SAFELOCK CLOSURE

The PECO SafeLock Closure is an inherently safe, easy to operate, reliable closure. Before operating, one must become familiar with the closure and its operating parts. Below is a sketch of the PECO SafeLock Closure with all parts identified to assist you in following the operating procedure. The closure may be provided with an external cover to keep it clean from dust, rain, sand and foreign materials. The cover is not shown in the general assembly.
The Pressure Lock Assembly (PLA) incorporates a Pressure Warning Device (PWD), which is designed to warn the operator of internal pressure when partially opened. The pressure must be fully released through the pressure vent nozzle before the PLA is opened. The PLA also acts as a locking device for the closure handle. The closure handle can only be rotated when the closure has zero internal pressure, the PLA is moved away from the head surface in the handle hole, and a pin is inserted through the pin-hole in the PLA body.

PLA IN CLOSED POSITION

![FIG. A]

PLA IN OPEN POSITION

![FIG. B]

CAUTION!
Prior to opening the PECO SafeLock Closure, the operator must review and follow any applicable corporate policy or procedure concerning the service to which the operator will be exposed.
CLOSURE OPENING PROCEDURE

The closure outer cover must be removed first. Once this is done, follow the procedure described below

VENTING OF INTERNAL PRESSURE
1. Follow any applicable operating procedure for depressurization and preparation for opening the closure. Close all block valves to stop flow to the vessel or pipeline.
2. Open blowdown, vent, and/or drain valves per “Owner’s Procedure” or “Company Operating Procedure”. Reduce the internal pressure to zero (0) pressure.

Caution: Opening pressure containment equipment/devices while under pressure can cause serious injury.

3. Once the pressure indicator shows that the vessel internal pressure has reached zero (0) pressure, slightly (less than one turn) open the Pressure Lock Assembly (PLA) to verify that the pressure inside the closure has reached zero (0) pressure. (Refer to Figures on previous pages).
4. If there is no sound (hisss...) Of pressure escaping, completely open the PLA and move it away from head surface through the hole in the handle until the pin-hole in the PLA body clears the handle surface. Insert the holding pin, already provided, across the pin-hole in the PLA body. Now the PLA is firmly held in the closure handle. The closure handle is free to rotate about the center bolt.
5. Check the opening in the vessel head for the PLA to insure that it is not plugged with internal debris and/or corroded. Use a 1/4” diameter by 12” long rod and push it through the hole to see if it is clear through the head thickness.
6. If an audible “hissing..” Sound is still present or the PLA hole in the head appears to be plugged if there is any other indication that internal pressure still exists, do not attempt to open the closure. Investigate and eliminate the source of internal pressure prior to opening the closure.

OPENING THE CLOSURE
1. Once the internal pressure has been relieved, keep the venting valves open.
2. The closure is ready to be opened.
3. Check that the area inside the closure shell sub recess is clean. If there is any dirt or debris present, blow it out using a high-pressure air hose.
4. Attach the telescopic extension to the free end of the closure handle and extend it to its’ maximum length.
5. Rotate the closure handle about the center to open the closure until all C-ring segments are moved out of the shell-sub annulus and the PLA has reached the blind hole in the head. Make sure the PLA is in line with the blind hole.
6. Remove the pin and install the PLA in the blind hole to keep the closure handle in the open position.
7. Pull the closure door out of the shell-sub using the cross bars. Pull the door straight out and then swing the door as soon as it is clear of the shell opening.
8. To provide clear access to the vessel or launcher/receiver or pipeline opening, push the hinge assembly (or parallel plate assembly) about the hinges only. Vertical vessels or pipeline openings have davits which move the head or door in a horizontal plane about the vertical axis.
9. If the door is dirty, clean the door inside and out by using the proper cleaning solvents. Remove the o-ring (gasket) and clean the o-ring (gasket) groove.
10. Clean the o-ring (gasket) and check for any protrusion, sharp edges, extrusion, bubbles, damage or cut. To insure proper operation, Peco recommends using a new o-ring each time. However, if the o-ring looks clean and smooth, it can be re-used.
1. Open the Head (Door) slowly.

2. Remove the gasket (o-ring) and look for possible points of improper fit (see Fig. C).

3. Clean all of the sealing surfaces and the teeth of the head (door) and the shell-sub. Inspect these surfaces for pitting, corrosion, scratches, or other surface defects.

4. Lubricate both the o-ring sealing surfaces as well as all of the unpainted surfaces of the Head, Shell-sub and Spacers. PECO recommends using Molycote G, Selig “Redilube”, or equal lubricant.

5. If the previous o-ring shows any sign of surface damage, discard it and install a new o-ring. The PECO Inventory Control Number (ICN) for the gasket is listed on the Closure Name Plate (see Fig. E).

NOTE:

PECO recommends using replacement gaskets supplied by PECO. However, any replacement gasket for the closure, whether purchased from PECO or elsewhere, must be identical in dimension, material, and hardness to the original gasket designed and furnished by PECO. The use of a gasket not identical in dimension, material, and hardness could create serious problems in achieving the seal and fit required for proper closure operation. Do not install silicone or any material other than the lightly lubricated o-ring in the gasket groove.

HEAD (DOOR) ALIGNMENT INSPECTION AND CORRECTION PROCEDURE

(This applies only when the Closure/Door is found misaligned)

1. Confirm that the head (door) and shell-sub are properly aligned. This is done by closing the head (door) slowly. Do not bump the head against the shell-sub. Prior to closing the head, apply plastigage or spray color coat at 12, 3, 6, and 9 O’clock positions at the surface 90 degrees to the vessel axis. When the head is closed and reopened the markings should transfer from the shell-sub to head or vice versa. No transfer of marking means the portion of head surface in that region made no contact with the corresponding shell surface and requires adjustment in that plane (12-6 or 3-9 plane).

2. With the head (door) closed, check for equal clearance between the head periphery and the shell-sub at 12, 3, 6, and 9 O’clock positions. If the difference exceeds 015”, an adjustment should be made to center the closure head in the shell-sub.

If the closure head (door) is not aligned as above, the follow the procedure given on page 5 to adjust the alignment. If the alignment is found acceptable, then go to Closure Closing Procedure.
NOTE:
Failure to align the closure before trying to move the C-ring segment blocks into the annulus (recess) may result in “closure closing difficulties”. It can also cause failure to achieve the seal and fit-up required for proper closure operation.

Adjustment of the Closure (Head or Door Alignment)

The PECO SafeLock closure is adjusted at the factory for proper operation. If, at some time, it is noticed that the head surface does not align properly with the shell-sub, it will be necessary to adjust the closure to maintain its’ ease of operation and insure proper sealing. The alignment is accomplished in the following manner (Refer to FIG. D):

1. With the head closed against the shell-sub, note the position of the mismatch.
2. Adjust the hinge adjustment bolts until the subs match for their entire circumference.

Example 1:
If the top (12 o’clock) of the head (door) is closer to the shell-sub than the bottom (6 o’clock) along the periphery, the head must be lowered. This is accomplished by simultaneously loosening the inside (closest to the closure) top adjustment bolt until the clearance between head and the shell-sub is equal at 12 and 6 o’clock. Then tighten the opposing adjustment bolts firmly.

Example 2:
If the left (9 o’clock) of the head (door) is closer to the shell-sub than the right (3 o’clock) along the periphery, the head must be moved towards the hinge. This is accomplished by simultaneously loosening both the outside (furthest from the closure) top and bottom adjustment bolts and tightening the opposite bolts. Do this until the clearance between head and shell-sub is equal at 9 and 6 o’clock positions. Finally, tighten all adjustment bolts firmly.

Example 3:
If the top (12 o’clock) of the head (door) lower tooth surface is in contact with the shell-sub seating surface and there is no contact at the bottom (6 o’clock), the head needs to be rotated about the horizontal axis. This is accomplished by simultaneously loosening opposite top (towards outside face of head) and bottom (towards inside face of head) bolts (these bolts are parallel to the vessel axis) until contact with shell-sub is achieved at both 12 and 6 o’clock positions. This should be done in small steps and a head-shell contact check should be made at each step. If the top (12 o’clock) of the head (door) lower tooth surface is not in contact with the shell-sub seating surface and their is contact at the bottom (6 o’clock), then just follow the above procedure in reverse order.

NOTE!
DO NOT DISASSEMBLE THE CLOSURE UNTIL PARTS HAVE BEEN MARKED FOR REASSEMBLY IN THE SAME ORDER AND LOCATION.
1. Confirm alignment of the head and the shell-sub prior to closing the closure (see steps under “Cleaning and Inspection”). Make sure the o-ring is installed in the o-ring groove.

2. Move the head (door) inside the shell-sub by using the two T-shaped handles located on the head at top left and bottom right corners. Press the head in as far as it can go.

3. Unscrew the PLA, raise it in the handle hole and insert the pin across to hold the PLA in position. The PLA can now move with the handle.

4. Clean and lubricate the PLA threads. If required install a new o-ring on the PLA.

5. Connect the lever arm handle and extend it to its’ maximum length.

6. Rotate the lever in a clockwise direction while the head is kept pressed in.

7. After all C-ring segment blocks are moved into the shell-sub annulus simultaneously, the lever arm should be right above the PLA hole location.

   Remove the pin and install the PLA into the head by screwing it in the hole. Tighten PLA by hand. Make sure it is “hand-tight”. Do not use mechanical force to obtain a seal.

8. Remove the handle, collapse it and replace it in its’ proper location.

9. After the vessel is pressurized, check for leaks. If no leaks are found, install the cover properly to keep it protected from rain, sand, dust, debris and other foreign materials.

WARNING!

CHANGE OR MODIFICATION TO THE ORIGINAL DESIGN, MATERIALS OF CONSTRUCTION, ELASTOMER, SEALING DEVICES, OR OPERATION WITHOUT WRITTEN AUTHORIZATION OF PERRY EQUIPMENT CORPORATION, VOIDS PECO’S WARRANTY AND THE ASME “U” STAMP IF SO FURNISHED.

PECO disclaims responsibility for any damage sustained as a result of violation of the written instructions for safe operation, maintenance and inspection of the SafeLock Closure.
TOOLS REQUIRED TO OPERATE PECO SAFELOCK CLOSURE

The only tool required is the telescopic lever supplied with the closure

CHECKLIST

Review all of the work performed to insure that all the items are as specified above. Use the following checklist.

1. Are the closure head and the shell-sub properly cleaned?
2. Was a new gasket installed?
3. Are all un-coated or un-painted machined surfaces well lubricated (do not excessively lubricate)?
4. Is the o-ring (gasket) installed properly?
5. Is the door aligned properly with the shell-sub?
6. Are all the C-ring segment blocks fully in the shell annulus (recess)?
7. Are all the radial cross bars in straight radial position? Are opposing cross bars in line?
8. Are all the nuts and bolts tightly secured on all connections of the head mechanism?
9. Was the PLA properly installed with grease and proper o-ring (gasket)?
10. Was the PLA installed hand tight?
11. Did all components pass visual inspection?

Once the responsible party is satisfied that all of the above mentioned items are completed, the closure is ready for applying internal pressure.

After pressurization, install the closure cover supplied with the closure. This will preserve the lubrication of the sliding blocks and the pin connections.