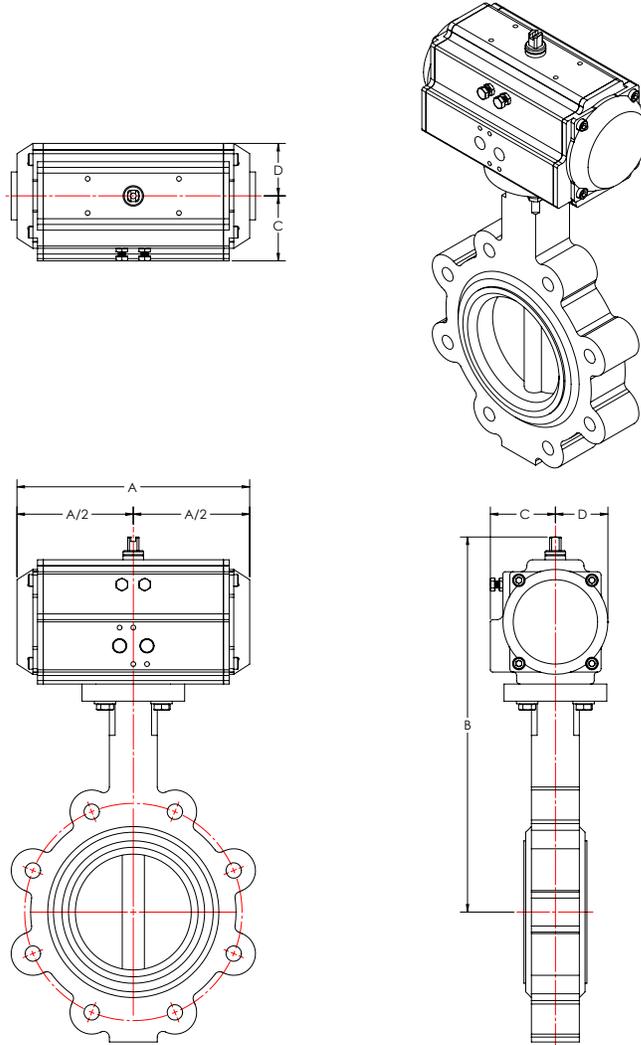
## 100 PSI VALVES WITH SERIES C PNEUMATIC ACTUATORS



SIZE	DA ACTUATOR	A	B	C	D
2"	C-DA063	6.61	10.6	1.85	1.42
2-1/2"	C-DA063	6.61	11.1	1.85	1.42
3"	C-DA063	6.61	11.4	1.85	1.42
4"	C-DA083	8.03	13.1	2.24	1.81
5"	C-DA083	8.03	13.5	2.24	1.81
6"	C-DA092	10.31	14.4	2.30	1.79
8"	C-DA125	11.85	17.1	2.93	2.66
10"	C-DA125	11.85	18.4	2.93	2.66
12"	C-DA140	15.35	20.8	3.03	2.95

SIZE	SR ACTUATOR	A	B	C	D
2"	C-SR063	6.61	10.6	1.85	1.42
2-1/2"	C-SR083	8.03	12.0	2.24	1.81
3"	C-SR083	8.03	12.2	2.24	1.81
4"	C-SR092	10.31	13.4	2.30	1.79
5"	C-SR092	10.31	13.8	2.30	1.79
6"	C-SR125	11.85	16.0	2.93	2.66
8"	C-SR140	15.35	17.8	3.03	2.95
10"	C-SR140	15.35	19.1	3.03	2.95
12"	C-SR160	18.03	21.8	3.43	3.43

200 PSI VALVES WITH SERIES C PNEUMATIC ACTUATORS

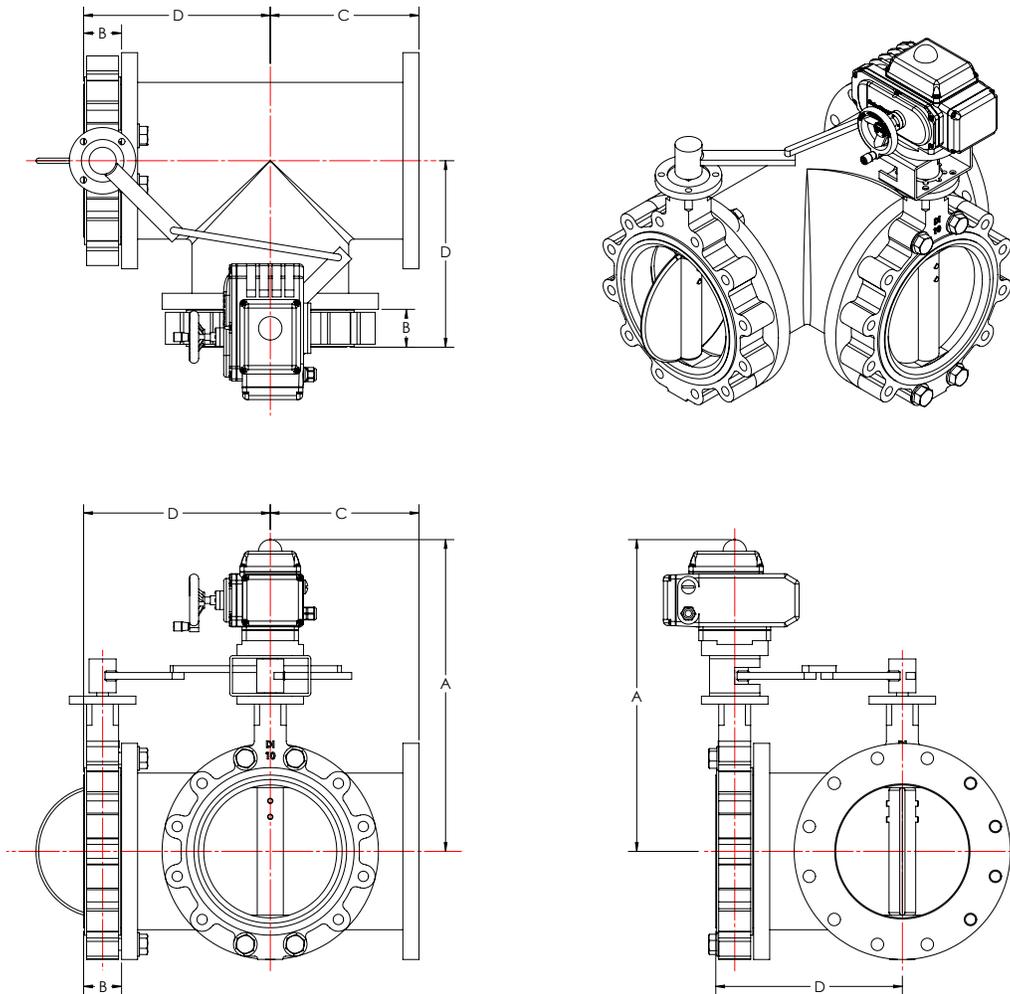


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SIZE	DA ACTUATOR	A	B	C	D
2"	C-DA063	6.61	10.6	1.85	1.42
2-1/2"	C-DA063	6.61	11.1	1.85	1.42
3"	C-DA063	6.61	11.4	1.85	1.42
4"	C-DA083	8.03	13.1	2.24	1.81
5"	C-DA092	10.31	13.8	2.30	1.97
6"	C-DA105	10.55	15.1	2.52	2.26
8"	C-DA125	11.85	17.1	2.93	2.66
10"	C-DA140	15.35	19.1	3.03	2.95
12"	C-DA160	18.03	21.8	3.43	3.43

SIZE	SR ACTUATOR	A	B	C	D
2"	C-SR063	6.61	10.6	1.85	1.42
2-1/2"	C-SR083	8.03	12.0	2.24	1.81
3"	C-SR083	8.03	12.2	2.24	1.81
4"	C-SR092	10.31	13.4	2.30	1.79
5"	C-SR125	11.85	15.3	2.93	2.66
6"	C-SR125	11.85	16.0	2.93	2.66
8"	C-SR140	15.35	17.8	3.03	2.95
10"	C-SR160	18.03	20.0	3.43	3.43
12"	C-SR190	20.67	23.5	4.06	4.06

## 3-WAY BUTTERFLY VALVE ASSEMBLIES



SIZE	A*	B	C	D
2"	14.7	1.69	4.5	6.2
2-1/2"	15.2	1.81	5.0	6.8
3"	15.5	1.81	5.5	7.3
4"	18.2	2.05	6.5	8.6
5"	18.5	2.21	7.5	9.7
6"	20.6	2.21	8.0	10.2
8"	22.8	2.36	9.0	11.4
10"	24.1	2.68	11.0	13.7
12"	25.9	3.07	12.0	15.1

\*Height varies according to actuator chosen and accessories used  
-Other 3-way butterfly valve configurations available



## FLOW COEFFICIENTS AND DATA

SIZE	Valve Flow Coefficient (Cv)								
	Valve Rotation in Degrees								
	10°	20°	30°	40°	50°	60°	70°	80°	90°
2"	0.1	5	12	24	45	64	90	125	<b>135</b>
2-1/2"	0.2	8	20	37	65	98	144	204	<b>220</b>
3"	0.3	12	22	39	70	116	183	275	<b>302</b>
4"	0.5	17	36	78	139	230	364	546	<b>600</b>
5"	0.8	29	91	133	237	392	620	930	<b>1022</b>
6"	2	45	95	205	366	605	958	1437	<b>1579</b>
8"	3	89	188	405	727	1202	1903	2854	<b>3136</b>
10"	4	151	320	694	1237	2047	3240	4859	<b>5340</b>
12"	5	234	495	1072	1911	3162	5005	7507	<b>8250</b>

## OPERATING TORQUE

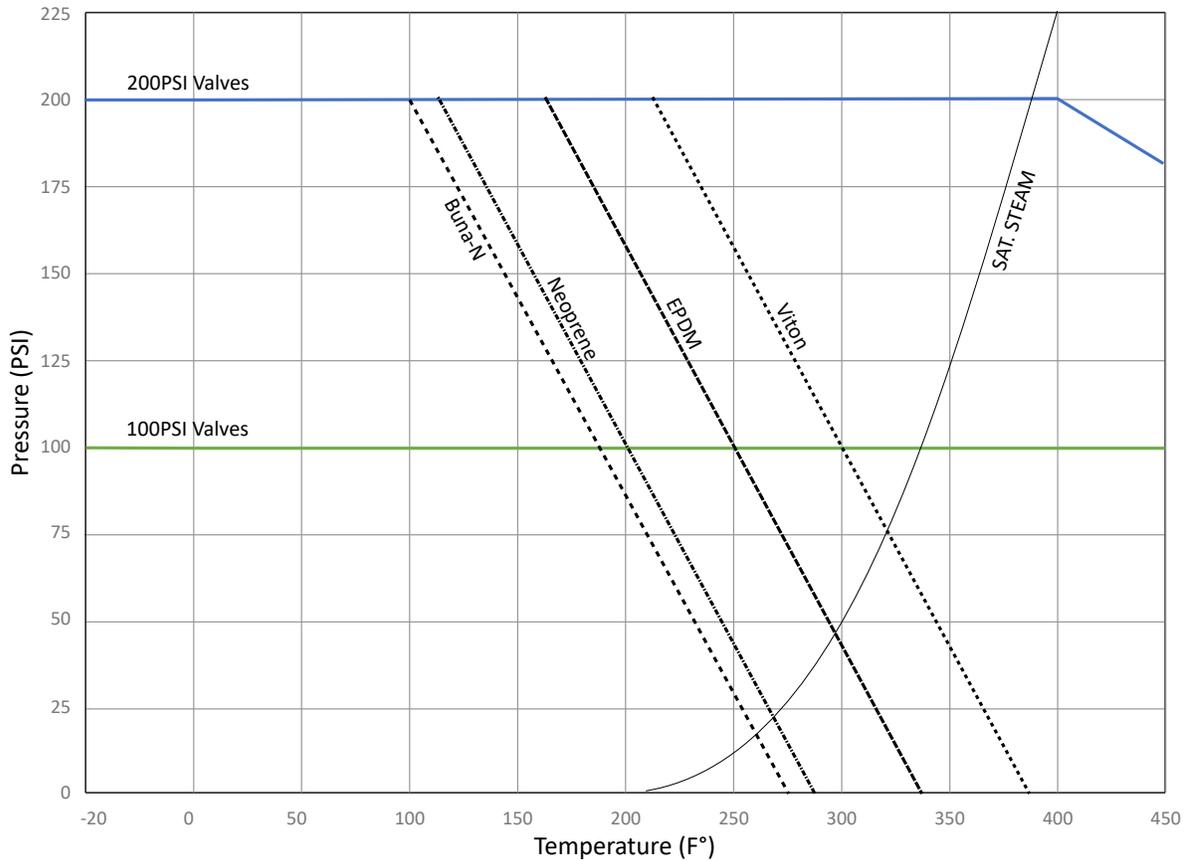
SIZE		2"	2-1/2"	3"	4"	5"	6"	8"	10"	12"
100 PSI	in-lb	80	106	124	230	283	469	664	956	1513
	Nm	9	12	14	26	32	53	75	108	171
200 PSI	in-lb	89	159	195	301	460	664	991	1788	2655
	Nm	10	18	22	34	52	75	112	202	300

No safety factor included. Torques are with water as operating fluid, dry media may require a higher safety factor.

## VALVE WEIGHTS

SIZE	2"	2-1/2"	3"	4"	5"	6"	8"	10"	12"
LBS	7.4	9.1	9.6	15.0	20.6	23.7	38.0	57.0	87.0
KGS	3.35	4.13	4.35	6.80	9.34	10.75	17.23	25.85	39.46

## PRESSURE/TEMPERATURE RATINGS CHART



## WARRANTY

This limited warranty applies in the United States to products manufactured by VSI, LLC. VSI, LLC. warrants the product purchased from it or its authorized reseller to be free from defects in material and workmanship under normal use during the three year warranty period from the date of its purchase. Other products not manufactured by VSI, LLC. which are provided as part of an assembly may carry additional warranties from that manufacturer or supplier.

During the warranty period, VSI, LLC. will repair or replace defective parts of the product, or, at VSI, LLC. sole option, issue a credit for the original purchase price of the product. Repaired or replaced product will be warranted hereunder only for the remaining portion of the original warranty period. All exchanged products under this Limited Warranty will become the property of VSI, LLC. A proper Return Material Authorization (RMA) number will have to be obtained for all products to be returned under this Limited Warranty. Any claim under this Limited Warranty must include a description of the problem encountered and any relevant information that may assist VSI, LLC. in the replication or resolution of the problem.

This Limited Warranty is transferable during its term to the end user of the product. Any transfer shall not extend or alter the terms of this Limited Warranty.

This Limited Warranty extends only to products purchased from VSI, LLC. or its authorized reseller and does not extend to any product that has been damaged or rendered defective as a result of (a) modification, repair, alteration or improper installation by any person other than VSI, LLC. or its authorized representative; (b) unreasonable or improper use or storage, use beyond rated conditions, operation other than per VSI, LLC. or the manufacturer's instructions, or being otherwise subjected to improper maintenance, negligence or accident; or (c) any use of the product after purchaser has knowledge of any defect in the product.

**The warranties provided above are in lieu of and exclude all other warranties, statutory, express or implied, including without limitation any warranty or merchantability or fitness for a particular purpose. VSI, LLC. expressly disclaims all warranties not stated in this limited warranty. Any implied warranties that may be imposed by law are limited to the terms of this limited warranty.**

VSI, LLC. warranty liability shall not exceed the original purchase price of the defective product. VSI, LLC. is not liable for any damages caused by the product or other products or the failure of the product or other products to perform, including any lost profits, lost savings, incidental or consequential damages. VSI, LLC. is not responsible for charges resulting from the removal and/or replacement of the product. VSI, LLC. is not liable for any claims made by third parties or by the purchaser for a third party. This limitation applies whether damages are sought, or a claim is made, under the Limited Warranty or as a tort claim, product liability claim, contract claim, or any other claim. This limitation cannot be waived by any person. This limitation of liability will be effective even if VSI, LLC. or its authorized representative has been advised by the purchaser of the possibility of such damages.



## SAMPLE SPECIFICATION

### 1. **Replaceable Seat Butterfly Valves**

1.1. This specification covers the design, manufacture, and testing of replaceable seat butterfly valves 2-inch (50 mm) to 12-inch (300mm) under shell pressures of up to 200 psig (1,379 kPa) 1.2.

### 2. **CONNECTIONS**

2.1. Valves shall be of the wafer lugged flange type for installation between ANSI B16.5, Class 150 flanges.

2.2. All valves shall be fully lugged type with drilled and tapped holes.

2.3. Lay length for valves shall conform to API 609

### 3. **MARKINGS**

3.1. Each valve shall be marked with the manufacturer's name and valve size cast into the body of the valve. Lettering shall be a minimum of 1/2 inch tall and project 1/10 inch from body.

3.2. Valves shall be equipped with a tag identifying the size, the model designation, the pressure rating, the seat material, and a unique traceable serial number in addition to manufacturer's name and contact information.

### 4. **DESIGN**

4.1. Valves shall be designed and suitable for use in water, low pressure steam, and glycol water mixes for HVAC control

4.2. Valves shall be designed and tested to ANSI Class VI leakage rate.

4.3. The valve shall be rated to an allowable shutoff pressure of 200psi or 100psi as specified by the engineer. All valves shall be bi-directionally rated to the allowable shutoff pressure.

4.4. Valve design, including face to face dimensions, shall comply with API 609 requirements

4.5. The shell thickness shall be designed to conform to ASME B16.42 pressure and temperature requirements

4.6. Stem shall be of a one-piece design and of the blowout proof style.

4.7. Stem shall be retained by a spring clip and washer that is easily removable in the field. Retention of the stem to the disc by pins will not be accepted.

4.8. The stem to disc connection shall be by an accurately broached square in the disc mating with a machined square on the valve shaft. As-cast connections, pins, press fits, or any means that result in hardware exposed to the line media are not acceptable connection methods between the disc and shaft.

4.9. No part of the valve body or stem shall be exposed to the line media. Only the disc and the seat may be exposed to the line media.

4.10. The seat shall totally encapsulate the body isolating it from the line media and shall incorporate a means to seal the valve to the companion pipe flange with no gaskets required.

4.11. The seat shall be field replaceable with no special tools. It shall be retained in the valve body by means of a tongue-and-groove design. The seat shall have integrally molded seals at the upper and lower shaft penetration to prevent line media from fouling the bearings.

4.12. All valves shall have at minimum one bearing in the lower trunnion and two in the upper trunnion.

4.13. The valves shall be equipped with a mounting area conforming to International Organization of Standardization (ISO) 5211 so that any standardized lever, gearbox, pneumatic, hydraulic, or electric actuator may be installed as required by application. There shall be sufficient clearance to directly mount standardized operators with easily accessible fasteners.

### 5. **MATERIALS**

5.1. The valve body shall be constructed of ASTM A536 65-45-12 Ductile Iron for all valves

5.2. The valve disc shall be cast from ASTM A351 CF8 Stainless Steel 304 or ASTM A351 CF8M Stainless Steel 316 as specified by the engineer. The disc edge shall be ground and polished.

5.3. The replaceable seat shall be made of peroxide cured EPDM or Buna-N. Viton seats are required for installations where operating temperatures reach or exceed 250°F

5.4. The valve stem shall be constructed of stainless steel material with a minimum Yield Strength of 35,000 PSI. Valve stems shall be ASTM A276 Stainless Steel 416

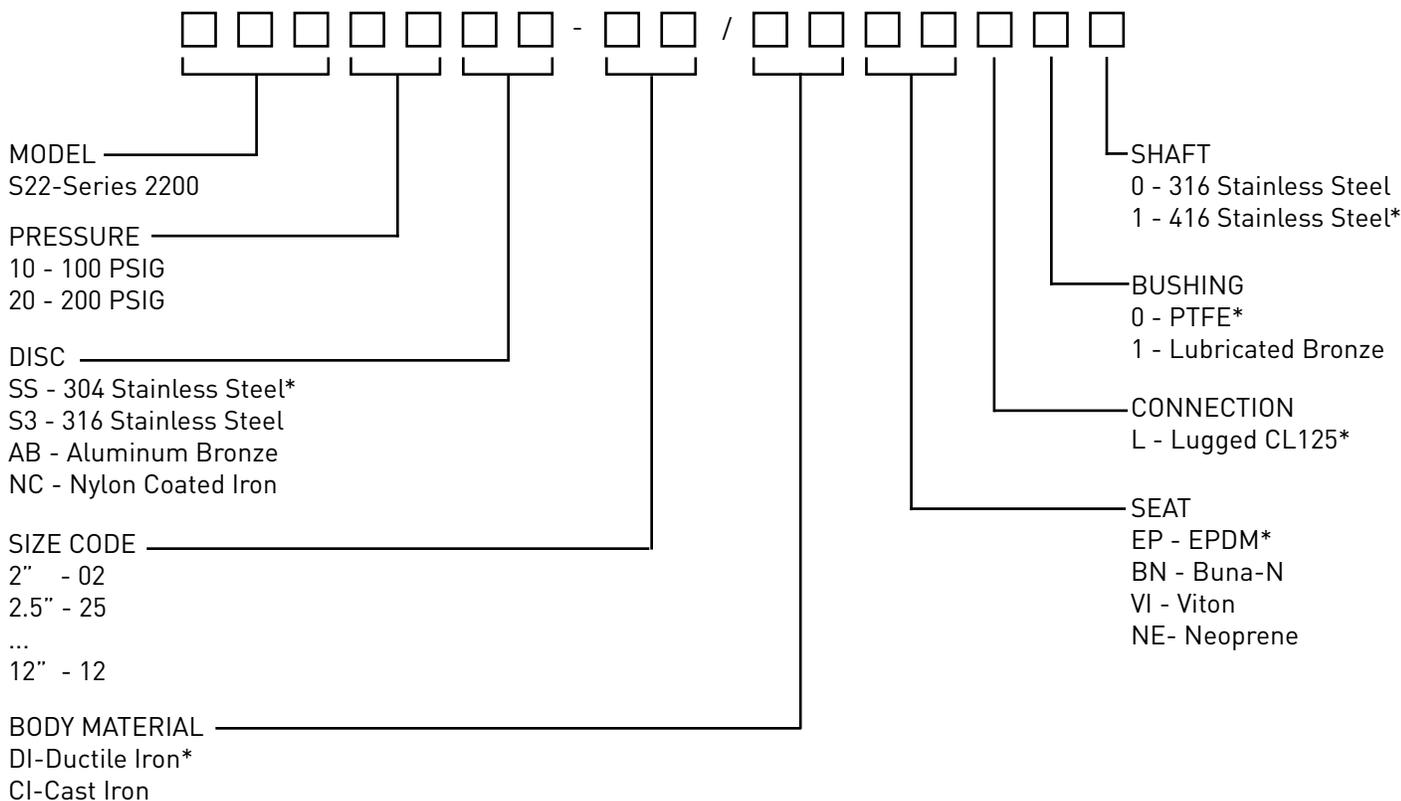
5.5. The valve body shall be coated with a heat cured epoxy

### 6. **MANUFACTURER**

6.1. Replaceable seat butterfly valves shall be VSI Series 2200 Butterfly Valves as manufactured by Valve Solutions, Inc., Alpharetta, GA USA or approved equal

6.2. All valves shall be warranted by manufacturer for a minimum of 24 months.

## PART NUMBER MATRIX



\* Standard Material

**EXAMPLE:**

S2210SS-04/DIEPL01

A Series 2200, 100psig operating pressure, 304 Stainless Steel Disc, Size 4", Ductile Iron Body, EPDM seat, Lugged CL125 connection, PTFE bearings, SS416 shaft

## OTHER PART NUMBER INFORMATION

### ASSEMBLIES

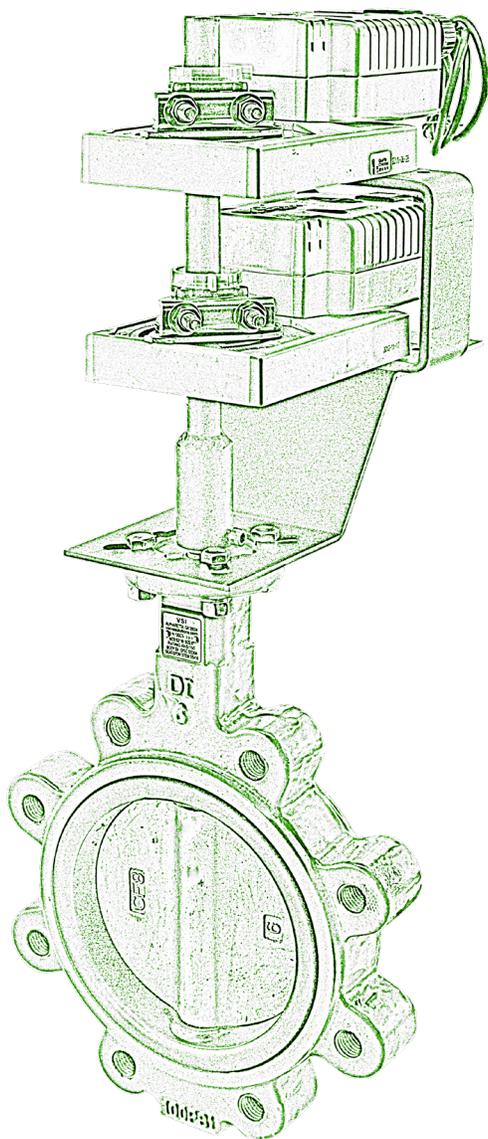
The part numbers above represent only the part number for the valve without any operator or accessories. When purchased with an actuator as part of an assembly the entire part number will be formatted as the valve part number, forward slash, then the actuator and accessory part numbers.

Example: S2210SS-04/C-SR092/ALS-100

The above valve is a 4" valve model S2210 with a C-SR092 spring return pneumatic actuator and ALS-100 switch-box

### MANUAL OPERATORS

Sizes 2" to 6" are available with a locking lever operator, add a "L" suffix. Sizes 8" and larger are available with a worm gear and handwheel operator, add a "WH" suffix.



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