

## ***OPERATIONS AND MAINTENANCE GUIDE***

### **FOR DUAL CHAMBER ORIFICE FITTINGS**

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An ISO 9001:2015 registered company

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# CONTENTS

Normal Operation .....	4
Key Operating Parts .....	5
Removing the Orifice Plate .....	6
Orifice Plate Inspection .....	13
Replacing the Orifice Plate .....	14
Greasing Procedure .....	21
Installation Preservation & Storage Requirements .....	22
Model Numbering System .....	23
Orifice Fitting Quick Inspection & Assessment .....	24
Scheduled Teardown Maintenance .....	25
Lifting and Handling .....	26

## WARNINGS



### **WARNING: PRESSURIZED UNIT.**

Ensure all operating staff are trained in the safe operation of this and all other pressurized equipment. **SAFETY FIRST.**



Orifice fittings and their components can present both heavy lifting and tip over hazards. Workers should wear suitable PPE at all times and have strategies in place for safely lifting, moving and storing orifice fittings and their components.



The soft seat valve seal design *does not* require lubrication through the grease port. Attempting to lubricate a Canalta DC Orifice fitting equipped with a soft seat slide valve will cause the inner O-ring seal to be ejected from the dovetail groove resulting in valve failure.

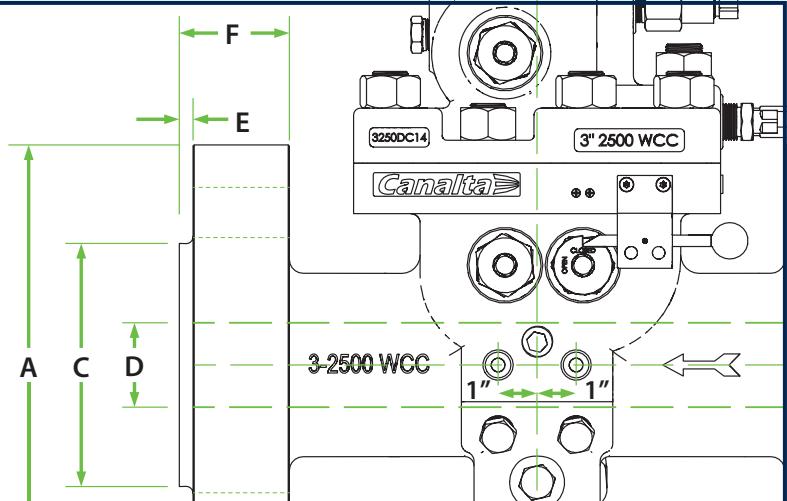
## CHANGE OF OWNERSHIP

By purchasing meters/meter runs from Canalta, a client would have entered into a binding contract. At the point of delivery/receiving of goods, the ownership of the purchased goods is then transferred to the client.

It is the responsibility of the client to ensure that any practices carried out after transfer of ownership are to be in compliance with manufacturing codes, standards and governing statutory legislation. Moreover, any activities need to be approved by the relevant Notified Bodies where applicable.

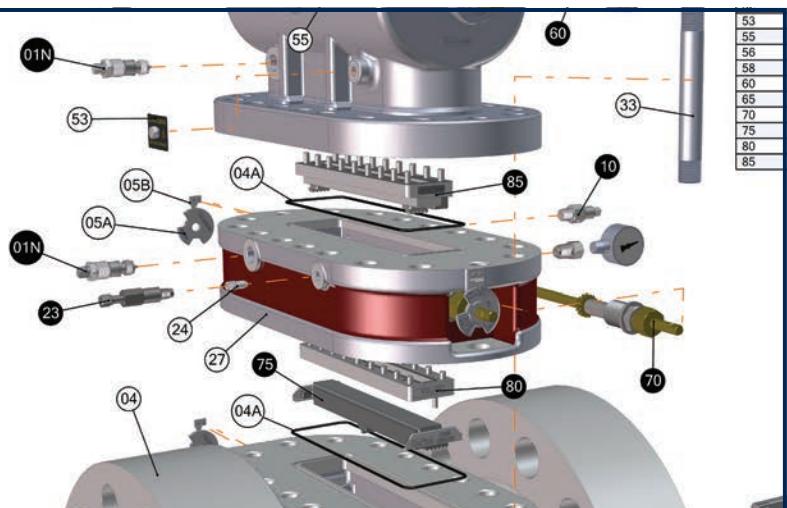
**Complete dimensions tables for all of our orifice fitting models are available by contacting your nearest Canalta Flow Measurement sales representative.**

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*Looking for general assembly diagrams? Contact your nearest Canalta Flow Measurement sales representative to get all of the technical documents you need.*

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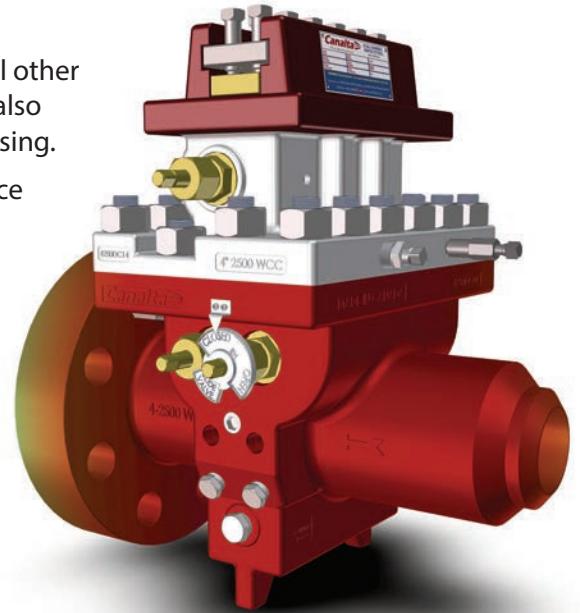
**Canalta supplies a complete lineup of quality orifice fitting replacement parts and accessories - many of them compatible with other industry leading brands.**

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## GENERAL OPERATING NOTES

- It is the responsibility of the end user to ensure all operating staff are competent and properly trained in the operation of this and all other pressurized equipment. The following operating instructions are also given on the operating plate attached to each flow meter top housing.
- It is the responsibility of the end user to assess the expected surface temperature of the unit while in service, and to take the necessary precautions to avoid operator injury.
- It is the responsibility of the end user to account for all vented process fluids, and to develop the necessary procedures to avoid operator injury and environmental damage.



## NORMAL OPERATION

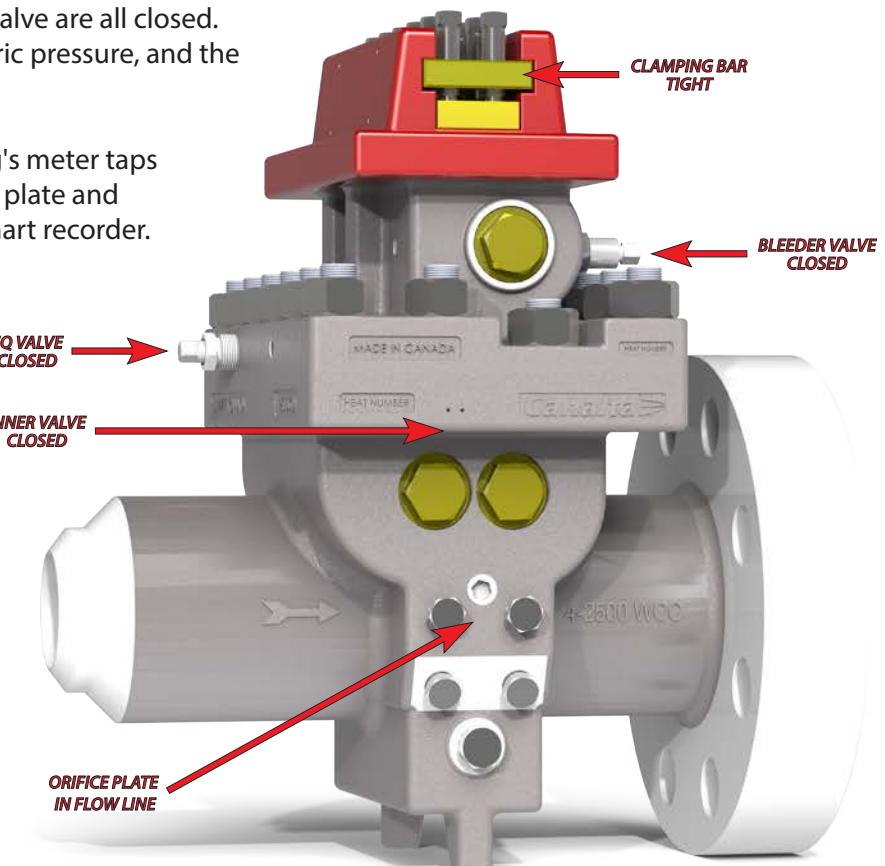
The Canalta Dual Chamber Orifice Fitting allows for accurate placement of an orifice plate in the flow line, along with easy removal and replacement, without interrupting the flow or dismantling the pipeline. Flow of the gas or liquid through the orifice plate creates the differential pressure which is measured and used for the calculation of the flow rate through the pipeline.

The unit is in normal metering status when the plate carrier and orifice plate are in the lower chamber, concentric to the flow line, and the inner slide valve, equalizer valve and bleeder valve are all closed. The upper chamber of the unit is at atmospheric pressure, and the clamping bar at the top of the unit is tight.

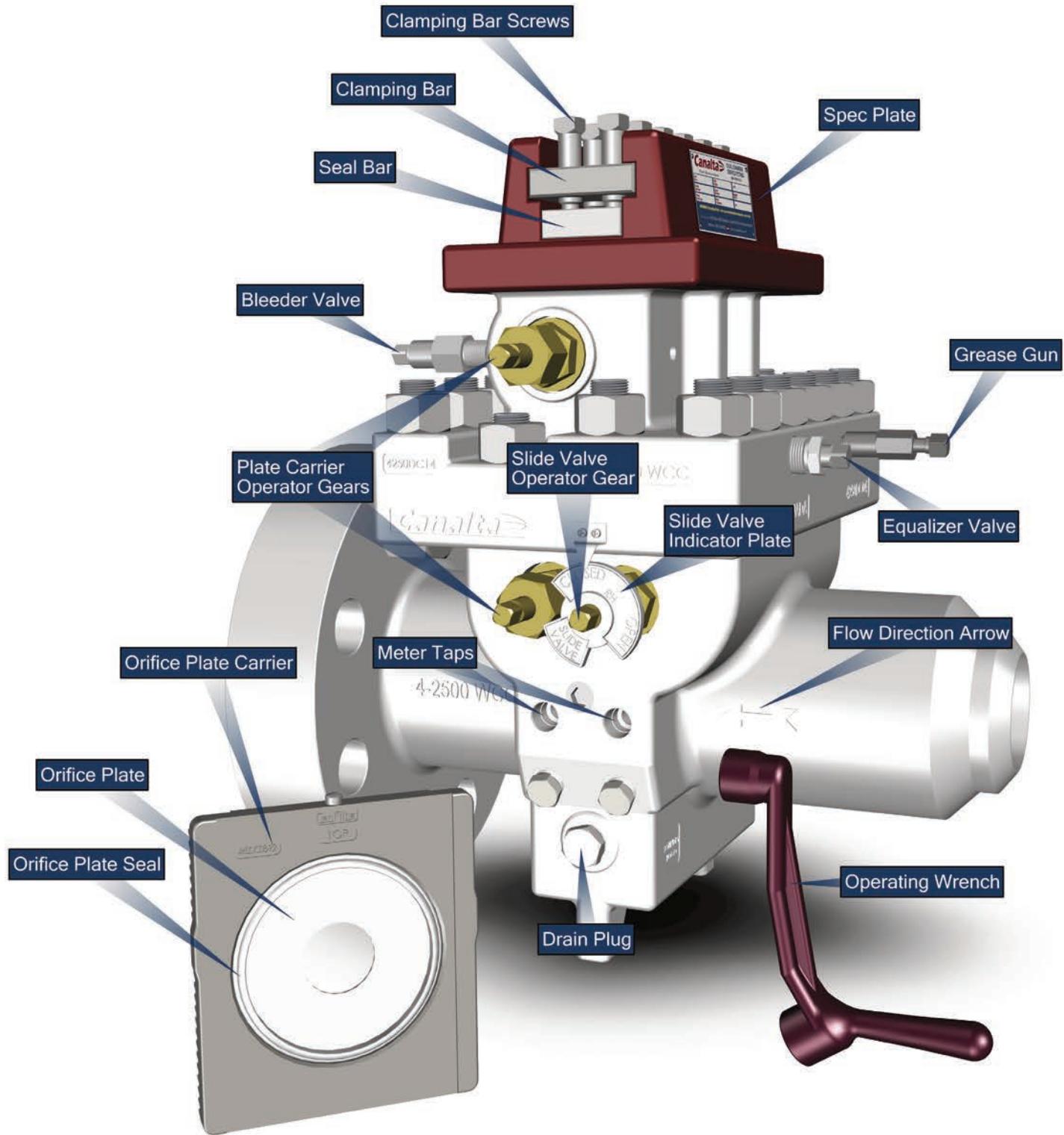
Pressure sensors installed in the lower housing's meter taps read the differential pressure across the orifice plate and transmit the readings to a flow computer or chart recorder.

Orifice plate condition is critical to accurate metering. The orifice plate must be removed and inspected for damage, general wear and particulate build-up regularly. Prior to beginning the orifice plate removal procedure, the operator must confirm that the clamping bar is tight and that the bleeder valve is fully closed.

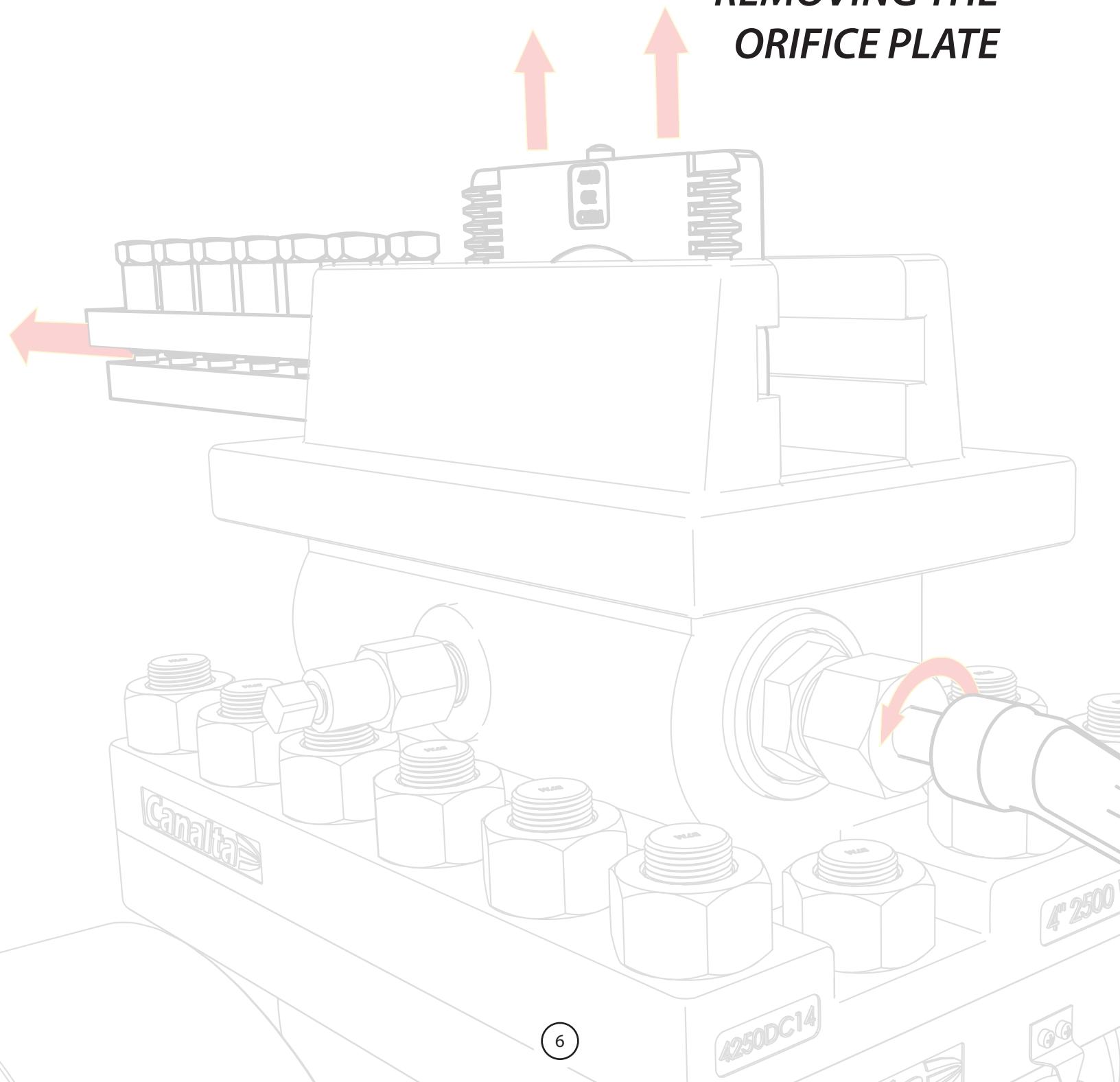
*During normal operation, only the lower chamber is pressurized. Atmospheric pressure in the upper chamber is necessary for proper functioning of the inner slide valve.*



## KEY OPERATING PARTS AT A GLANCE

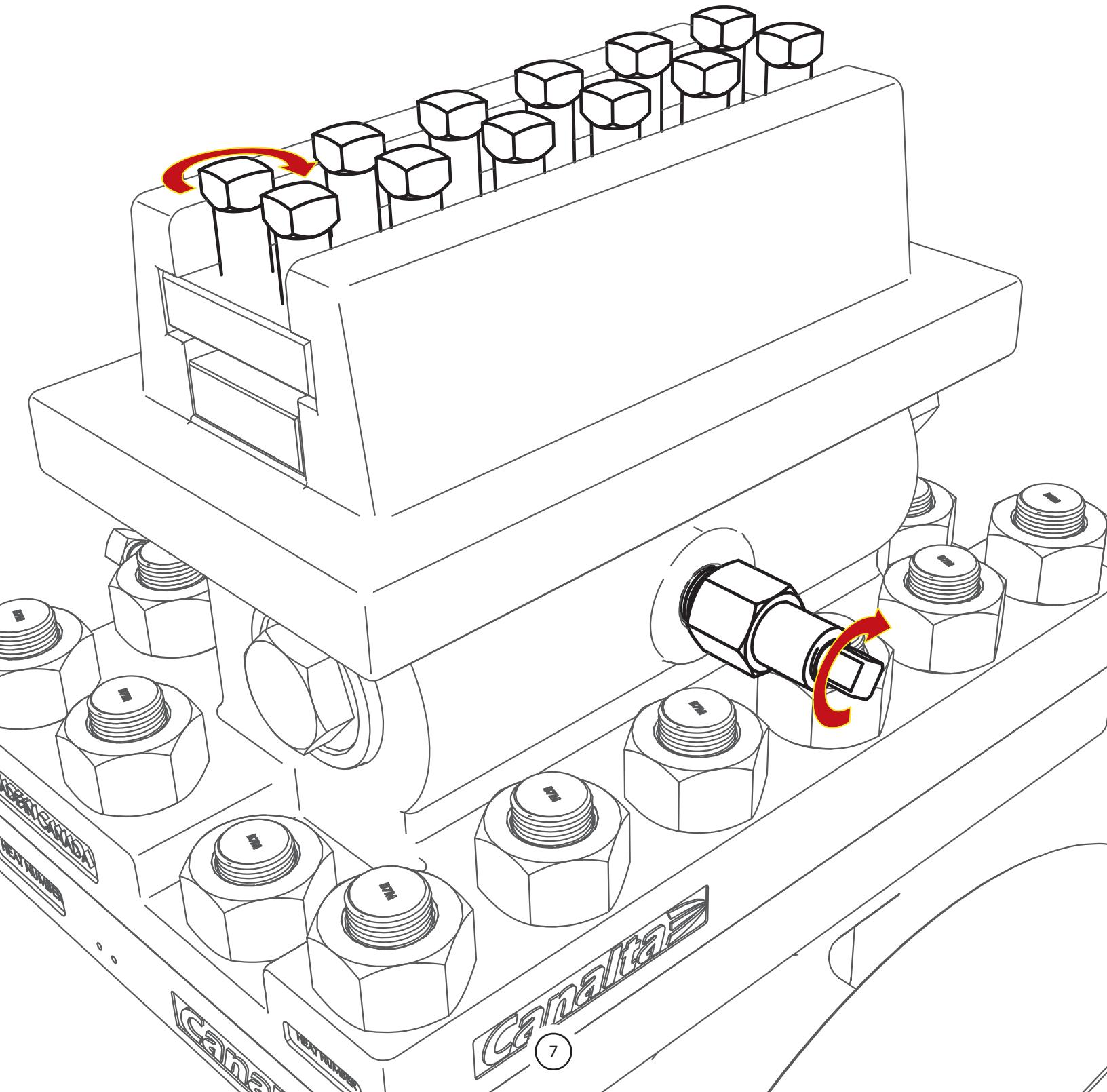


## **REMOVING THE ORIFICE PLATE**

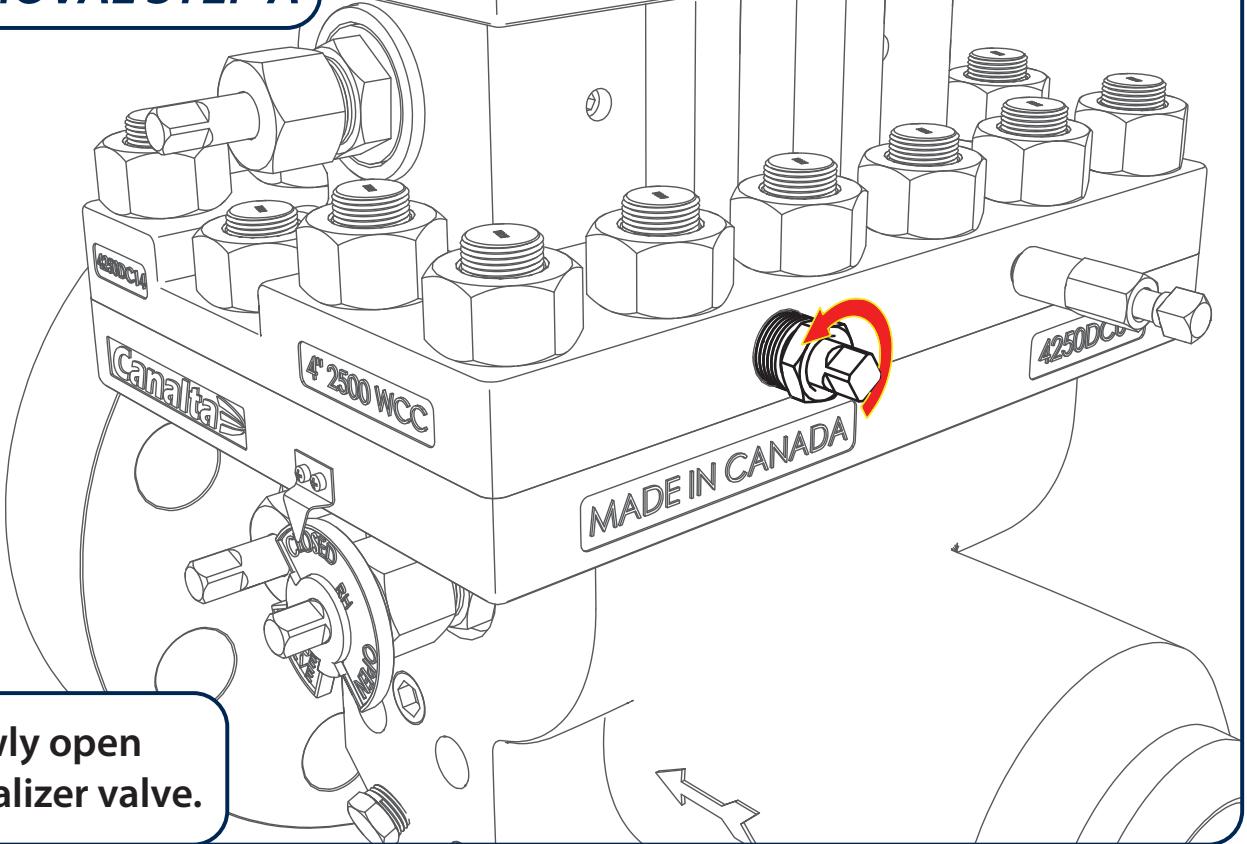




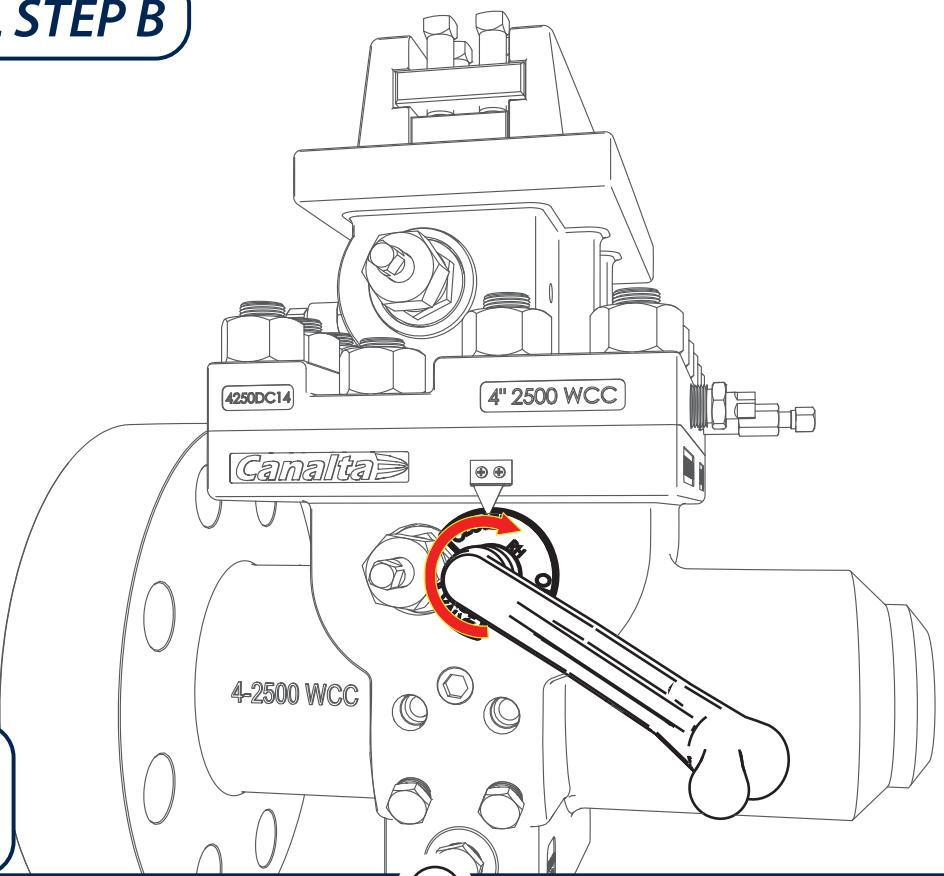
Ensure the bleeder valve is closed and clamping bar tight before beginning.



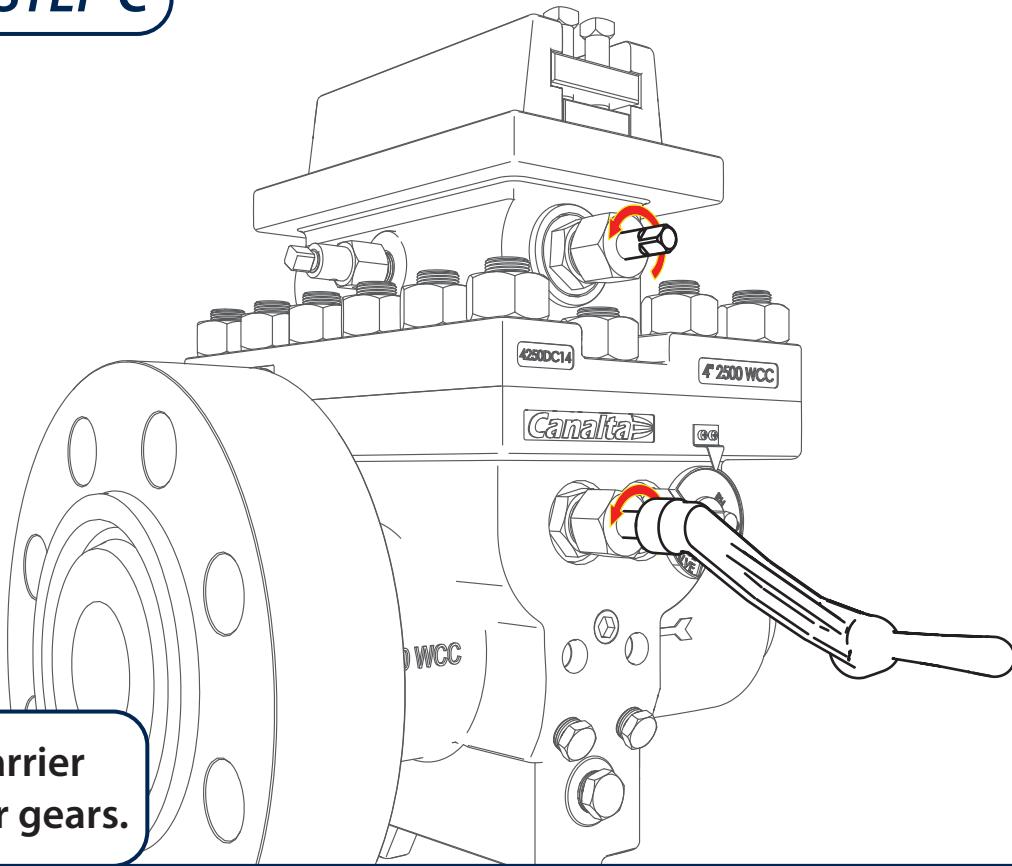
## REMOVAL STEP A



## REMOVAL STEP B



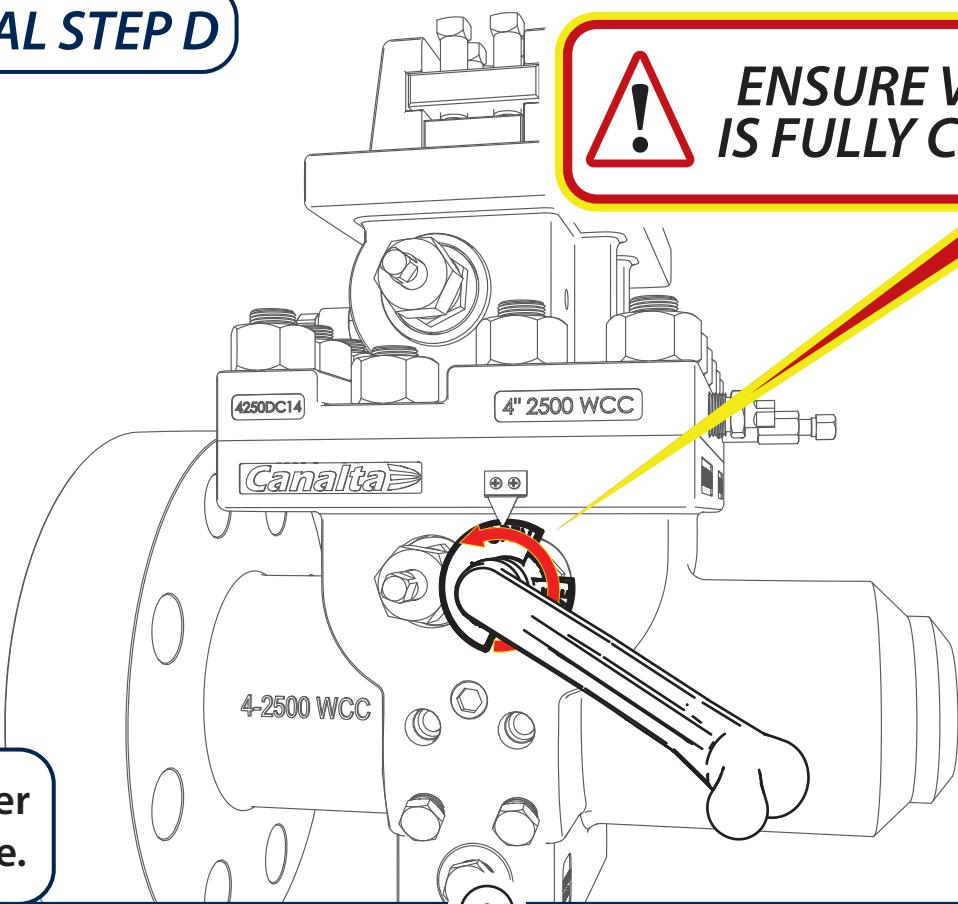
## REMOVAL STEP C



## REMOVAL STEP D



**ENSURE VALVE  
IS FULLY CLOSED**

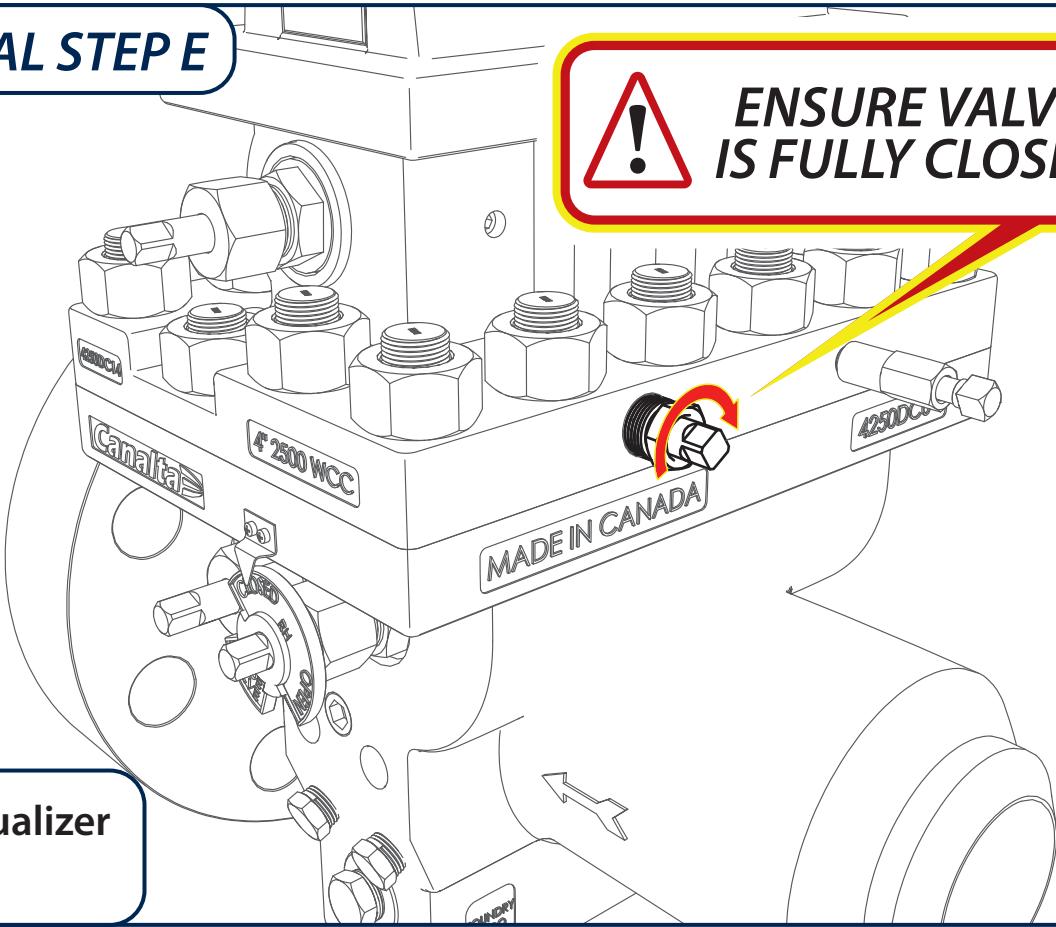


## REMOVAL STEP E



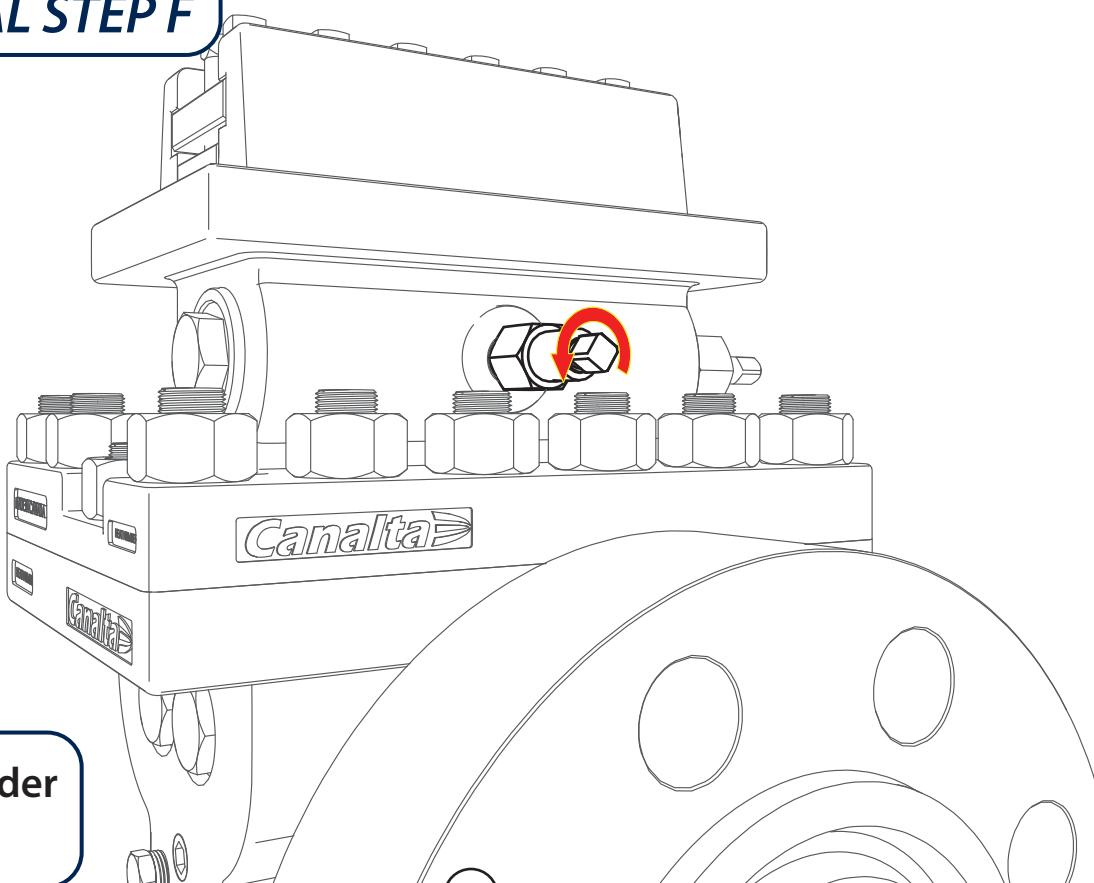
**ENSURE VALVE  
IS FULLY CLOSED**

Close equalizer  
valve.

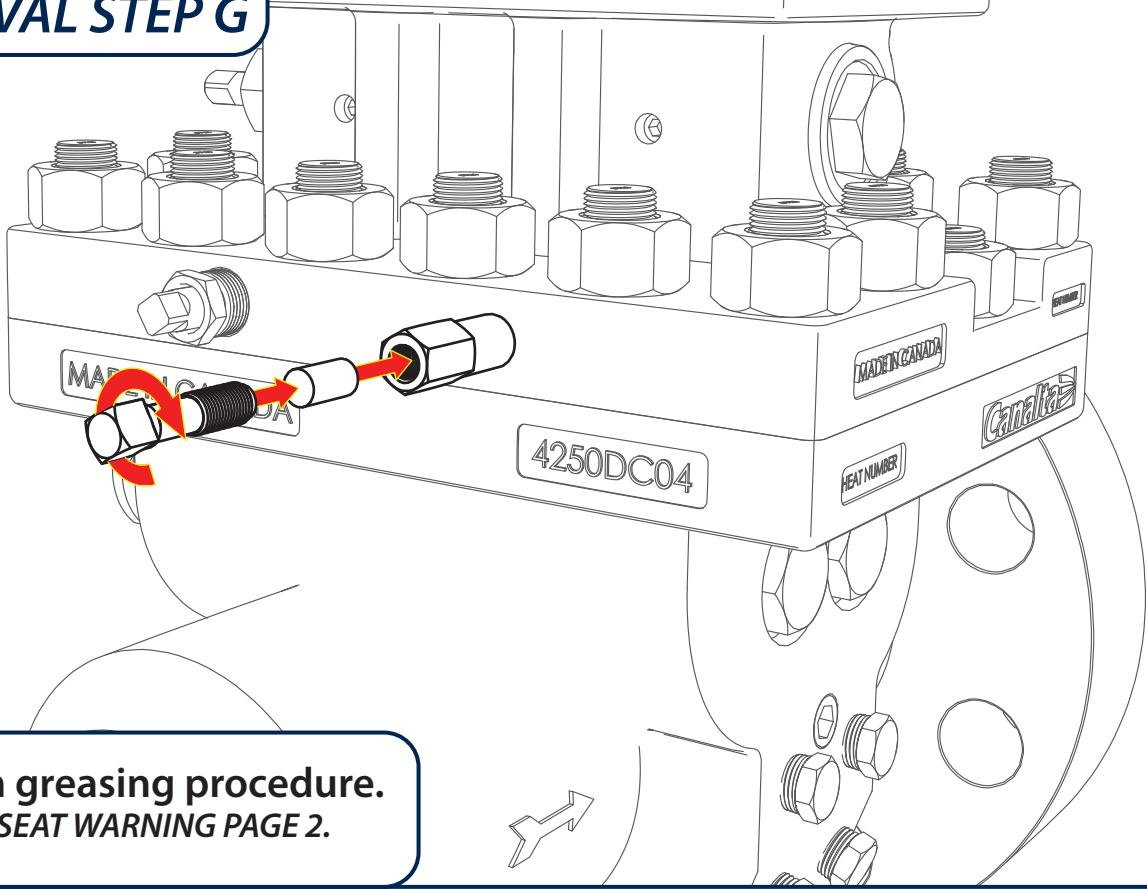


## REMOVAL STEP F

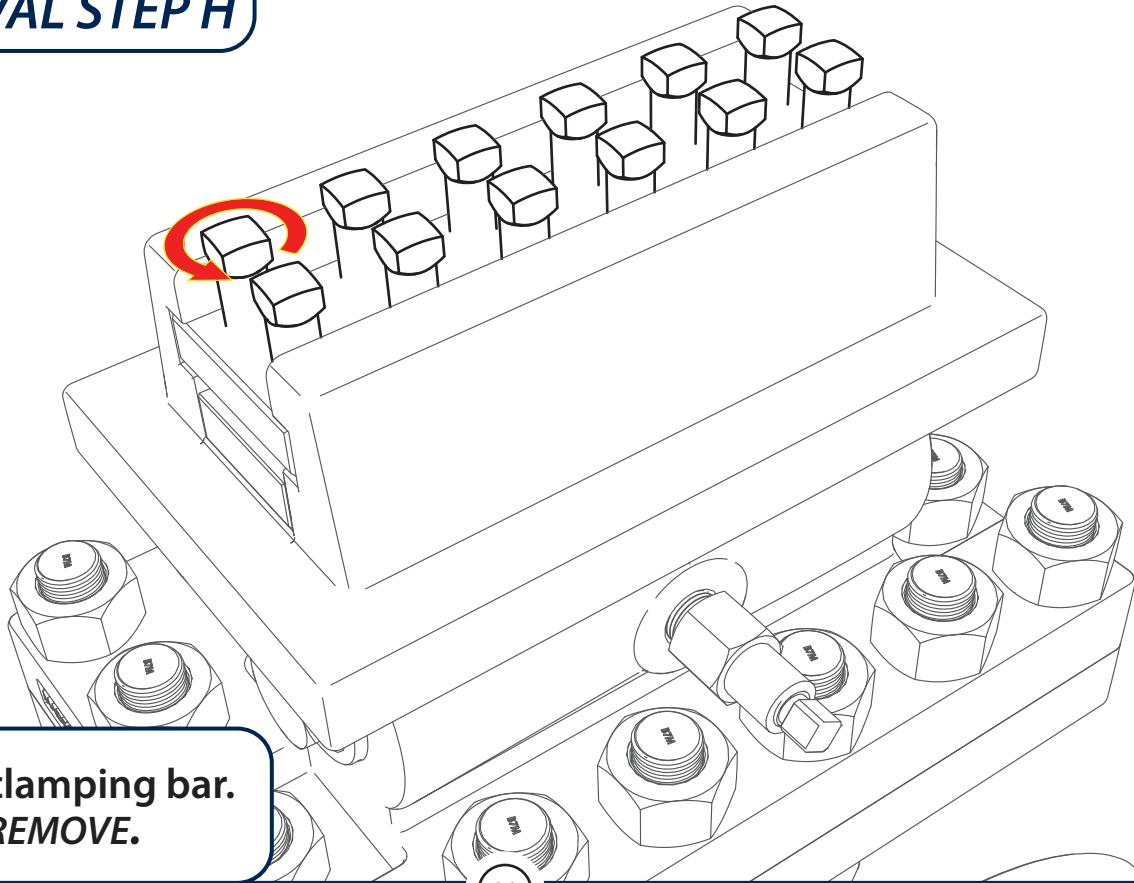
Open bleeder  
valve.



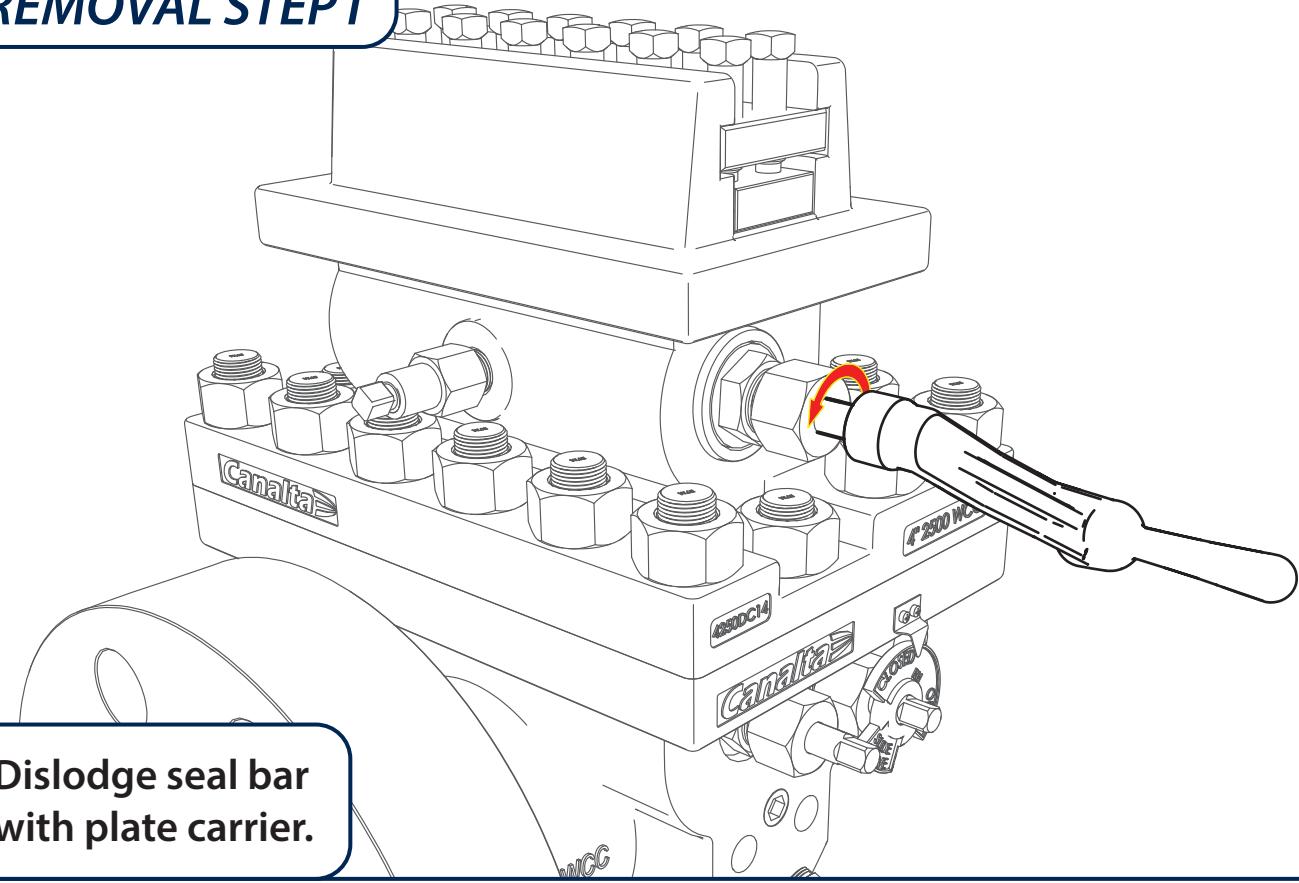
## REMOVAL STEP G



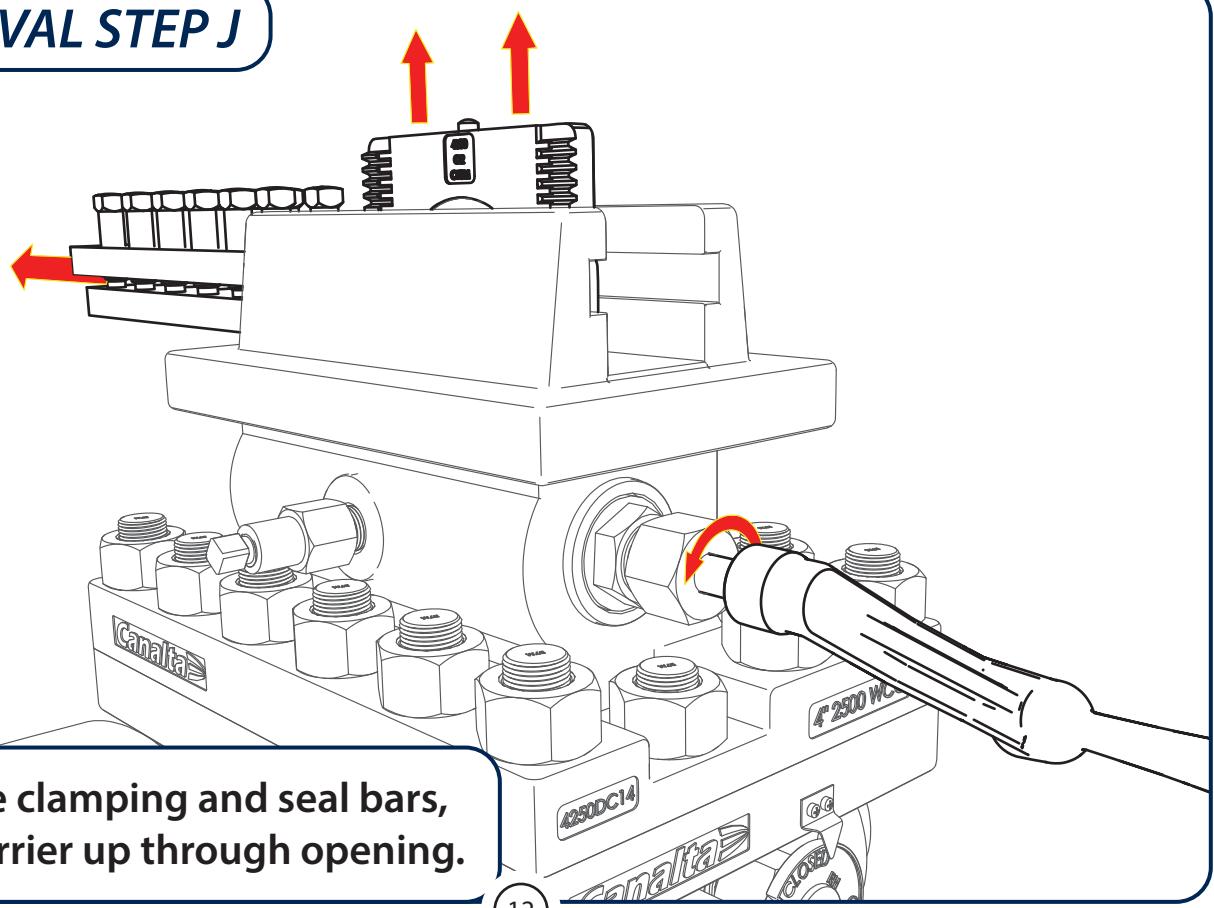
## REMOVAL STEP H



## REMOVAL STEP I



## REMOVAL STEP J

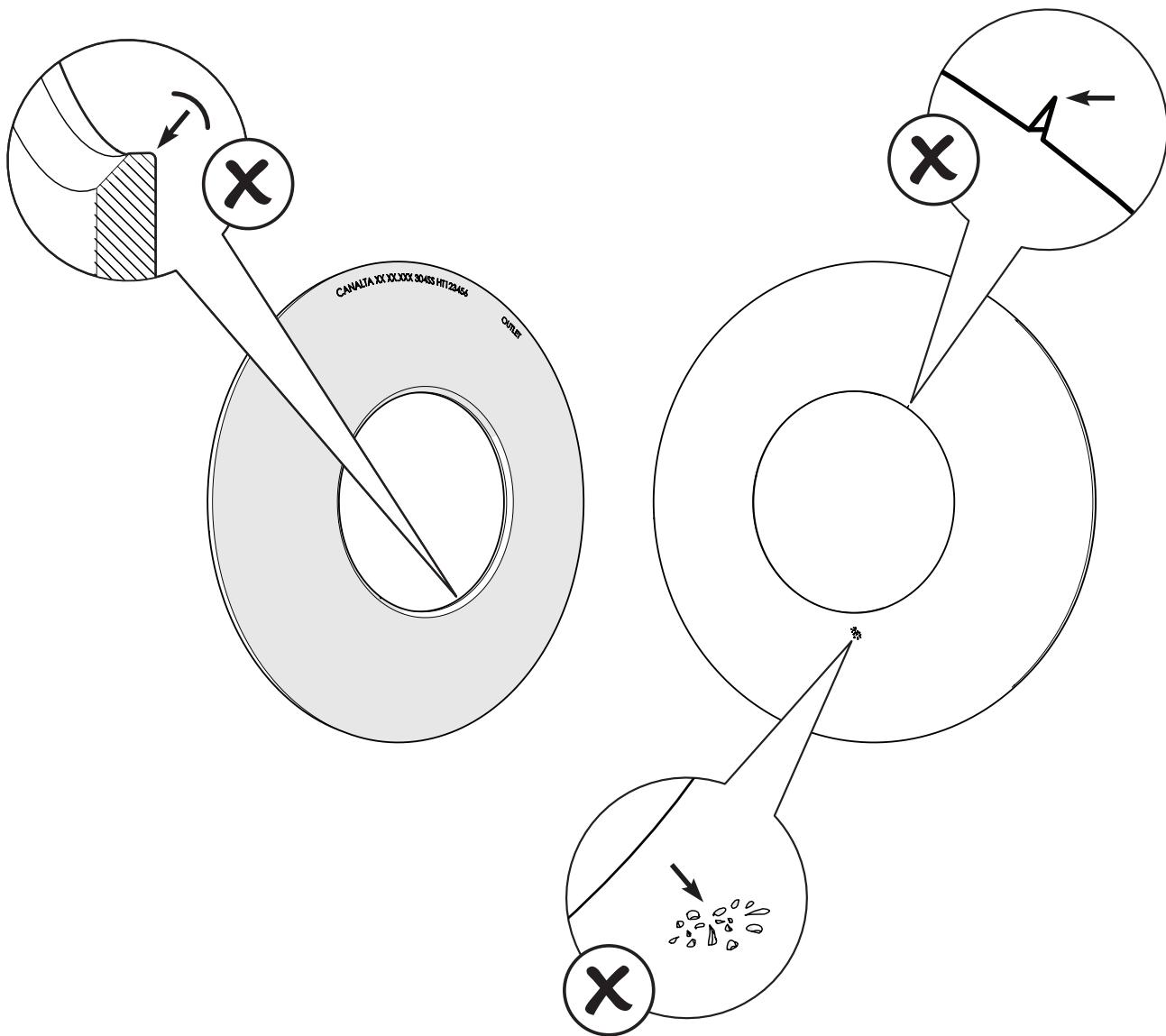


## ORIFICE PLATE INSPECTION

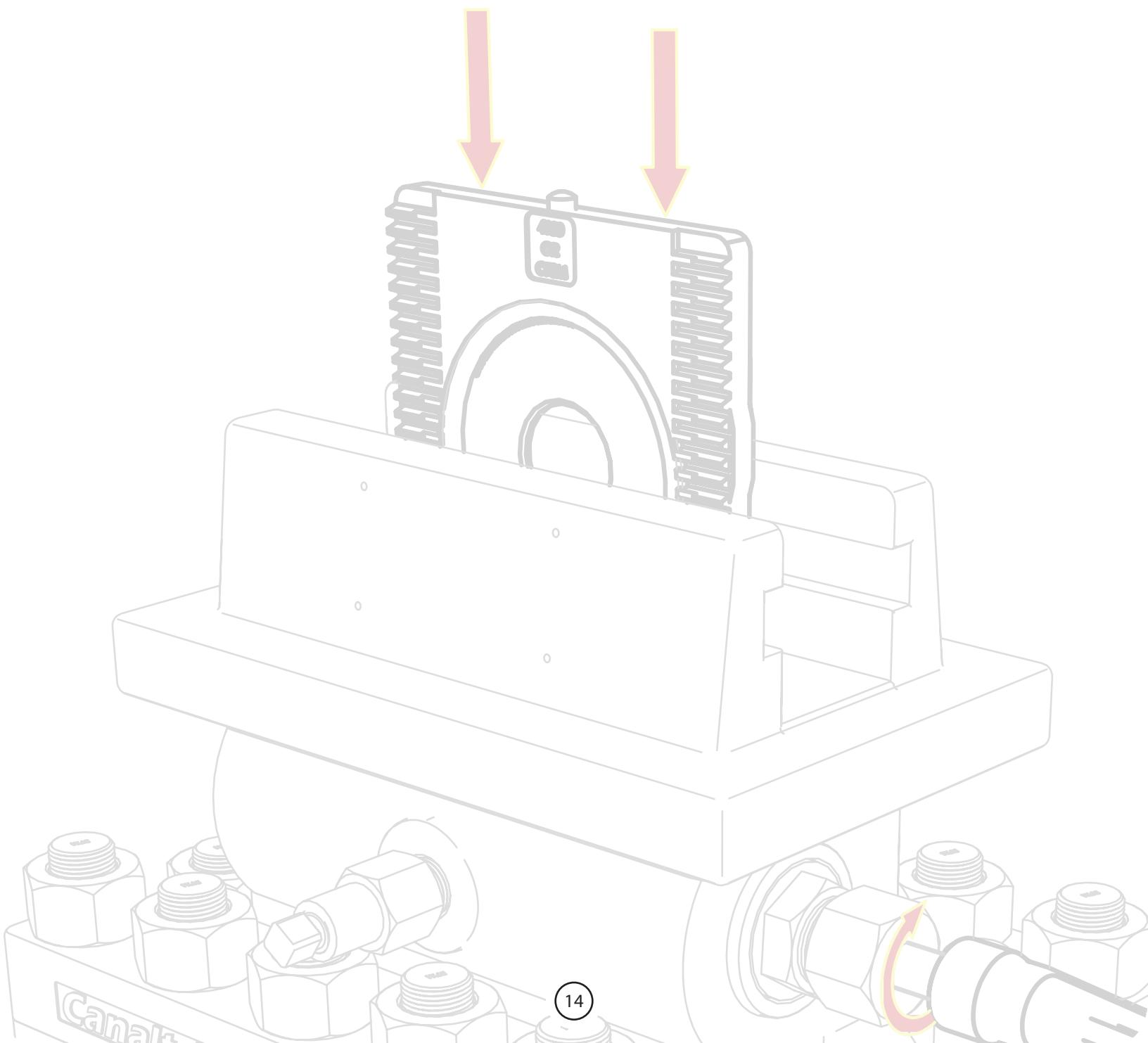
Regular orifice plate inspections are crucial to measurement accuracy. Canalta recommends that the orifice plate be removed from the flow line and inspected at least monthly. AGA-3 / API 14.3 sections 2.4.1 and 2.4.2 outline orifice plate parameters that can be affected by service conditions. Damage, excessive wear and build-up can lead to a reduction in flow meter accuracy.

Pay particular attention to dirt, grease or ice accumulation, pitting due to corrosion, nicks, dings and other impact damage, as well as general wear and erosion of the normally sharp bore edges. Replace the orifice plate as necessary.

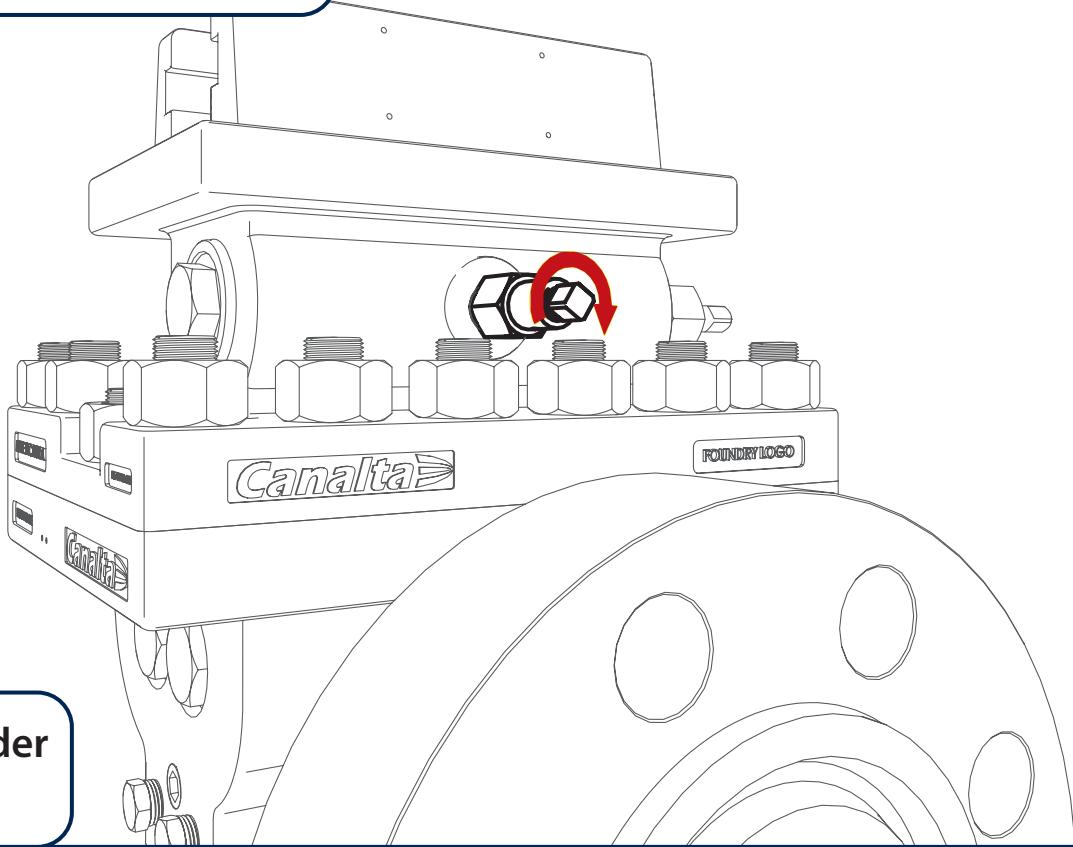
Orifice plate seals should also be inspected to reduce the possibility of bypass. Pay attention to dirt or grease accumulation, cracks, tears or cuts and swelling. Replace seals as necessary.



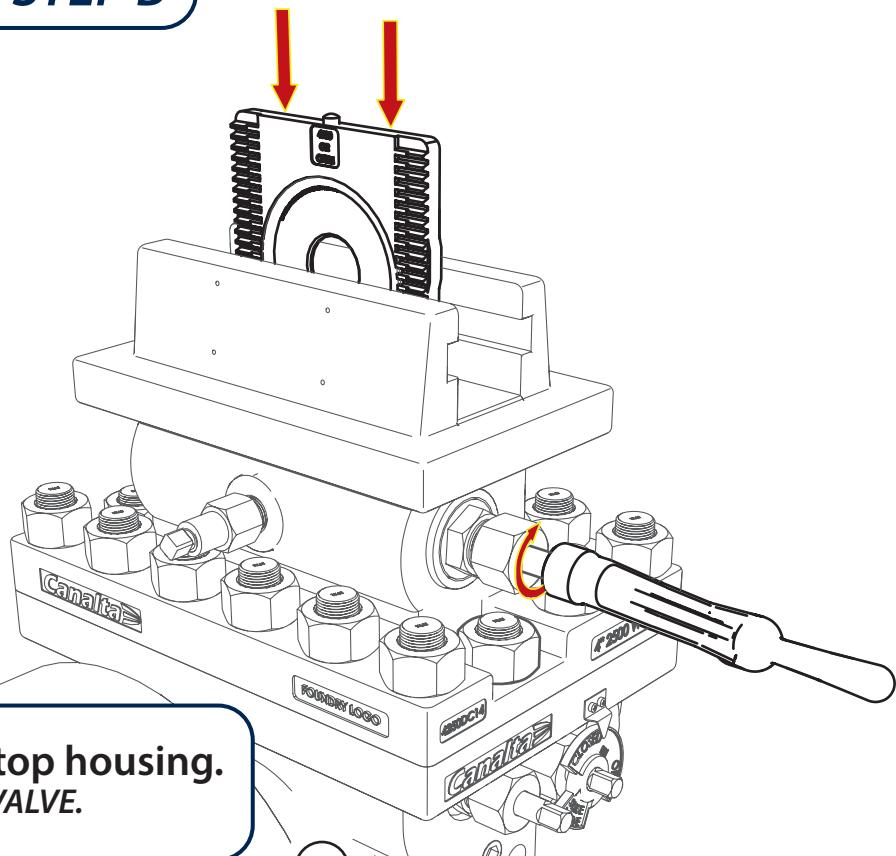
## ***REPLACING THE ORIFICE PLATE***



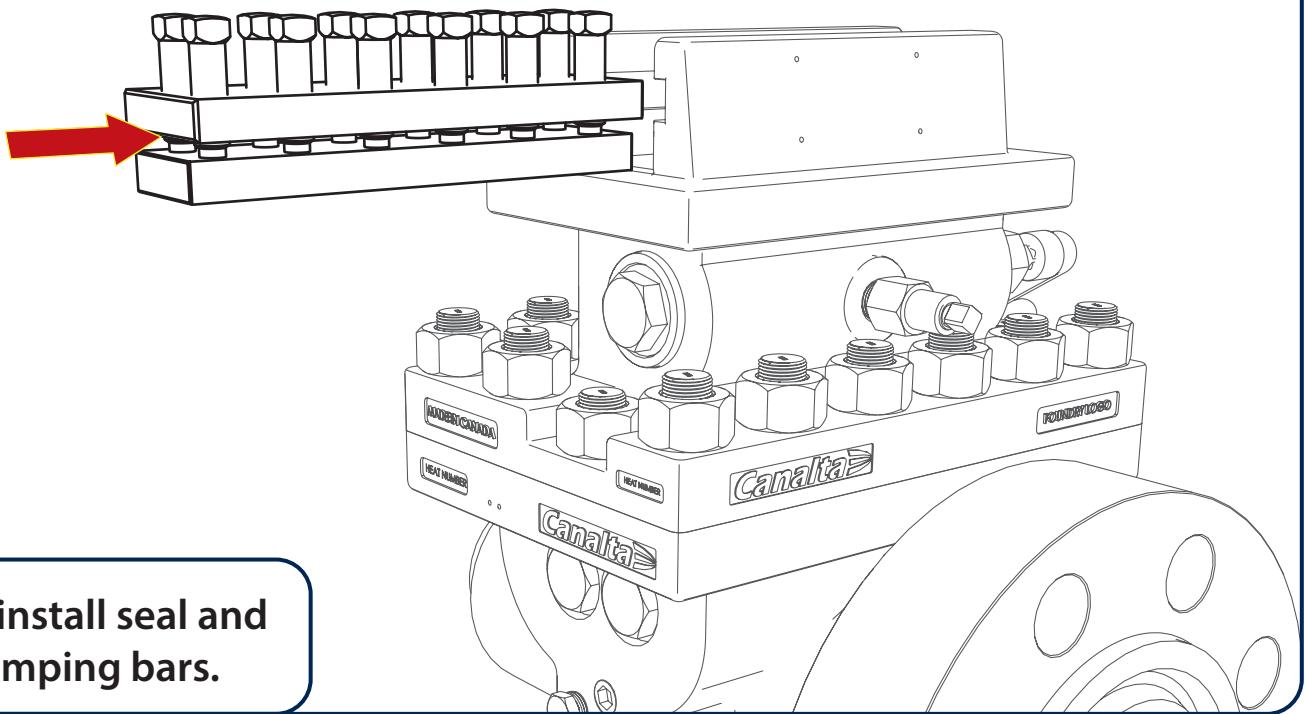
## REPLACEMENT STEP A



## REPLACEMENT STEP B

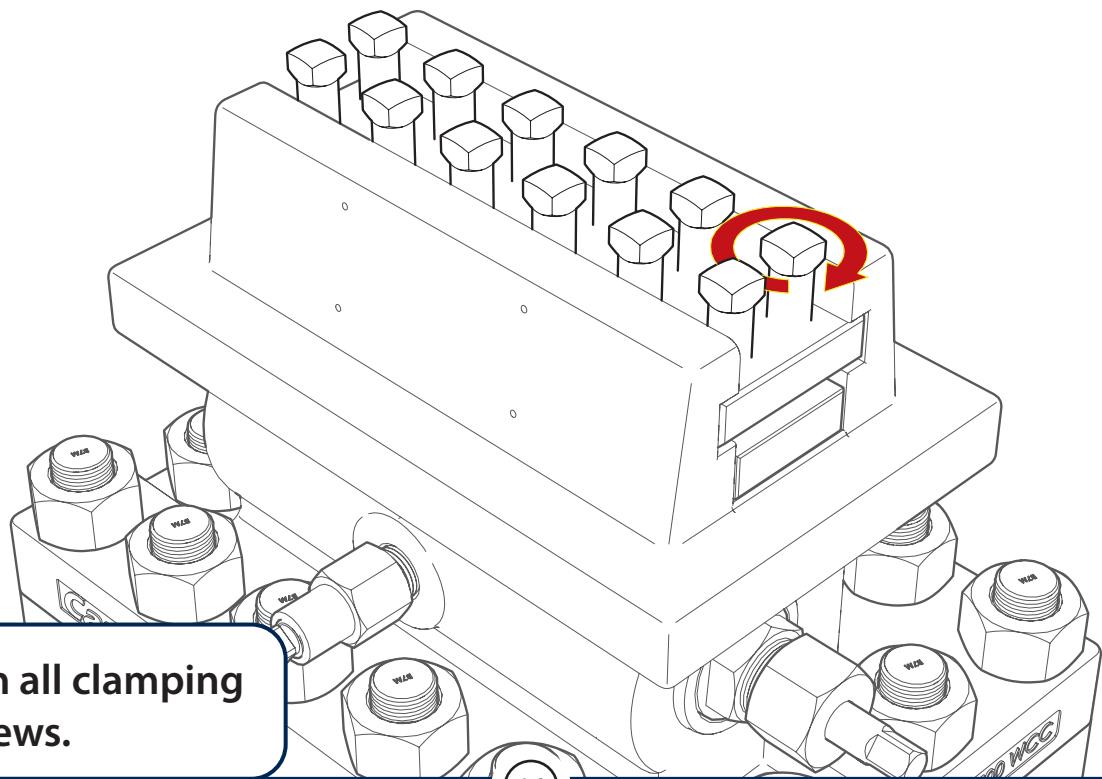


## REPLACEMENT STEP C



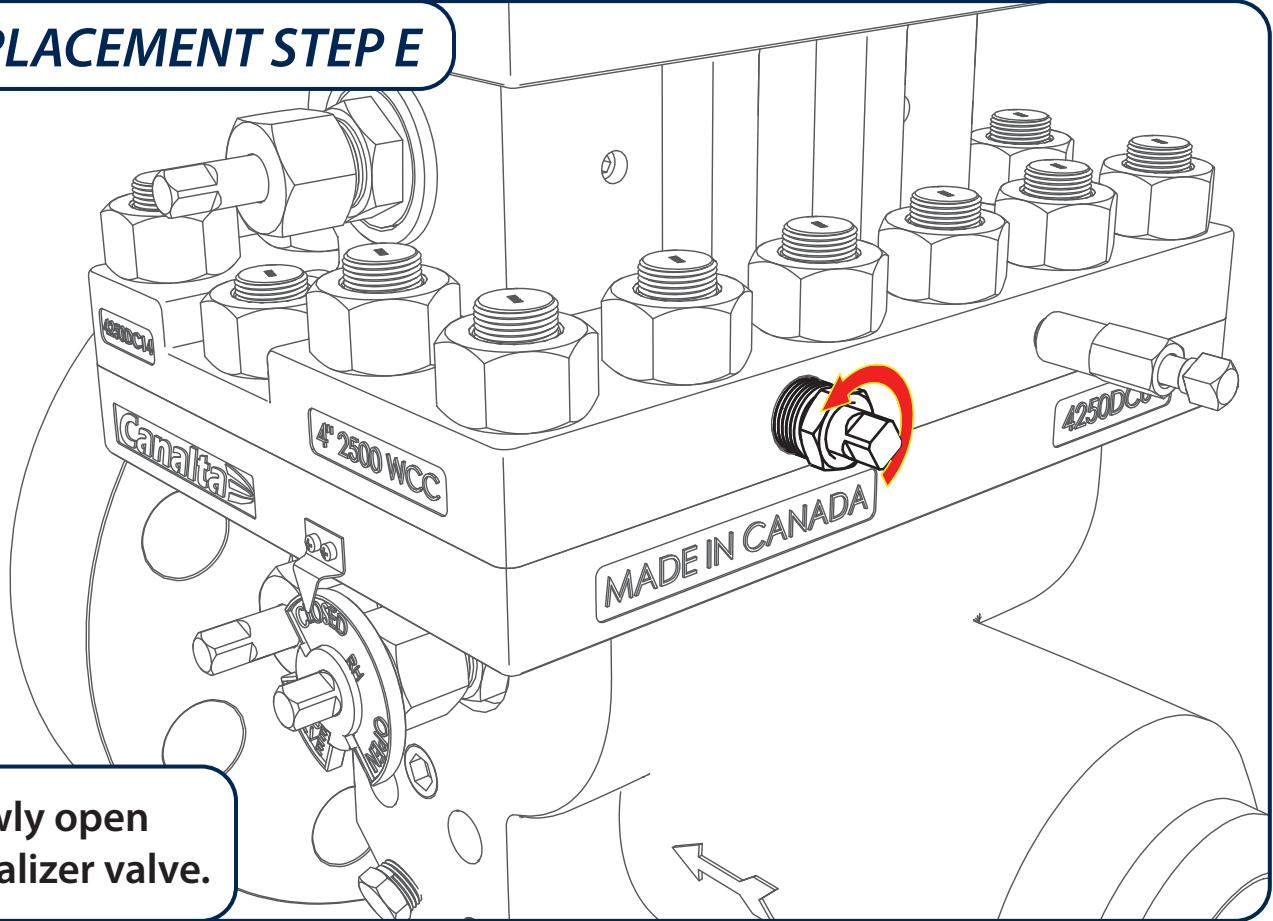
Reinstall seal and clamping bars.

## REPLACEMENT STEP D

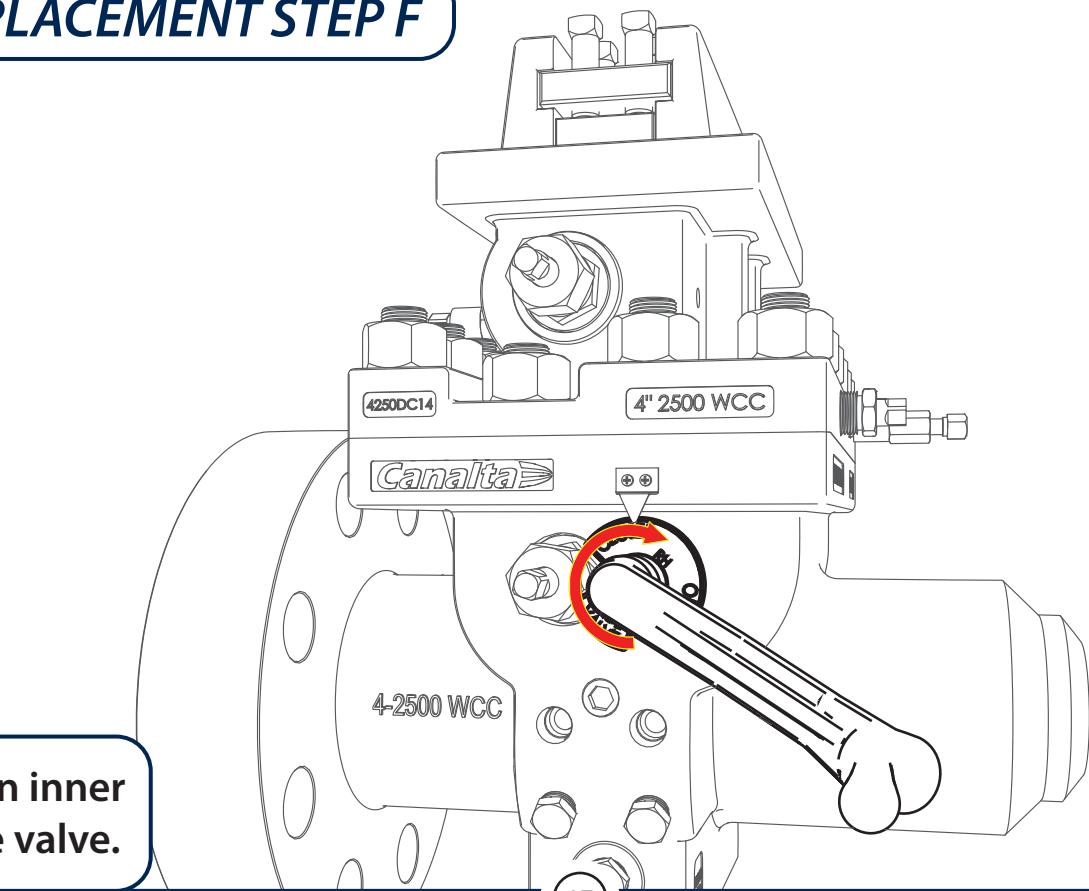


Tighten all clamping bar screws.

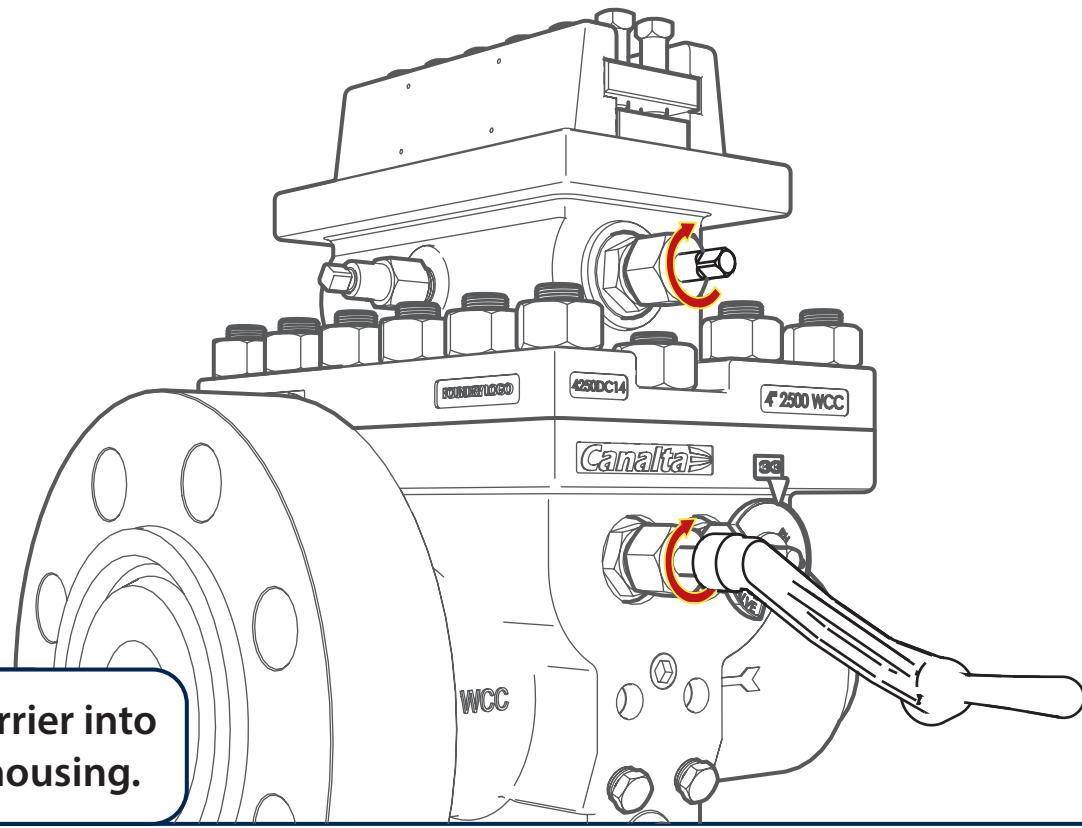
## REPLACEMENT STEP E



## REPLACEMENT STEP F

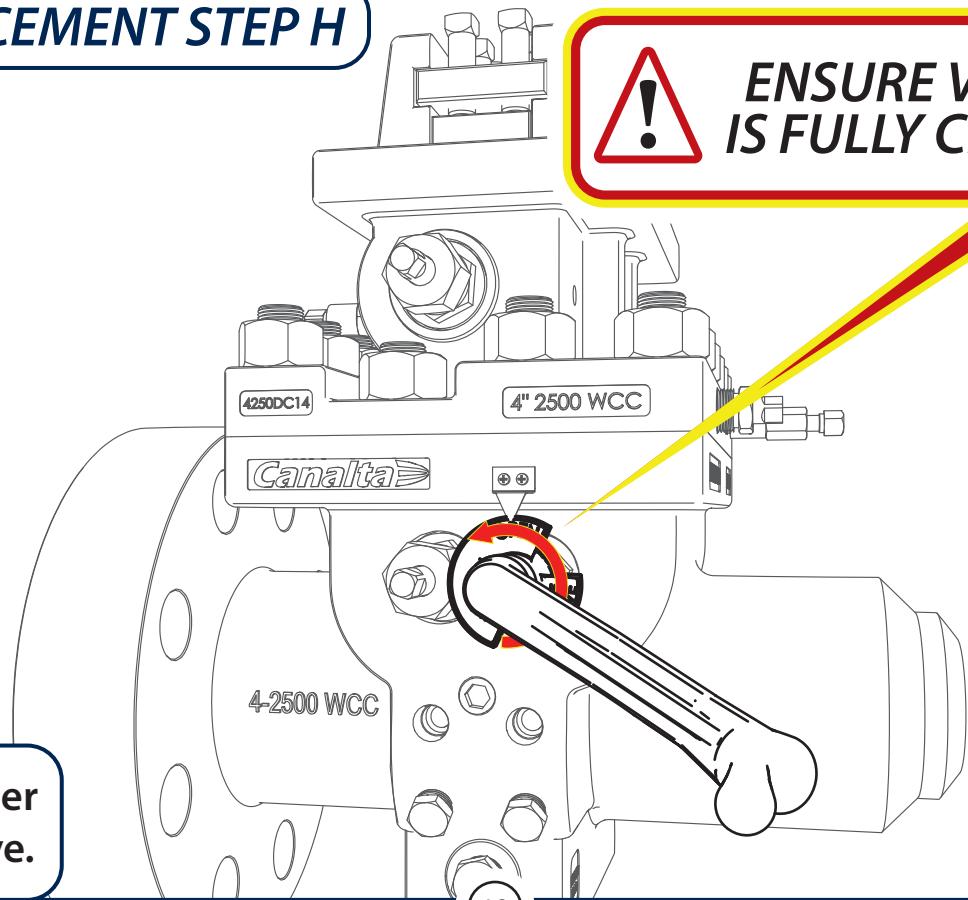


## REPLACEMENT STEP G



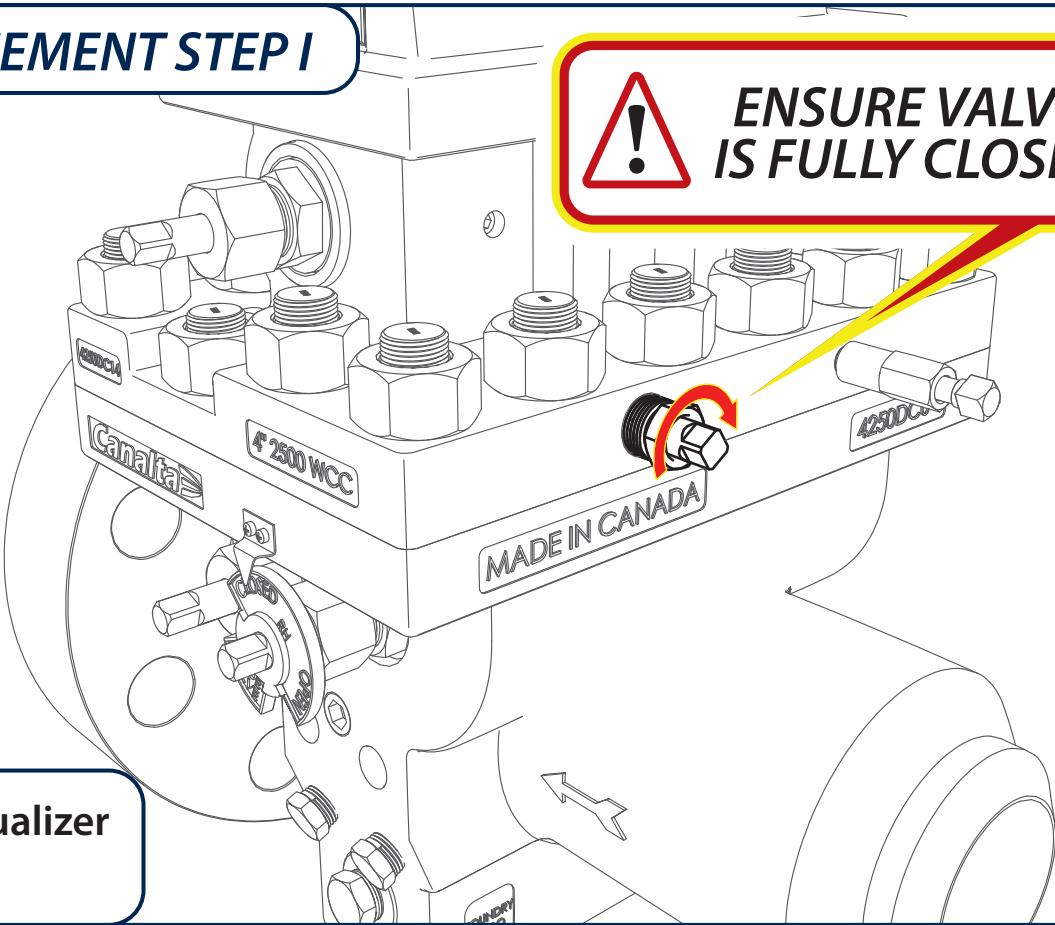
## REPLACEMENT STEP H

**ENSURE VALVE IS FULLY CLOSED**

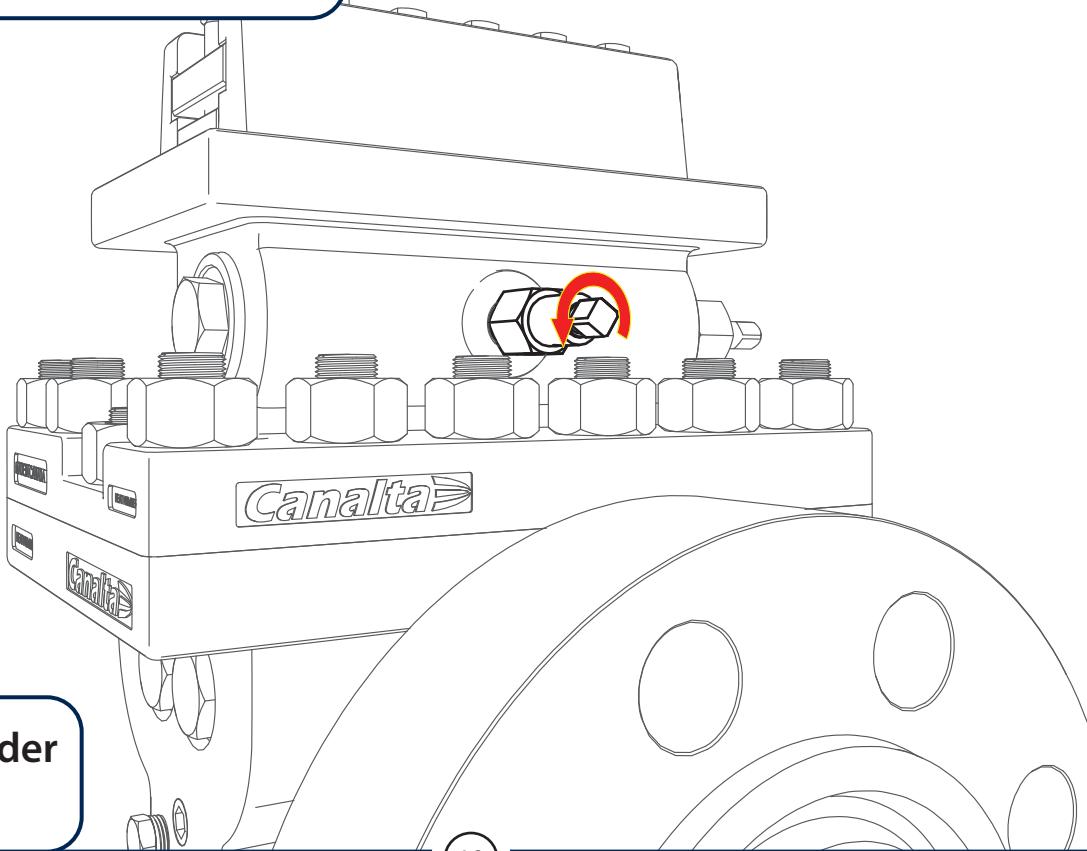


## REPLACEMENT STEP I

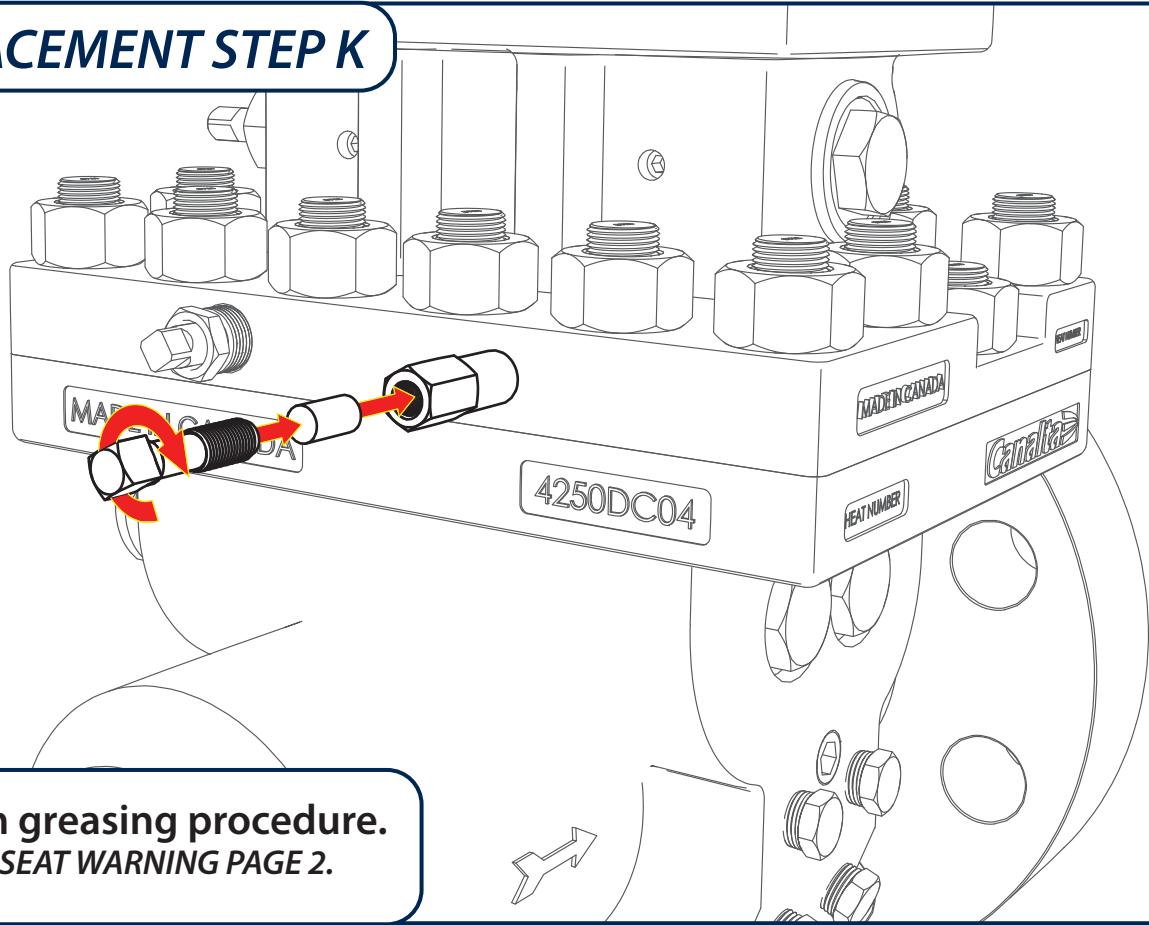
**ENSURE VALVE  
IS FULLY CLOSED**



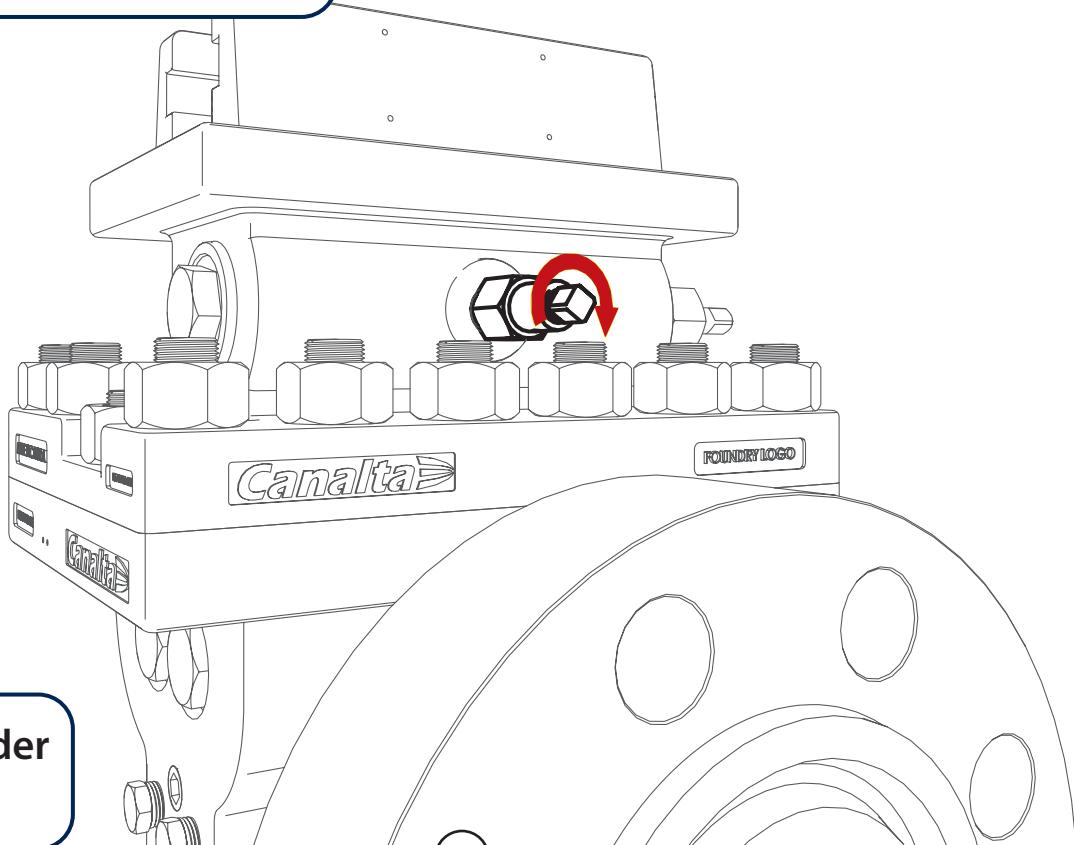
## REPLACEMENT STEP J



## REPLACEMENT STEP K



## REPLACEMENT STEP L

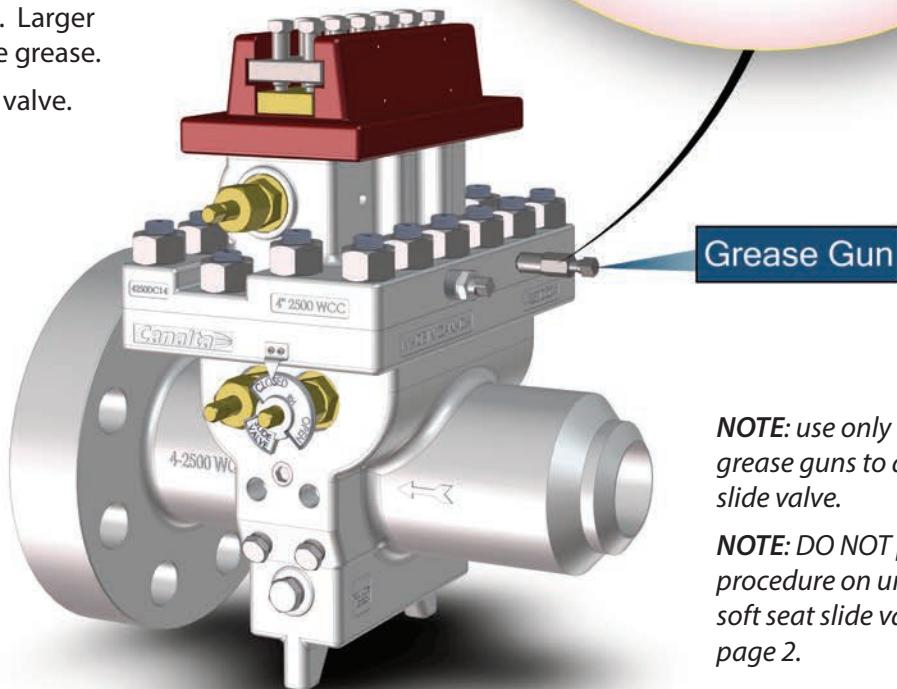
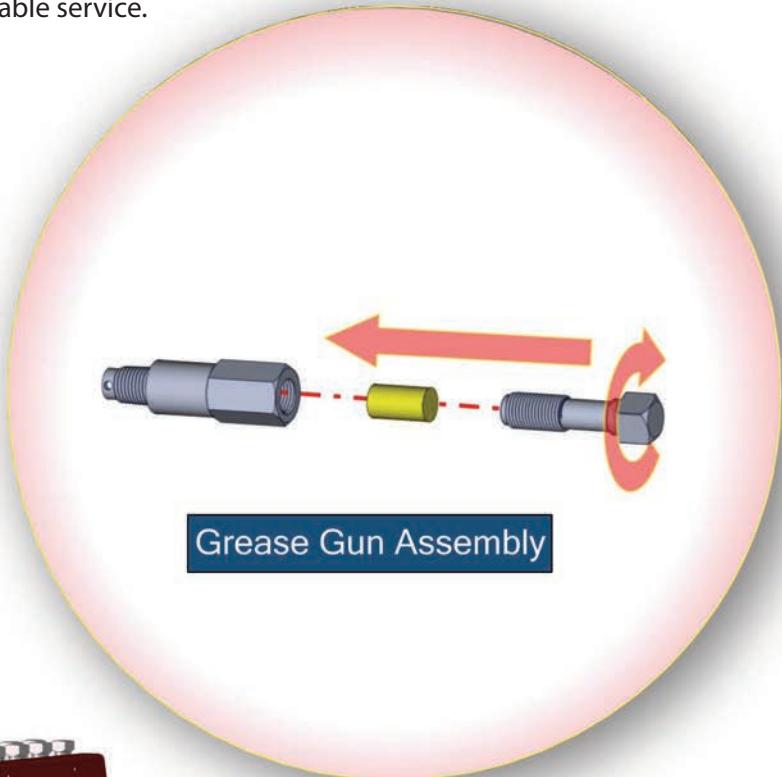


Close bleeder  
valve.

## **GREASING PROCEDURE**

The metal-to-metal grease seal design requires lubrication on a regular basis. For the procedure to be successful, a pressure differential across the slide valve being serviced is required, with the chamber immediately below the valve having a higher pressure and forcing the valve strip up against the seat. The double ball grease check valve prevents process pressure from coming through the grease port. For best results, use only valve seal grease supplied by Canalta and recommended for the applicable service.

1. Ensure that the inner slide valve and equalizer valve are fully closed, and that the upper chamber is de-pressurized.
2. Open the bleeder valve and allow the top chamber to de-pressurize. A pressure differential now exists between the lower and upper chambers, and the slide valve is ready to be greased.
3. Remove the threaded stem from the grease gun assembly. Insert one stick of grease.
4. Replace the grease gun stem and turn in slowly so as not to rupture the grease channel seal.
5. Repeat steps 3 and 4 if additional grease is required. Larger units require more grease.
6. Close the bleeder valve.



**NOTE:** use only Canalta supplied grease guns to apply grease to the slide valve.

**NOTE:** DO NOT perform greasing procedure on units equipped with soft seat slide valves. See warning page 2.

## **INSTALLATION RECOMMENDATIONS**

The DC Dual Chamber Orifice Fitting is typically installed in conjunction with upstream and downstream meter run sections (tubes). This is essential to meet the recommendations of both AGA Report 3 and ISO 5167. To obtain the best measurement results, follow the recommended piping configurations and installation requirements of either of these two standards, as well as the recommendations below.

1. Always ensure that operating staff are competent and properly trained to operate this and all other pressurized equipment.
2. When installing the fitting or meter run, ensure that the flow arrow on the outer surface of the fitting corresponds to the direction of flow in the line.
3. Attention to clearances is essential. Users should refer to the appropriate Weights and Dimensions brochure and any order specific General Arrangement drawings for details. Ensure there is operating clearance above the top of the fitting for removal of the plate carrier. For 8" - 30" DC Dual Chamber Orifice Fitting models, additional clearance at the sides of the fitting is necessary for pinion gear rotation and operating wrench removal.
4. When used to measure wet gas, the vertical mount is recommended to prevent dam formation against the orifice plate.
5. Instrument tap lines should be installed sloping upwards to the differential pressure measurement instrument. Where this cannot be accomplished, use seal pots to chemically seal the sensing lines eliminate hydrostatic head errors.
6. To avoid damage to the orifice plate, ensure that the orifice plate and plate carrier are removed from the fitting prior to pressure testing the system.
7. Before inserting the orifice plate and plate carrier into the fitting, always ensure that the lower cavity of the fitting is free of debris. If debris has accumulated, remove the lower drain plugs and rod-clean the lower section.

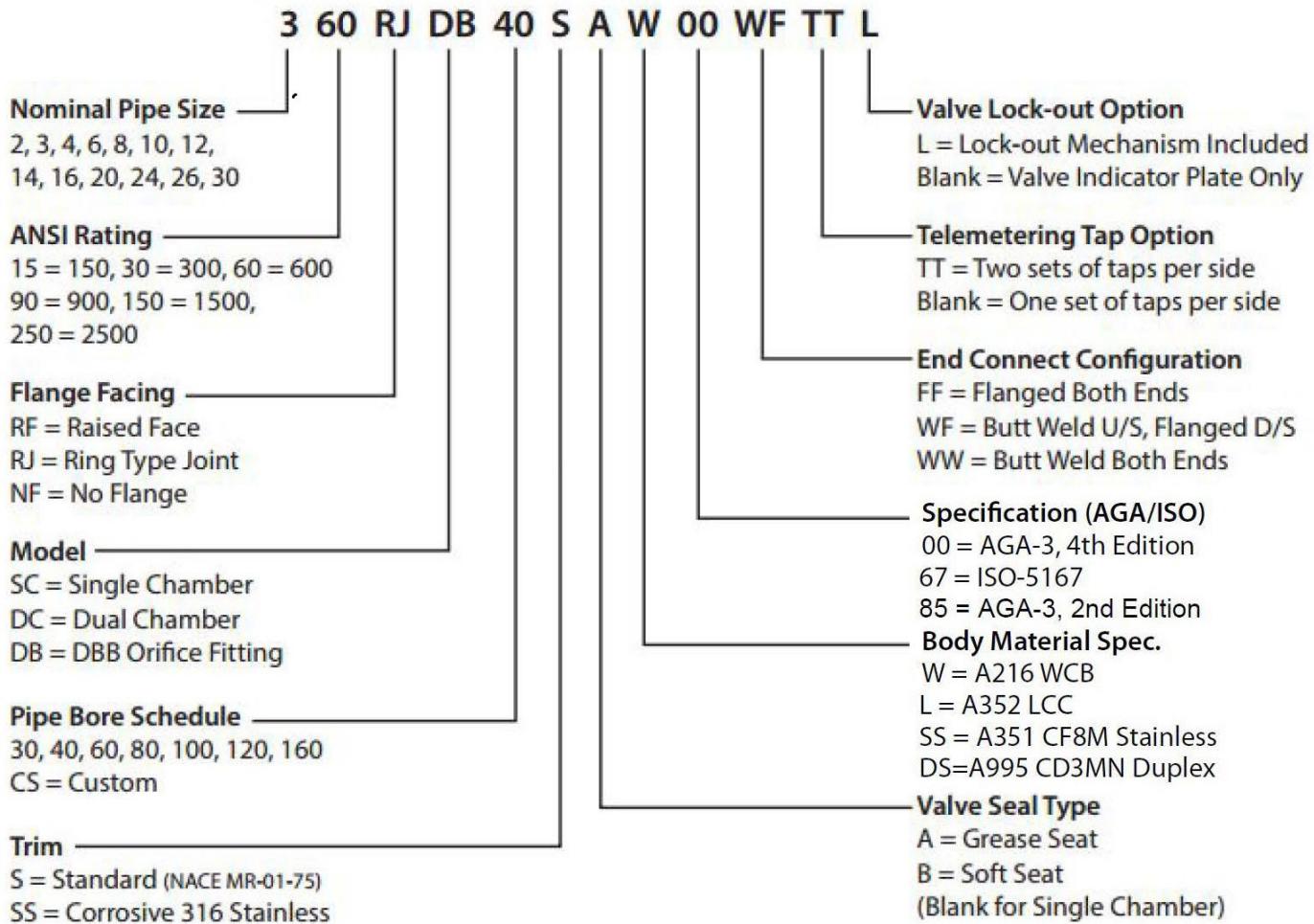
## **PRESERVATION & STORAGE**

The following measures should be taken to preserve and store all orifice fittings and meter runs that are not currently in service:

- Hydrostatic testing is required before entering service if stored for more than 1 year;
- Apply rust inhibitor every 3-6 months inside the bore to prevent rust and corrosion;
- Store in dry conditions, preferably indoors to prevent rust and corrosion;
- The end caps shipped with the meter run or fitting should be left in place during storage.

## MODEL NUMBERING SYSTEM

Each individual Canalta Orifice Fitting is assigned a model number which can be found on the unit's sales and quality control documentation. These model numbers facilitate quick identification of specific features of an orifice fitting, such as pipe schedule, body material and applicable standard. To understand the model number on your Canalta Orifice Fitting, use the legend below.



**Note:** the orifice fitting model number may deviate slightly from this legend in cases where exotic materials or other custom features are included. Please contact us directly for any questions or concerns regarding your Canalta Orifice Fitting.

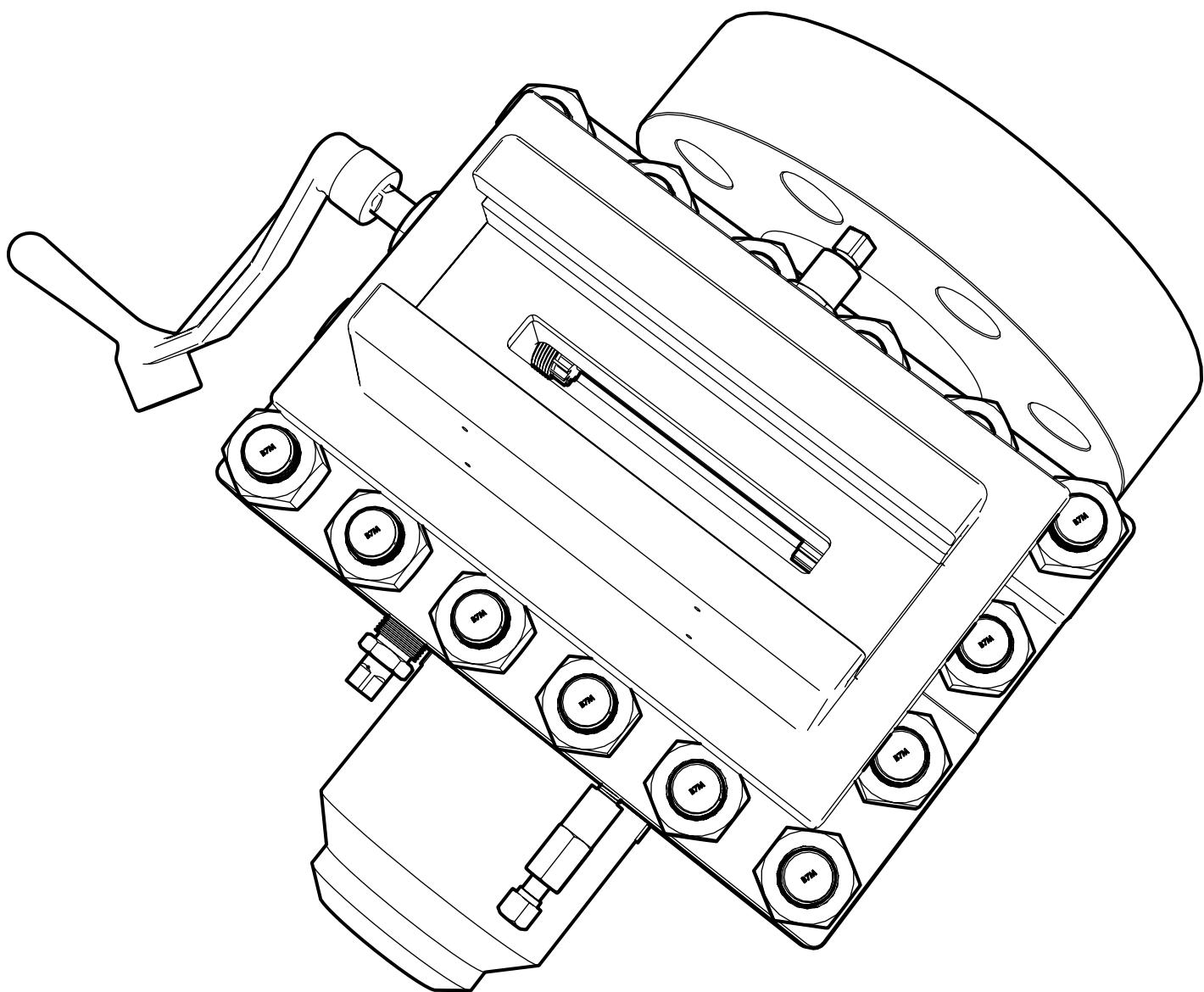
## ORIFICE FITTING QUICK INSPECTION & ASSESSMENT

While the seal and clamping bars are off of the orifice fitting and the top housing is open, visually inspect the interior of the unit.



**DO NOT OPEN SLIDE VALVE TO INSPECT LOWER  
HOUSING WHILE TOP HOUSING IS OPEN AND UNIT  
IS UNDER PROCESS PRESSURE.**

Pay attention to the condition of the interior surfaces of the orifice fitting, the pinion gear, seal bar face and O-ring. Excessive corrosion, fluid build-up or other visible damage may indicate the need for more extensive maintenance and replacement of parts. Similarly, excessive resistance when turning gear shafts during operation may indicate the need for the replacement of parts.



## SCHEDULED TEARDOWN MAINTENANCE

Both measurement accuracy and orifice fitting performance in general can benefit from periodic teardown maintenance. Canalta recommends teardown maintenance be performed every two years or earlier if deemed necessary. The appropriate Disassembly/Assembly can be requested from Canalta if required.

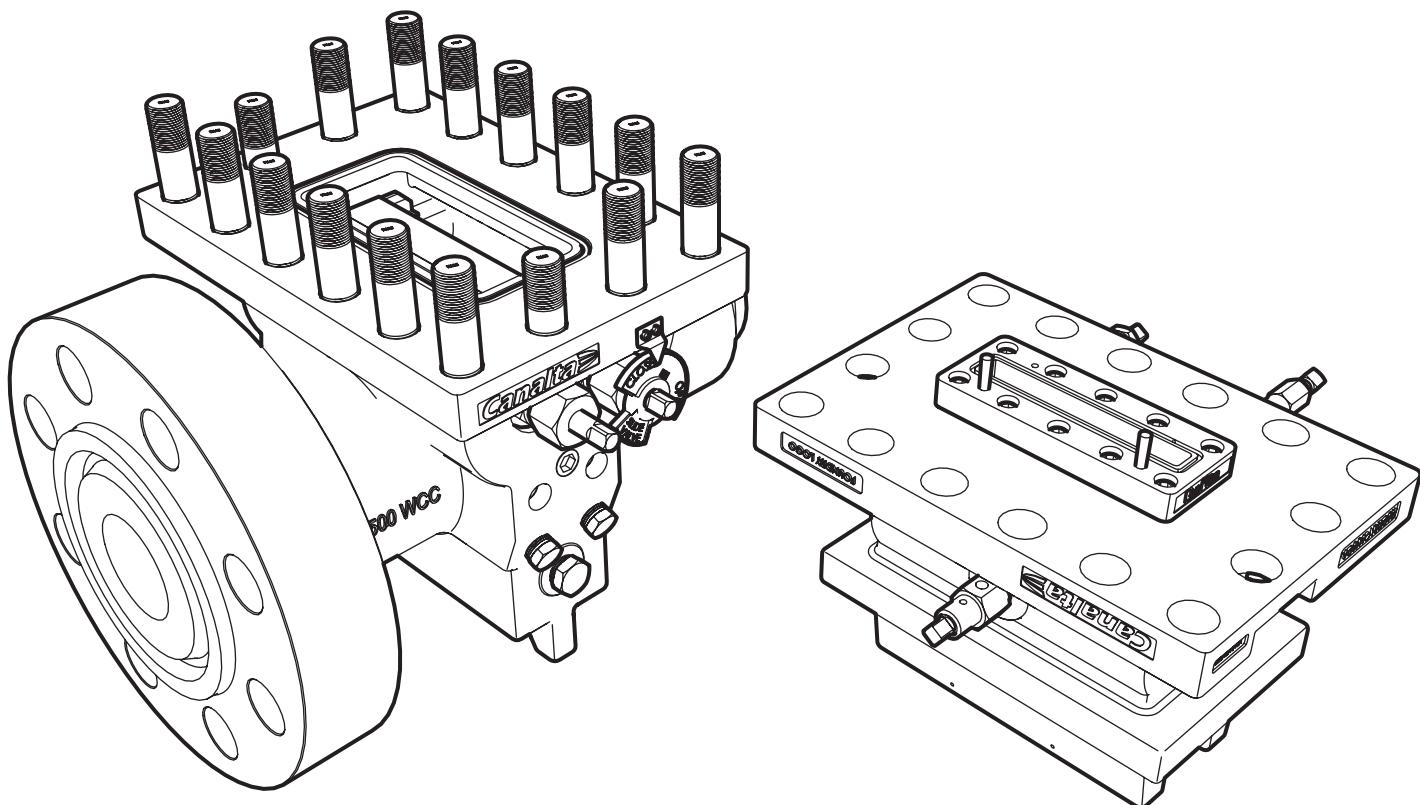


**ENSURE FLOW LINE IS DE-PRESSURIZED BEFORE REMOVING  
TOP HOUSING FROM ORIFICE FITTING BODY. FAILURE TO  
DE-PRESSURIZE COULD RESULT IN SERIOUS INJURY OR DEATH.**

After de-pressurizing the line and removing the top housing, perform the following inspections and parts replacements:

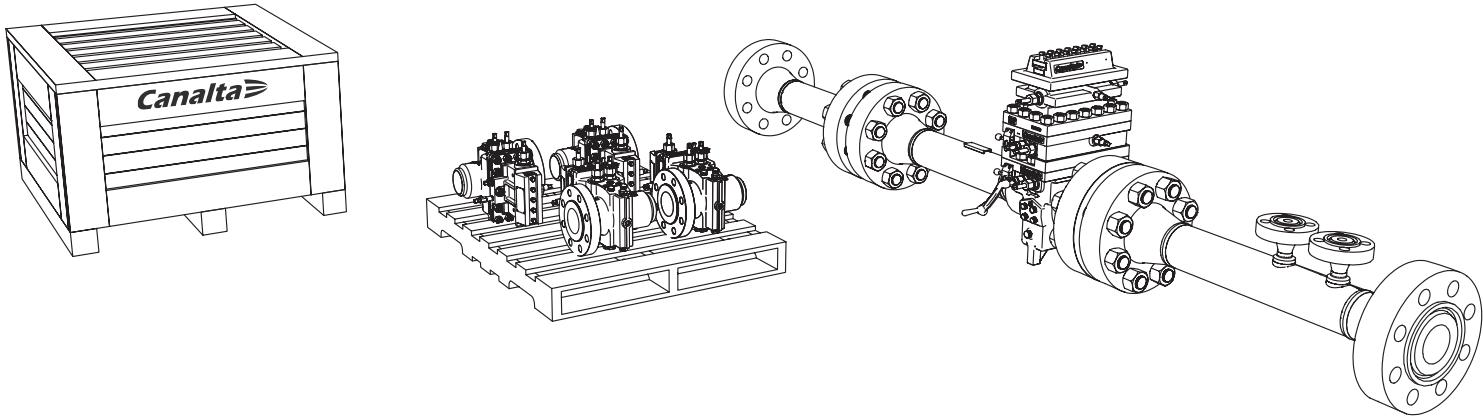
- Visually inspect all interior surfaces of the orifice fitting body for excessive build-up or corrosion;
- Inspect gear shafts for broken or bent teeth. Replace as necessary.
- Inspect valve seat surfaces for abrasion or corrosion. Replace as necessary.
- Manually change out valve seat grease in the grease track (for grease-type units only).
- Replace the valve strip and all accessible O-rings (including valve seat O-rings on soft seat units).
- Remove the drain plugs and rod-clean the lower section of all accumulated debris.
- Inspect all differential pressure tap holes for build-up. Clean out as necessary.

When returning the line to service, ensure that the orifice plate is in the top housing during re-pressurization, the slide valve is in the closed position, the EQ and bleeder valves are closed, and the seal and clamping bars are in place and tightened down.



## LIFTING AND HANDLING

Canalta Flow Measurement products generally require mechanical lifting devices and techniques. All safety activities associated with lifting techniques and equipment shall be in accordance with local laws and the receiving company's HSE policies and procedures, and shall be followed without exception. Extreme care shall be exercised throughout the operation to prevent both injury to personnel and damage to the meter. Proper rigging and lifting techniques should be followed. Do not stand under suspended load. Improper handling may cause injury and/or damage. SAFETY FIRST.



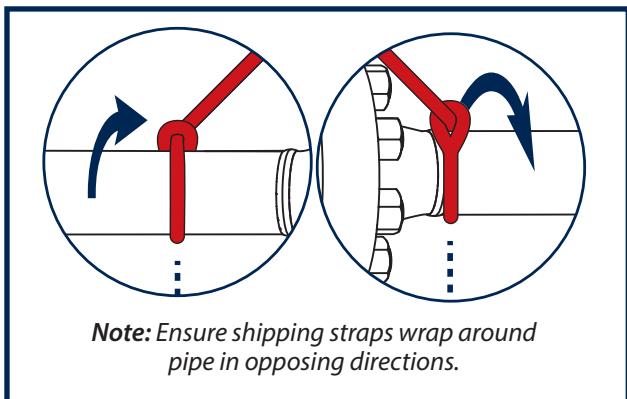
Most Canalta products arrive at their destination in a wooden crate or strapped to a wooden pallet, and are therefore easily moved using a standard forklift. There are scenarios, however, where a meter run or fitting only unit must be moved without the aid of a frame. In either case, care must be taken to assess the weight of the package and ensure that the machinery and lifting aids are appropriate to the items being handled. Crate, pallet and/or meter run weights are documented on the commercial invoice or packing slip accompanying the shipment.

## MOVING UNITS IN CRATES AND ON PALLETS

- Select an appropriate forklift based on the weight of the package being handled. Use fork extensions if necessary.
- Center the forks so the load is evenly distributed. Ensure the load is balanced and secure prior to lifting. Use extra strapping to secure any unstable loads.
- Drive the forks into the load as far as possible. Avoid contact with any parts of the load that may extend past the edge of the pallet. Tilt the load back slightly, then lift.
- Keep the load as low as possible while traveling, keeping an even pace, avoiding fast starts and sudden stops.

## MOVING METER RUNS

- Select an appropriate forklift and lifting straps based on the weight of the meter run being handled. Position the forks as narrowly as possible to create a single lifting point.
- Determine the meter's fulcrum and position the straps so the unit is balanced when lifted. Ensure the straps are wrapped in opposing directions to prevent the unit from rotating and swinging.
- Ensure the rigging set up is adequate to maintain control through all stages of hoisting, maneuvering and lowering the meter run.
- For meter runs containing a Dual Chamber fitting, a strap should be attached to the fitting top chamber in order to prevent the meter run from "rolling". Refer to diagram and instructions on page 28 for meter strap positioning.
- Slide the ends of the straps over the forks, positioning the straps as close to the forklift body as possible without having the meter run make contact with the forklift.
- Tilt the load back slightly then lift. Keep the fork as low as possible while travelling, keeping an even pace, avoiding fast starts and sudden stops.



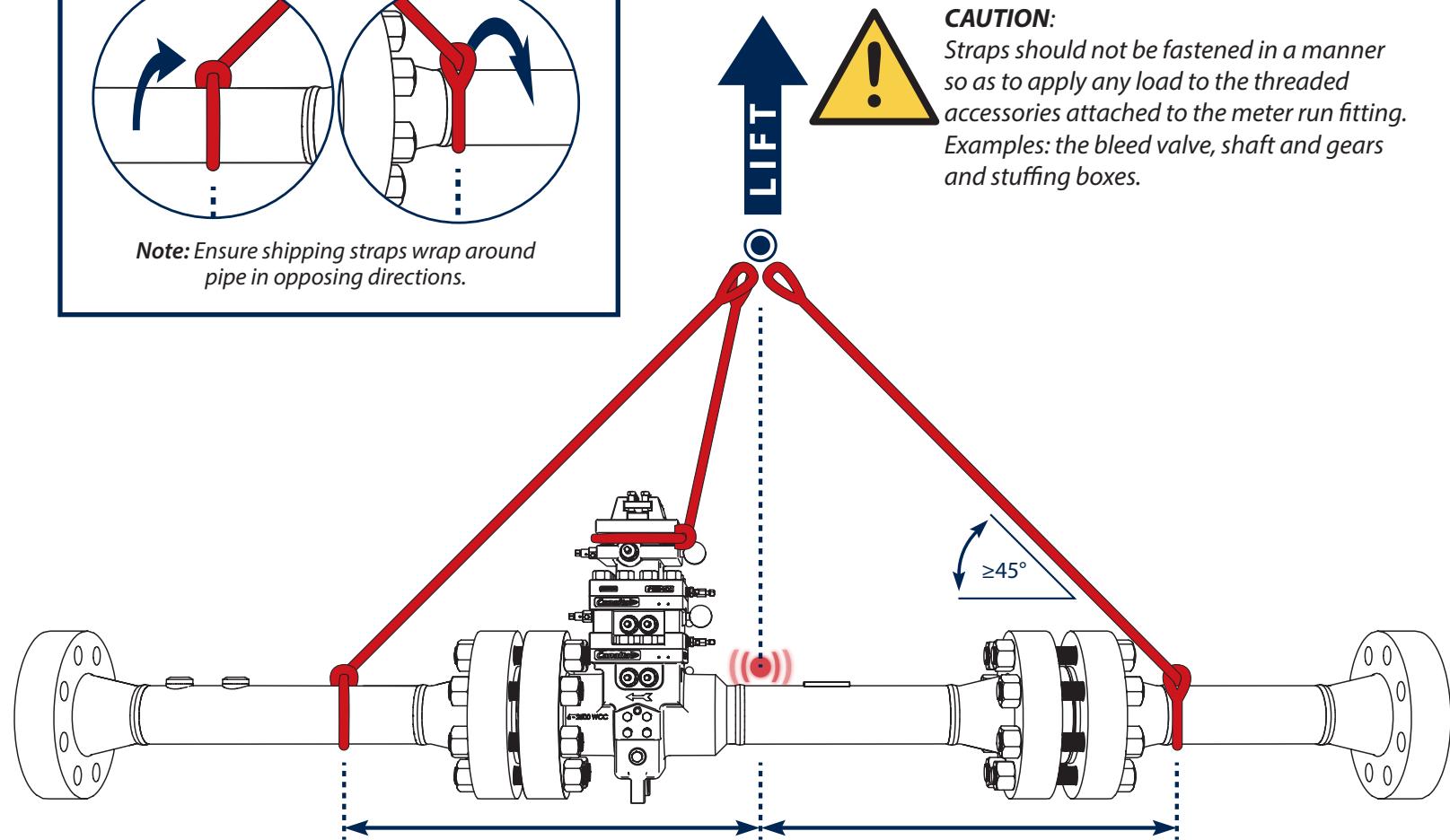
**CAUTION:**

The center of gravity of meter runs with Dual Chamber and DBB fittings is above the central axis of the meter run pipe.



**CAUTION:**

Straps should not be fastened in a manner so as to apply any load to the threaded accessories attached to the meter run fitting. Examples: the bleed valve, shaft and gears and stuffing boxes.



Center of Gravity



Lifting Straps



Lift Point

**Note:** Lifting diagrams may not reflect all configurations. Centers of gravity not exactly as shown.

## MOVING DUAL CHAMBER FITTING ONLY UNITS

- Select an appropriate forklift and lifting straps based on the weight of the meter being handled. Position the forks as narrowly as possible to create a single lifting point.
- Wrap the lifting strap around the fitting, under the shoulder of the top housing. *Do not position the lifting strap under the plate carrier operator gears or under any threaded components - lifting from this position may result in significant damage and inoperability.*
- Slide the end of the lifting strap over the forks, positioning the strap as close to the forklift body as possible without having the unit make contact with the forklift. Adjust as necessary.
- Tilt the load back slightly, then lift. Keep the forks as low as possible while traveling, keeping an even pace, avoiding fast starts and sudden stops.



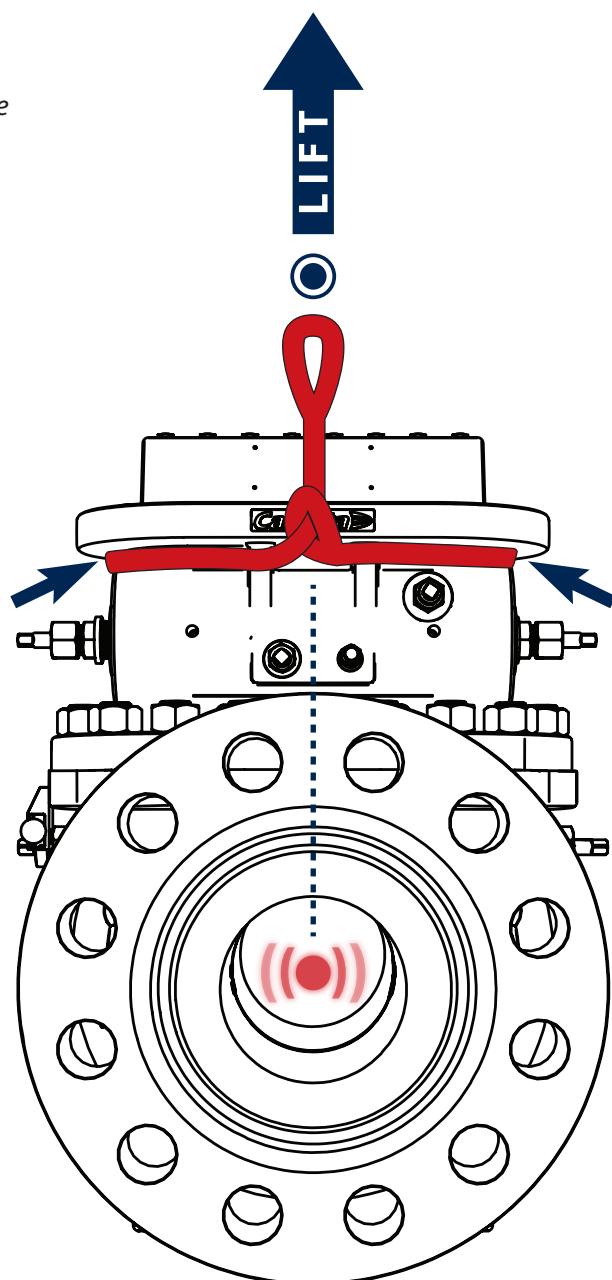
### RECOMMENDATION:

A lifting strap should only be secured directly below a reinforcing flange of the fitting top chamber as shown below.

((●)) Center of Gravity

Lifting Straps

Lift Point



*Note: Lifting diagrams may not reflect all configurations. Centers of gravity not exactly as shown.*

## ***NOTES***

# **Canalta**

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