



TDW D-2000 Closure

Installation, Operation and Maintenance Instructions

16 – 30 Inch

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NOTICE

Any operation involving work on pipe containing liquids or gases under pressure is potentially hazardous. It is necessary, therefore, that correct procedures be followed in the use of this equipment to maintain a safe working environment.

No person should use this equipment who is not fully trained in the procedures stated in this manual, and who is not fully aware of the potential hazards connected with work on pipe containing liquids or gases under pressure.

The purchaser of this equipment is responsible for the manner in which this equipment is used and maintained and for the training and competence of the operators.

Should any difficulty arise at any time in the use of this equipment, please contact TDW immediately.

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D-2000 Closure, 16"–30" Instructions for Installation, Operation, and Maintenance

Section I: Introduction

1.0 Purpose

This manual provides instructions for the installation, operation, and maintenance of the TDW® D-2000 Clamp Ring Closure, 16"–30". This closure is also available in other sizes.

2.0 Discussion

The TDW clamp ring closure is a quick-opening closure easily operated by one person. It is equipped with a pressure warning lock, in accordance with UG-35 of ASME Sect. VIII, Div. 1, to alert the operator to the existence of internal pressure prior to opening the closure.

The closure is designed primarily for horizontal installation, meaning that the door swings open on the horizontal axis. However, the closure can be installed on a vertical installation. In the latter case, a counterbalance, not addressed in this instruction, can be provided to facilitate opening. Figure 1 shows the clamp ring closure, installed horizontally.

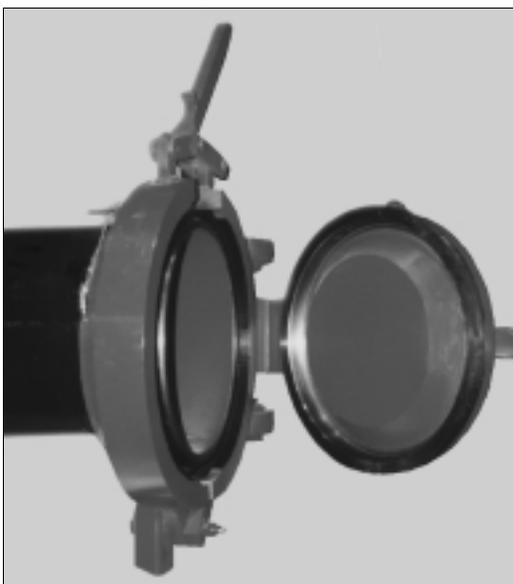


Figure 1. TDW® D-2000 Clamp Ring Closure

3.0 Safety

3.1 General

TDW clamp ring closures are designed for fast, easy, and safe operation. A closure may not operate effectively if it has been subjected to misuse or external damage or has been operated or maintained contrary to TDW's printed instructions. It is mandatory that correct procedures be followed in the care and use of TDW closures to maintain their safety features, efficiency, and ease of operation.

The following reminders are useful in ensuring that your TDW clamp ring closures operate properly:

1. Clean the O-rings and O-ring sealing surfaces and coat them with a thin film of grease before the closure is closed.
2. Inspect the O-ring for cuts, scratches, deterioration, twisting, or swelling. Replace O-rings if there is any sign of abnormality.
3. Clean the interior surfaces of the clamp ring, and apply a thin film of lubricant before the closure is closed. This is particularly important in corrosive environments.
4. Lubricate all hinge points at regular intervals.
5. Make sure that the door, clamp ring, and pressure warning lock are fully closed and secured before attempting to pressurize the vessel.
 - Never allow pressure to be applied to any TDW closure that may be inoperative.

- Never try to open a TDW closure while the vessel is under pressure.
- Never force the clamp ring operating mechanism if the clamp ring does not operate freely.

Although it may be necessary to force the door open or closed, the clamp ring should always operate freely. Do not force the clamp ring operating mechanism or use a "cheater" pipe on the handle of a lever-operated clamp ring. Damage to components may result. Damaged components could prevent the clamp ring from closing fully.

If excessive force has been used on the clamp ring operating mechanism, the component attachment welds should be visually inspected for damage and/or examined by any common NDT method.

The closure door face must always be parallel to and concentric with the face of the barrel collar. If a TDW closure does not operate freely and easily following routine maintenance and adjustment, and the door face is not parallel to and concentric with the barrel collar face, contact the TDW factory for assistance and repair, as necessary.

Do not allow anyone to operate a TDW closure who is not fully trained in the procedures contained in the printed operating instructions, and who is not fully aware of the potential hazards created by liquids or gases under pressure.

Should any questions or difficulties arise at any time in the use of TDW clamp ring closures, please contact TDW immediately.

3.2 WARNINGS and CAUTIONS

The purpose of **WARNINGS** and **CAUTIONS** in this manual is to call the operator's attention to the possible danger of injury to personnel and equipment. All warnings and cautions deserve careful attention and understanding.

- A. **WARNING:** Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury and damage to equipment.
- B. **CAUTION:** Indicates a potentially hazardous situation that, if not avoided, could result in minor to moderate injury and damage to equipment. A **CAUTION** may also be used to warn operators about unsafe practices.

Section II: Installation and Operation

1.0 Installation

1.1 General

- A. To maintain the closure in proper working order, those making the shop or field installation must carefully follow the welding instructions and preventive maintenance instructions.
- B. It is important to keep the following points in mind during installation:
- Level the closure during the installation process;
 - Properly align the barrel collar;
 - Position the door hinge in the vertical position (horizontal on a vertical installation) to permit easy opening and closing of the door.
- C. A bleeder valve and a pressure gauge must be installed on the vessel the closure is welded to. An operator must be able to bleed the vessel and determine when there is zero (0) psig within the vessel.

1.2 Welding Procedures

- A. The same welding procedures are to be used whether post-weld heat treatment is required or not.
1. Remove closure door O-ring and pressure warning lock O-ring before welding. (See Figures 2 and 3.)
 2. If post-weld heat treatment is required, it is recommended that it be accomplished by localized stress relieving. If that is not possible, the closure door must be removed prior to heat treatment. (See Section II, subsection 3.1, beginning on page 9, for removal instructions.)



Figure 2. Remove O-Ring on Closure Door



Figure 3. O-Ring on Pressure Warning Lock

B. Standard Barrel Collar—Materials:

- ASTM A694 F46
- Carbon maximum: 0.26%
- Manganese maximum: 1.40%
- Minimum tensile strength: 60,000 psi
- Minimum yield strength: 46,000 psi

1. TDW refers the welder to the applicable codes such as ASME, API, ANSI, etc. These codes require that the welder and the weld procedure be previously qualified.
2. These codes recommend the proper preheat and post-weld heat treatment procedures. The welder should refer to these codes and follow the recommended welding procedures for the materials being welded.

NOTE: Standard barrel collar material and properties shown above. Other materials provided on request. Refer to material test reports supplied with each closure to determine weld procedure for actual materials being welded.

NOTE: Any practical welding process (manual, submerged arc, etc.) can be used. Applying as low a heat range as possible is recommended, to help prevent the barrel collar sealing surface from warping.

C. The procedures for welding are as follows:

1. Position the barrel collar to align properly with the vessel. Make sure the door hinge is vertical (horizontal for a vertical installation).

CAUTION: When welding to a vessel of high-yield strength steel (over 71,000 psi), preheating may be required to avoid cracking. Refer to proper ASME, API, or ANSI codes.

2. Tack weld approximately every four inches around circumference and check again for proper alignment.

CAUTION: When welding on the barrel collar, a low welding heat range and the following proper sequence of welds will help prevent possible warping of the barrel collar sealing surface.

3. Weld stringer bead and immediately start the hot pass with two or more men on opposite sides to equalize stress. Figure 4 shows the recommended welding sequence.

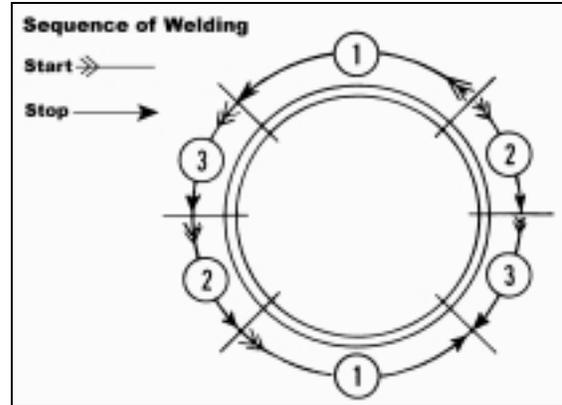


Figure 4. Recommended Welding Pass Sequence

4. When the welding process is completed, replace the O-rings on the closure door and the pressure warning lock.

D. If post-weld heat treatment is required, a localized heat treatment procedure should be followed.

1. Coat the O-ring groove with a heat resistant material (such as "TURCO PRE-TREAT," or "WATER NO SCALE") for protection during post-weld heat treatment.
2. Precautions such as interior braces should be used during treatment so that the barrel collar does not warp or droop.
3. After post-weld heat treatment, clean the barrel collar and reinstall the O-ring. Open and close the door to check for proper actuation and alignment.
4. If a localized heat treatment procedure is not possible, the door and clamp ring pivot nut must be removed prior to heat treatment. (See Subsection 3.1, beginning on page 9 for removal instructions.)

CAUTION: When cleaning the barrel collar, be very careful not to damage the O-ring sealing surfaces.

- E. Before placing the closure in service, all surfaces should be clean, with the O-ring and O-ring sealing surfaces covered with a thin

film of grease. The closure door face should be parallel with and concentric to the face of the barrel collar. If these two faces become misaligned, use the eight setscrews located in the hinge's mounting bracket hubs to bring the faces into correct alignment. Each hub has four setscrews. See Figure 5, below.



Figure 5. Aligning Door and Barrel Collar Face Using Setscrews

2.0 Operation

2.1 General

A. As shown in Figures 5 and 6, a warning plate is attached to the front of the closure. This warning concerns personal safety precautions and must be observed to prevent injury to personnel. Always keep this plate legible.



Figure 6. Warning Plate

B. The closure contains a pressure warning lock to alert the operator to pressure in the vessel before the closure is opened. The lock is mounted on top of the barrel collar, as shown in Figure 7. The pressure warning lock is integral to the clamp ring and must be removed before the clamp ring can be spread.

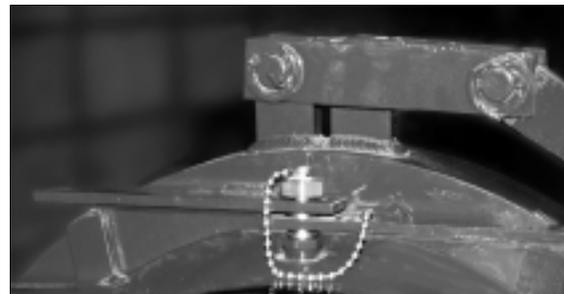


Figure 7. Pressure Warning Lock

C. Always clean the O-rings and O-ring surfaces and coat them with a thin film of grease each time the closure is open. Inspect for cuts, scratches, or deterioration. Replace if there is any sign of damage. See Figure 8.



Figure 8. Inspect and Lubricate O-Ring

WARNING: Replace damaged O-rings immediately.

A damaged O-ring will cause leakage of gases or fluids that can lead to serious injury and property damage.

D. Always clean the interior surfaces of the clamp ring and apply a thin film of lubricant. When opening, check lubrication of all hinge points on the clamp ring assembly. These include the following:

- One clamp ring pivot pin (Figure 9);
- Three clamp ring link pins (Figures 9 and 10); these pins should be lubricated at all points along the pin, not just the front (Figure 11).

The door-hinge bearings are oil impregnated, sintered bronze and do not require lubrication but should be checked at regular intervals for excessive wear.



Figure 9. Grease the Clamp Ring Pivot Pin

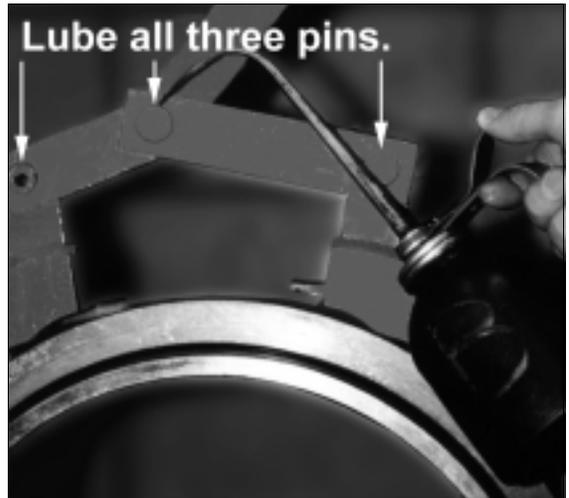


Figure 10. Clamp Ring Hinge Points

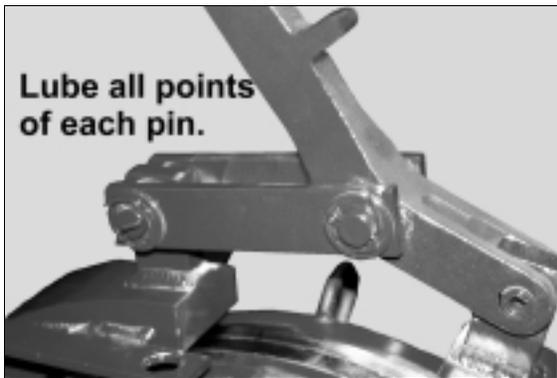


Figure 11. Rear View of Three Clamp Ring Pins

2.2 Opening Procedures

WARNING: Do not open closure while vessel is under pressure.

Bleed all pressure from vessel before opening pressure warning lock. Pressure gauge on vessel must read zero (0) psig. If product vents or sprays from pressure warning lock, vessel is still pressurized. When all internal pressure is relieved, open pressure warning lock and open closure.

When opening pressure warning lock, clamp ring, and door, always stand on the side of the closure that is opposite the door hinge. Do not stand in front of closure or on door hinge side of closure (or above it in a vertical installation) while opening.

Spraying line fluids or sudden door opening may result in personal injury or property damage.

- A. Isolate the vessel from line pressure, bleed pressure to 0 psig, and drain.
- B. Open the pressure warning lock by turning the screw counterclockwise. See Figure 12.



Figure 12. Open Pressure Warning Lock

- C. Once the pressure warning lock is completely unthreaded, remove the screw and open the clamp ring by lifting the clamp ring handle (Figure 13). This will spread the two clamp ring pieces so the closure door can be opened (Figure 14).



Figure 13. Lift Clamp Ring Handle to Spread Clamp Ring



Figure 14. With Clamp Ring Spread Door Can Be Opened

NOTE: The pressure warning lock is not designed or intended to be used as a pressure bleed-down valve and should never be used as such.

2.3 Closing Procedures

- A. Inspect, clean, and lubricate the O-ring, O-ring grooves and sealing surfaces, and the pressure warning lock. Replace the O-ring if it is damaged.

WARNING: Replace damaged O-rings immediately.

A damaged O-ring will cause leakage of gases or fluids that can lead to serious injury and property damage.

- B. Push the door firmly shut. Before the clamp ring can be closed, the door must be completely closed, showing no gap between the door face and the hub face.
- C. Close the clamp ring by pulling the clamp ring handle over the top of the closure. Lower it fully so that the pressure warning lock screw can be inserted through the aligned holes in the bars and threaded into its bushing. The clamp ring does not use any wedging action during closing since the clamping surfaces are parallel to the door and the hub faces. Do not force the clamp ring handle if the clamp ring will not close freely. Verify that the door is adjusted properly and check for debris.

NOTE: As the clamp ring is closed, the bars attached to the back of the clamp ring move closer together (Figure 15). When the clamp ring is fully closed, the holes in the bars are in alignment. If the holes do not overlap, you will not be able to thread the pressure warning lock screw into the bushing. If the clamp ring appears to be closed and the holes still do not line up, re-open the clamp ring and check for damage and debris.



Figure 15. Holes in Bars Don't Overlap When Clamp Ring Handle Is Not in Closed Position

- D. Install the pressure warning lock screw. Make sure it is not cross-threaded into the bushing. Tighten hand tight, and then add about one-eighth of a turn with a small wrench. **Do not over tighten.**

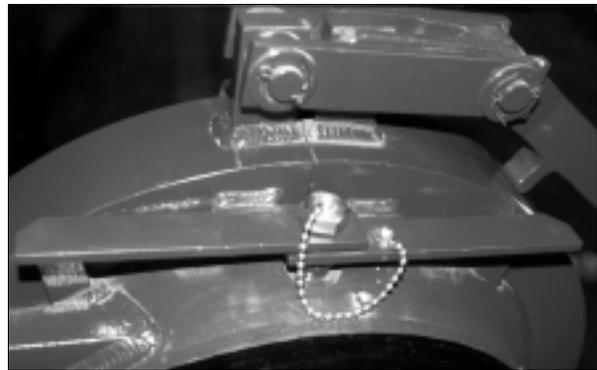


Figure 16. Pressure Warning Lock in Place

WARNING: Never attempt to pressurize vessel until you have made sure that door, clamp ring, and pressure warning lock are fully closed and secured.

A line spraying fluids or a door opening suddenly can result in personal injury or property damage or both.

- E. The vessel can now be pressurized to line pressure and placed on-stream.

3.0 Removal and Installation of Closure Door

3.1 Removal

- A. Unthread the pressure warning lock and the O-ring.
- B. Open the closure door and remove the O-ring carefully to prevent damage.
- C. Close the door and push the clamp ring handle all the way down to lock the door in place.
- D. Attach a hoist to the lifting eye.

CAUTION: All major components of the D-2000 closure are extremely heavy. Make sure the hoist used has an adequate lifting capability to avoid possible injury to personnel.

- E. Remove the eight door hinge cap plugs.
- F. Remove the eight door hinge setscrews.
- G. Remove the two split clamp collars.
- H. Remove the upper bearing assembly.
- I. Lift up on the clamp ring handle and spread the clamp ring.

- J. Open the door clear of the clamp ring assembly.
- K. Lift the door until the lower hinge pin clears the lower hinge bracket. Pull the lower hinge pin away from the bracket and remove the lower bearing assembly.
- L. Lower the door until the upper hinge pin is clear of the upper hinge bracket.
- M. Set the door aside.
- O. If disassembly is for post-weld heat treatment, other than a localized procedure, restrain the clamp ring by temporarily replacing the nylon insert clamp ring pivot nut with something that will not melt.

Caution: Clamp ring could slip off pin during handling if not adequately restrained.

Note: The clamp ring is not designed for removal in the field. If removal of the clamp ring is required, contact TDW for assistance.

3.2 Installation

- A. To reinstall the closure door, follow the reverse of the removal instructions.
- B. Adjust the hinge setscrews to align door with the barrel collar.

Section III: Maintenance

1.0 Maintenance

1.1 General

Maintenance is required on TDW closures. Most is preventive maintenance and can be performed each time the closure is opened.

1.2 O-Ring/O-Ring Surfaces

There are two O-rings on the D-2000, 16"-30" closure. One is on the pressure warning lock screw, and another is on the barrel collar, making a seal when the door is closed. Always clean and coat these with a thin film of grease each time the closure is open. Inspect for cuts and scratches or deterioration. Replace O-rings if there is any sign of damage.



Figure 17. Lube O-Ring on Pressure Warning Lock Screw



Figure 18. Additional Lube Points

1.3 Clamp Ring

Always clean the interior surfaces of the clamp ring and apply a thin film of lubricant. At regular intervals:

- A. Lubricate all hinge points on clamp ring assembly. The door hinge bearings are oil impregnated, sintered bronze and do not require lubrication but should be checked at regular intervals for excessive wear.
- B. Keep all exterior surfaces painted to prevent rust.

1.4 Pressure Warning Lock

- A. Make sure threads are clean and free of nicks.
- B. Inspect the O-ring and bushing.

- C. Keep the assembly free of paint.
- D. Lube inside the bushing periodically.

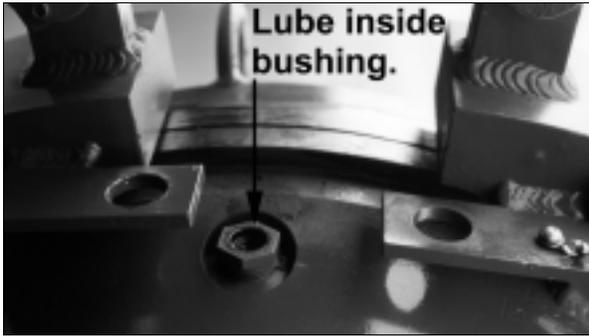


Figure 19. Lube Bushing for Pressure Warning Lock

Section IV: Parts List 1
D-2000 Closure, 16"-30"

Item	Qty.	Description
1	1	barrel collar
2	1	door
3	1	clamp ring
4	1	clamp ring handle
5	1	door hinge arm
6	1	clamp pivot plate
8	2	shaft collar
9	2	flat plain washer
10	2	handle link
11	3	grease fitting
12	2	bearing assembly
13	2	Clevis pin
14	2	spacer
15	1	O-ring
16	1	nameplate
17	1	pressure warning plate
18	1	pressure warning plate
19	2	clamp ring locking lug
20	1	Spirol™ pin
21	2	flat washer
22	2	cotter pin
23	8	setscrew
24	8	cap plug
25	2	flat bar
27	1	handle
28	2	rubber seal
29	2	drive screw
31	1	chain assembly
34	1	clamp ring pivot pin
36	1	flat washer
37	1	Esna™ nut
38	1	pressure warning lock screw
39	1	warning pad
40	1	Buna-N O-ring
41	1	bushing
42	12	drive screw
43	1	instructions (not shown)
44	1	caplug

NOTE: Item numbers correspond with TDW Assembly Drawing 19-3716-0600-SUF and the numbering on page 14.

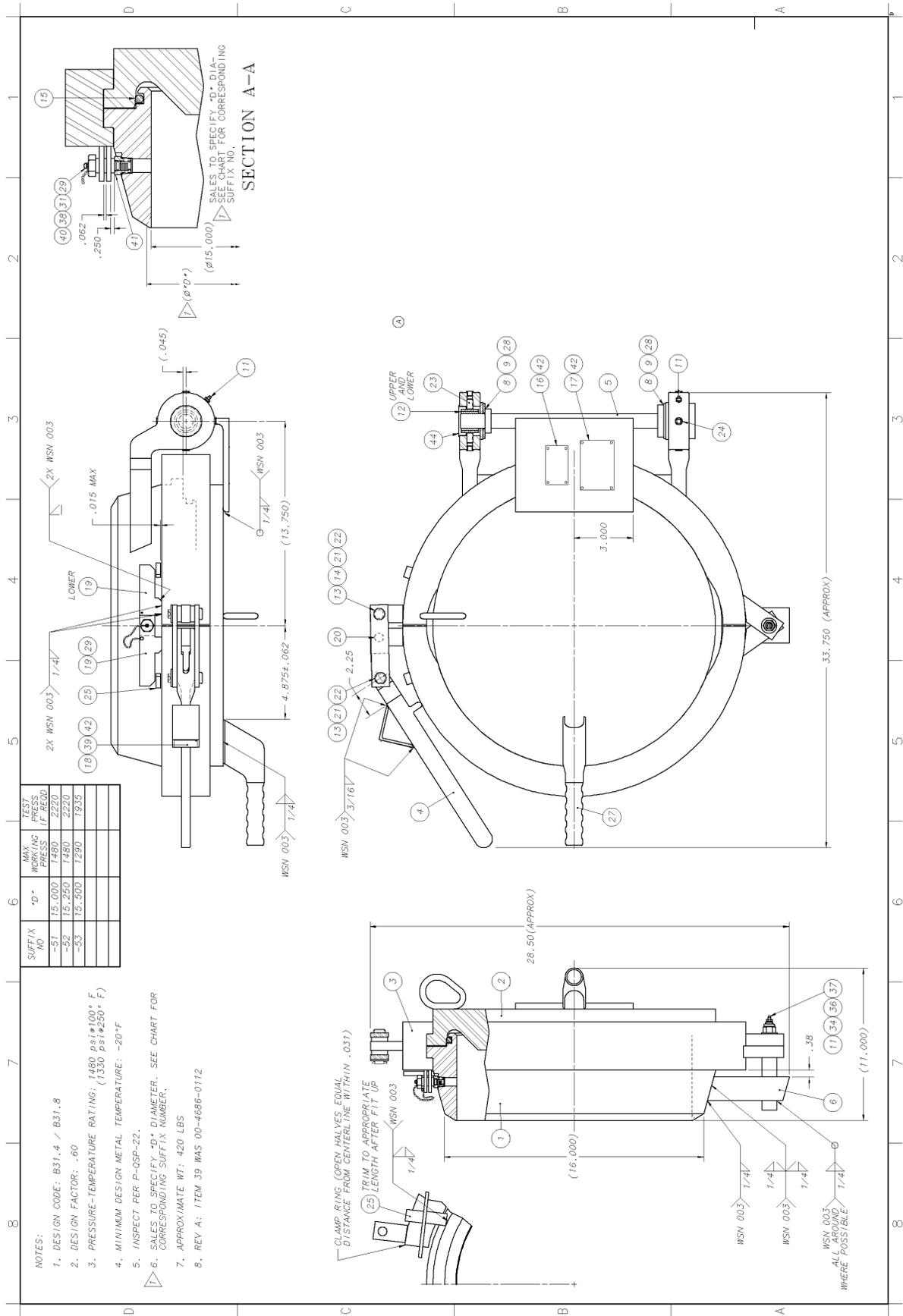


Figure 20. D-2000 Clamp Ring Closure, 16'-30"

Product Warranty

1. Products manufactured by T. D. Williamson, Inc., are warranted free from defects in material and workmanship for a period of **three (3) years from the date of shipment from the factory. Elastomer products are warranted for one (1) year under proper storage to be free from defects in material and workmanship. The foregoing warranty does not apply to any items not manufactured by T.D. Williamson, including but not limited, to, electronic devices, switch components, pumps, O-rings, purchase cylinders, etc. These third party parts will revert back to suppliers warranty. TDW assumes no liability under this or any other warranty for components not manufactured by TDW. This Warranty applies only to products shipped after June 30, 2000.**
2. If TDW accepts any claim made under this Warranty, TDW's liability, if any, shall be limited to, at TDW's sole option, repair or replacement of the failed part or product, or a refund of the purchase price, less an allowance for services rendered for the product prior to the Warranty claim. **TDW disclaims any and all responsibility for special, consequential or incidental damages arising out of or related to the sale, use, or inability to use any products covered by this Warranty.**
3. Buyer agrees not to return goods for any reason except with the prior written consent of TDW, which consent, if given, shall specify the terms, conditions and charges upon which any returns may be made. Materials returned to TDW for Warranty work must have a Return Material Authorization (RMA) number, and such number must be noted on the package at the time of shipment. Claims under this Warranty must be made in writing within ten (10) days of any failure and sent by registered mail to: P. O. Box 3409, Tulsa, Oklahoma 74101. Any failed products or parts must be held for inspection by TDW or, at TDW's option, returned to TDW's factory. Customer shall prepay shipping charges, and shall pay all duties and taxes, as applicable, for products or parts returned to TDW for warranty service.
4. This Warranty shall not apply to any product or component which has been repaired or altered by anyone other than TDW, or has become damaged due to misuse, negligence or casualty, or has been operated or maintained contrary to TDW's printed instructions and warnings.
5. The sole purpose of the exclusive remedy contained in the limited Warranty shall be to provide repair or replacement of failed products, or to refund the purchase price of the failed product as explained above in paragraph 2. This exclusive remedy shall not be deemed to have failed of its essential purpose so long as TDW agrees to repair or replace the failed product or to refund the purchase price as explained above.
6. All rights, duties, and obligations arising under this limited Warranty shall be governed by the laws of the State of Oklahoma, U.S.A., regardless of conflict of laws provisions. In the event Buyer initiates litigation under this Warranty, Buyer hereby agrees that jurisdiction for such litigation shall be brought only in the District Court for the County of Tulsa, Oklahoma.
7. TDW reserves the right to make any changes in or improvements on its products without incurring any liability or obligation to update or change previously sold product and/or the accessories thereto.
8. **This warranty is in lieu of all other warranties express or implied, including the warranties of merchantability and fitness for particular purpose, which are expressly disclaimed. TDW neither assumes nor authorizes any other person to modify these terms and conditions, warrant specific applications, or assume for TDW any other liability in connection with the sale of any TDW product other than as provided in this warranty.**

T.D. Williamson, Inc. is ISO 9001 certified.

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