

# Technical Service Bulletin 911

## Troubleshooting of Cation Column

Performance problems in ion exchange systems are usually characterized by shortened useful operating cycles and/or a significant drop in water quality produced by the unit. These conditions usually show up when conductivity or analytical tests indicate the system is failing to meet effluent purity standards or is exhausting before the normal water throughput is reached. Some of the more common reasons for cation ion exchange performance issues are listed below.

### 1. Reduced Production Capacity

No.	Possible Cause	Corrective Measure
1	Leaking Valves	Leaking backwash inlet valve can affect the outlet quality, misleading one to believe that bed has exhausted. Check all valves for tightness, replace/repair as the case may be.
2	Instrumentation	Check if flow meter & totalizer is working properly. Rectify/Calibrate if found faulty.
3	Regenerant	Check if Acid quantity, concentration and quality is as specified. In case of H <sub>2</sub> SO <sub>4</sub> regeneration ensure two step regeneration is done.
4	Regenerant	Check regenerant flow and timing is maintained during the regeneration cycle. Slow rinse cycle should not be cut short to save time, slow rinse time should be as long as injection time as a minimum.
5	Change in Feed Analysis	Simultaneously check the feed water quality if there is increase in TDS, Hardness or Sodium levels. In such case increase the regeneration level.

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### 2. Hardness Leakage (Decreased Purity of Produced water)

No.	Possible Cause	Corrective Measure
1	Leaking Valves	Leaking backwash inlet valve can affect the outlet quality, resulting in poor outlet quality. Check all valves for tightness, replace/repair as the case may be.
2	Regenerant	Check if Acid quantity, concentration and quality is as specified. In case of H <sub>2</sub> SO <sub>4</sub> regeneration ensure two step regeneration is done.
3	Regenerant	Check regenerant flow and timing is maintained during the regeneration cycle Slow rinse cycle should not be cut short to save time, slow rinse time should be as long as injection time as a minimum.
4	Change in Feed Analysis	Simultaneously check the feed water quality if there is increase in TDS, Hardness or Sodium levels. In such case increase the regeneration level.
5	Resin Fouling	Take sample of the Resin for testing. Check for any fouling & carry our de-fouling as per TSB 909
6	Resin Quantity	Please check the resin quantity is as per design or not. The resin level should be visible at the lower glass of the resin column. If level is less, top up with new resin.

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### 3. Pressure Drop Increase

No.	Possible Cause	Corrective Measure
1	Faulty Valves	Check if Valves are not stuck in the partially open position. In Acidic corrosive environment valves may get stuck.
2	High Flow Rate	Check the flow in flow meter, correct flow to design value.
3	Bottom Collector Choked	Strainer buttons get choked due to resin fines. An extended backwash might help in removing the fines stuck in the strainer button slits. In case it doesn't work, open top manhole & observe the Backwash distribution pattern. It should reveal if bed is choked. If bed is choked, remove the resin, clean strainer buttons/bottom collector screens & reload resin.
4	Increased Suspended Solids	Improve pretreatment/Filter operations. Increase backwash period to properly loosen the resin bed.
5	Fouling by Iron or Calcium Sulphate.	Analyze feed water for Fe. In case Fe is present, carry out Iron de-fouling as per TSB 909. Check the H <sub>2</sub> SO <sub>4</sub> concentration in case of CaSO <sub>4</sub> fouling. In step wise regeneration do not exceed 2% in first step & 4 % in second step.
6	Bio growth in Resin Bed.	Check pre-treatment for presence of Organic matter. Improve pre-chlorination. Carry out de-fouling as per TSB 909
7	Compacted Bed	If in previous cycles backwash is not properly carried out in case of co-current vessels or more than 7-8 cycles are run without backwash in case of counter current regeneration, bed would get compacted, especially in second scenario. Carry out extended backwash to de-compact the resin bed.
8	Resin Fines	Excessive resin fines will lead to increased pressure drop. Carryout extended backwash & scrape off the top layer of fines & replace with fresh resin.
9	Excessive Resin	Ensure only required volume is filled in the column. Remove excess resin.

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