



Low Profile Membrane Electrode Cells

Best Practices



Keys to Success

- Color code the anolyte supply & return connections and their respective anolyte tubing lines to avoid connecting a supply line to the anolyte output and visa versa.



Low Profile Cell

- Show a picture/drawing
- Point out: membrane shell, electrode, bulkhead with swivel hosebarb adapters



Baselines

Baseline values are important from the beginning in order to troubleshoot ME Cells in the future.

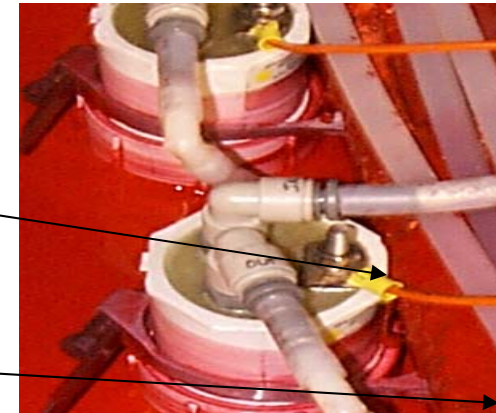
1. Total Amps (rectifier)
2. Measure individual ME Cell for peak Amps.
3. Volts required for largest load along with the film thickness target
4. Use the TruIDL Voltage Logger to create a Voltage Vs Time plot
5. Inlet manifold pressure (not to exceed 5-7 psi).

Installation of Low Profile Cell

- See Membrane Shell Replacement Strategy (990157) before replacing any Cells.
- If ED tank is full of paint, the Low Profile Cell must be filled with either DI or RO water before installing to avoid any potential damage to Low Profile Cell.
- Seam of Membrane Shell and Electrode must be against tank wall. Electrical stud or wire should be facing tank wall to ensure membrane and electrode seam are facing tank wall.
- Anolyte supply inlet and outlet must NOT be reversed. Damage to the Cell may occur.
- If electrical stud is exposed, it must be covered with red plasti dip. (See Installation Reference 993144)

Electrical stud or wire

Tank Wall



Electrical stud or wire is facing tank wall.



Electrical wire and stud covered with red plasti dip.



Flow Meters

- Every cell should have an individual Flow Meter/Isolation Valve.
 - Maintenance friendly.
 - Easier to isolate leaking ME Cells.
 - Do not have to shut down 2 or 3 cells in a bank (using one flow meter) if only one Membrane Electrode Cell is leaking.

Supply and Return Tubing

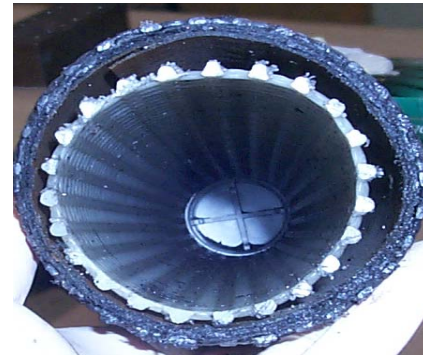
- Supply tubing should be 3/8" x 9/16" (3/32 wall).
- If using 1/2" return tubing it should be 1/2" x 11/16" (3/32 wall).
- Never use wire ties to bundle tubing together.
- Never allow tubing to become kinked.
- Braided tubing is less likely to become kinked.
- Use 90 degree fittings on return manifold so tubing over time does not become kinked.
- When replacing Cells both supply and return tubing should be replaced too. If tubing is cut from bulkhead it becomes shorter and shorter - this will create stress & the bulkhead fittings may start to leak.

Examples of what NOT to do

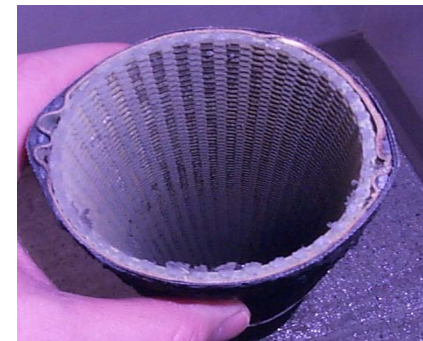


Anolyte Recirculation

- Make sure inlet manifold pressure is only 5 – 7 psi. Over pressurizing Low Profile Cell membranes can result in permanent damage and will begin to leak.
- Use a Ball Check Valve with manual bypass on discharge leg of anolyte supply piping to prevent siphoning of anolyte from Membrane Electrode Cell. Contact UFS for details.
- Anolyte Return Manifold must be above anolyte tank for gravity return of anolyte. Use vertical pipe into anolyte tank.



Over Pressurized Shell



Normal Looking Shell



Anolyte Leak Condition

- There are two basic types of anolyte leaks
- The first is the evidence of E-coat paint in the anolyte tank
 - Cut, tear, or damage to one or more Membrane Shells.
 - Anolyte return or supply line is cut and falls into the paint bath
- Second type of leak is a loss of anolyte fluid. This is generally a leak at the Bulkhead with the tubing and the swivel Hosebarb fitting.



Locating the Leak

- If the anolyte tank is low and the anolyte is not paint colored, then use a flashlight and inspect all the anolyte connections outside the tank and at the Bulkhead Other common place can be found with anolyte connections at the Bulkhead where there is no slack in the the anolyte tubing or the swivel connector is missing an o-ring or is otherwise damaged.

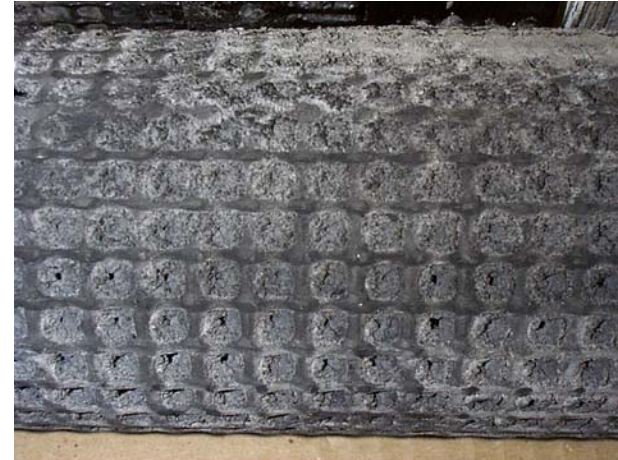


Troubleshooting

- Add temporary flow meter to return side to verify the flow coming out is the same going in. This will indicate any gross leaks.
- Refer to Service Reference (990104) to help identify leaking Low Profile ME Cells.
- Disconnect return line and watch level.
- If leaker is found and hole or tear is 1" or less, it can be fixed with UFS repair kit 164023. If larger than 1" the shell needs to be replaced.
- If current (amps) drop more than 40% visually inspect ME Cell.

What to do if a leaker is found?

- Turn off flow meter to leaking Cell.
- Disconnect electrical connection to the Cell. If Cell is not disconnected electrically the Cell will heat up causing paint solids to build up on the OD of the membrane.
- If the Cell is not disconnected electrically make sure the Cell is filled with anolyte at least 2 times per shift. This will slow down the build up of paint solids on the outside of the membrane.
- Obtain troubleshooting help from **UFSc.com**



Paint Build-Up on OD of Membrane Shell.



Normal Looking OD of Membrane Shell.