

# Technical Service Bulletin 904

## Conditioning of Ion Exchange Resin

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Ion exchange resins are essentially insoluble polymers and usually do not require any pretreatment before use. However, the ion exchange resins supplied contain a small amount of soluble impurities, which may need to be removed before use depending on the application. This is done to obtain high purity for the initial treated water or solution.



### Cautions

1. Familiarize yourself with the Material Safety Data Sheets (SDS) for all chemicals used.
2. Always work in well-ventilated area.
3. Wear proper PPE like tight goggles, nitrile gloves, acid/alkali proof clothing as may be required.
4. Always add acid to water.

### Warnings

1. Do not inhale vapours/fumes.
2. Avoid substance contact.
3. Do not empty acidic/alkaline contents to unspecified drains.

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### 1. Preparation for Conditioning

- 1) Load the ion exchange resin and water into the ion exchange column.
- 2) Perform a backwash to expand the resin bed by about 50%, remove the air, and arrange the ion exchange resin by particle size.
- 3) Stop the backwash and allow the resin bed to settle without disturbance.
- 4) Drain water until the water level reaches 3cm (slightly more than 1”) above the top of the ion exchange resin bed.

### 2. Anion Exchange Resin Conditioning

No.	Conditioning	Remarks
1	Pass 1.5N (N, normality) sodium hydroxide (NaOH) through at twice the volume of the resin.	20min
2	Rinse with Feed water at five times the volume of the resin to remove residual sodium hydroxide. Maintain the water level at 3cm above the top of the resin bed.	30min
3	Pass 2.0N hydrochloric acid (HCl) through at twice the volume of the resin.	20min
4	Rinse with Feed water at five times the volume of the resin to remove residual hydrochloric acid. Maintain the water level at 3cm above the top of the resin bed.	30min
5	Repeat the steps of sodium hydroxide injection → wash → hydrochloric acid injection → wash from 1) to 4).	
6	If a high purity resin bed is required, pass a polar solvent such as acetone or ethanol through at twice the volume of the resin, followed by rinsing.	
7	Once conditioning is complete, the ion exchange resin is in the Cl form. To change it to the OH form, regeneration is performed through steps 1) → 2), followed by rinsing with DM/Ultrapur water until the rinse water pH reaches 9.0.	

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### 3. Cation Exchange Resin Conditioning

No.	Conditioning	Remarks
1	Pass 2.0N hydrochloric acid (HCl) through at twice the volume of the resin.	20min
2	Rinse with water at five times the volume of the resin to remove residual hydrochloric acid. Maintain the water level at 3cm above the top of the resin bed.	30min
3	Pass 1.5N sodium hydroxide (NaOH) through at twice the volume of the resin. (For weakly acidic cation exchange resins that swell when converted to the Na form, this can cause compaction of the resin bed and risk of damage to the ion exchange column. Therefore, it is advisable to pass the sodium hydroxide up-flow and special care is needed depending on the size of the ion exchange column.)	20min
4	Rinse with water at five times the volume of the resin to remove residual sodium hydroxide. Maintain the water level at 3cm above the top of the resin bed.	30min
5	Repeat the steps of hydrochloric acid injection → wash → sodium hydroxide injection → wash from ① to ④.	
6	If a high purity resin bed is required, pass boiling water through for about 30 minutes, allow to cool, then pass a polar solvent such as methanol, acetone, or ethanol through at twice the volume of the resin, followed by rinsing with DM/ultrapure water.	
7	Once conditioning is complete, the ion exchange resin is in the Na form. To change it to the H form, regeneration is performed through steps ① → ②, followed by rinsing with DM/ultrapure water until the rinse water pH reaches 4.0.	

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