

Winters Instruments: Corporate Engineering White Paper: updated Dec 2018

Waste Water Treatment Application: Isolation Ring Assembly

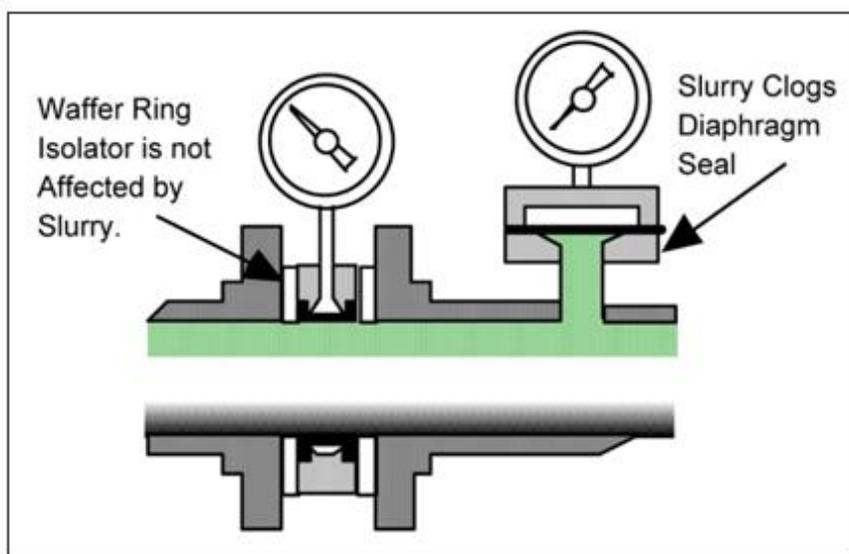
Principle of Operation

Obtaining accurate pressure readings on waste water treatment and slurry lines is difficult because the solids present in the process media block pressure elements such as gauges, switches and transmitters.

Isolation rings consist of an inner rubber elastomer nestled inside two end plates and center section. The assembly is installed between flanges in the process pipe. The space between this rubber membrane, housing ring and pressure instrument is filled with silicone (or other fill fluids as per options). As the process media flows through the isolation ring and passes through, it presses against the rubber membrane causing it to expand or contract. The pressure which is exerted by the media is subsequently transferred via the fill fluid to the pressure instrument (gauge, switch or transmitter).

The inside diameter of the ring assembly is based on ASME B36.10 pipe specifications and is sized so that it matches the adjacent pipe. This enables the isolation ring to be continually cleaned by the motion of the process fluid without any resultant build-up caused by step changes in the pipe's inner diameter.

Note: The isolation ring is rated up to 1000psi input pressure.





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Maintenance

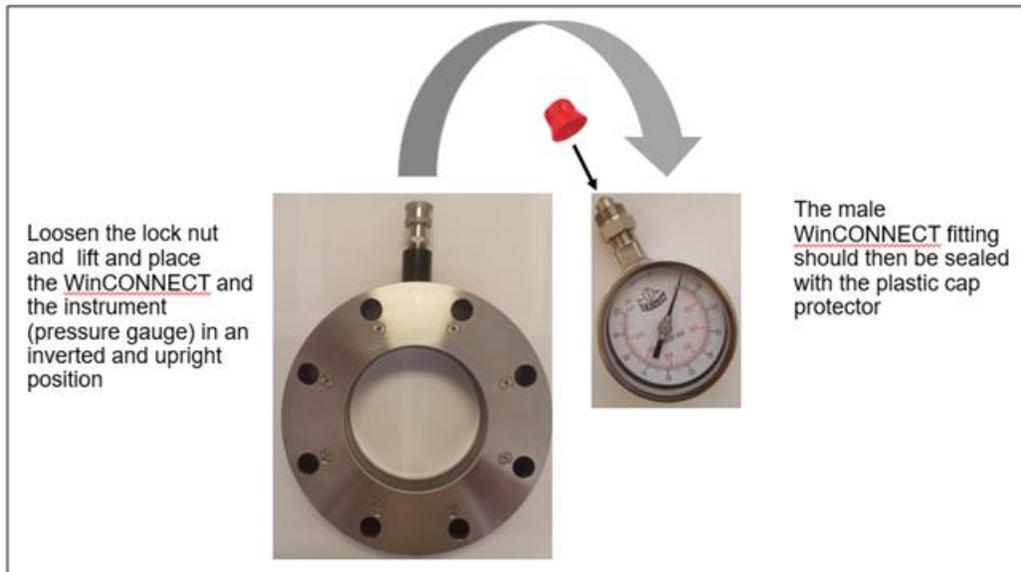
The isolation ring is fitted with pressure instruments such as gauges, transmitters and switches. Please refer to Winters' specification literature and pressure instruments Installation, Operation and Maintenance guide found on www.winters.com for these products and accessories.

The isolation ring also has a modular male-female WinCONNECT fitting which allows removal of the instrument assembly whilst preventing subsequent fill fluid leakage from the isolator ring. The pressure instrument assembly is fitted with the male adaptor of the WinCONNECT fitting which is secured by hand tightening to the female lock nut on the other part of WinCONNECT (which is fitted to the isolation ring). Refer to picture below.

If removing the entire assembly of isolation ring and instrument(s), first turn off the process media supply into the pipe where the isolation ring is fitted. Once the system has been depressurized, the instrument(s) may be safely removed. If the isolation ring is to remain fitted, then it is possible to remove only the instruments through disconnecting the WinCONNECT, without having to turn off the process.

Loosen the lock nut and in quick fashion, lift and place the WinCONNECT and the instrument in an inverted and upright position. The male WinCONNECT fitting should then be sealed by screwing on the red plastic cap protector (it is now safe to store it or to send it your nearest Winters facility). The female WinCONNECT fitting is equipped with an Automatic pinion-actuated shut-off which allows the isolation ring to remain in-line and not interrupt the operation of the process. There is also a red plug that can be screwed into the female thread to provide added protection against dust & dirt. The system may now be turned on.

Note: Repeat the above process when installing a new instrument with a WinCONNECT fitting.



Storage

Correct storage of the isolation ring extends the service life. Rubber membranes are perishable if the following precautions are not taken prior to installation.

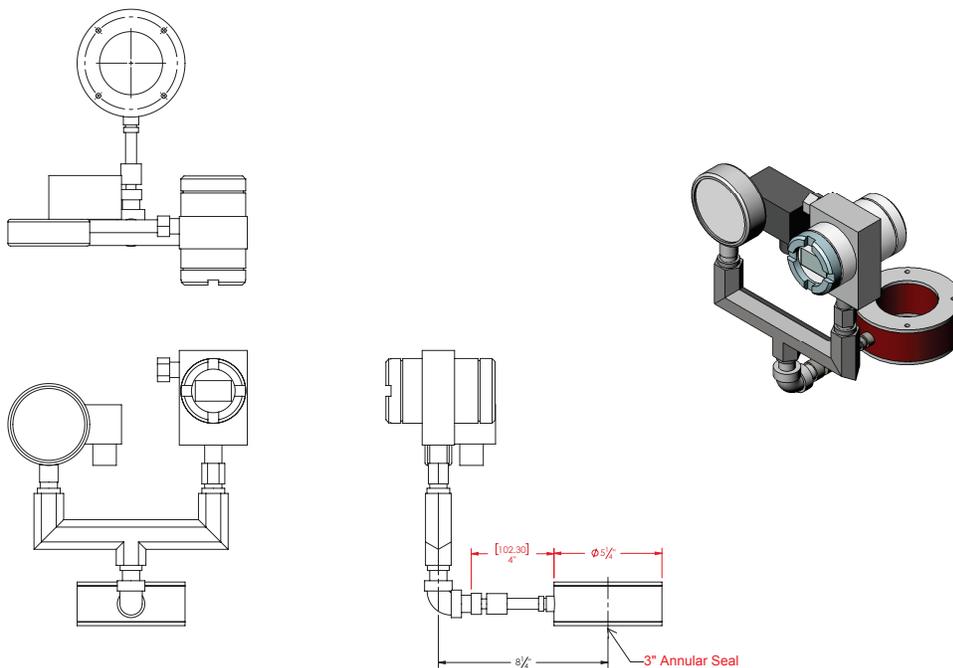
1. Keep isolation rings cool. They can be stored in an unheated area, but allow maximum ventilation in storage areas subject to high ambient temperatures. Trailers and storage sheds can become very hot during summer months. Avoid these locations where possible.
2. Avoid direct sunlight. UV light deteriorates rubber. Leave the isolation ring in its box.
3. Avoid ozone. DO NOT STORE isolation rings near electrical equipment.
4. If the isolation ring already has instruments installed, then be careful where the assembly is stored so these external devices are not physically damaged.
5. These separate instruments may be fitted with a WinCONNECT fitting. DO NOT REMOVE THE RED PLASTIC CAP PROTECTOR FROM THE WinCONNECT FITTING UNTIL ATTACHING IT TO THE ISOLATION RING. DO NOT REMOVE THE RED PLASTIC PLUG FROM ISOLATION RING COUPLER UNTIL READY TO FIT INSTRUMENT ASSEMBLY

Useful notes : Isolation ring location on pipe

Before ordering and then assembling the instruments to the isolation ring, care needs to be taken to review the isolation ring location on the pipe. First of all . identify the pipe diameter size and location where the isolation ring will fit. Then check to see what instruments require to be fitted to the isolation ring. It is advisable to obtain the weight & dimension specifications on the instruments being fitted . This is so the correct fittings can be selected , such as T sections .

When fitting an isolation ring to a horizontal pipe , care needs to be taken to ensure that there is sufficient clearance between the fitted isolation ring instruments and any other horizontal pipe that runs above it . Make sure that the instruments are mounted to the WIN Connect are rotated to a position that allows for best visual inspection of dial/display AND also allows for ease of connecting electrical outputs to nearby conduits.

When fitting an isolation ring to a vertical pipe , it is recommended to use an elbow fitting between the isolation ring and the WINCONNECT . This allows the instrumentation to be connected closer to the pipe , in the vertical plane and will reduce the likelihood of instruments being damaged. The length of the elbow is dependent on the type of instruments being connected, for care needs to be taken to ensure there is sufficient clearance between the instruments and the pipe. See example drawing below. Use of the elbow will also provide better support to the assembly.





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Installation

1. Safety Considerations:
 - a. Pressure isolation rings often handle chemically reactive (eg chlorine) and abrasive fluids. Applications such as these can result in the elastomer sleeve wearing out over time.
 - b. Make sure that the fitted pressure instruments (gauges, switches, transmitters) have pressure & temperature ratings suitable for actual operating conditions. Note that isolation ring's maximum pressure rating is 1000 psi, so the pressure instruments can only be used up to this maximum rating. Process fluid that exceeds these design pressures may result in equipment damage or personal injury.
 - c. The rubber sleeve elastomer must be chemically compatible and temperature compatible with the process fluid.
2. Inspect the isolation ring prior to installation. Do not install if it is damaged. The isolation ring should not show any indication of leakage and the elastomer should be free from cuts or puncture holes.
3. The isolation ring can be installed at any altitude with liquid flow in either direction. Install in a straight pipe run at least 5 pipe diameters from tees and elbows where possible.
4. To install, sandwich the isolation ring between two flanges in the process pipe line. Center as carefully as possible. Install gaskets on both sides of the isolation ring. Insert the flange bolts. Tighten these bolts in a criss-cross pattern.

Operating Instructions

1. Isolation rings are vacuum filled at the factory.
 - a. Do not disassemble the isolation ring without Factory Authorized Approval.
 - b. Do not remove the female portion of the WinCONNECT fitting from the isolation ring stem. Do not remove the red plastic plug .
 - c. Do not remove the red plastic cap protector from the WinCONNECT fitting until ready to attach the pressure instrument(s) to the isolation ring.
2. To attach a pressure instrument with the WinCONNECT fitting to the Isolation ring, the isolation ring and instrument assembly must be pre-assembled and vacuum filled prior to attaching it to the isolation ring.



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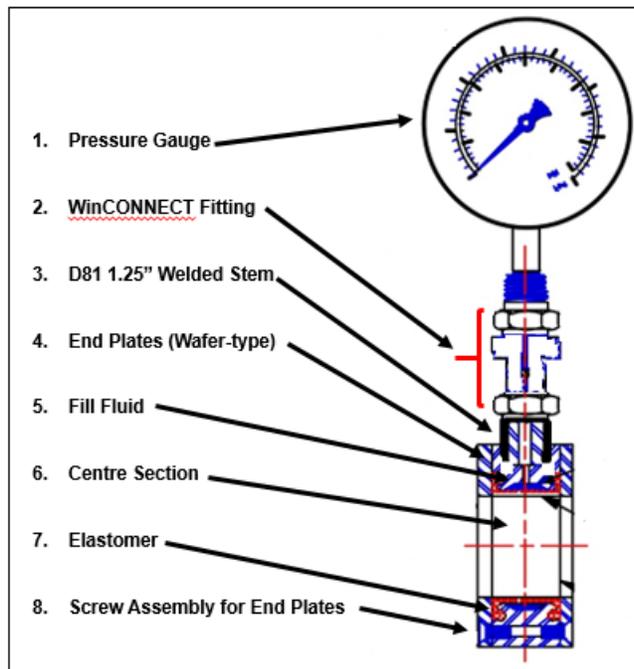
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- a. Instruments should not be attached to an isolation ring installed in a process pipe while the system is pressurised.
 - b. Hold the pressure instrument and WinCONNECT fitting assembly upside down, until the installer is ready to mate the WinCONNECT fittings.
 - c. Unscrew and remove the red plastic plug from the female coupler attached to the isolation ring.
 - d. Unscrew and Remove the red plastic protective cap from the WinCONNECT fitting (save the protector for future use).
 - e. Quickly install the male and female connections of the WinCONNECT fitting.
 - f. Hand tighten the lock nut.
 - g. The instrument assembly may be rotated 360 degrees to face any direction by loosening the lock nut and turning the pressure gauge and then re-tightening the ring.
3. To remove pressure instruments from the isolation ring:
- a. It is not necessary to remove the isolation ring from the process pipe.
 - b. In order to minimize any slight fill fluid loss, stop the upstream process altogether by turning the system off. The interruption will be brief as the WinCONNECT and instrument removal is a very quick and straight forward procedure.
 - c. Loosen the lock nut on the WinCONNECT fitting (item 2).
 - d. Quickly lift the male WinCONNECT fitting along with the pressure gauge out of the female WinCONNECT and place the WinCONNECT fitting and the instrument in an inverted and upright position.
 - e. It is necessary for the male WinCONNECT fitting to be sealed with the red plastic cap protector (it is now safe to store it or to send it your nearest Winters facility).
 - f. The female WinCONNECT fitting is equipped with an Automatic pinion-actuated shut-off which allows the isolation ring to remain in-line and not interrupt the operation of the process.
 - g. Screw in the red plug into the female coupler of the isolation ring , to protect it from dust and dirt
 - h. The system may now be turned back on.
4. Elastomer Sleeve and module seal replacement:
- a. Shut down the upstream process.
 - b. Remove isolation ring from the process line.
 - c. Remove WinCONNECT and pressure gauge (item 1 and 2).
 - d. Remove screws from end plate (item 8).
 - e. Remove end plate (item 4).
 - f. Remove old elastomer (item 7).
 - g. Use ¼" hex (Allen) key to remove the seal screw.

- h. Use a packing extractor to remove the old rubber seal.
- i. Clean all components thoroughly.
- j. Press new rubber seal into the stem (item 3). Drive all the way to bottom of bore. Replace seal screw. Do not over tighten.
- k. Collapse new elastomer (item 7), push through the centre section (item 6) and work seal lips into housing grooves.
- l. Reinstall end plates (item 4).
- m. Replace end plate screws (item 8).
- n. Connect the fill fluid connector located on the stem (item 3) to the vacuum filling system, evacuate air from the isolation ring assembly and refill it with the new fill fluid.
- o. The isolation ring can now be reinstalled into the pipe for service.

5. To attach the WinCONNECT fitting to pressure instruments:

- a. Attach the pressure gauge or other instrument to the WinCONNECT fitting (item 1 and 2).
- b. Connect the instrument assembly to the vacuum filling system.
- c. Evacuate all the air from the instrument assembly and fill with fill fluid.
- d. Detach the instrument assembly from the filling system. Protect the WinCONNECT with the plastic cap protector.
- e. The instrument assembly can now be attached to an isolation ring or stored for future use.





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