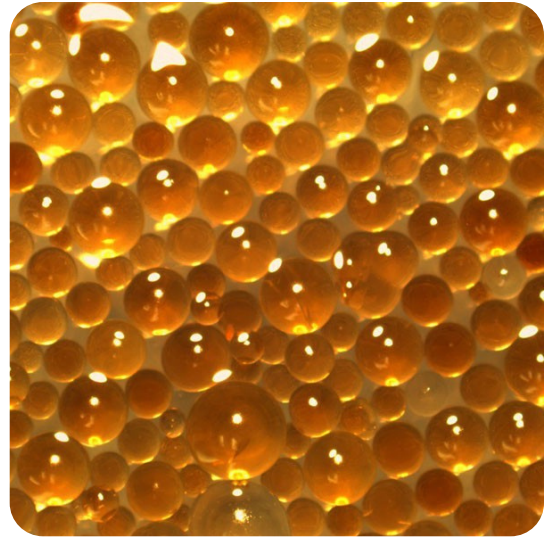


ION EXCHANGE TESTING SERVICES



ION EXCHANGE TESTING CAPABILITIES



Routine Analysis

- Water Retention Capacity
- Backwashed and Settled Density
- Particle Size Distribution (Wet Sieve)
- Salt-Splitting Capacity
- Total Capacity (anion or cation)
- Percent Regeneration
- Bead Integrity
- Organic Fouling
- Inorganic fouling (including hardness and silica)
- Cation/Anion Ratio in mixed bed systems

Non-Routine Analysis

- Optical and Electron Microscopy
- Foulant Identification

Water Treatability Suite

- Adsorption kinetic studies
- Adsorption isotherms and resin selection
- Column water treatment studies
- Regeneration studies and optimisation



membraneworks

Membrane Works
12/31 Coombes Drive
Penrith, NSW, 2750

P: 1300 910 454
info@membraneworks.com.au
www.membraneworks.com.au

ION EXCHANGE TESTING SERVICES



Membrane Works now offer extensive Ion-exchange (IX) resin testing services in our Sydney laboratory. Ion-exchange resins are commonly used to demineralise make-up water in power stations, to remove contaminants from drinking water and increasingly in process and mine water treatment.

Routine testing: of ion exchange resin is recommended to ensure optimum performance from systems such as softeners, dealkalisers, condensate polishers, deionisers, ultrapure water systems and/or demineraliser systems. For critical systems an annual resin check is recommended by manufacturers. Our analysis can be performed on any manufacturer's ion exchange resin.

Water Treatment Studies: For many challenging waters it's critical to evaluate a number of resins and real-world conditions before finalising system design. This can avoid performance issues in the future. Our treatment studies include:

- Kinetic adsorption studies to determine adsorption rates for high throughput systems such as condensate polishing
- Equilibrium adsorption studies for rapid evaluation of different resins
- Laboratory column testing to optimize treatment and evaluate breakthrough and bleed kinetics
- Regeneration and resin cleaning studies to bring resins back to peak performance

Resin troubleshooting: Our resin autopsy studies will help you solve performance issues such as poor regeneration, decreased adsorption capacity or evaluation of resin life and retirement planning. Organic fouling is commonly encountered in many resins as is inorganic scaling or physical damage caused by mechanical or chemical shocks. We can help you identify these problems ensuring smooth operation in the years to come.

ION-EXCHANGE TESTING FEATURES

- **Routine and Non-Routine testing suite**
- **Failure investigations and fouling analysis**
- **Water treatment studies**

ION-EXCHANGE TESTING BENEFITS

- **Reduce costs by identifying the correct resin up-front**
- **Improve water quality through process optimization**
- **Increase up-time and reduce cleaning frequency**

ION EXCHANGE TESTING SERVICES



Test	Importance
Resin (bead) Integrity	Resin beads can crack and degrade due to high pressure, osmotic shock or chemical damage. Broken beads fill voids to impede flow and increase bed pressure. Resin integrity uses microscopy to measure the percentage of broken and cracked beads as well as any fouling on the resin surface.
Total Exchange Capacity (TEC)	Over time, ion-exchange resins can lose functionality due to degradation or fouling. Total exchange capacity (TEC) first regenerates the resin to a known ionic form and then elutes these from the resin using an excess of a different reagent. Total Exchange Capacity is used to measure a resin's deterioration and determine if replacement is required.
Percent Regeneration	Measuring the exchange capacity of a resin directly after a plant regeneration allows us to determine regeneration efficiency. Comparing with the Total Exchange Capacity indicates whether regeneration can be improved or if a resin needs to be replaced. Field regenerated samples are expected to be in the range of 65-80% percent regeneration.
Water Retention Capacity	Measures the inherent water content of a fully hydrated resin by drying it in an oven. Elevated water content indicates degradation of the polymer chain and loss of cross-linking, while depressed water content typically results from accumulation of foulants on the beads. An increase in Water Retention Capacity is a key indicator of oxidative damage.
Organic Fouling	Measures the degree of extractable organic fouling accumulated on the resin. High levels of organics will inhibit exchange, leading to long rinse times. The expected fouling limits are: <ul style="list-style-type: none">< 5 mg/kg resin for resin less than 3 years operation< 10 mg/kg resin for resins less than 5 years operation> 10 mg/kg resin indicates replacement is required
Inorganic Fouling	Measures the degree of extractable inorganic fouling on the resin. The results can help identify fouling or regeneration issues. High-impact foulants such as aluminium, iron and silica are also detected. As a general guide <ul style="list-style-type: none">< 400 ppm is considered low> 400 to 3500 ppm is considered moderate> 3500 ppm is considered heavy
Salt-Splitting Capacity	Measures the strong base (quaternary amine) sites on an anion resin. Salt-splitting sites are necessary to remove weak acid species such as bicarbonate and silica. A reduction in SSC typically indicates an increase in weak base capacity. Most significant loss of % strong base is traceable to organic fouling and leads to poor demineraliser performance