

Membrane Autopsy

CAPABILITIES

ChemTreat Membrane autopsy capabilities include non-biased expert evaluation and inspection of membranes to identify the causes of membrane failure in microfiltration (MF), ultrafiltration (UF), nanofiltration (NF), and reverse osmosis (RO) membranes. Membrane autopsies include the physical dissection of a membrane element or module, in-depth analytical testing, results interpretation, reporting and recommendations.

ChemTreat Membrane autopsy capabilities include, but not limited to:

Exterior Inspection

Exterior inspection of membrane elements examines for:

- Physical damage or defects in O-rings and brine seals
- Anti-telescoping device (ATD) for channeling and colloidal debris
- Feed spacer being forced out may also be an indication of the fouling level

Internal Inspection

This is a destructive technique to examine the inside of the membrane. The key is to identify the foulant and then take the proper steps to treat the cause. Envelopes and feed spacers are inspected for the extent and pattern of fouling, channeling, and ungluing.

Deposit Analysis

During the internal inspection, sample of the foulant(s) are collected for analyses.

Loss on ignition (LOI) determines the amount of organic versus inorganic material in the sample. X-ray fluorescence (XRF) is used to identify the inorganic material remaining following the LOI. Scanning Electron Microscopy (SEM) with Energy Dispersive X-Ray Analysis (EDX) is used to provide photographs of the foulant layer and to detect the spatial distribution of elements in a foulant layer of the membrane.

Fourier Transform Infrared Spectroscopy (FTIR) can be used to further analyze organic material. Once a sample is scanned, it is matched using a vast library to determine its composition.

Microbiological Analysis

This analysis determines the biological activity of the sample, which includes: total bacteria count (TBC), slime-forming bacteria, sulfate-reducing bacteria, and iron-related bacteria, etc. The diversity of a biofilm can be a good indication of its maturity.

Cell Test and Cleaning Study

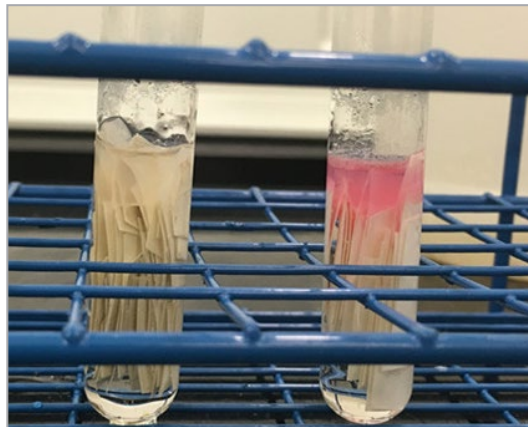
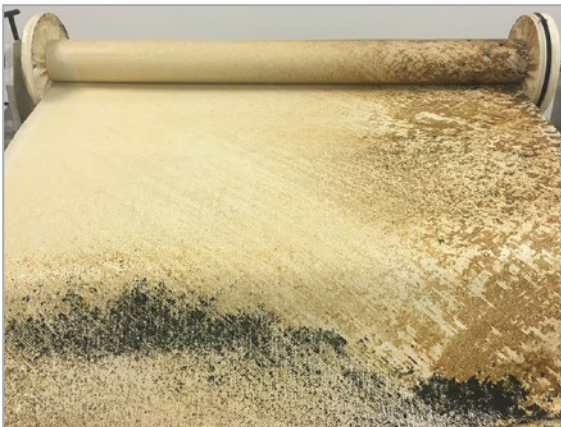
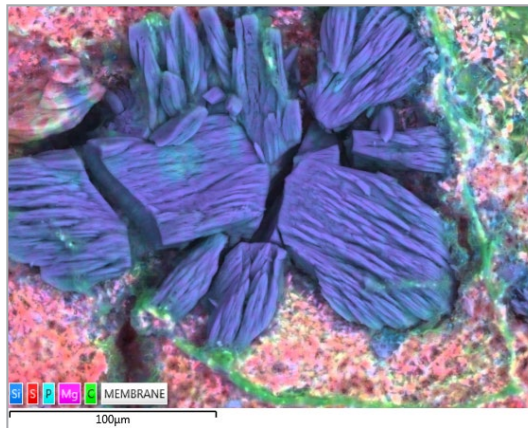
Cell testing is used to determine the performance of removed membrane samples based on the RO manufacture's standard test condition. It is also useful in the optimization of membrane cleaning procedures to improve overall element performance.

Fujiwara Test

This test is used to determine whether the membrane surface has been exposed to an oxidizing halogen, such as chlorine or bromine.

Dye Test

A dye test is performed to detect any physical defects or deterioration of the membrane surface. Areas of damage show the dye to soak through to the permeate side of the membrane.



ChemTreat cannot guarantee results.