



Flo-Tite Sentinel Series Flanged / Wafer End Connection Installation, Operation & Maintenance Manual



Note: Before using a valve, read the entire IOM carefully and make sure you have a clear understanding of all information included.

This manual describes the procedures for the safe and efficient installation, operation and maintenance of Flo-Tite Sentinel Series Ball Valves. **Failure to follow the procedures in this manual may result in Flo-Tite warranties being voided.** Problems with the operation and maintenance of these valves should be directed to the nearest Flo-Tite Representative.

The Flo-Tite SENTINEL Series are designed as a single body construction, to allow ease of access for maintenance of the valve ball and seat without special tools. Segment ball valve is an advanced quarter-turn control valve which can be used switch on and off and proportionally adjusted. Segment ball core is designed with special V type notch, which owns accuracy flow control, small volume and big flow coefficient. It is applicable to controlling gas, liquid, and solid particle medium. Owing to zero clearance rotation, there is big shear force and self-cleaning property, especially applicable to controlling suspension with fibers, small solid particles, and solid grains. Therefore this product is widely used in petroleum, chemistry, papermaking, polysilicon, chemical fiber, electric power, metallurgy, pharmacy, environmental protection, and other industrial departments' self-control system.

INSTALLATION:

A. Receiving and Preparation Procedure

- A1. Remove shipping protection.
- A2. Inspect the valve(s) for transportation damage*.
- A3. Inspect the valve bore and remove any debris.
- A4. Cycle the valve and inspect the valve for smooth operation, size permitting.
- A5. As shipped from the factory, valves may contain a silicone based lubricant. This is for break-in and may

be removed if it is objectionable for a particular application by disassembling and solvent washing.

*If transportation damage is found, immediately take pictures for record purposes and contact the inbound carrier to submit a claim.

B. Installation Procedure

B1. General – The valve may be fitted in direction of arrow casted on valve body in the pipeline. Prior to installing the valve, the pipe on either side of the intended installation should be checked to be free of dirt, debris, weld slag, etc. to prevent damage to the seats, seals and surface of the ball. The piping must also be free of tension or compression.

WARNING – Never use the valve as a pipe support or structural member.

B2. Installation of the Flo-Tite SENTINEL Series valves is accomplished by inserting the valve between flanges attached to piping and supplied by others and attaching the valve to the mating flanges with fasteners of the size and type specified by industry standards. Fasteners should be tightened in a “star” pattern.

Caution – Ensure that mating flanges are of the same size, type and pressure rating as the valve and that fasteners are of the size and type approved for the flange.

B3. Valves with actuators should be checked for actuator-valve alignment. Angular or linear misalignment will result in high operational torque. Electric and/or pneumatic connections should be made in accordance with the correct actuator IOM instructions.

C. OPERATION:

C1. Manual operation of the valve is accomplished by turning the handle ¼ turn (90 degrees).

*The valve is open when the handle is “in-line” with the valve or pipeline. The valve is closed when the handle is “across” or perpendicular to the valve or pipeline.

C2. Flo-Tite SENTINEL Series valves can be operated with either electric or pneumatic actuators. For instructions on installation and operation, refer to the IOM for the correct actuator.

C3. Flo-Tite SENTINEL Series valves may include one of several different styles of limit switches and positioners. Please refer to the appropriate IOM for each device.

MAINTENANCE:

CAUTION – Ball valves can trap fluid in the ball cavity when closed. Be prepared to capture and manage any liquid retained in the valve body when disassembling the valve.

WARNING – If the valve has been in hazardous fluid service, review applicable MSDS sheet and decontaminate the valve before disassembly. All persons involved with the disassembly should wear personal protection equipment such as aprons, gloves, face shield, etc. to prevent personal injury.

Access to the valve internals starts with relieving pressure in the pipeline. Turn the valve handle to the 45 degree, half open, position and flush the line, when applicable, to remove any hazardous material from the line. Repair kits can be ordered from the local Flo-Tite Representative. This should be done prior to any disassembly work.

CAUTION - Valves with actuators, limit switches or positioners should have these devices disassembled from the valve prior to disassembling of the valve.

WARNING- Use extreme caution disconnecting any electrical and/or pneumatic sources to the valve to protect against personal injury. Isolate the valve actuator prior to disconnecting.

Stem Packing

Stem seal leakage may be corrected without disassembly. Tighten the packing gland nuts one flat at a time alternating between nuts, until leakage stops. If leakage continues, or the valve's operating torque becomes excessive, the seals are worn and replacement of the packing will be necessary.

WARNING- Do not remove packing gland while the line is under pressure. Personal injury could occur

D. Valve Disassembly-

WARNING – Use extreme caution when removing the SENTINEL Series valve from the pipeline to prevent personal injury that may be caused by “cold springing” of the piping.

CAUTION – valves shall be adequately supported prior to unfastening the studs and nuts that hold the valve in line and secured with lifting straps or slings to hold the weight of the valve.

D1. Remove the flange bolts and nuts and lift valve from line for servicing. NOTE: care should be taken to avoid scratching or damaging serrated gasket. These valves can be heavy depending on what size you are repairing. They should be adequately supported before removal from the line has begun.

D2. For manual valve, Loosen handle nut remove handle. For actuated valve, remove actuator, and other hardware. Next, remove Self Lubricating Bearing and Packing.

D3. Remove Socket Head Screw, Retainer, Wave Spring, Seat and O ring just in case if needed to replace.

D4. Remove Hexagon Nut, Gland, Stud, Packing and Upper shaft.

Visual Inspection-

Clean and inspect all metal parts. It is not necessary to replace stem unless the seating surfaces have been damaged by abrasion or corrosion. Flo-Tite strongly recommends that all seats, seals and packing be replaced whenever a valve is disassembled for reconditioning. This is the surest protection against subsequent leakage after reassembly. Replacement parts are sold in kit form. Refer to the metal tag attached to the side of the valve body to identify the specific sealing materials used. Kits can be obtained via the local Flo-Tite Distributor. Replacement parts should be purchased prior to valve disassembly. Required information to purchase replacement parts include:

- a. Line size
- b. Model designation
- c. Seat/seal materials

Valve Reassembly –

Note- The valve may be reassembled and operated dry when no lubricants are allowed in the system; however, a light lubricant stem will aid in assembly or reduce initial operating torque. Lubricant used must be compatible with the intended system fluid.

Install one new seat and seal in the body cavity with the spherical curvature facing the ball. Replace the stem in the reverse order from above based on valve size, including reattaching the handle. Use the wrench to bring the valve at closed position. This will align the stem tang and the ball slot. Turn the handle to the open position to help hold the ball in place

Place the body seal gasket into the shoulder counter-bore at the flange in the valve body. Using the match marks to realign the body and body end, carefully place the cap end back into the body. Install the cap end nuts and tighten in a star pattern to the torque values specified below.

Note: Make sure ball is in closed position before tightening up the end connections.

WARNING- extreme care must be exercised during tightening of the body end nuts to make sure that complete engagement of studs with the body flange is maintained. There should be at least one stud thread exposed on each side.

Cycle the valve slowly, with a gentle back and forth motion to build gradually to a full quarter turn. By cycling slowly, the new seat lips will conform to the seal shape against the ball. An initial fast turning motion, at this point, may cut the seats before they have a chance to form the proper seal. When possible and practical, test the valve prior to reinstalling into the pipeline.

Reinstallation-

Carefully inspect the faces of both the valve flanges and the mating flanges to insure they are clean and undamaged. Place the valve in the preferred position and support it from moving. Install a sealing gasket between each pair of flanges and reinsert the bolting and hand tighten. Secure the bolting to the recommended torque values in a star pattern to insure that the gasket is compressed evenly around the entire circumference.

Repair Kits –

Repair kits typically consist of replaceable seats, body seals and packing seals. Contact your local Flo-Tite Representative to order and receive the kits prior to any maintenance work.

VALVE - SOFT PARTS							
SEAT		STEM SEALS		BODY SEAL		O-RINGS	
TFM	F	TFM	F	TFM	F	VITON	V
CTFM	Y	CTFM	Y	CTFM	Y	EPDM	E
PTFE	T	RTFM	X	PTFE	T	PTFE	T
RPTFE	R	PTFE	T	RPTFE	R	BUNA	B

MAXIMUM ALLOWABLE DIFFERENTIAL PRESSURE AND TORQUES

Valve Size		Class 150										Class 300									
		Max Shut Off Differential Pressure				Max Control Differential Pressure				Maximum Torque ★		Max Shut Off Differential Pressure				Max Control Differential Pressure				Maximum Torque ★	
		Wafer		Flanged		Wafer		Flanged				Wafer		Flanged		Wafer		Flanged			
NPS	DN	bar	psi	bar	psi	bar	psi	bar	psi	NM	In-Lbs	bar	psi	bar	psi	bar	psi	bar	psi	NM	In-Lbs
1"	25	20	290	20	290	15	217	15	217	25	221	50	725	40	580	35	507	35	507	48	425
1 1/4"	32	20	290	20	290	15	217	15	217	25	221	50	725	40	580	35	507	35	507	55	487
1 1/2"	40	20	290	20	290	15	217	15	217	30	266	50	725	40	580	35	507	35	507	60	531
2"	50	20	290	20	290	15	217	15	217	35	310	50	725	40	580	35	507	35	507	70	620
2 1/2"	65	20	290	20	290	15	217	15	217	60	531	50	725	40	580	35	507	35	507	140	1239
3"	80	20	290	20	290	15	217	15	217	80	708	50	725	40	580	35	507	35	507	224	1983
4"	100	16	232	16	232	12	174	12	174	140	1239	40	580	40	580	25	362	25	362	315	2788
5"	125	16	232	16	232	12	174	12	174	160	1416	40	580	40	580	25	362	25	362	480	4248
6"	150	16	232	16	232	12	174	12	174	220	1947	40	580	40	580	25	362	25	362	930	8231
8"	200	16	232	16	232	12	174	12	174	350	3098	35	507	40	580	25	362	25	362	1830	16197
10"	250	14	203	14	203	10	145	10	145	660	5841	35	507	40	580	20	290	20	290	3125	27659
12"	300	/	/	14	203	/	/	10	145	1200	10621	/	/	40	580	/	/	20	290	4000	35403
14"	350	/	/	12	174	/	/	8	116	1700	15046	/	/	40	580	/	/	20	290	6120	54167
16"	400	/	/	12	174	/	/	8	116	2600	23012	/	/	40	580	/	/	20	290	8030	71072
18"	450	/	/	10	145	/	/	6	87	3500	30978	/	/	40	580	/	/	20	290	12000	106209
20"	500	/	/	10	145	/	/	6	87	3800	33633	/	/	30	435	/	/	10	145	15000	132761
24"	600	/	/	8	116	/	/	4	58	6000	53105	/	/	30	435	/	/	10	145	20500	181440

★ Valve Torques Are for Metal Seated B Style Valves with MC-pulp Medium
 For Soft Seated Valve Torque, Deduct 10% off the Chart
 For Clean Liquid Media, Deduct 20% off the Chart

Consult Factory for Other Media.

Flo-Tite's marking system follows MSS SP-25-1998

Valve Markings- Casted into valve bodies include the following; Flo-Tite Name, Model Numbers, Body Material, Valve Size, & Pressure Rating

Standard Trim Soft Parts

ID-Codes

Valve Size

Flow Direction

Body Material

Part Number

Seat Material

Valve Side A



Flo-Tite Name

Class Ratings

Valve Side B



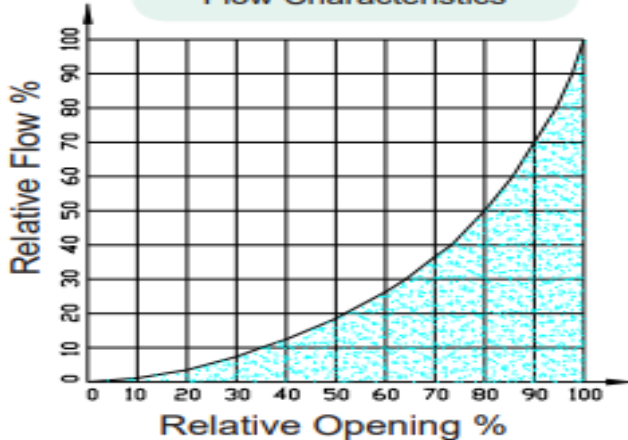
Ball Material

Stem Material

Rated Cv

VALVE SIZE		CV
NPS	DN	
1"	25	27
1 1/4"	32	47
1 1/2"	40	70
2"	50	135
2 1/2"	65	210
3"	80	390
4"	100	560
5"	125	790
6"	150	1130
8"	200	1860
10"	250	2900
12"	300	4320
14"	350	6640
16"	400	8000
18"	450	10000
20"	500	12200
24"	600	17270

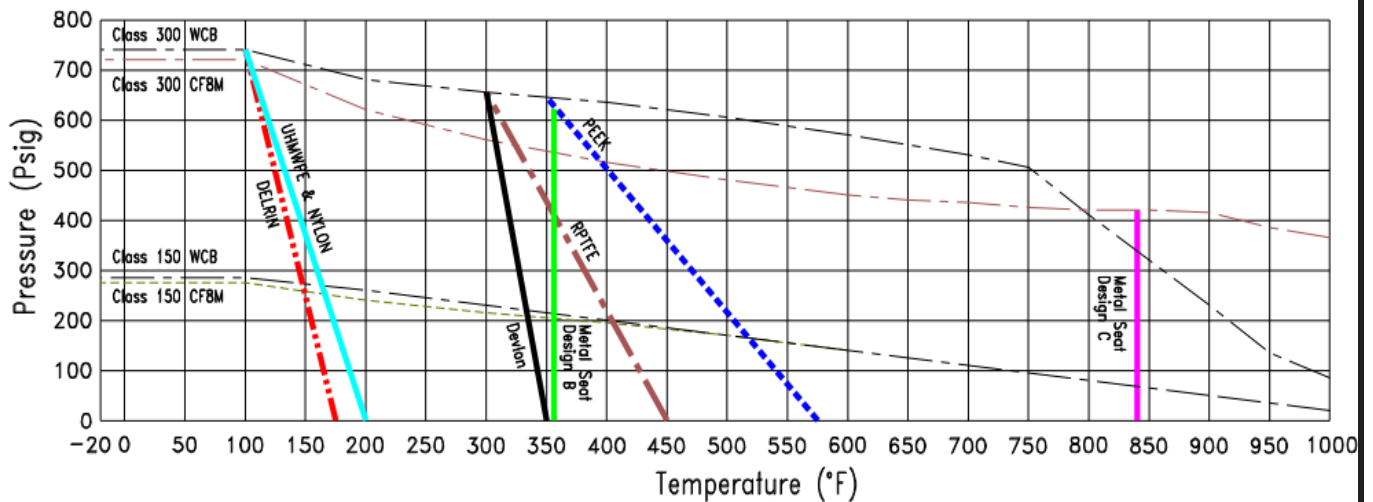
Typical Inherent Equal Percentage Flow Characteristics



Important Information Required to size control valves:

1. Type of Media, ie Liquid, Gas or Steam
2. What Type of Calculation
 - a. Cv required given the Flow Rate Through the Valve
 - b. Flow Rate given the Cv
3. Flow Rate, GPM, PPH (Lb/H), SCFM
4. Inlet Pressure of Media to Valve (PSIG)
5. Outlet Pressure of Media from Valve (PSIG)
6. Inlet Temperature of Media at Valve
7. Specific Gravity of Media at Valve
8. Media Vapor Pressure (PSIA)
9. Media Critical Pressure
10. Pipe Size Upstream of Valve
11. Pipe Size Downstream of Valve

PRESSURE TEMPERATURE RATING



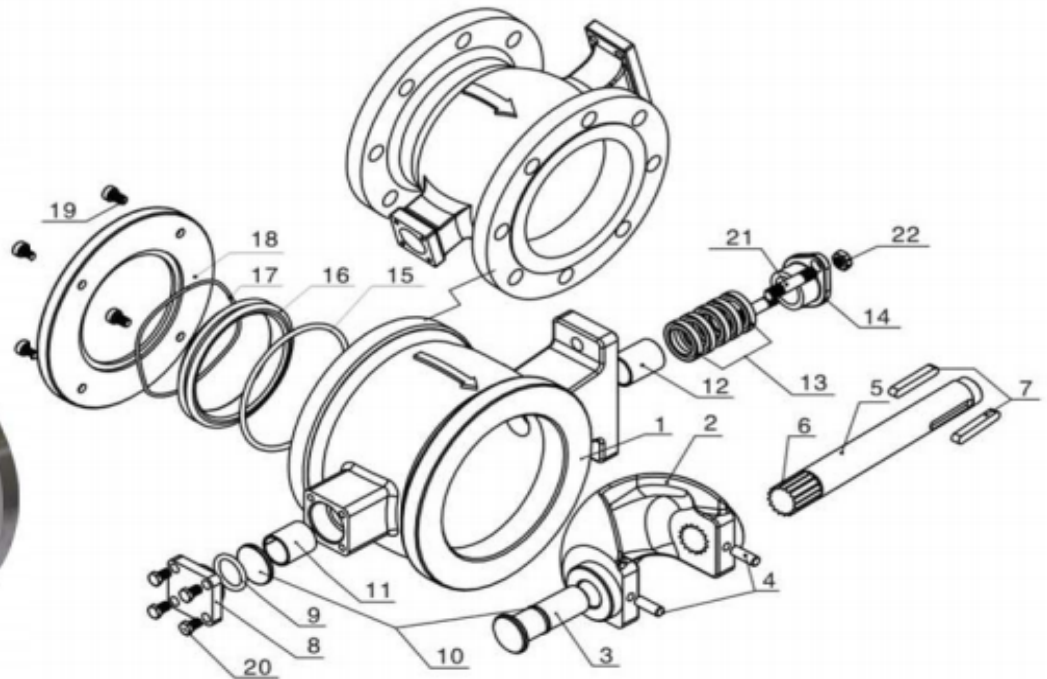
Seat Design B is standard metal seat with a temperature limit of 356 °F.

Seat Design C is optional metal seat with a temperature limit of 842 °F.

WCB is not recommended for prolonged use above 800 °F

BILL OF MATERIALS

Exploded View Sentinel Series



No.	Name	Quantity	Material
1	Body	1	WCB, CF8, CF8M, 317, 2205 Duplex
2	Ball	1	CF8, CF8M, Hard Chrome Plating or Stellite Surfacing
3	Lower Shaft	1	17-4PH, SS316L
4	Cylindrical Pin	2	SS304, SS316
5	Upper Shaft	1	17-4PH, SS316L
6	Spline	1	17-4PH, SS316
7	Flat Key	2	SS304, Carbon Steel
8	Blind Flange	1	CF8, CF8M
9	O-Ring	1	VITON, Graphite
10	Gasket	1 each	PTFE, Graphite
11	Self Lubricating Bearing	1	Composite Material
12	Self Lubricating Bearing	1	Composite Material
13	Packing	1 set	PTFE, Graphite
14	Gland	1	CF8
15	O-Ring	1	Viton, Graphite
16	Seat	1	PTFE, Devlon, SS304, SS316, Hard Chrome Plating or Stellite Surfacing
17	Wave Spring	1	SS316
18	Retainer	1	Carbon Steel, SS304, SS316
19	Socket Head Screw	4	A193 B7, A193 B8
20	Hexgon Screw	4	A193 B7, A193 B8
21	Stud	2	A193 B7, A193 B8
22	Hexagon Nut	2	A194 2H, A194 8

Please carefully review all important procedures in this manual. If anything is unclear, please feel free to contact Flo-Tite directly



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