

Installation, Operation, and Maintenance Manual

API 6D Three - Piece Trunnion Mounted Ball Valve – Trident Series





API 6D Three - Piece Trunnion Mounted Ball Valve Trident Series

Document Number: EDC 502
Revision: B
Release Date: 10/2/2023

TABLE OF CONTENT

1	SCOPE.....	3
1.1	RESPONSIBILITY FOR VALVE APPLICATION.....	3
1.2	RECEIVING INSPECTION, HANDLING AND STORAGE	3
2	BILL OF MATERIAL.....	5
3	INSTALLATION	6
3.1	NAMEPLATE	7
3.2	HIGH TEMPERATURE SERVICE.....	7
3.3	LOW TEMPERATURE SERVICE	7
4	OPERATION.....	7
4.1	INITIAL START-UP/COMMISSIONING.....	7
4.2	NORMAL OPERATING ACTIVITY.....	7
4.3	DOUBLE BLOCK AND BLEED OPERATION	8
4.4	BODY CAVITY RELIEVING SYSTEM.....	8
5	MAINTENANCE.....	9
5.1	VALVE MAINTENACE IN OPERATION.....	9
5.1.1	STEM LEAKAGE	9
5.1.2	SEAT LEAKAGE.....	9
5.2	SCHEDULE OF ROUTINE MAINTENANCE.....	9
5.3	VALVE CLEANING.....	10
5.4	EMERGENCY REPAIR.....	10
6	DISASSEMBLY AND REASSEMBLY INSTRUCTIONS	10
6.1	DISASSEMBLY	10
6.2	RECONDITIONING	12
6.3	REASSEMBLY	12
7	PROPER VALVE TESTING.....	13
7.1	SHELL TEST	13
7.2	HYDROSTATIC SEAT TEST.....	13
7.3	DOUBLE BLOCK AND BLEED (DBB) TEST	14
7.4	SUPPLEMENTAL AIR SEAT TEST	14
8	BOLTS TIGHTENING TORQUE.....	14
9	TROUBLESHOOTING.....	14

1 SCOPE

The following instructions are very important for the maintenance, disassembling and assembling of C&C Trident series end entry three-piece trunnion ball valves.

The instructions make references to valves with emergency sealant injectors and with back up rings for high pressure service. As the above-mentioned features are not standard, in some cases these parts may not be found, or may be found partially during the disassembling of the valves.



We recommend that this entire document be read prior to proceeding with any installation or repair.

1.1 RESPONSIBILITY FOR VALVE APPLICATION

The End User is responsible for ordering the correct valves for the intended application. C&C Valves are to be installed in observance of the pressure rating and design temperature. Prior to installation, the valves and nameplates should be checked for proper identification to be sure the valve is of the proper type, material, and is of a suitable pressure class and temperature limit to satisfy the application requirements.



Do not use any valve in applications where either the pressure or temperature is higher than the allowable working values. Also, valves should not be used in service media if not compatible with the valve material of construction, as this may cause premature failure.

1.2 RECEIVING INSPECTION, HANDLING AND STORAGE

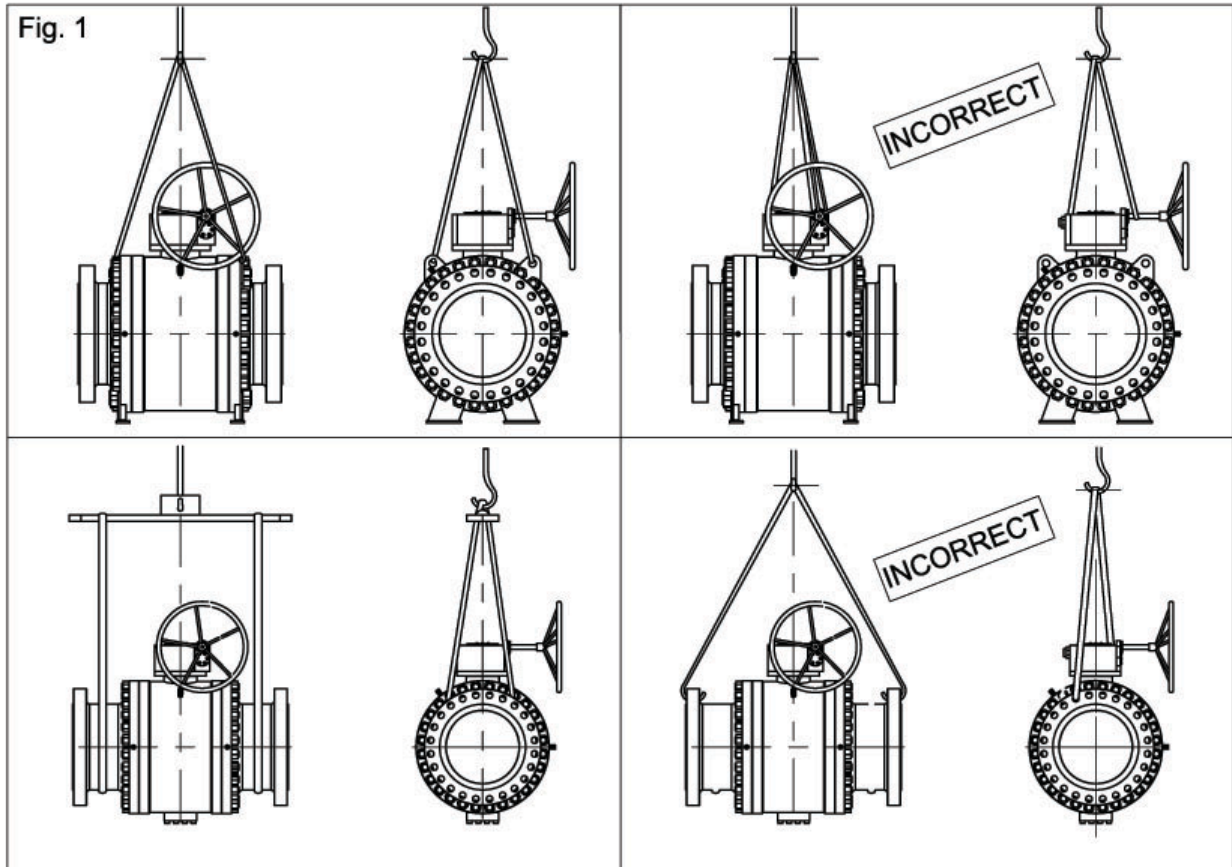
On arrival at site, an accurate checking must be carried out in order to verify if any damage has occurred during transportation.

- Compliance to purchase order requirements.
- Correct type, pressure class, size, body, trim & seal material and end connections (This information may be found on the nameplate or may be stamped on the body of the valve)
- Each C&C valve has unique serial number hard stamped on the closure of the valve. (This shall be always be quoted for any enquiry related to a particular valve)
- Condition of valve paint and location of required Mylar tags.
- End protectors on valve end are in place with a nonporous moisture barrier between the cover and the metal flange or welding end.
- Valve are shipped in the fully open position with wooden or plastic covers to protect the ends from ingress of foreign materials.

It is recommended that lifting devices that are rated for the valve weight should be used when lifting any C&C Valves. C&C Trident series ball valves 6" full bore and larger are provided with lifting lugs. Operators like gearboxes or actuators may have their own lifting points that are intended and designed to bear the load of the operator only. Operator lifting points **shall not** be used to lift the valve/operator assembly.

Recommended handling procedure when lifting with slings is shown in **figure 1**.

- Pallets, boxes, crates are provided with lifting/piling indications that shall be followed at all times.
- Operator lifting points shall not be used to lift the valve.
- Other lifting equipment provided with hooks can be used instead.
- Chains shall not be used instead of slings using procedures in **figure 1**.
- Lifting equipment's safe working load (SWL) shall always be double checked prior to any lift.
- During lifting/handling always keep valve flange protection in place to avoid foreign material from entering the valve bore
- Pay attention, as not to damage the valve paint during lifting/handling procedures.



Special care to the marking applied on the crates, and particularly to piling instructions, must be taken during storage/stowage of the box containing the valves. Unless otherwise agreed, CNC wooden boxes are not suitable for storage/stowage one on top of the other. Non-observance of crate handling markings could result in the serious injury of people and damages to the goods.



Do not store valve without end protection to prevent from ingress of foreign materials



API 6D Three - Piece Trunnion Mounted Ball Valve Trident Series

Document Number: EDC 502
Revision: B
Release Date: 10/2/2023

- Whenever possible valve shall be stored indoors and out of weather. When stored without wooden box, care must be taken not to put stainless steel valves and/or components in contact with any carbon steel components and/or structures to avoid cross contamination. Also, grinding of carbon steel components near stainless steel valves shall be avoided.
- For open air storage, special precaution should be taken to avoid both package and valve damage by environmental factors. Wooden boxes shall have minimum protection, using cellophane or similar sheets without tears/holes adequately fixed and the boxes lifted from the ground. Box condition shall be checked maximum every two months.
- For storage periods over two months in un-covered areas, CNC does not take any responsibility unless this requirement has been agreed on the purchase order.
- Lubrication during storage is not recommended.

2 BILL OF MATERIAL

Item	Component	Item	Component
1	Body	25	Trunnion O-Ring
2	Closure	26	Anti-Static Plunger
3	Gland flange	27	Anti-Static Spring
4	Mounting Flange	28	Stem injection fitting
5	Ball	29	Stem Drive Key
6	Trunnion/ Internal Trunnion Support	30	Stem drive Pin
7	Stem	31	Mounting Flange Cap Screw
8	Seat Assembly	32	Gland Flange Cap Screw
9	Body Nuts	33	Upper gland dowel Pin
10	Body Bolts	34	Primary Stem O-Ring
11	Body Gasket	35	Secondary Stem O-Ring
12	Body O-Ring	36	Stem Fire Safe Seal
13	Seat Injection fitting	37	Mounting Flange O-Rings
14	Buried Check Valve	38	Gland Flange O-Rings
15	Seat Insert	39	Gland Bearing
16	Seat Spring	40	Gland Gasket
17	Seat Fire Safe Seal	41	Stem Thrust Bearing
18	Seat O-Rings	42	Stem Thrust Washer
19	Trunnion Nuts	43	Gearbox bolts
20	Trunnion Bolts	44	Gearbox Nuts
21	Trunnion Thrust Bearing	45	Gear Operator/lever Operator
22	Trunnion Thrust Washer	46	Vent / drain Valve
23	Trunnion Gasket	47	Cavity Bleed Fitting
24	Trunnion Bearing Pin	48	T-Lever

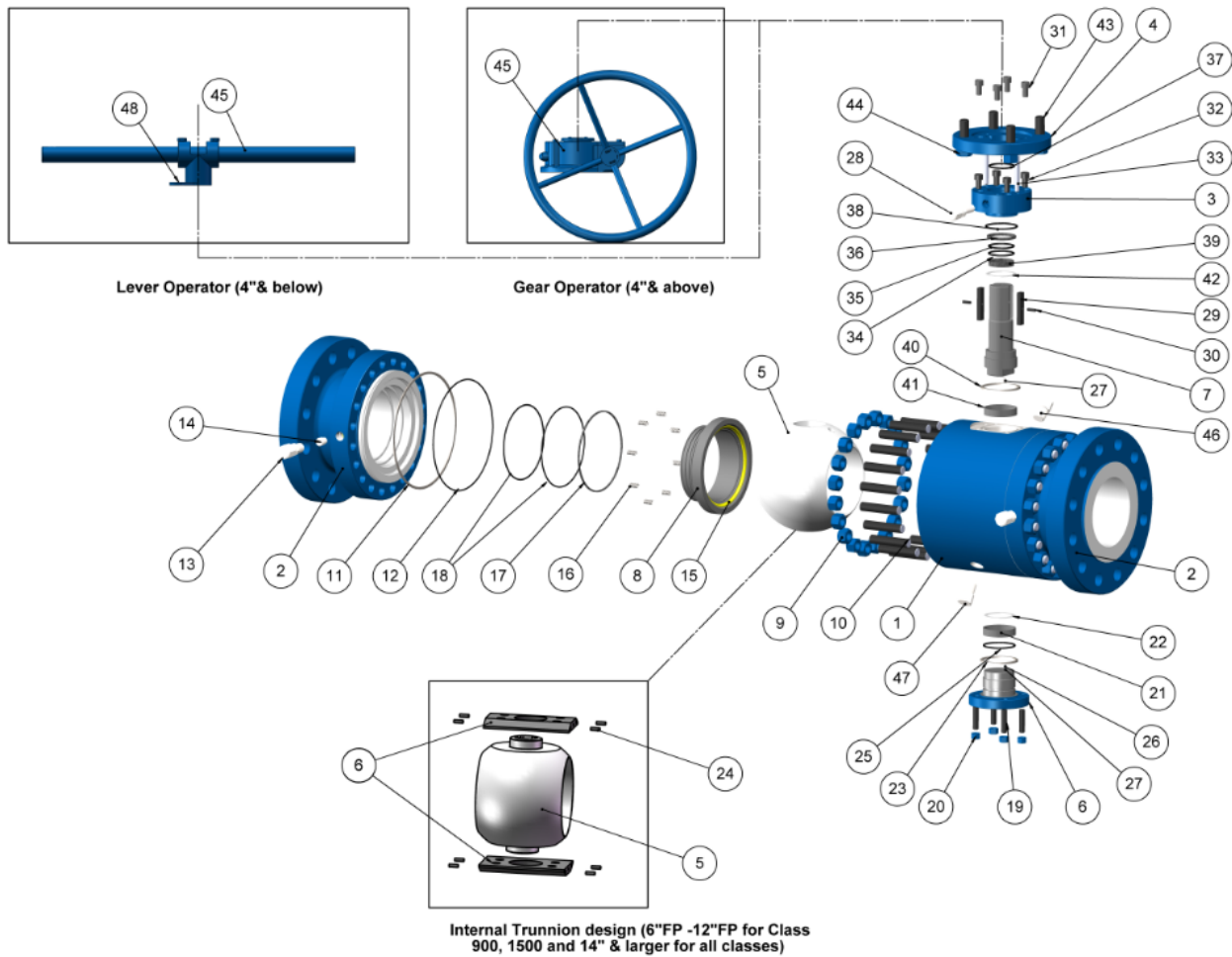


Figure 2: Trident Series Ball Valve

3 INSTALLATION

Valves, as delivered, are ready for installation once valve flange protectors are removed and rust preventative grease wiped off flange gasket surfaces. A light solvent may be used to fully remove grease residue.

Install valve in system using proper size and type mating flanges and appropriate gaskets (for RF) or seal rings (for RTJ). Valve design allows for line flow in either direction.

The pipeline where the valve is to be installed shall be clean, free from sand, welding slags, debris, pieces of wood and/or any other foreign material that can damage the valve seats during operation.

Actuator and Gear stops are pre-set at the factory and should require no further adjustments. With the exception of 'fail-safe closed' valves, all other valves are shipped in the open position. Valves should not be closed until the bore of the valve has been cleaned of all debris.

3.1 NAMEPLATE

Nameplates provided on the products are designed to either advise operators of residual hazard or provide information regarding the valve. Hiding or removing such information can be very dangerous to personnel operating or maintaining the valve.

3.2 HIGH TEMPERATURE SERVICE

Some valves do have operating temperatures that can be very dangerous to people or animals. To avoid any kind of injuries operators must ensure the valve surfaces that reach such temperatures are suitably protected against accidental contact.

Operators are recommended to always provide an efficient protection/insulation of the valve surfaces that may be touched by personnel and/or animals and that exceed, in lower or in higher, the human tolerable limits (as a suggestion use -4°F through +140°F).

3.3 LOW TEMPERATURE SERVICE

Prior to exposure to freezing temperatures, it is highly recommended the valve be drained. Water that may be trapped in the body cavity could freeze and impair the operation of the valve or damage the valve. If the valve has a grease fitting in the lower drain, a sufficient amount of antifreeze injected into the body cavity via the lower drain grease fitting will prevent accumulated water from freezing. It is also advisable to inject a sufficient amount of valve lubricant into the grease fittings of valve and operator (if present) prior to extended cold temperature exposure. Trapped water should be drained from stem extensions. Some stem extensions in the field are equipped with plastic plugs that can be removed to drain trapped water from the piped extension.

4 OPERATION

4.1 INITIAL START-UP/COMMISSIONING

Once installed in the line the valve should be left either in the fully open or fully closed position, depending on the start-up/commissioning operation.



Do not leave the valve in partially open position for a long period. Ensure the pipeline is free of any debris such as sand, tools, welding slag or weld splatter and rod ends. This will damage the valve ball and seats during the start-up/commissioning operations.

4.2 NORMAL OPERATING ACTIVITY

The valve is designed for on/off service only. Pressure - temperature limits are stated on the valve nameplate. Do not use valve for flow control neither in the partially open position nor for throttling service, as these could lead to premature failure. The valve can be operated from the fully open to the fully closed position by acting on the hand wheel/lever (clockwise to close). When the stem flats or keyway are perpendicular to the fluid bore, valve is closed. Positive stops and arrow indication are provided on handles and gear operators.

4.3 DOUBLE BLOCK AND BLEED OPERATION

When pressure is applied to both ends of a closed valve, each seat will be forced against the ball, creating a double block. The hex head bleed fitting (47) provides a safe and convenient method for checking closed valve seat sealing effectiveness.



Before opening the bleed fitting, note orientation of the exhaust hole in the bleed valve. Never open bleed fitting while valve is exposed to line pressure.

4.4 BODY CAVITY RELIEVING SYSTEM

Trunnion mounted ball valves have a body cavity where pressure can be trapped in a closed volume. Under these circumstances, any increase of the contained fluid temperature or any degradation of the contained fluid can result in an uncontrolled pressure increase of the trapped fluid potentially above the design pressure of the valve.

C&C's standard trunnion mounted ball valves contain two self-relieving seats (SPE). The DIB design has two configurations: DIB-1 and DIB-2. The DIB-1 configuration has two double piston effect (DPE) seats, and the DIB-2 configuration has one SPE seat and one DPE seat.

To relieve body cavity pressure, all of the C&C trunnion mounted ball valves are provided with one of the following body cavity relieving systems (depending on the design of the seats).

- **Self-Relieving Seats:**
The design of a SPE seat is such that when the pressure in the body cavity exceeds the rated pressure of the valve, not to exceed 1.33 times the maximum operating pressure (MOP), then the seat will automatically disconnect from the ball and allow pressure equalization between the body cavity and the pipeline. When one or both seats are of the SPE type, there is no need for any other type of body cavity relieving systems.
- **Pressure Relief Valve:**
In the DIB-1 configuration, where both seats are DPE, a Pressure Relief Valve (PRV) is essential to prevent overpressure. The PRV is pre-set and tested in the factory to relieve pressure at 1.33 times the maximum operating pressure (MOP). Alternatively, a pressure relief bypass line (LRK) can be installed at the customer's request for liquid service, making the valve unidirectional. The LRK connects the body cavity to either the upstream or downstream end flange.

It is recommended to install the DIB-2 valve with the SPE seat on the upstream side.



For the DIB-1 and DIB-2 Configurations Exercise Extreme Caution: Warning!
When opening the body drain plug/valve, exercise extreme caution. In the event of a failed upstream seat, the valve might continue to hold pressure, but the media could flow into the body cavity through the failed seat. Personnel must adhere to stringent safety protocols to avoid any potential risks or accidents. Failure to do so can result in grave consequences, including injury or harm to personnel.

It is a mandatory requirement to keep body cavity pressure relieving system functioning correctly. Failure of the body cavity pressure relieving system can lead to failure of the valve pressure containment capability with consequent injuries to personnel, damage to the environment and loss of production.

5 MAINTENANCE

Maintenance personnel performing this operation shall be fully trained to handle pressure-containing equipment. Opening pressure containing equipment without having released all of the internal pressure and having safely isolated the pipeline where the valve is assembled can lead to serious injury or even death of the personnel involved. **DO NOT PROCEED IF IN DOUBT. ALWAYS DOUBLE CHECK.**

Some pipelines may contain fluids that are dangerous or lethal to human beings, animals and to the environment. Always check with the HS&E manager before releasing any fluid to the atmosphere.

5.1 VALVE MAINTENANCE IN OPERATION

5.1.1 STEM LEAKAGE

The C&C Trident series valve is provided with a stem sealant injector, stem leakages can be temporarily stopped by injecting sealant into the stem fitting (28). It is also possible to replace the upper stem fire safe seal (36) without disassembling the gland flange (3).

To replace all the stem O-Rings, it is necessary to depressurize the line and to disassemble the stem-gland flange group as per instructions at para 6.1.

5.1.2 SEAT LEAKAGE

If the valve has been provided with emergency seat sealant injection fittings (13), seat leakage can be temporarily eliminated or, at least, considerably reduced by injecting sealant when the valve is in a fully closed position. Seat sealant fittings (13) are located in the closure (2). Disassembling the valve and replacing the seat seal can eliminate seat leakages.

5.2 SCHEDULE OF ROUTINE MAINTENANCE

Valves are designed for a maintenance free life of 2-10 years depending upon severity of service. Routine maintenance consists of injecting lubricant through the groove or channel inside the valve leading to seal points around the ball thus topping off the lubricant. In order to guarantee efficient valve operation, the valve shall be inspected on a regular basis during the operation and subject to scheduled maintenance. Qualified person shall do all maintenance work.

Table 1: Recommended Lubrication Quantities	
Valve Sizes	Lubricant by valve size (ounces)
2"	2
3"	2
4"	2
6"	3
8"	3
10"	3
12"	3
14"	4
16"	4
18"	4
20"	6
24"	8

5.3 VALVE CLEANING

Valve cleaning is required when the valve does not seal properly and becomes hard to operate. Valve cleaners are products that contains detergent, sealant and oils. They clear channel/passage where old grease may have hardened. Inject cleaner through the seat injection fitting (13), leave it for three-to-four hours. If possible, cycle the valve to evenly distribute the cleaner in the ball seat contact area. This procedure is often successful in freeing seized, or hard to turn valves.

Note: Always replace the valve cleaner with equal quantities of Lubricant after cleaning

5.4 EMERGENCY REPAIR

- All C&C Trident series valves are designed to operate without lubrication. Sealant injection can be used to stop/reduce leakage across the seats and/or through the stem seals as an emergency temporary solution. Furthermore, there is no guarantee that after the injection of the sealant the valve seats or stem seal will seal perfectly.
- Sealant must be injected only when leakage occurs. See table 1 for volume of sealant required by valve size.
- Prior to injecting sealant, it is suggested to flush the seat with flushing fluid and set the valve to the fully closed position.



Improper Selection of the lubricants may cause incompatibility of the soft components of the valve with the products injected. The end user is responsible to use the correct lubricants.

- A valve, which requires continuous heavy sealant injections, shall be either replaced or repaired immediately.



Injection fittings should not be removed if there is pressure in the line. Injection fittings should never be painted.

6 DISASSEMBLY AND REASSEMBLY INSTRUCTIONS

6.1 DISASSEMBLY

To disassemble three piece end entry ball valves, no special tools are needed. A torque wrench or bolt tightening tool is required to tighten nuts during reassembly. For tightening torque please refer to section 8.

- In case the valve is in operation, first, release the pressure from the line. For a complete disassembly, the valve must be removed from the line.
- Open the cavity bleed fitting (47) to discharge the residual pressure and operate the valve to the fully open position. Always use the safety plug or bleed fitting provided either at the drain connection or at the vent connection to release the body cavity pressure.



To avoid possibility of being struck by liquid or foreign solid materials, position yourself so the hole of the bleed fitting is pointing safely away from you.



Never unscrew the flanged connections with residual pressure in the line.



Be careful not to injure personnel performing this operation. Always wear safety gloves, shoes and glasses.

- Remove the valve from the line.
Before disassembling the valve, it is important to mark all the parts, in order to correctly reassemble the valve.
- The valve shall be positioned to have the flow axis along the horizontal position and the upper part shall be easily accessible.
- Remove the valve operator, after having removed the bolts (43) and nuts (44), which are connected with the valve, remove/pull the actuator carefully until it is completely disconnected from the stem (7).
- During this operation, particular care shall be paid not to damage both the stem (7) and the key (29).
- Unscrew the body nuts (9), leaving 4 or more (depending on valve size) on each closure for easier handling.
- Turn the valve and rest it in one end flange. In this way the valve bore will be in a vertical position. Pay attention not to damage the surface of the flanged end.
- Remove the stem key (29).
- Unscrew the actuator mounting flange cap screw (31). Remove the mounting flange (4).
- Unscrew the gland flange caps screw (32).
- Remove the gland dowel pins (33) from the gland flange using eyebolts fitted in the threaded hole in the pins.
- Extract the stem (7) and the gland flange (3) group from the body (1).
- Remove the stem Fire safe seal (36), the stem O-Rings (34 & 35), the gland flange O-Ring (37), stem thrust bearing (41) and the stem thrust washer (42).
- It is possible to remove the stem injection fitting (27) for cleaning.
- **External trunnion design**
 - Unscrew the trunnion nuts (19) and bolts (20).
 - Extract trunnion (6) from the body (1) and remove the trunnion O-Ring (25) and trunnion Fire Safe gasket (23).
 - Unscrew and remove the cavity bleed fitting (47) and the drain valve (46). Welded connections shall not be removed.
 - Remove the body nuts (9) left on the upper closure (2).
 - Lift carefully the closure (2) paying attention not to damage the body O-Ring (12) and body gasket (11) which can follow the closure or stay in the body cavity.
 - Unscrew the body nuts (9) left on the lower closure (2) and lift the body (1).
 - Remove the ball (5) from the body (1) by using nylon rope or strap without damage.
- **Internal plate trunnion design**
 - Remove the ball (5) and internal trunnion support (6) (only 6"-12" for class 900, 1500 and 14" & larger for all classes) from the body (1).
 - Place the ball (5) on a wooden block.

- Remove trunnion thrust washer (22), where provided. If damaged only, trunnion trust bearing (21) may be removed using an extractor.
- Extract the seat (8) from the closure (2). Seat seal can be either O-Rings (18) or an insert (15). It is not possible to remove seat insert (15), if it's found damaged new seat rings with inserts shall be used during reassembling.
- Remove the seat O-Rings (18) and the seat fire safe gasket (17).
- Remove the seat springs (16) from their housing in the seat (8) or in the body (1), where provided.

6.2 RECONDITIONING

- The metallic parts can be cleaned using cloths wet with the cleaner.
- To clean the O-Rings and gaskets use dry, clean cloths. If possible, it is recommended to wash the O-Rings with soap and water, rinsing with clean water.
- After cleaning components be sure that there are no damaged parts and, particularly, there are no scores on metallic surfaces in moving or sealing areas. Also, check the condition of the O-Rings and back-up rings, making sure that they have not been damaged.
- Replace any damaged parts.
- Lubricate O-Rings and metallic surfaces, which come into contact during the ball movement with VALTEX 2000 grease. The trunnion trust bearing (21) are self-lubricated and do not require any additional lubrication.

6.3 REASSEMBLY

- (a) To reassemble the seat group in the closure (2) proceed as follows:
- Put the body gasket (11) and O-Ring (12) into their housing in the closure (2). The body O-Ring (12), seat O-Rings (18) and the gland O-Rings (38) must be fitted stretching them slightly. Any damage on these O-Rings can cause breakages during the valve assembly.
 - During reassembling, refer to markings applied before disassembling.
 - Insert the seat springs (16) into the seats (8) or body (1), where provided.
 - Insert the seat O-Rings (18) and the fire safe seals (17), where provided
 - Press the seat assembly (8) into the closure (2)
 - When pressing the seat into the closure pay attention that the seat moves correctly, parallel to the closure surfaces. For this operation, we recommend using clamps and a rubber hammer.
 - It is not possible to replace the seat insert (15) only.
 - Lay one closure (2) on the plane surface in vertical position.
- (b) Assemble the stem/gland flange group as follows:
- Insert in the upper part of the stem (7) into the stem thrust washer (42).
 - Assemble to the gland flange (3) the gland flange O-Rings (38), the fire safe seal (36) and the stem O-Rings (34, 35).
 - Insert the upper gland dowel pins (33) in the body (1).
 - Insert the stem (7) into the gland flange (3).
 - Insert the stem fire safe gasket (35).
- (c) Turn the valve bringing the stem axis in the vertical position.
- (d) Fit the stem/gland plate group following the markings made before disassembling. If parts are correctly aligned, reassembly shall be easy.
- (e) Completely tighten the body bolts & nuts (9 &10), on both sides of the valve, gland flange and trunnion cap screws. Refer to section 8
- (f) Fit the mounting flange (4) by the upper gland dowel pin (32) and then lock it with the mounting flange caps crews (31).

- (g) Be careful not to over-torque the nuts and cap screws. Damages to the threads can cause the flanged joint to fail under pressure and injury personnel performing test operation.
- (h) Insert the stem drive key (28) on the stem (7)
- (i) Reassemble seat injection fitting (13), when provided; stem injection fitting (27), drain valve (46) and the cavity bleed fitting (47).
- (j) Reassemble the gearbox operator (45), if provided ensuring that all the marks previously made correspond and using only part of the fixing bolts (43) and nuts (44). Carry out some opening and closing operations, verifying the perfect functioning of the operator and the valve.
For either gear operated valves or actuated valves, make sure that both the travel ends act when the valve is fully open and closed.

7 PROPER VALVE TESTING

Always perform an API 6D pressure test before re-installing the valve into the line to verify that the maintenance operation have been satisfactorily performed and to re-certify pressure containment capability of the valve.



Installing the valve in the line without pressure testing could cause leakage of production fluid and, potentially hazardous situation.

7.1 SHELL TEST

There shall not be any leakage under the pressure when ball is partially open and both ends are blanked. Testing pressure is 1.5 times the maximum operating pressure. Test duration are 2min for 4" and under valves, 5min for 6" to 10" valves, 15min for 12" to 18" and 30min for 20" and larger.

- (a) Fit the vent valve and set it in open position.
- (b) Operate the valve to the half-open position.
- (c) Fill in the valve with the fluid (Venting the air through the vent valve)
- (d) Close the vent valve and apply pressure in accordance with maximum operating pressure of the pipeline.
- (e) Visually check the outside of the ball valve for leakage.
- (f) Depressurize the valve.



DIB-1 valves come standard with pressure relief valve at the cavity to prevent any overpressure of trapped service media in the body cavity due to thermal expansion. When testing the DIB-1 valves at pressure above 1.1 times of working pressure, per ASME class, the pressure relief valve shall be removed and replaced with a solid plug, as the relief valve will pop/relieve during the test.

7.2 HYDROSTATIC SEAT TEST

Valves are to be subjected to a hydrostatic seat test. There is to be no leakage under test pressure. Test pressure is to be applied to the appropriate end of the valve. Testing pressures 1.1 times maximum operating pressure. Test durations are 2min for 4" and under valves, 5min for 6" to 18" and 10min for 20" and larger valves.

- (a) Operate the valve to the fully close position and open the vent valve.
- (b) Pressurize one side in accordance with max operating pressure of the pipeline.
- (c) From the body vent or bleed fitting, check for possible seat leakage.



API 6D Three - Piece Trunnion Mounted Ball Valve Trident Series

Document Number: EDC 502
Revision: B
Release Date: 10/2/2023

- (d) Repeat same operations as per points (b) & (c) on opposite side of the valve.
- (e) Depressurize the valve.

7.3 DOUBLE BLOCK AND BLEED (DBB) TEST

If the valve seats have DBB function, then the seat test shall be performed as follows:

- (a) With the valve unseated and partially open, the valve cavity shall be completely filled with test fluid.
- (b) The valve shall then be closed and the vent valve opened to allow excess test fluid to overflow from the valve – cavity test connection.
- (c) The test pressure shall be applied simultaneously from both ends.
- (d) Seat tightness shall be monitored from the cavity connection.
- (e) Depressurize the valve.

7.4 SUPPLEMENTAL AIR SEAT TEST

The seat test specified in 7.2 shall be repeated at the test pressure between 80 psig and 100 psig using air as the test medium.

8 BOLTS TIGHTENING TORQUE

Table 2: Recommended Bolt Torque							
Bolt Size		Torque Values (Inch-lbs.)		Bolt Size		Torque Values (Inch-lbs.)	
Inch	Metric	B7	B7M	Inch	Metric	B7	B7M
1/4	M6	62	53	1-1/4	M30	10798	9824
5/16	M8	142	124	1-3/8	M36	15002	14028
3/8	M10	248	221	1-1/2	M39	19799	18587
7/16	-	416	381	1-5/8	M42	25800	24286
1/2	M12	602	549	1-3/4	M45	32394	27756
9/16	M14	903	841	1-7/8	M48	39607	34695
5/8	M16	1204	1106	2	M52	49210	41634
3/4	M20	2168	2036	2-1/4	M56	71957	61761
7/8	M22	3629	3469	2-1/2	M64	99571	86914
1	M24	5532	5222	2-3/4	M68	134531	113113
1-1/8	M27	7877	7125	3	M76	175245	147808
Note: Tightening Torque Values \pm 10%							

9 TROUBLESHOOTING

Issue	Possible Cause	Solution
Valve will not open or close	<ol style="list-style-type: none"> 1. Improper setting of gear or actuator stops 2. Ice inside operating device 	<ol style="list-style-type: none"> 1. Reset travel stop. 2. Remove operating device cover and



API 6D Three - Piece Trunnion Mounted Ball Valve Trident Series

Document Number: EDC 502
Revision: B
Release Date: 10/2/2023

		check for ice. Remove and replace as necessary
Valve hard to operate	<ol style="list-style-type: none"> 1. Foreign material in line/valve 2. Lack of lubrication 3. Gear hard to operate or stuck 	<ol style="list-style-type: none"> 1. Flush line to remove debris. Clean the valve – see valve cleaning procedure. 2. Lubricate seats utilizing sealant injection fittings (13) 3. Check gear. Lubricate or replace.
Leak around the seat	<ol style="list-style-type: none"> 1. Foreign material between seat and ball. 2. Valve not fully closed 3. Worn or damaged seat inserts and/or ball. 4. Worn or damaged seat O-Ring seals 	<ol style="list-style-type: none"> 1. Clean and lubricate seats – see Valve cleaning and emergency repair section. 2. Check the gear operator for fully closed position. 3. Disassemble the valve and replace damaged component(s) 4. Disassemble the valve and replace the O-Ring.
Leak around the stem	<ol style="list-style-type: none"> 1. Worn or damaged O-Ring seals 	<ol style="list-style-type: none"> 1. Grease the stem. Disassemble the valve and replace the O-Rings
Leak around trunnion	<ol style="list-style-type: none"> 1. Worn or damaged trunnion O-Ring and/or gasket 2. Trunnion cap screws not properly tightened 	<ol style="list-style-type: none"> 1. Disassemble the valve and replace the O-Ring and/or gasket. 2. Tightened cap screws to specified torque.
Leakage from bleed or injection fittings	<ol style="list-style-type: none"> 1. Foreign material in the fittings 2. Fittings are loose 	<ol style="list-style-type: none"> 1. Inject small amount of cleaner to flush foreign materials 2. Tightened fitting.