



Tech Fact

## Ion Exchange Resins

### Resin Sampling from an Ion Exchange Vessel

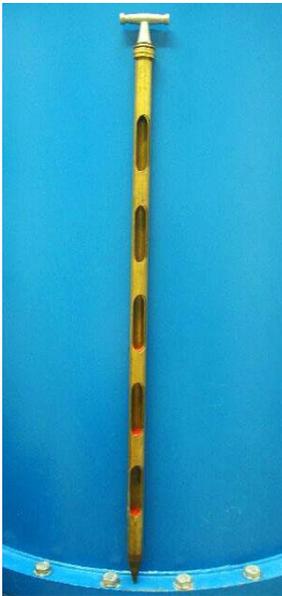
#### Introduction

Three methods are described to obtain a representative sample from a resin bed from the top of the bed to the bottom.

#### Common equipment

- 10 liter (2 to 3 gallon) clean plastic bucket
- 1 liter (1 US quart) plastic sample jars
- Plastic storage bags for secondary leak containment
- Labels

#### Method 1 using a sampling rod



*Sampling rod*

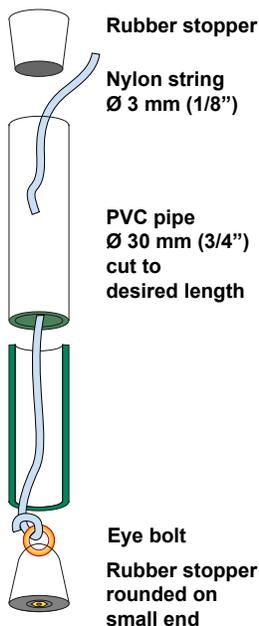
This is the recommended method. It requires a hollow sampling rod, of the type used by customs officers for grain (also called "grain thief"). This method is suitable for large resin beds with freeboard. For packed bed units, it can be applied in the backwash tower.

#### Procedure

1. Note whether the resin bed is in the exhausted or regenerated form.
2. Open the drain valve of the unit and drain the resin bed completely.
3. At the same time, open the manhole of the unit.
4. Fit planks over the surface of the resin bed.
5. Enter the unit, using a safety harness.
6. For small diameter columns (less than 1 m or 3 feet) take a sample from the center.
7. For large diameters, a sample should be taken from the center, plus three additional samples evenly spaced around a circle with a radius equal to about two-thirds of the column radius.
8. Close the hollow rod, plunge it vertically into the resin bed.
9. Open the sampling rod, rotate it, close it again and withdraw it from the bed.
10. Collect the resin sample(s).
11. Homogenize the resin sample by hand.
12. Remove the planks, close the manhole and fill the column again, preferably from the bottom.
13. Ideally, the total volume of the sample should be about three liters.
14. Divide the sample into three portions:
  - 14.1. One for immediate examination.
  - 14.2. One to be sent to the resin supplier for analysis.
  - 14.3. The last one should be retained until everything is clear.
15. Label all resin samples carefully.

**NOTE:** This procedure is not intended to act as a confined space entry procedure and all local/site precautions should be followed.

## Method 2 using a PVC pipe



This method requires a rigid PVC pipe that can be built on-site.

1. Build the device as shown in figure on the left. It is important that the lower stopper be rounded or it will not seat properly. A rubber ball may be substituted in place of the stopper, but its diameter must be larger than the diameter of the pipe.
2. Establish an open access to the resin vessel. This is a good time also to measure the resin depth and inspect the upper distributors. It is not always necessary to remove the manhole cover. If there is a nozzle larger than 5 cm (2 in), it can be used for this procedure.
3. Drain the excess water in the vessel to resin level. Make sure that no free acid or caustic is present. If necessary, rinse the resin to ensure the resins are at neutral pH.
4. Allow the lower stopper to extend 15 cm (6 in) from the bottom of the PVC pipe. Use the upper stopper to hold the string in this position.
5. Using a slow up and down motion, insert the device into the resin bed slowly. This must be done slowly to allow the resin level to equalize in the pipe. Inserting the device too fast will give you a sample of only the bottom portion of the bed.
6. When the device hits bottom, pull it back 5 to 8 cm (2 to 3 in) and pull the string to seat the lower stopper. Pushing down on the pipe will aid in seating the stopper. Stretch the string tight and insert the upper stopper to hold it.
7. Remove the device from the bed and lower the bottom end of the pipe to a person on the floor. Remove the upper stopper.
8. Remove the lower stopper and allow the resin to discharge into the bucket.
9. Prepare three specimens as described in the first method. Label them.

**WARNING:** The resin will come out with a lot of force in some cases. Use caution and wear eye protection.



### **Method 3 siphon resin using a rubber hose**

This is an emergency method to be used if no sampling rod is available or if there is not enough space to enter the ion exchange unit.

1. Open the manhole.
2. Slightly expand the resin bed by passing an upflow current of water through it.
3. Use a rubber hose fitted with a piece of steel pipe as a sinker.
4. Plunge the rubber hose into the slightly fluidized resin bed until it hits the bottom of the column.
5. Siphon a slurry of water and resin into a drum of 100 to 200 L (25 to 50 gallons) capacity.
6. Raise the steel pipe and the hose with a slow, regular movement and continue siphoning.
7. Repeat the procedure until enough resin has been collected from the unit.
8. Prepare three specimens as described in the first method. Label them.

### **Note**

If a representative sample from a resin bed from the top of the bed to the bottom cannot be taken, the sample should be labeled indicating the location from where the sample was taken (i.e., top of bed, bottom of bed).

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**WARNING:** Oxidizing agents such as nitric acid attack organic ion exchange resins under certain conditions. This could lead to anything from slight resin degradation to a violent exothermic reaction (explosion). Before using strong oxidizing agents, consult sources knowledgeable in handling such materials.

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