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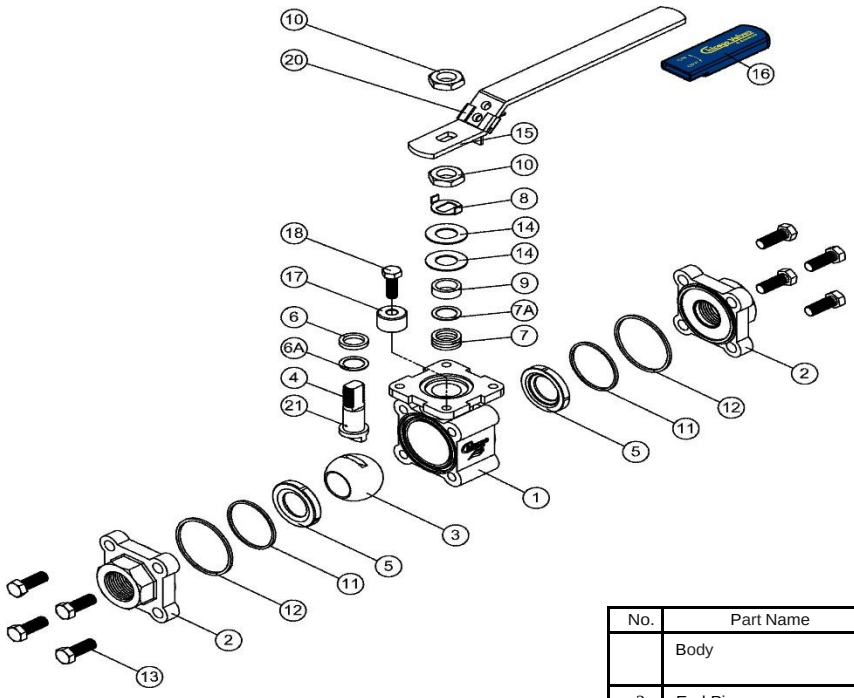
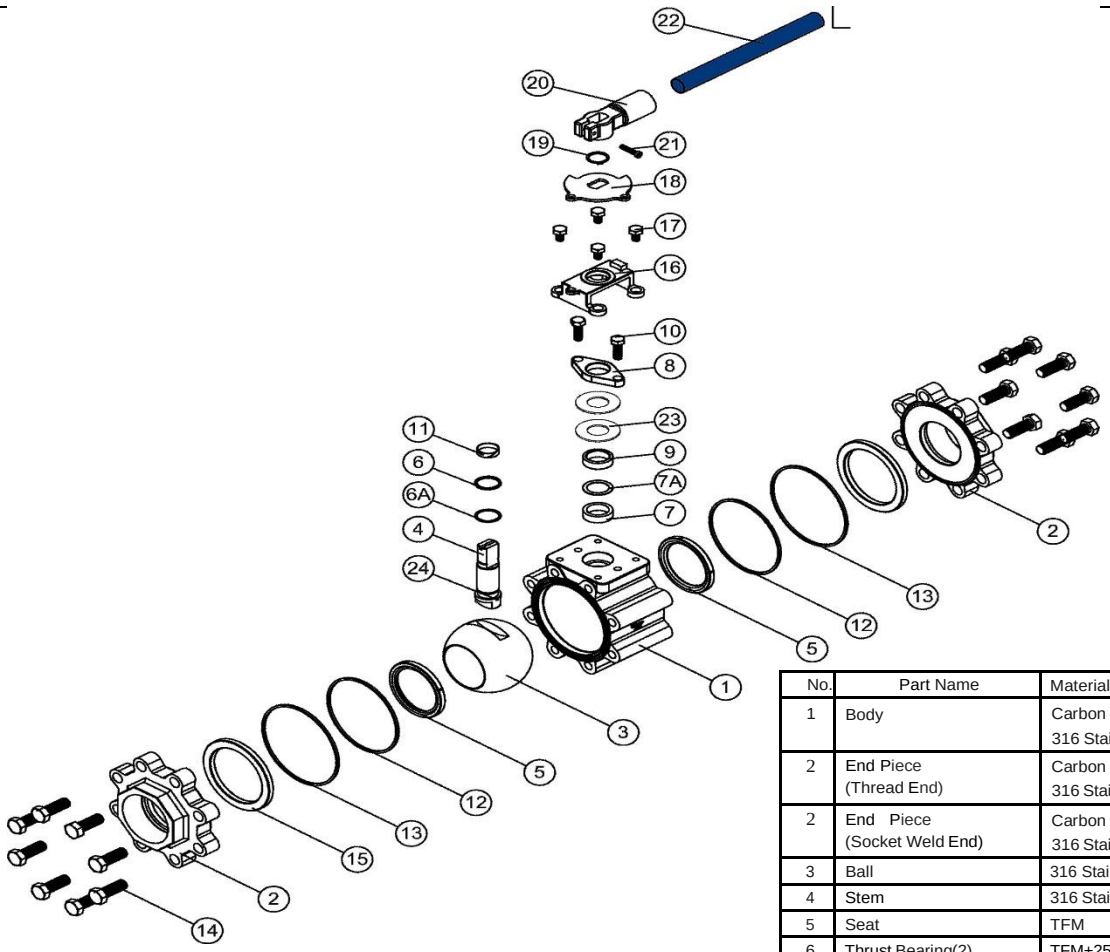
Series 70/79 Three Piece Standard/Full Port Ball Valve
Installation, Operation, and Maintenance Instructions



No.	Part Name	Material	Q'ty
	Body	Carbon Steel ASTM A216 WCB 316 Stainless Steel ASTM A351 CF8M	1
2	End Piece (Thread End)	Carbon Steel ASTM A216 WCB 316 Stainless Steel ASTM A351 CF8M	2
2	End Piece (Socket Weld End)	Carbon Steel ASTM A216 WCB 316 Stainless Steel ASTM A351 CF3M	2
3	Ball	316 Stainless Steel ASTM A351 CF8M	1
4	Stem	316 Stainless Steel	1
5	Seat	TFM	2
6	Thrust Bearing(2)	TFM+25%Carbon	1
6A	Thrust Beartng(1)	PEEK	1
7	Stem Packing	Graphite	1
7A	Packing Protector	PEEK	1
8	Lock Washer	304 Stainless Steel	1
9	Sleeve	304 Stainless Steel	1
10	Thin Nut	304 Stainless Steel	2
11	Body Seal(2)	TFM	2
12	Body Seal(1)	Graphite	2
13	Bolt	88M	8-12
14	Disk Spring Washer	301 Stainless Steel	2
15	Handle	304 Stainless Steel	**1**
16	Handle Sleeve	PVC	1
17	Set Sleeve	304 Stainless Steel	**1**
18	Set Screw	304 Stainless Steel	1
20	Locating Lock	304 Stainless Steel	1
21	Anti-Static	316 Stainless Steel	**2**
22	End Piece		2



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3	Ball	316 Stainless Steel ASTM A351 CFBM	**1**
4	Stem	316 Stainless Steel	**1**
5	Seat	TFM	2
6	Thrust Bearing(2)	TFM+25%Carbon	1
6A	Thrust Bearing(1)	PEEK	1
7	Stem Packing	Graphite	1
7A	Packing Protector	PEEK	**1**
8	Gland	17-4	**1**
9	Sleeve	304 Stainless Steel	**1**
10	Gland Bolt	304 Stainless Steel	2
11	Stem Bearing	RPTFE	1
12	Body Seal(2)	TFM	2
13	Body Seal(1)	Graphite	2
14	Bolt	BBM	16-24
15	Seat Support	Carbon Steel ASTM A216 WCB 316 Stainless Steel ASTM A351 CF8M	2
16	Stop Housing	304 Stainless Steel ASTM A351 CF8	1
17	Screw{2)	304 Stainless Steel	4
18	Travel Stopper	304 Stainless Steel	1
19	C-Snap Ring	Nickel Plated Carbon Steel	1
20	Juction Head	304 Stainless Steel ASTM A351 CFS	1
21	Screw{1)	304 Stainless Steel	1
22	Pipe Grip	304 Stainless Steel	1
23	Disk Spring Washer	301 Stainless Steel	2
24	Anti-Static	316 Stainless Steel	2

INSTALLATION:

Chicago Valves' ball valves have been designed and engineered to provide long lasting and trouble-free service when used in accordance with the instructions and specifications herein.

General:

- The following instructions only refer to Chicago Valves standard valves as described in this document.
- Keep the protective covering in place until the moment of installation. Valve performance depends upon the prevention of damage to the ball surface. Upon removal of the cover, make sure that the valve is completely open and free of obstructions.
- When shipped, valves may contain a silicon-based lubricant which aids in the assembly of the valve however valves can be ordered clean and free of lubricants
- Certain ferrous valves are phosphate coated and oil dipped during manufacturing.

Safety Precautions:

- Before removing valve from pipeline: media flowing through a valve may be corrosive, toxic, flammable, or of a contaminant nature. Where there is evidence of harmful fluids having flowed through the valve, the utmost care must be taken. It is suggested that at least the following safety precautions should be taken when handling the valves. More precautions may be required, refer to the media's Safety Data Sheet for additional precautions.
  1. Always wear eye shields
  2. Always wear gloves and overalls
  3. Wear protective footwear
  4. Wear protective headgear
  5. Ensure that running water is easily available
  6. Have suitable fire extinguisher ready if media is flammable.

- By checking line gauges, ensure that no pressure exits on either the upstream or the downstream sides of the valve.
- Ensure that any media is released by operating the valve slowly the half-open position.
- Ideally, the valve should be decontaminated when the ball is in the half-open position and then leave the valve in the fully open position.
- These valves, when installed, have body connectors which form an integral part of the pipeline, and the valve cannot be removed from the pipeline without being dismantled

OPERATION:

- Chicago Valves ball valves provide tight shut off when used under normal conditions and in accordance with Chicago Valves published pressure/temperature charts.
- If these valves are used in a partially open (throttled) position, seat life will be reduced and is not recommended unless it is a "V" series control valve that has been properly sized for the application.
- Any media which might solidify, crystalize or polymerize should not be allowed to stand in the ball valve cavities unless regular maintenance is provided. If minimal maintenance is performed, Chicago Valves offers cavity filled and/or steam jacketed ball valves.

Manual Operation:

- Chicago Valves use a ¼ turn operation closing in a clockwise direction. It is possible to see when the valve is open or closed by the position of the handle (wrench). When the handle (wrench) is across the pipeline (perpendicular), the valve is closed, reversing the handle is not recommended.

Remote Operation:

- Where manual operation is not required, valves may be automated for remote operation, instrument control, etc. A range of Chicago valves pneumatic and electric actuators are available.
- No stop plate is fitted to the valve, since that operation is normally part of the actuator, unless required.
- Operation will be in accordance with Chicago Valves installation, operation and maintenance instructions for the relevant actuator.

Installation:

- Chicago Valves cannot anticipate all the situations a user may encounter while installing and using the valve.
- The user must know and follow all applicable industry specifications and government regulations for the safe installation and use of these valves.
- Only qualified personnel or technicians who are trained for maintenance work and have read the instructions are to assemble and disassemble the valve.
- Misapplication of the product may result in injuries or property damage of which Chicago Valves is not liable for.

1. Before installing the valves, the pipes must be flushed clean of dirt, burrs and welding residues, or you will damage the seats and ball surface. These valves should be installed using good pipe fitting practices.
2. For Socket weld or Butt Weld End Valves:
   A) For valves with soft seats such as Delrin®, or UHMWPE, the Ends **must** be disassembled to prevent heat damage to the seats during welding in line. A new body seal is required for reassembly.
   - Place the valve into a vise with flat jaws squeezing only enough to securely hold the valve. Overtightening can cause damage to the valve. Then use a wrench to remove the body bolts. Valve must be in the partially open position to prevent the ball from sliding out.
   - Place the center section assembly with seats and body seals in a clean area where it will not be damaged.
   - Align the ends and then tack weld around them first and then complete the welding per industry standard. Once the caps are fully welded to the pipes, and the welds are cool to touch, re-install the center section with the seats and new body seals, then re-install the body bolts.
   - Tighten all the nuts finger tight and close the valve slowly to make sure there is no binding and allow the ball to align.
   - Tighten the nuts evenly or in a star patten and in according to the torques in the table at the end of this IOM.

   B. Valves with PTFE, TFM®, RTFE, Nova, or PEEK seats with PTFE or flexible graphite body seals may be welded in line without disassembly following the procedure on page 15.

Maintenance:

General:

- Chicago's Valves are designed to have a long, trouble-free life. When necessary, valves may be refurbished, using a small number of components, none of which require additional machining.
- Chicago's Valves are designed for easy service and assembly in the field. The following checks should, however, help to extend valve life or reduce plant problems.

Steam Leakage:

- Examine the Belleville washers for damage. If they are in good condition, retighten the packing nut to the required torque listed at the end of this IOM. If no torque wrench is available start by tightening it 1/8 of a turn at a time. If after ½ to ¾ of a turn leakage is still apparent, then the packing should be replaced. If damaged, dismantle the steam down to the gland and install new Belleville washers with their outer edges touching. Further maintenance necessitates dismantling of the valve.

Leakage at Body Joint:

- Check for tightness in the body bolts. If loose, tighten body bolts to the specifications listed in the table below. Excessive force will only stretch or strip the bolts.
- If there is still leakage, this may be due to damage to the body seal, and it will be necessary to dismantle the valve.

In-Line Leakage:

- Check that the ball valve is fully closed. If it is, leakage may be due to a damaged seat or ball sealing surface, and it will be necessary to dismantle the valve.
- *Note:* Stem leakage and leakage at body joint, if not cured by simple means described above, necessitate dismantling valve. If there is not stem leakage, the stem assembly should not be touched.

Leakage at Pipeline Joint:

- *Threaded Valves:* Test for tightness of screwed thread. If loose, tighten with standard wrench – excessive force will only damage the connection. Normal jointing materials should be used in the correct quantity.
- *Welded Valves*: Examine welds for leakage point.
- *Clamp End Valves*: Check the tightness of the clamp and make sure the seal is properly aligned and not damaged.

Refurbishing:

- Before disassembly of valves from the pipeline follow these instructions.

1. Cycle the valve with the line pressure fully relieved before attempting to remove the valve from the pipeline to ensure pressure has also been discharged from the valve cavity. Bring the valve handle to the open position.
   - **Warning:** Trying to remove the valve body from the line in the closed position with the ends still attached in the pipeline will damage the ball.
2. With the valve in the open position, loosen all the body bolts making sure that any leftover pressure or media has been evacuated. Remove the body bolts, so the valve body can eb removed from between the end caps. Bring the body out from between the end caps and bring it to a clean space where it can be dismantled.
3. Remove and discard the seats and body seals. Be careful not to damage the sealing surfaces.
4. Support the ball to prevent it from falling out of the body and turn the handle to the closed position for its removal. Set the ball aside in a clean secure area for reuse
5. To dismantle the stem assembly, first remove the handle nut and handle from the stem. Using a wrench to prevent the stem from turning, remove the packing nut, Belleville washers and gland(s). It is normally not possible to remove the stem packing at this stage.
6. Withdraw the stem through the body cavity and remove the thrust seals from the stem. Stem packing may now be removed from the top of the stem bore.
7. Clean all components thoroughly and examine all seating/sealing surfaces.
8. If there is a build-up of solids which cleaning fluids will not remove, use a proper tool to get it off making sure not to scratch the machined surfaces.
9. No eroded or corroded leak paths are permissible. If any are found, the part must be replaced. The ball must have no scratches across its seating surfaces and any damage to the port lip will damage the new seats – a damaged ball must not be re-used, install a new ball.

Rebuilding:

- Before rebuilding, check that all the correct components are available and that they are fit for re-assembling. When rebuilding, cleanliness is essential to allow long valve life and provide cost-effective maintenance
- Note: The valve may be assembled and operated dry where no lubricants are allowed in the system; however, a light lubrication of mating parts will aid in assembly and reduce initial operating torque.
- Lubricant used must be compatible with the intended line fluid. C.V.C uses food grade oil on valves for ball and seat lubricant.

1. Install thrust bearings on the stem and slide the stem up through the body.
2. Install new steam seals, gland ring, and Belleville washers onto the stem. Install stem nut and tighten to the torque values given in the table below.
3. Install the stem nut locking tab and tighten the stem nut slightly if necessary to align nut with locking device surfaces.
4. Install travel stop (if supplied) and handle. Make sure handle aligns with the flow bore through ball. Install the handle retainer nut or screw.
5. Turn the handle to the CLOSED position. Line up the ball slot with the stem tang and place the ball into position
6. Install the seats into the body.
7. Install the seat retainer when applicable.
8. Install new body seals into the valve body.
9. Slide the body center-section assembly back between the end caps.
10. Install the body bolts and nuts and tighten in a “star” pattern to the torque specified in the table below.
11. Cycle the valve open and closed several times slowly to ensure that operation is smooth and free of binding or sticking.

Test:

- If possible, leak tightness should be checked.

New Parts:

- Maintenance kits are available from Chicago Valves.
- When ordering maintenance kits, please be sure to specify type and size of valve and seating material required.
- Where a valve needs repairing, rather than maintaining, it must be noted that only Chicago Valves authorized spare parts should be used.
  - These also include basic components such as bolts, screws, and nuts, etc.
- In addition to maintenance kits, spare parts are available from Chicago Valves & Controls including balls, stems, and glands for selected series. If additional parts are required, its normally recommended that the complete valve be replaced.
- Parts from different valve series should **NOT** be interchanged.
  - This is to ensure, so far as is reasonably practicable, that the valve remains capable of being used for the purpose for which it was designed and constructed, without risk to health and safety of plant personnel.

  HOWEVER, IF THE VALVE IS ALTERED IN ANY WAY, NO LIABILITY CAN BE ACCEPTED BY CHICAGO VALVES.

Tools:

- No special tools are required for the maintenance of C.V.C Valves.

Dismantling:

- If the valve is closed, and not in the fully open position as suggested, refer to safety precautions before proceeding further.
- During dismantling, do not assume that the valve is totally decontaminated – harmful media may still be trapped in crevices.
- To remove the valve from the pipeline, extract the body bolts and slide the body out from between the ends. For standard end cap valves, it is in some cases unnecessary to remove the body completely away from the pipeline. Remove all but one of the body bolts, and with this remaining bolt loose, the body may be rotated out from the line using the remaining bolt as a hinge. However, this is not possible with flanged end caps.

Welding In-Line:

The following welding instructions are to protect the soft internal components of Chicago Valves with socket weld ends or butt weld ends. The installer shall be responsible for all welding procedures and qualifications.

Valves with PTFE, TFM®, RTFE, NOVA, or PEEK seats with PTFE body seals may be welded in line without disassembly following this procedure.

Welding Procedure:

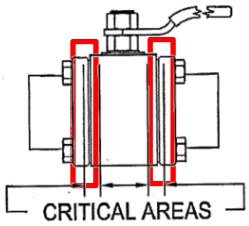
- Be sure the ends of the pipe that are to be welded are clean to the bare metal. Any contaminates in the weld area may cause porosity in the weld.
- Valve **MUST** be in the fully **OPEN** position for the entire welding process and remain **OPEN** until the valve and welds are cool to the touch
- Position the valve in your piping scheme, being sure you achieve the standard end gap from the end

of the pipe to the end of the valve.

- Tack weld the valve in place taking care to monitor the temperature in the critical areas (see warnings below).
- Immediately cool all portions of valve and pipe so the parts are cool to the touch. Non oily shop air or air convection can help accomplish this.
- Tightly wrap a damp cotton shop towel or cloth around the valve exposing only the ends needing welding and the handle.
- Alternate weld passes end to end allowing the valve and weld to cool between passes. Cool the valve and weld by using a damp cotton shop towel or cloth or by quenching with cool water until the entire valve and weld area is cool to the touch.
- Remove the cloth that is wrapped around the body of the valve.
- When the valve is cool, retighten the body bolts to the torque values in the table below.
- It is **HIGHLY** recommended that the valve be flushed out while still in the open position after welding prior to any operating to prevent accidental damage to the seats from debris.
- When possible, perform a final seat test before placing valve in service.

Warnings:

Temperatures in the critical areas around the seats and seals must not exceed 350°F, **it will damage the integrity of the soft seats and seals. Monitor with Tempilstik® or pyrometer.**



- **Valves with Delrin® or UHMWPE Seats MUST be disassembled for welding pipe ends in line.**
- **Valves that are disassembled must be reassembled using new body seals.**

Torque Requirements:

Body Bolting Torque Data

Size(F/P)	THREAD	Tightening Torque(lbf-in) Max
1/4",3/8",1/2"	5/16-20UNF	131
3/4"	3/8-24UNF	131
1"	3/8-24UNF	200
1-1/4"	1/2-20UNF	200
1-1/2", 2"	1/2-20UNF	478
2-1/2"	5/8-11UNC	478
3",4"	5/8-11UNC	1042

Packing Thin Nut on Stem Torque Data

Size(F/P)	THREAD	Tightening Torque(lbf-in) Max
1/4",3/8",1/2"	3/8-24UNF	58
3/4"	3/8-24UNF	58
1"	5/8-18UNF	58
1-1/4"	3/4-16UNF	217
1-1/2"	3/4-16UNF	217
2",2-1/2"	3/4-16UNF	340

Packing Gland Bolts Torque Data

Size(F/P)	THREAD	Tightening Torque(lbf-in) Max
3"	7/16-14UNC	340
4"	7/16-14UNC	378