

**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 ⁻ ⇒ NO ₃ ⁻), approx.	%	5
Whole uncracked beads, min.	%	90
Particle density	g/mL	0.68
Shipping weight**	lbs/ft ³	42

**Recommended
Operating
Conditions**

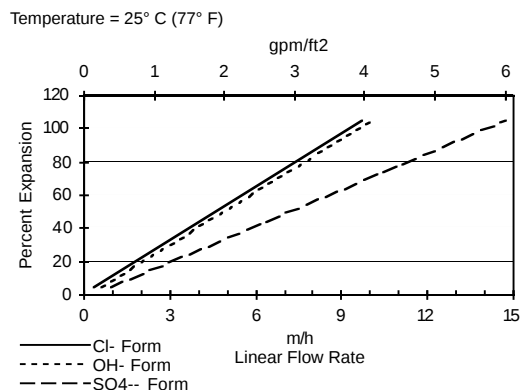
- Maximum operating temperature:
Cl⁻ form 100°C (212°F)
- pH range 0 - 14
- pH range operational 4.5 - 8.5
- Bed depth, min. 800 mm (2.6 ft)
- Flow rates:
 - Service/fast rinse 5 - 60 m/h (2 - 24 gpm/ft²)
 - Backwash See Figure 1
 - Co-current regeneration/displacement rinse 1 - 10 m/h (0.4 - 4 gpm/ft²)
 - Counter-current regeneration/displacement rinse 5 - 20 m/h (2 - 8 gpm/ft²)
- Total rinse requirement 3 - 6 bed volumes (0.3 - 0.6 gpm/ft²)
- Regenerant:
 - Type NaCl (3 - 10%)
 - Temperature Ambient or up to 50°C (122°F)
- Organic loading, max. 3 g KMnO₄/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

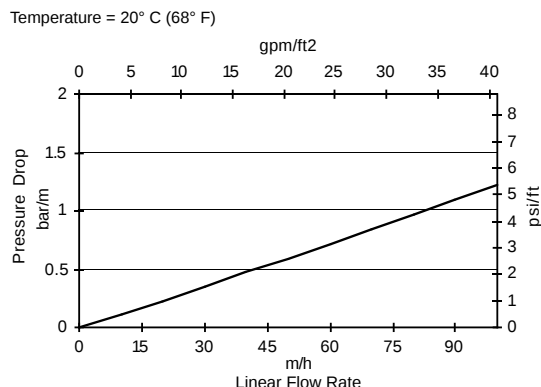


For other temperatures use:

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

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

Figure 2. Pressure Drop Data



For other temperatures use:

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

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

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

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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