LG QuantumFlux™ Pressurized UF Membrane

Technical Service Bulletin 602

UF Element Start-Up Considerations and Checklist

Successful UF system performance, both short term and long term, depends on handling, operation, and maintenance in accordance with all published guidelines and limits. Specific guidelines and limits can be found in:

- Performance projection software
- Element Specification Sheets
- Standard and Custom Warranties
- Technical Service Bulletins

Please refer to all appropriate documents to become familiar with the guidelines and limits for a specific project. As an UF module supplier, LG Chem's scope of supply and liability is limited. The considerations and items presented below are intended as a general reference and are not to be considered all-inclusive for any specific project.

Feedwater Source

- Ensure the feed water quality is satisfactory & within design expectations.
- Intake or well flows are able to provide continuous design feed flow to all UF units.
- Chemical tanks are filled with proper chemicals.
- Chemical injection points are properly located.
- Chemical suction and discharged piping are installed as designed.
- Provisions exist for proper chemical mixing and draw-down measurement.

Instrumentation, Sampling, and Monitoring

Each UF train requiring monitoring and performance tracking contains, as a minimum, provision for reporting:

- Feed water flow rate (m^3/h) (gpm).
- Feed water pressure (kPa) (psi)
- Feed water temperature (°C) (°F)
- Filtrate pressure (kPa) (psi)
- Filtrate flow rate (m^3/h) (gpm)
- Feed water turbidity (NTU)
- Product water turbidity (NTU)

Ensure that:

- Instruments are properly located and installed.
- Instruments are calibrated to the manufacturer's specifications.
- SCADA (Supervisory Control and Data Acquisition), if provided, is functioning and available for retrieval of historic operating data.
- Data collection routine for startup and long-term operation has been established.
- Data acquisition and analysis routine has been established.
- Arrangements have been made to use LG Chem's data acquisition program or direct transmission of data (in spreadsheet form) to LG Chem for review.
- Sample valves are located in the feed, filtrate, and concentrate piping of each UF train to be monitored.
- Transparent tubing/piping should be installed on filtrate side of each module for visual inspection.

LG QuantumFlux™ Pressurized Membrane

Technical Service Bulletin 602

UF Element Start-Up Considerations and Checklist

Pre-startup Checklist

Before loading modules on the skid(s), confirm that the system is ready for commissioning and subsequent operation.

- The piping system is ready and clean.
  Flush system piping repeatedly to ensure the pipes are free of debris.
- The feed water quality is satisfactory, within design expectations.
- All valves are in the closed status and work properly.
  Cycle all valves from the control system.
  Check and adjust opening and closing timing, as needed.
  The maximum module pressurization/depressurization rate is 0.25 bar (4 psi)/second.
- All equipment is in standby status and works properly.
  Cycle all equipment on and off from the control system.
  Check and adjust pump and blower ramp-up and ramp-down times, as needed.
  The maximum module pressurization/depressurization rate is 0.25 bar (4 psi)/second.
- CIP and drain system are ready.
- Auto control system is ready.
- The electric system is complete.
- Pretreatment processes and associated equipment, especially coarse and fine screening, is installed and working properly.

System Integrity Checklist

Before installing modules on the skid(s), a system integrity test should be carried out. This is to ensure that there is no leakage of water or air from the system. After installing the modules, it is more difficult to determine if a decrease in test pressure is due to a system or module integrity issue.

- Fill the system piping with water.
- Once full of water, close valves for the section of the system to be tested.
- Pressurize with air to 1 bar (15 psi).
- Once air pressure is stabilized, turn off the air supply. Note the pressure.
- Check for leaks and decline in the air pressure.
- Repair any leaks.
- Repeat until all leaks are fixed and there is effectively no decline in pressure.

LG QuantumFlux™ Pressurized Membrane

Technical Service Bulletin 602

UF Element Start-Up Considerations and Checklist

Prohibited Chemicals

In general, LG Chem UF modules have very high chemical tolerance. However, generally speaking, chemicals commonly known to be incompatible with PVDF, PVC, ABS, polyurethane, and EPDM should be avoided. The following is a non-exhaustive list of chemicals that should not come into contact with the UF modules:

Class	Examples
Non-polar solvents	Pentane, Heptane, Hexane, Toluene, Benzene, Chloroform, Cyclohexane
Slightly polar solvents	Chlorobenzene, Cyclohexanone, Acetaldehyde, etc.
Polar aprotic solvents	Acetone, Acetonitrile, Dimethylformamide (DMF), Dimethylacetamide (DMAC), Dimethyl sulfoxide (DMSO), N methyl-2-Pyrolidone (NMP), Methyl ethyl ketone (MEK), Methyl Butyl Ketone (MBK), Methyl Isobutyl Ketone, Methyl Acetone etc.
Alcohols	High concentrations (E.g. >50%) of Methanol, Ethanol, Diacetone alcohol
Paint Thinners	Turpentine, Naphtha, Kerosene, Xylene, etc.
Ethers	Diethyl ether, Tetrahydrofuran, Isopropyl Ether, etc.
Esters	Ethyl acetate, Butyl acetate, Isopropyl Acetate, Cellulose acetate, Ethyl Benzoate etc.
Selected Strong Alkalis	50% NaOH
Chlorinated Compounds	Chlorinated solvents
Selected Acids	Chlorosulfonic Acid, Phosphoric Acid (molten and anhydride)