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# DOWEX™ NSR-1

A Strong Base, Nitrate Selective, Anion Exchange Resin

| Product | Type | Matrix | Functional group |
|---|---|---|---|
| DOWEX™ NSR-1 | Triethylamine strong base anion | Styrene-DVB, macroporous | Quaternary amine |

## Guaranteed Sales Specifications

| | | |
|---|---|---|
| Total exchange capacity, min. | | 0.9 min |
| Water content | % | 53 - 63 |
| Bead size distribution | | |
| Particle size (mesh) | Mesh, thru 14 | 100 max |
| | On 16 mesh | 3 max |
| | Thru 40 mesh | 5 max |

## Typical Physical and Chemical Properties

| | | |
|---|---|---|
| Ionic form as delivered | | $Cl^-$ |
| Total shrink ($Cl \Rightarrow NO_3$), approx. | % | 5 |
| Whole uncracked beads, min. | % | 90 |
| Particle density | g/mL | 0.68 |
| Shipping weight** | $lbs/ft^3$ | 42 |

## Recommended Operating Conditions

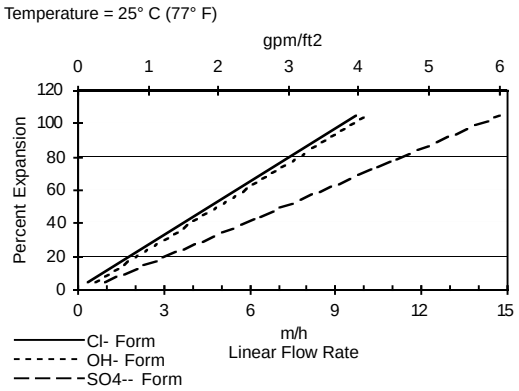
- Maximum operating temperature:
  - $Cl^-$ form: 100°C (212°F)
- pH range: 0 - 14
- pH range operational: 4.5 - 8.5
- Bed depth, min.: 800 mm (2.6 ft)
- Flow rates:
  - Service/fast rinse: 5 - 60 m/h (2 - 24 $gpm/ft^2$)
  - Backwash: See Figure 1
  - Co-current regeneration/displacement rinse: 1 - 10 m/h (0.4 - 4 $gpm/ft^2$)
  - Counter-current regeneration/displacement rinse: 5 - 20 m/h (2 - 8 $gpm/ft^2$)
- Total rinse requirement: 3 - 6 bed volumes (0.3 - 0.6 $gpm/ft^2$)
- Regenerant:
  - Type: NaCl (3 - 10%)
  - Temperature: Ambient or up to 50°C (122°F)
- Organic loading, max.: 3 g $KMnO_4$/L resin

** As per the backwashed and settled density of the resin, determined by ASTM D-2187.

## Typical Properties and Applications

DOWEX™ NSR-1 is a macroporous strong base anion resin supplied in the $Cl^-$ form, based upon a triethylamine chemistry. The NSR-1 is designed to have better selectivity for nitrate in the presence of moderate to high concentrations of sulfate ions, as compared to standard type I or type II strong base anion resins. The DOWEX NSR-1 resin is certified under ANSI STD 61, making DOWEX NSR-1 the resin of choice for nitrate retention and removal from water streams that also contain sulfate.

## Figure 1. Backwash Expansion Data

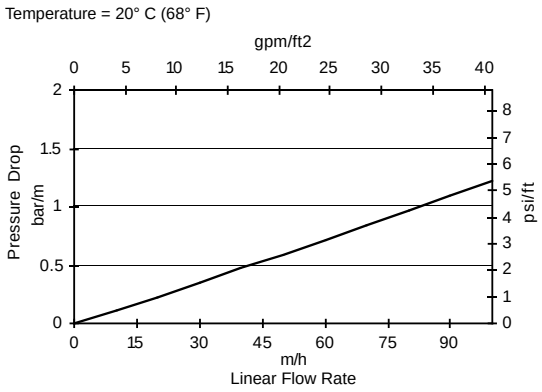



**For other temperatures use:**

$F_T = F_{77°F}$ [1+ 0.008 ($T_{°F}$ -77)], where F ≡ gpm/ft$^2$

$F_T = F_{25°C}$ [1+ 0.008 (1.8$T_{°C}$ - 45)], where F ≡ m/h

## Figure 2. Pressure Drop Data




**For other temperatures use:**

$P_T = P_{20°C}$ / (0.026 $T_{°C}$ + 0.48), where P ≡ bar/m

$P_T = P_{68°F}$ / (0.014 $T_{°F}$ + 0.05), where P ≡ psi/ft

Note: These resins may be subject to drinking water application restrictions in some countries: please check the application status before use and sale.





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