

Direct Potable Water Reuse Standard Operating Procedure

Wichita Falls, Texas

Microfiltration Membrane Pinning Procedure

This SOP supersedes any previous SOP on this topic.

INTRODUCTION

Microfiltration cell integrity is measured on a daily basis. The integrity has an upper control limit of 1.65 psi/minute, designated by the TCEQ and a lower control limit of 0.65 psi/minute for the City of Wichita Falls. When a faulty sub module is identified following a direct integrity test and air leak test, it should be replaced or repaired as soon as possible to retain the integrity of the microfiltration cell.

OBJECTIVE

To provide the proper sequence of steps to repair or replace a microfiltration sub module.

PROCEDURE

1. Rack Removal

If a sub-module is suspected of being faulty, e.g. loss of integrity as shown by the Direct Integrity Test and identified visually as per the Air Leak Test, the suspect modules must be replaced as soon as possible.

A faulty sub-module can only be replaced with the rack lifted from the cell.

- From a SCADA work station, place the cell "Out of Service" from the Cell Overview screen.
- Next, open the cell drain valve from the Cell Force screen to drain the water from the cell.
- Position the hoist directly over the rack to be removed.
- Remove the rack keeper plate.
- Disconnect the rack process air connections, and slide clear the joints to allow the rack to be lifted without fouling the couplings.
- Lower the lifting bar and engage the lifting tabs on the rack.
- Unseat the rack by pushing the rack away from the filtrate header.

- Slowly hoist the rack from the cell ensuring a vertical, central, balanced lift, checking the hooks remain in position on the rack lifting hoops. Take care not to damage the top and bottom manifolds during the lift. Always have someone guiding the rack as it is lifted.
- Place the rack into the tilting maintenance rack stand for easy removal of the modules.
- If repairs are expected to take more than a half hour, refill the cell with feed water to the top of the modules. Do not submerge the open filtrate header. This will keep the modules wet and prevent damage.

2. Module Removal Procedure

- Locate the module to be removed and removed the lower clover by removing the retaining nut and then pulling off the bottom clover from the four sub modules.
- Unclip the faulty sub module top clip by carefully prying the ends apart until the clip will just slip over the manifold locating ring. Slide the clip down and pull the sub module downwards out of the top clover.
- Inspect removed sub modules for damage or foreign matter. Seals may have flash, be worn, cut or rolled; any of which will cause some bypass.
- Return any defective components with details of module serial number and a brief description of the circumstances.

3. Repair of Sub Modules

The repair method is to insert the sub module in the test vessel, then pressurize the feed side to locate the defective fibers by observing the source of bubbles at the potted end. Defective fibers may then be blocked off by "pinning" with nylon pins.

Do not allow the sub modules to dry out. Carry out the repair as quickly as possible.

Insert the sub module into the test vessel with the top potting sleeve visible at the top of the vessel and slowly pressurize to 50 kPa.

Broken or damaged fibers will bubble before a pressure of 50 kPa is reached.

If there are a large number of such fibers, it is likely that the membrane have been damaged by a broken screen or have dried out.

Broken fibers ('squirters') must be repaired with nylon pins. Pins are available from Evoqua. The pins should be gently pushed into place until they will go no further. This is usually all the way to the tab at the end of the pin. The remainder of the pin or tab may simply be bent to break off.

Once all squirters have been pinned, switch off the compressed air and allow the vessel to vent before removing the sub module.

4. Replacement Procedure

- The top potting sleeve o-rings must always be replaced whenever a sub module is repaired or replaced. Lightly grease o-rings before re-installation. Slide the retaining clip over the sub module the correct way up to prepare for fitting.

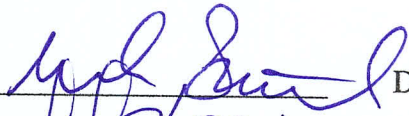
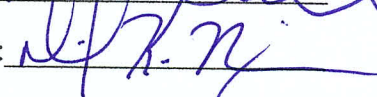
- Insert the sub module in the top manifold and secure it with the clip. Ensure that the clip open ends are located correctly on the manifold lug.
- Slide the bottom manifold over the screwed locating rod. Push the manifold evenly over the sub module o-rings.
- Screw the retaining nut on to the lower manifold to hold in place.

The rack may now be refitted and the unit returned to service in the reverse order of the removal procedure:

- The unit must be "Out of Service:
- Drain the unit if it has any water to keep the membranes wet.
- Replace the rack.
- Refit the keeper plate.
- Refit the process air hose.
- Refill the cell from the Cell Force screen at a SCADA work station.
- Place the cell back in service.

See associated SOP:

Microfiltration Direct Integrity Test SOP
Microfiltration Air Leak Test SOP

Prepared by:  Date: 6-11-14
Approved by:  Date: 6-11-14

*This SOP is considered effective on the date it is approved. SOP's are to be reviewed and/or updated annually or any time this process has changed.

Reviewed by: _____ Date: _____
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Sign below and date that you have read this SOP. By signing you are stating that you understand and will defer to this SOP when applicable.

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