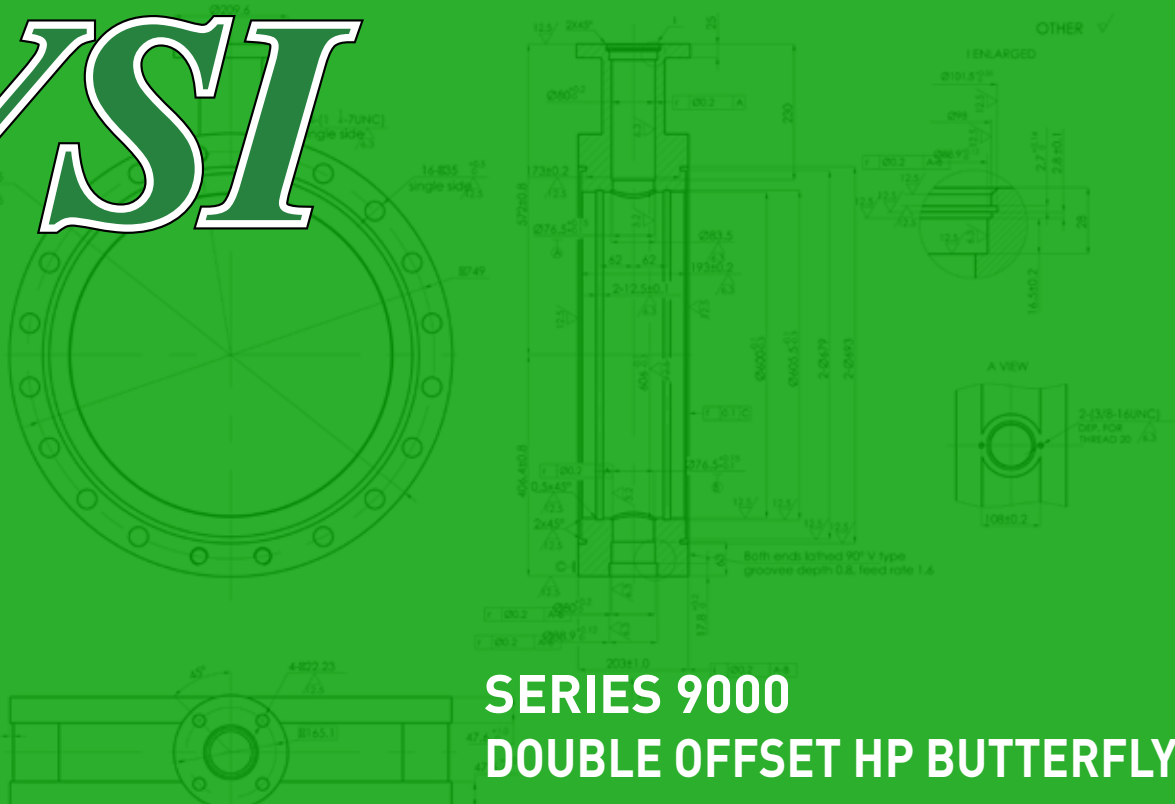


# VSI



## SERIES 9000 DOUBLE OFFSET HP BUTTERFLY VALVES 2"-12"



### TOP FLANGE

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

### PULL DOWN PACKING

All Series 9000 valves feature a pull-down type packing that allow regular adjustment of the packing without requiring any removal of the installed operator.

### SHAFT PINS

The taper design of the shaft pins wedges the shaft and disc together to form a vibration and chatter free connection. After being pressed in pins are welded to ensure they cannot back out and damage downstream equipment

### BI-DIRECTIONAL SEATING

The seat and body design of the Series 9000 are suitable for bi-directional and dead end service at the full rated pressure

### SQUARE DRIVE STEM

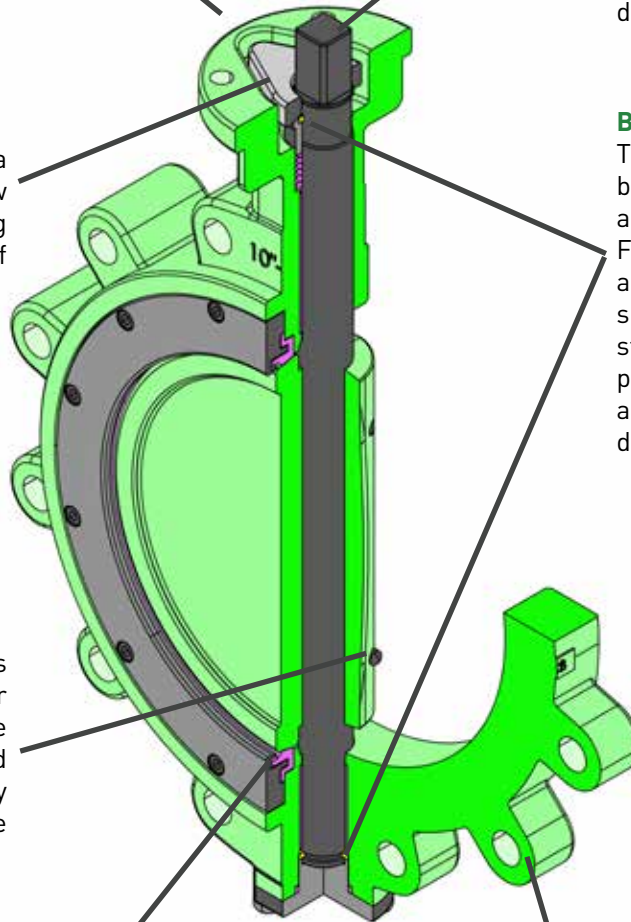
The square drive design of the Series 9000's one-piece stem allows for the direct mounting of actuators with no special couplings. With four mating surfaces the backlash inherent with keyway or double D type designs is eliminated

### BLOWOUT PROOF

The Series 9000 features two blowout prevention devices that also act as anti-static devices. First the packing and gland feature a blowout prevention retaining split ring. Secondly the one-piece stem itself features a blowout prevention retaining split ring that additionally serves to center the disc.

### 100% TESTING

Every valve is fully tested in VSI's ISO 9001 facility to ensure performance and reliability. The body is hydrostatically tested to 1.5 times pressure rating. The seat is tested to 1.1 times pressure rating and at 50psito ANSI Class VI zero leakage. Every valve is serialized and test report is available.





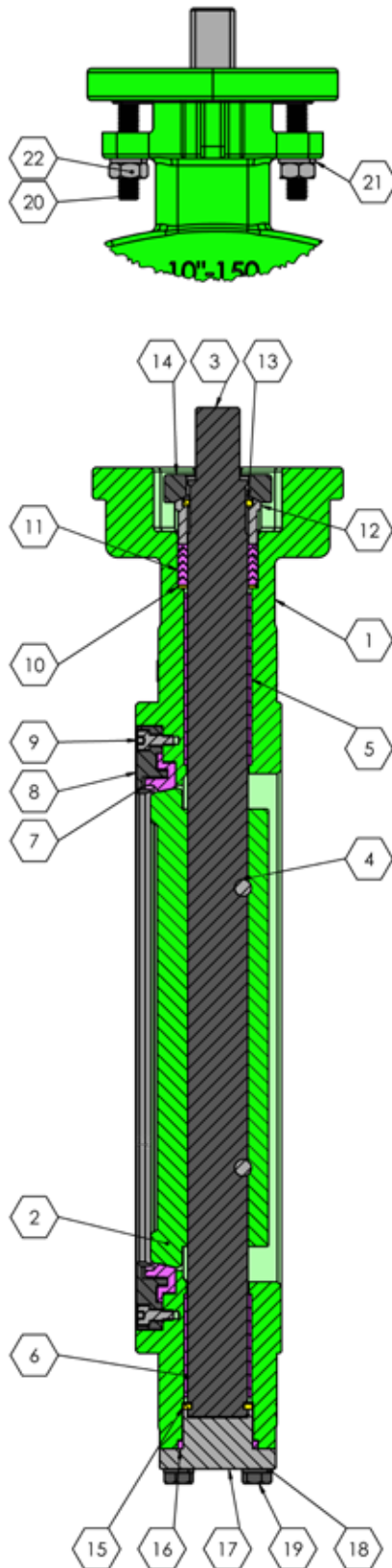
## DESIGN STANDARDS

Size Range	2"-12" Lugged CL150
Connections	ANSI B16.1 Class 125/ANSI B16.5 Class 150
Design	API 609 ANSI B16.34
Lay Length	API 609
Testing	API 598 MSS SP-67
Cold Working Pressure (CWP)	285 PSIG (CL150 WCB) 275 PSIG (CL150 CF8M)
Temperature	-40°F to 600°F (See Pressure/Temp Chart)
Bonnet	ISO 5221

## Resistance Guide

Designation	Common Names	Composition	Min/Max Temperature Range	General Properties	Resistant to:	Attacked by:
TFM™	TFM™, Modified PTFE	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
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
PEEK	PEEK, PAEK	Polyether-ether-ketone	-50F/500F	Excellent low friction properties, low thermal conductivity, and highly resistant to thermal degradation and creep	Steam, seawater, Animal and vegetable oils, hydrocarbons, ozone, strong and oxidizing chemicals.	Halogens and strong acids, halogenated compounds, and aliphatic hydrocarbons at high temperatures
ALTA	Graphite Reinforced PTFE	C-Polytetrafluoro-ethylene	-100F/560F	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

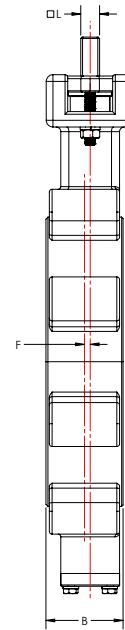
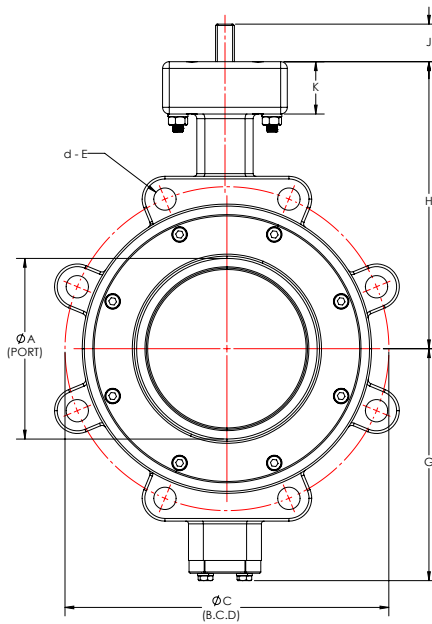
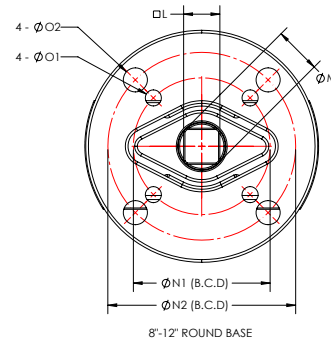
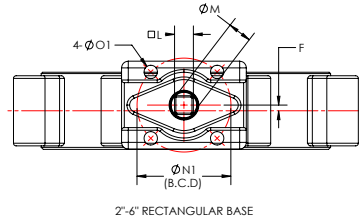
### MATERIALS OF CONSTRUCTION



Item	Description	Materials Available	Standard
1	Body	Carbon Steel*	ASTM A216 WCB
		Stainless 316*	ASTM A351 CF8M
2	Disc	Stainless 316*	ASTM A351 CF8M
3	Shaft	Stainless 17-4PH*	ASTM A564 17-4PH
4	Disc Pins	Stainless 304*	ASTM A276 304
5	Upper Bearing	Graphite/Teflon/SS304 Composite*	
6	Lower Bearing	Graphite/Teflon/SS304 Composite*	
7	Seat	TFM*	Commercial
		RPTFE	Commercial
		PTFE	Commercial
		PEEK	Commercial
		ALTA	VSI Standard
8	Seat Retainer	Same as Body*	
9	Retainer Screws	Stainless 304*	ASTM AF593 Group 1
10	Packing Washer	Stainless 304*	ASTM A276 304
11	Packing Set	PTFE*	Commercial
		Graphite	Commercial
12	Gland	Stainless 316*	ASTM A276 316
13	Blowout Ring	Stainless 316*	ASTM A276 316
14	Gland Flange	Stainless 316*	ASTM A351 CF8M
15	Blowout Ring	Stainless 316*	ASTM A276 316
16	Cap Seal	PTFE*	Commercial
17	Lower Cover	Same as Body*	
18	Lock Washer	Stainless 304*	ASTM A193
19	Hex Bolt	Stainless 304*	ASTM F593 Group 1
20	Gland Stud	Stainless 304*	ASTM F593 Group 1
21	Lock Washer	Stainless 304*	ASTM A193
22	Hex Nut	Stainless 304*	ASTM F594 Group 1
NS	Tag	Aluminum*	UV Screen Printed

\* Standard Material Option

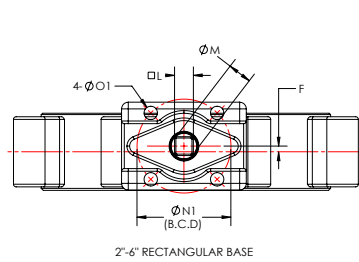
## BARESTEM DIMENSIONS (IMPERIAL)



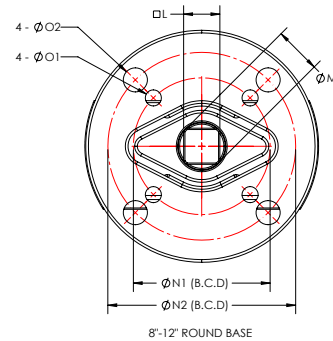
SIZE	A	B	C	d	E	F	G	H	J	K	L	M	IS01	N1	O1	IS02	N2	O2
2"	1.90	1.74	4.75	4	5/8"-11UNC	0.03	4.1	4.9	1.1	1.4	0.433	0.551	F07	2.76	0.39	-	-	-
2.5"	2.49	1.84	5.50	4	5/8"-11UNC	0.05	4.4	5.2	1.1	1.6	0.433	0.551	F07	2.76	0.39	-	-	-
3"	2.84	1.96	6.00	4	5/8"-11UNC	0.07	4.6	6.3	1.1	1.6	0.433	0.551	F07	2.76	0.39	-	-	-
4"	3.67	2.13	7.50	8	5/8"-11UNC	0.12	5.1	7.0	1.1	1.6	0.551	0.709	F07	2.76	0.39	-	-	-
5"	4.57	2.26	8.50	8	3/4"-10UNC	0.14	5.8	7.6	1.1	1.6	0.551	0.709	F07	2.76	0.39	-	-	-
6"	5.43	2.26	9.50	8	3/4"-10UNC	0.14	6.8	8.4	1.1	1.5	0.551	0.709	F07	2.76	0.39	-	-	-
8"	7.32	2.56	11.75	8	3/4"-10UNC	0.15	8.0	9.5	1.2	0.6	0.866	1.102	F10	4.02	0.47	-	-	-
10"	9.22	2.86	14.25	12	7/8"-9UNC	0.17	9.0	11.0	1.2	0.6	0.866	1.102	F10	4.02	0.47	-	-	-
12"	10.91	3.19	17.00	12	7/8"-9UNC	0.25	10.7	12.2	1.5	0.6	1.063	1.378	F10	4.02	0.47	F14	5.51	0.71



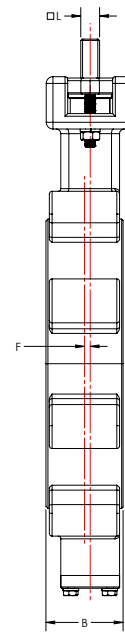
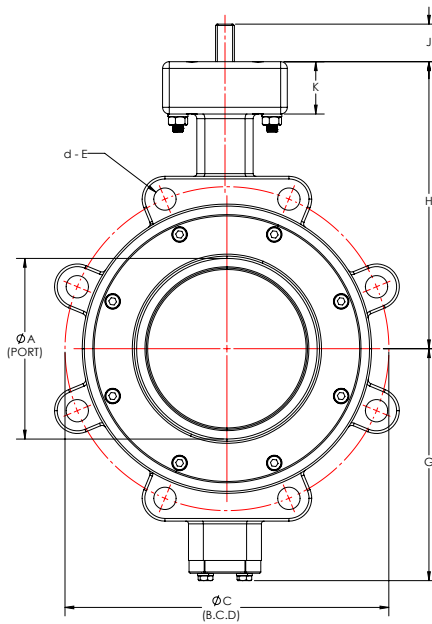
**BARESTEM DIMENSIONS (METRIC)**



2'-6" RECTANGULAR BASE



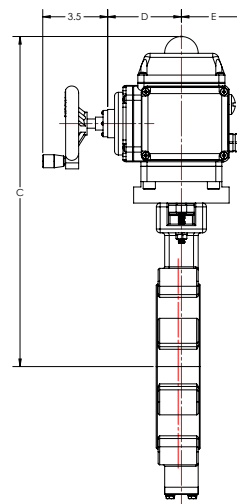
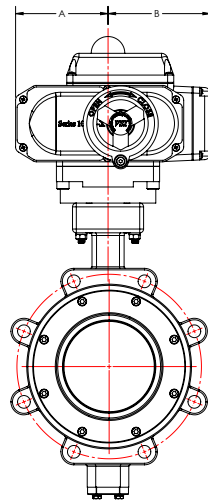
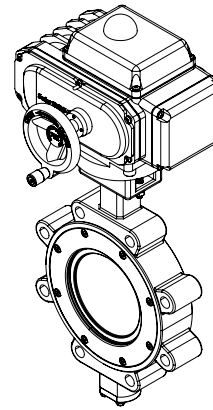
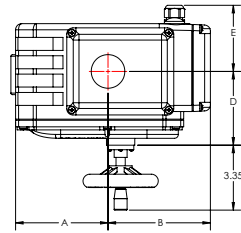
8'-12" ROUND BASE



PAGE 6

SIZE	A	B	C	d	E	F	G	H	J	K	L	M	IS01	N1	O1	IS02	N2	O2
2"	48	44.2	120.7	4	5/8"-11UNC	0.8	104	124	28	36	11	14	F07	70	9.9	-	-	-
2.5"	63	46.7	139.7	4	5/8"-11UNC	1.3	112	132	28	41	11	14	F07	70	9.9	-	-	-
3"	72	49.8	152.4	4	5/8"-11UNC	1.8	117	160	28	41	11	14	F07	70	9.9	-	-	-
4"	93	54.1	190.5	8	5/8"-11UNC	3.0	130	178	28	41	14	18	F07	70	9.9	-	-	-
5"	116	57.4	215.9	8	3/4"-10UNC	3.6	147	193	28	41	14	18	F07	70	9.9	-	-	-
6"	138	57.4	241.3	8	3/4"-10UNC	3.6	173	213	28	38	14	18	F07	70	9.9	-	-	-
8"	186	65.0	298.5	8	3/4"-10UNC	3.8	203	241	30	15	22	28	F10	102	12	-	-	-
10"	234	72.6	362.0	12	7/8"-9UNC	4.3	229	279	30	15	22	28	F10	102	12	-	-	-
12"	277	81.0	431.8	12	7/8"-9UNC	6.4	272	210	38	15	27	35	F10	102	12	F14	140	18

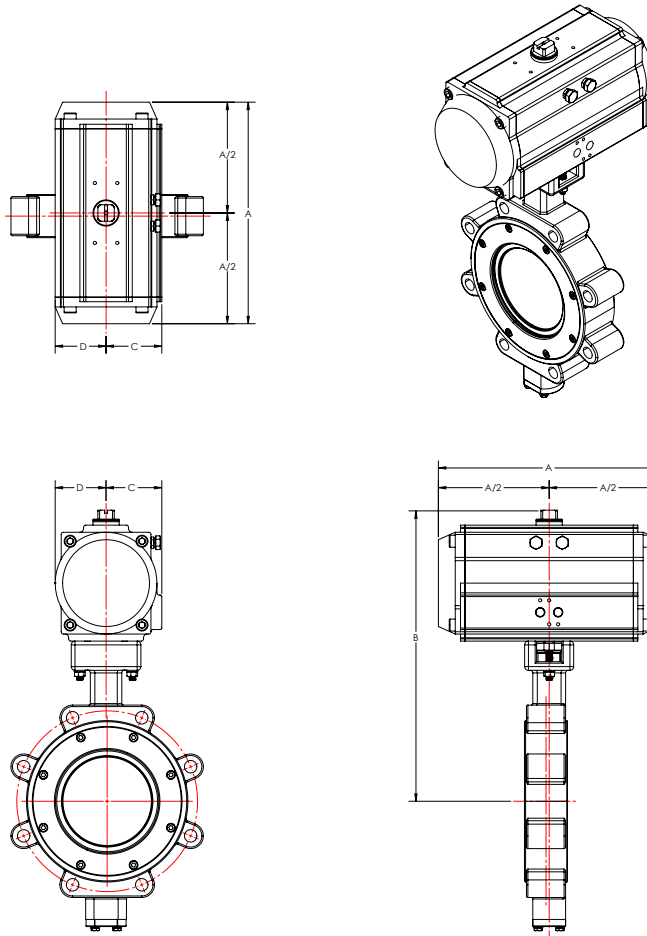
## DIMENSIONS WITH SERIES 1000-X ELECTRIC ACTUATOR



SIZE	2-POS ACTUATOR	MODULATING ACTUATOR	A	B	C	D	E
2"	1010-X	1010/S-X	3.86	3.86	11.6	2.81	2.90
2-1/2"	1010-X	1010/S-X	3.86	3.86	11.9	2.81	2.90
3"	1010-X	1010/S-X	3.86	3.86	13.0	2.81	2.90
4"	1010-X	1010/S-X	3.86	3.86	13.7	2.81	2.90
5"	1020-X	1020/S-X	4.76	5.28	16.2	3.72	3.40
6"	1020-X	1020/S-X	4.76	5.28	17.0	3.72	3.70
8"	1040-X	1040/S-X	4.76	5.28	18.1	3.72	3.40
10"	1060-X	1060/S-X	4.76	5.28	19.6	3.72	3.70
12"	1100-X	1100/S-X	5.83	6.38	21.8	5.12	4.37



**DIMENSIONS WITH SERIES C PNEUMATIC ACTUATORS**



PAGE 8

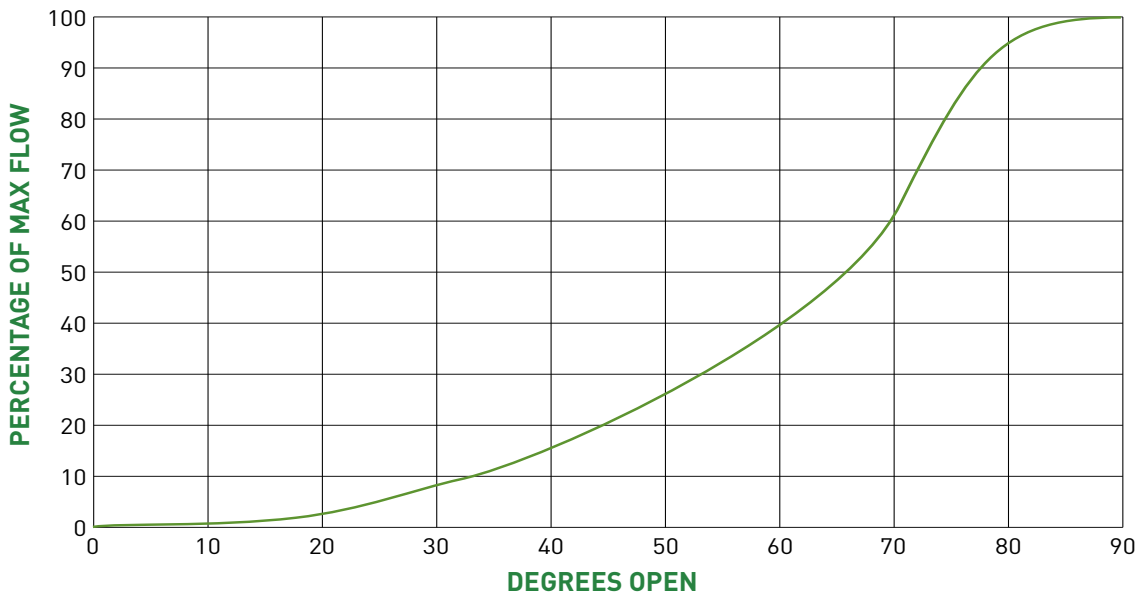
SIZE	DA ACTUATOR	A	B	C	D
2"	C-DA063	6.61	9.1	1.85	1.42
2-1/2"	C-DA063	6.61	9.4	1.85	1.42
3"	C-DA083	8.03	11.4	2.24	1.81
4"	C-DA083	8.03	12.1	2.24	1.81
5"	C-DA092	10.31	13.0	2.30	1.79
6"	C-DA105	10.55	14.4	2.52	2.26
8"	C-DA140	15.35	17.1	3.03	2.95
10"	C-DA140	15.35	18.6	3.03	2.95
12"	C-DA160	18.03	20.7	3.43	3.43

SIZE	SR ACTUATOR	A	B	C	D
2"	C-SR083	8.03	10.0	2.24	1.81
2-1/2"	C-SR092	10.31	10.6	2.30	1.79
3"	C-SR092	10.31	11.7	2.30	1.79
4"	C-SR125	11.85	13.9	2.93	2.66
5"	C-SR125	11.85	14.5	2.93	2.66
6"	C-SR140	15.35	16.0	3.03	2.95
8"	C-SR160	18.03	18.0	3.43	3.43
10"	C-SR190	20.67	21.2	4.06	4.06
12"	C-SR240	23.70	24.8	5.12	5.12



## FLOW COEFFICIENTS AND DATA

SIZE	Valve Flow Coefficient (Cv)								
	Valve Rotation in Degrees								
	10°	20°	30°	40°	50°	60°	70°	80°	90°
2"	2	5	13	20	32	45	65	78	<b>89</b>
2-1/2"	4	10	21	35	54	74	114	143	<b>150</b>
3"	6	14	33	52	82	118	174	207	<b>225</b>
4"	9	23	56	91	150	214	303	366	<b>394</b>
5"	16	44	101	170	274	374	565	661	<b>763</b>
6"	25	63	150	226	380	557	793	1014	<b>1050</b>
8"	57	127	296	495	817	1144	1615	2086	<b>2266</b>
10"	82	197	480	758	1213	1770	2596	3104	<b>3376</b>
12"	111	275	675	1036	1680	2404	3554	4119	<b>4606</b>





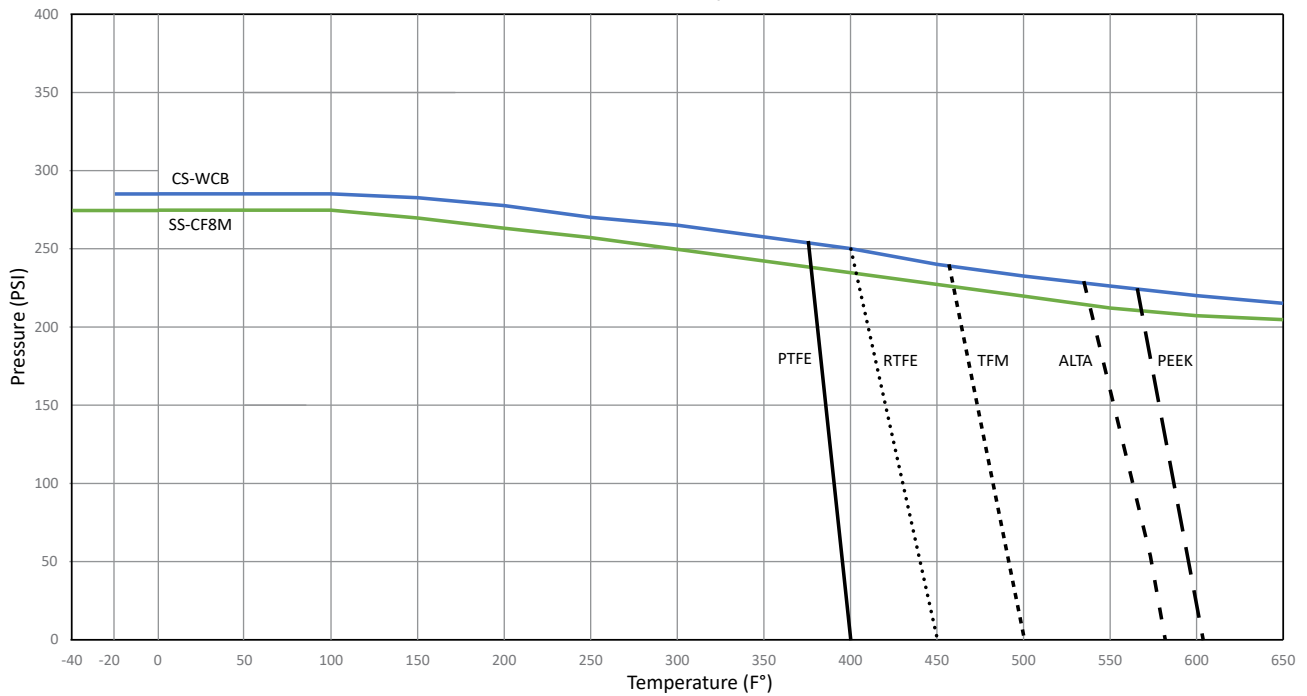
### OPERATING TORQUES

Seat Torque (in-lbs) at Pressure (PSI)

SIZE	100PSI	150PSI	200PSI	285PSI
2"	237	251	269	274
2-1/2"	271	281	324	335
3"	277	329	361	383
4"	469	550	572	725
5"	688	697	770	842
6"	820	909	1018	1269
8"	1547	1948	2133	2896
10"	2735	3103	3464	4176
12"	3425	4447	4757	6161

Shown torque values include a 30% safety factor.  
Torques are with water as operating fluid, dry media may require a higher safety factor.  
Torque may vary with seat material and line media - testing may be required

### PRESSURE/TEMPERATURE RATINGS CHART



CLASS 150 FLANGES    CARBON STEEL —  
    STAINLESS STEEL —

Absolute Minimum Operating Temp [-40F Stainless]/[-20F Carbon]

## SAMPLE SPECIFICATION

### 1. **High Performance Butterfly Valves**

1.1. This specification covers the design, manufacture, and testing of high performance butterfly valves 2-inch (50 mm) to 12-inch (300mm) under shell pressures of up to 285 psig (1,965 kPa).

### 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 tested to ANSI Class VI leakage rate.

4.2. The valve shall be rated to an allowable shutoff pressure of 285psi (WCB) or 275psi (CF8M). All valves shall be bi-directionally rated to the allowable shutoff pressure.

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

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

4.5. Stem shall be of a one-piece design and of the blowout proof style. Stem shall be retained by taper pins to the disc.

4.6. The seat shall be of the soft type with offset design, replaceable, and located on the valve body. The seat design shall be designed so that seat does not contact the seating surface of the disc through the entire rotation range.

4.7. The soft seat shall be drip tight and tested to ANSI Class VI "zero leakage". Metal seats that are not drip tight shall not be acceptable.

4.8. 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 A216 WCB Cast Steel or ASTM A351 CF8M Stainless 316 for all valves. Valve made from fabricated plate or bar stock shall not be acceptable

5.2. The valve disc shall be cast from ASTM A351 CF8M Stainless Steel 316. The disc edge shall be ground and polished.

5.3. The seat shall be made of TFM for general service and process steam. Additional seat materials shall be available and selected by Engineer where required.

5.4. The valve stem shall be constructed of stainless steel material with a minimum Yield Strength of 125,000 PSI. Valve stems shall be ASTM A564 Stainless Steel 17-4PH.

### 6. MANUFACTURER

6.1. High performance butterfly valves shall be VSI Series 9000 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.



## VALVE WEIGHTS (LUGGED VALVES)

SIZE	2"	2-1/2"	3"	4"	5"	6"	8"	10"	12"
LBS	10.0	12.0	14.0	22.0	29.0	36.0	56.0	85.0	132
KGS	4.5	5.4	6.4	10.0	13.2	16.3	25.4	38.6	59.9

## 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 two 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.

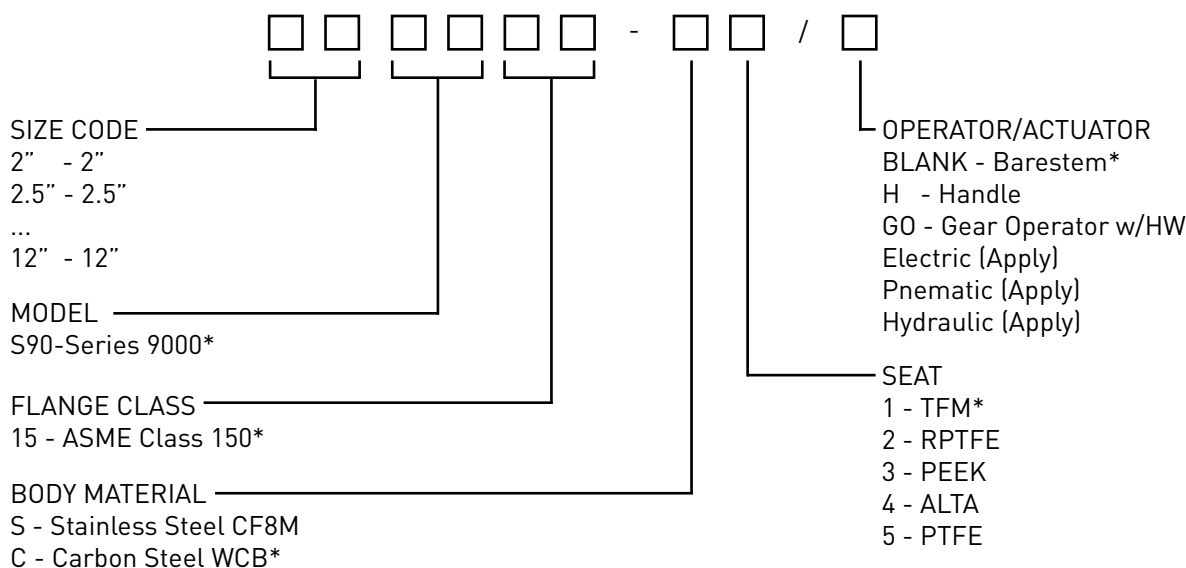
This Limited Warranty is transferable during its term to the end user of the product. Any transfer shall not extend or alter the terms of this Limited Warranty.

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.

## PART NUMBER MATRIX



\* Standard Material

**EXAMPLE:**

6" S9015-C1/H

A 6" Series 9000, ASME Class 150 body, Carbon Steel WCB body, SS316 CF8M disc, TFM seat, lever handle operator.

## OTHER PART NUMBER INFORMATION

### ASSEMBLIES

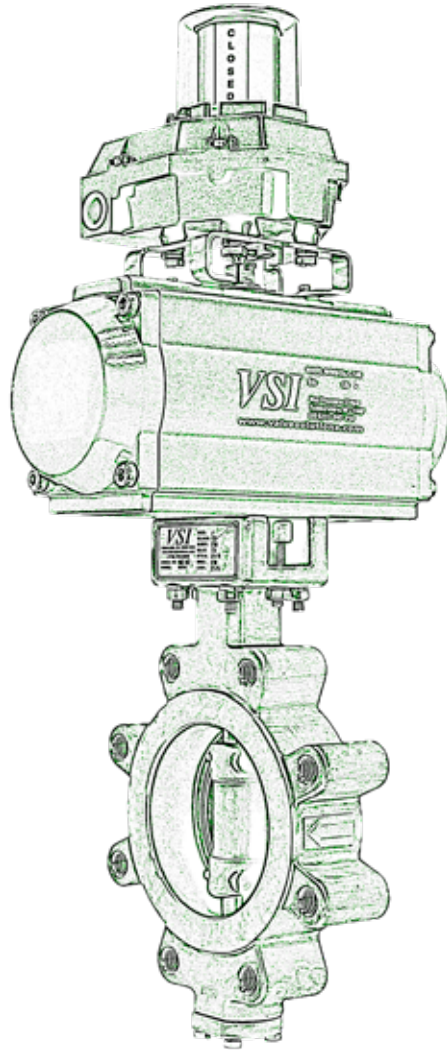
The part numbers above represent only the part number for the valve without any operator or accessories. When purchased with an actuator as part of an assembly the entire part number will be formatted as the valve part number, forward slash, then the actuator and accessory part numbers.

Example: 6" S9015-C1/C-SR125/ALS-100

The above valve is a 6" valve model S9015 with a C-SR125 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 "GO" suffix.



Valve Solutions, Inc  
tel: 1 (770) 740 0800  
fax: 1 (770) 740 8777  
email: [sales@valvesolutions.com](mailto:sales@valvesolutions.com)

**VSI**

[www.ValveSolutions.com](http://www.ValveSolutions.com)

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.valvesolutions.com](http://www.valvesolutions.com)