



## DOWEX™ Ion Exchange Resins

### Procedure for Removing Iron from Anion Resins

#### Introduction

Iron has a complex chemistry and may be present in the feed stream as inorganic precipitates (oxides/hydroxides) or as organometallic complexes. In water treatment applications, the metal is generally converted to the less soluble Fe III (ferric) form within the resin bed.

Two possible cleaning procedures are described: acid wash with HCl at high concentration or treatment with the reducing agent sodium dithionite ( $\text{Na}_2\text{S}_2\text{O}_4$ ) to convert Fe III to the more soluble Fe II (ferrous).

If only downflow chemical injection is possible, backwash the bed to loosen and clean it prior to the treatment and then lower the water level down to 10 cm above the resin level.

The resin should be first backwashed or treated with NaCl solution when organic fouling is suspected to ensure a good contact with the Fe cleaning solution. The NaCl solution may partially remove iron.

The detailed cleaning steps have to be adapted to each regeneration process (coflow, different types of counterflows).

Used, mechanically weak resins, may suffer from large osmotic (fast swell/shrink) and mechanical (air scrubbing) strains. It is advisable to use gradual changes in solution concentrations and to minimize the mechanical stress.

#### Acid Wash with HCl at High Concentration

The recommended procedure for acid washing is detailed below.

To avoid silica precipitation/polymerization, if the resin was highly loaded with silica during the cycle, it should be first regenerated.

The acid concentration should be increased gradually to avoid excessive osmotic stress to the resin.

1. Exhaust the resin.
2. Pass upflow 1-2 bed volumes of a 2% HCl solution at a contact time of 30 minutes.
3. Pass upflow 1 bed volume of a 10% HCl solution at a contact time of 30 minutes.
4. Leave to soak for 2-4 hours.
5. Displace upflow with 2-3 bed volumes water.
6. Rinse out with 3-5 bed volumes DI water (downflow).
7. Double regenerate the resin (same NaOH concentration, but twice as long).

Treatment with the Reducing Agent Sodium Dithionite to Convert Fe III to the more Soluble Fe II

The recommended procedure for Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub> treatment is detailed below.

Do not use air brushing to agitate the resin bed as this will impair the reducing agent performance.

1. Exhaust the resin.
2. Pass upflow 1-2 bed volumes of a 5% Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub> solution at a contact time of 30 minutes.
3. Leave to soak for 2 hours.
4. Pass upflow 1 bed volume of a 5% Na<sub>2</sub>S<sub>2</sub>O<sub>4</sub> solution at a contact time of 30 minutes.
5. Leave to soak for up to 24 hours if possible.
6. Displace upflow with 2-3 bed volumes water.
7. Rinse out with 3-5 bed volumes DI water (downflow).
8. Double regenerate the resin (same NaOH concentration, but twice as long).

**DOWEX™ Ion Exchange Resins**  
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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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