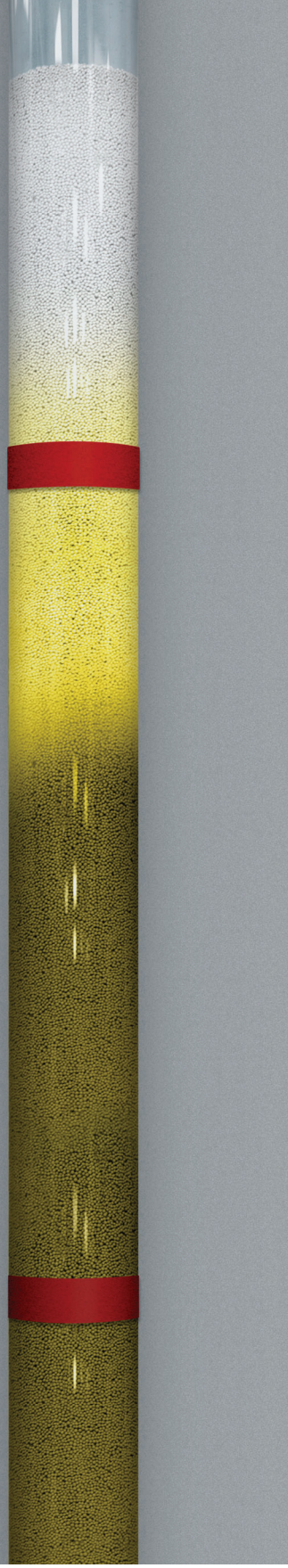
Directions to Obtain a Core Sample of an Ion Exchange Resin Bed



Proper sampling of the resin in an ion exchange unit for analysis is of paramount importance. Following these directions will help to ensure that the sample taken is representative of the whole bed.

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About Purolite

Purolite is a leading manufacturer of ion exchange, catalyst, adsorbent and specialty resins. With global headquarters in the United States of America, Purolite focuses 100% of its resources on the development and production of resin technology.

Responding to our customers' needs, Purolite has a wide variety of products and the industry's largest technical sales force. Globally, we have strategically located research and development centers and application laboratories. Our ISO 9001 certified manufacturing facilities in the USA, United Kingdom, Romania and China combined with more than 40 sales offices in 30 countries ensure complete worldwide coverage.

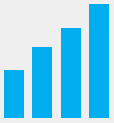
Purolite has been part of Ecolab since 2021. A trusted partner at nearly three million commercial customer locations, Ecolab (ECL) is the global leader in water, hygiene and infection prevention solutions and services. Ecolab delivers comprehensive solutions, data-driven insights and personalized service to advance food safety, maintain clean and safe environments, optimize water and energy use, and improve operational efficiencies and sustainability for customers in the food, healthcare, hospitality and industrial markets in more than 170 countries around the world.

PREMIER PRODUCTS

The quality and consistency of our products is fundamental to our performance. Throughout all Purolite plants, production is carefully controlled to ensure that our products meet the most stringent criteria, regardless of where they are produced.

RELIABLE SERVICE

We are technical experts and problem solvers. Reliable and well trained, we understand the urgency required to keep businesses operating smoothly. Purolite employs the largest technical sales team in the industry.



INNOVATIVE SOLUTIONS

Our continued investment in research and development means we are always perfecting and discovering innovative uses for ion exchange resins and adsorbents. We strive to make the impossible possible.

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Sampling Directions

Proper sampling of the resin in an ion exchange unit for analysis is of paramount importance since the results of analysis should lead to positive recommendations for cleaning or replacing the resin. Resin vessels are confined spaces and may be oxygen deficient. Follow all confined space protocols during this procedure.

Follow these directions carefully to ensure that the sample taken is representative of the whole bed:

1. Operate the unit to its normal exhaustion endpoint; backwash as usual; then regenerate and rinse as normal practice.
2. Isolate the unit; then open the drain valve after opening the manhole (a hot process or condensate polishing unit must be cooled before draining to prevent dehydration of the resin).

   Inspect the appearance of the top inlet distributor and regenerant distributor (e.g., are they level? Are the openings clogged with resin fines? Do they show any other signs of damage or abnormal condition?).
3. Drain the unit to a level slightly above (3–6") the bed surface. Observe (and record) the appearance of the bed surface (e.g., clean, dirty, level, hilly, cracks, sloped to side, pulled away from shell, or other abnormal conditions).

   Using a digital camera — take photographs. If bed surface is not level, location of high and low spots should be recorded. The cause should be established, if possible. (Possible causes: inlet distributor broken or damaged, regenerant distributor broken or damaged, underdrain system problems).
4. Measure and record the elevation of the top of the bed from a standard benchmark (e.g., from the inlet distributor or backwash outlet (this determines the actual backwash freeboard)). Calculate the actual resin bed depth, if possible.
5. Obtain a representative core sample (preferred) or a composite sample taken at three different elevations.

Retrieving the Sample

Survey the area for any safety interferences around and above the resin vessel (e.g., lighting, electrical conduits, etc.).

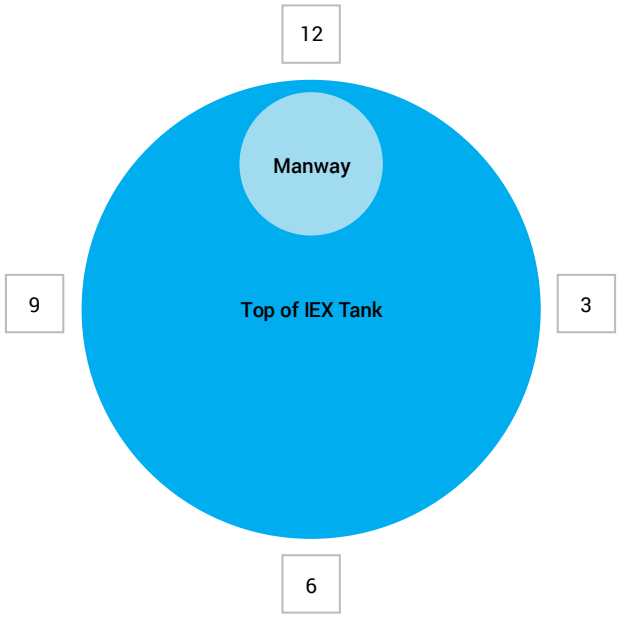
Use a 1" diameter PVC pipe with a thread end and cap at the top. Push the sampler directly down into the bed. This operation must be very carefully done gently to avoid disturbing the supporting bed or damaging the underdrain system or any mid-collector (especially if made of plastic). Attach the cap to the top and withdraw slowly with a twisting motion to retain the full depth of the core.

Empty the sample into a 5-gallon plastic bucket, and repeat sampling in a uniform pattern across the surface of the bed, if possible, until sufficient sample is collected. A minimum of 0.5 L is required for a single bed and a minimum of 1.0 L for layered or mixed beds.

For vessels 48"Ø and smaller, a sample from the middle of the vessel will provide a suitable sample. For vessels that are larger than 48"Ø, it is recommend to sample around the circumference of the bed. The samples should be kept separate in order to evaluate areas of the bed. Identify where in the bed 12, 3, 6 and 9 o'clock the samples were taken and from what reference point.

FIGURE 1

Core Sample



Sample Storage and Documentation

- Soak the resin in a container with water from an operating unit. 1/2" of water above the resin sample is sufficient.
- Identify the sample completely:
  - Resin Type:
  - Resin Manufacturer:
  - Resin Designation:
  - Type of Ion Exchange Unit:
  - Regenerant Chemical Used:
  - Is Sample Regenerated or Exhausted:
  - Resin Age:
- In cold weather, prevent the sample from freezing.
- Contact your local Purolite sales office (www.purolite.com/locations) to complete required paperwork for a resin analysis. When submitting your sample, be sure to include the resin analysis request document obtained from your Purolite representative. If specific operating problems have been encountered, any description, photographs or comments are most helpful.

Notes

Notes

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Purolite, a leading manufacturer of quality ion exchange, catalyst, adsorbent and specialty high-performance resins, focuses 100% of its resources on the development and production of resin technology.

We're ready to solve your process challenges. For further information on Purolite products and services, visit www.purolite.com or contact your nearest Technical Sales Office.

www.purolite.com

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