

# Membrane Cleaning Guide E-Coat Elements

The following are general recommendations for cleaning SPIRA-CEL® e-coat elements. More detailed procedures for cleaning membrane systems in e-coat applications should be provided by the system supplier or the cleaning chemical supplier.

## SAFETY PRECAUTIONS

When using the chemicals indicated below, please follow these accepted safety practices:

1. Always wear eye protection. In the case of handling corrosive chemicals, wear full-face masks and protective clothing. Consult the chemical manufacturer for detailed information about safety, handling, and disposal.
2. When preparing cleaning solutions, ensure that all chemicals are dissolved and well mixed before circulating the solutions to the elements.
3. High-quality water must be used for flushing and cleaning membranes. See *Water Quality*.
4. Cleaning chemicals will be present on both the permeate and concentrate sides of the membrane immediately after cleaning. Properly flush the system prior to operation with the feed stream and divert permeate to drain for at least 30 minutes or until the water is clear when starting up after cleaning.

## CLEANING PRECAUTIONS

Certain chemicals and cleaning conditions may have an adverse effect on membrane performance. We recommend caution with the following:

- Aggressive alkaline cleanings at high temperature and pH may cause membrane degradation and lead to premature failure. Please follow the recommendations of the system supplier or the cleaning chemical supplier.
- Frequent disinfection with an oxidizing solution (such as hydrogen peroxide blend) more than 1-2 times per week may cause premature membrane oxidation.

## CLEANING METHOD - FILTRATION OF ANODIC PAINT

The cleaning method described below is meant to be a general procedure to clean elements in the filtration of anodic paint.

1. Shut down the system to be cleaned. Be sure to follow all safety procedures for system shutdown.
2. Purge feed stream from the system, flushing it with water or permeate to remove the remaining paint from the system. Circulate permeate and discharge. Continue to flush until the permeate stream is clear in color.
3. Change the filter bag in the pretreatment system.
4. Prepare a cleaning solution as recommended by the paint supplier. Typical cleaning solutions comprise of fresh DI-water, 10% butyl glycol, and 1% dimethylethanolamine (DMEA) at pH 8.5-9\*. Circulate this solution for 3-4 hours while checking the permeate flow rate. The temperature must not exceed 45°C (113°F).

\**Note:* the concentrations given above are typical values used in the industry. If the cleaning using the above concentrations does not prove effective, the elements can handle a maximum concentration of:

- Butyl glycol: 20%
- DMEA: 2%

- Do not exceed these maximum concentrations, and please contact your paint supplier or system builder for more detailed information.
5. After cleaning, discharge the solution. The cleaning procedure described in step 4 was successful if the flow is about 330 L/h (or 1.5 gpm) for a 4" module, or 1300 L/h (or 5.7 gpm) for an 8" module. If the cleaning proved successful, proceed to step 6. In the case of extreme fouling, leave the cleaning solution in the system over night for an extended soak. Restart the system for about 1 hour the next day and check the permeate flow rate. Discharge the used cleaning solution.
  6. Prepare a fresh cleaning solution of slightly alkaline DI-water (pH 8.5-9). Flush the system with this cleaning solution.
  7. Prepare a fresh cleaning solution of slightly alkaline DI-water (pH 8.5-9). Circulate this solution for 30-50 minutes.
  8. After draining the system, start-up up the system with electrocoat paint. Be sure that the valves at the end of the pressure vessel are completely open. Open the feed valve very slowly; opening the valve too quickly may cause water hammer and damage the elements.

### CLEANING METHOD – FILTRATION OF CATHODIC PAINT

The cleaning method described below is meant to be a general procedure to clean elements in the filtration of cathodic paint.

1. Shut down the system to be cleaned. Be sure to follow all safety procedures for system shutdown.
2. Purge feed stream from the system, flushing it with water or permeate to remove the remaining paint from the system. Circulate permeate and discharge. Continue to flush until the permeate stream is clear in color.
3. Change the filter bag in the pretreatment system.
4. Prepare a cleaning solution as recommended by the paint supplier. Typical cleaning solutions comprise of fresh DI-water, 5% butyl glycol, and 3% acetic or lactic acid at pH 4-4.5\*. Circulate this solution for 3-4 hours while checking the permeate flow rate. The temperature must not exceed 45°C (113°F).  
*\*Note: the concentrations given above are typical values used in the industry. If the cleaning using the above concentrations does not prove effective, the elements can handle a maximum concentration of:*
  - Butyl glycol: 20%
  - Acetic or lactic acid: 10%
  - Do not exceed these maximum concentrations, and please contact your paint supplier or system builder for more detailed information.
5. After cleaning, discharge the solution. The cleaning procedure described in step 4 was successful if the flow is about 330 L/h (or 1.5 gpm) for a 4" module, or 1300 L/h (or 5.7 gpm) for an 8" module. If the cleaning proved successful, proceed to step 6. In the case of extreme fouling, leave the cleaning solution in the system over night for an extended soak. Restart the system for about 1 hour the next day and check the permeate flow rate. Discharge the used cleaning solution.
6. Prepare a fresh cleaning solution of slightly acidic or lactic DI-water (pH 4.5-5). Flush the system with this cleaning solution.
7. Prepare a fresh cleaning solution of slightly acidic or lactic DI-water (pH 4.5-5). Circulate this solution for 30-50 minutes.
8. After draining the system, start-up up the system with electrocoat paint. Be sure that the valves at the end of the pressure vessel are completely open. Open the feed valve very slowly; opening the valve too quickly may cause water hammer and damage the elements.

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