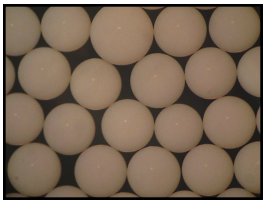
Product Data Sheet

AMBERLITE™ HPR9000 OH Ion Exchange Resin

Uniform Particle Size, Macroporous, Strong Base Anion Exchange Resin for Condensate Polishing and Mixed Bed Demineralization Applications for the Power Industry

Description



AMBERLITE™ HPR9000 OH Ion Exchange Resin is a premium-quality resin designed specifically for use in nuclear condensate polishing mixed beds and other regenerable mixed beds when highest resin purity and water quality are required.

The special dimensioning and consistency of the macroporous structure of AMBERLITE™ HPR9000 OH provides exceptional resistance to surface fouling as well as physical, osmotic, and oxidative stresses, which allows increased resin lifetime in operation.

AMBERLITE™ HPR9000 OH can operate reliably under the high flowrate and pressure drop conditions that are typically used in condensate polishers, and the particle size, uniformity, and white cream color resin allow for excellent, easy, and visible backwash separation when used in mixed beds.

AMBERLITE™ HPR9000 OH can be perfectly paired with several cation exchange resins and the selection depends on plant operation:

- When highest water quality and longest runtime are needed, AMBERLITE™ HPR1600 H Ion Exchange Resin is the best choice due to its exceptional chemical stability and high capacity.
- For a cation resin that balances capacity and regenerability, AMBERLITE™ HPR650 H Ion Exchange Resin is a trusted choice.
- For systems running with ETA chemistry, AMBERLITE™ HPR1400 H Ion Exchange Resin should be the choice to maximize the protection of the anion resin kinetics.
- For longest runtime in amine cycle operation or in the most oxidative environments, AMBERLITE™ HPR2000 H Ion Exchange Resin is the best choice due to its high sodium selectivity and excellent oxidative stability.

Resin Pairings

Recommended pairing:

- AMBERLITE™ HPR1600 H Ion Exchange Resin (gel)
- AMBERLITE™ HPR650 H Ion Exchange Resin (gel)
- AMBERLITE™ HPR1400 H Ion Exchange Resin (gel)
- AMBERLITE™ HPR2000 H Ion Exchange Resin (macroporous)

Additional options:

- AMBERLITE™ HPR2800 H Ion Exchange Resin (macroporous)

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Applications

- Condensate treatment
  - Mixed bed condensate polishing in PWR nuclear power plants
  - Mixed bed condensate polishing in fossil power plants
  - Condensate polishing air-cooled condenser systems
  - Start-up regenerable condensate polishing systems in nuclear power plants
- Demineralization
  - Ideally when treating water with:
    - High organic fouling potential
    - High percentage of silica
  - When the treatment goal is:
    - Removal of strong and weak acids
    - Lowest silica leakage
- Polishing
  - Mixed bed polishing in industrial demineralization
  - Single bed industrial demineralization requiring high water purity
  - Mixed beds requiring exceptional resistance to surface fouling and/or physical, osmotic and oxidative stresses

System Designs

- Co-current
- Counter-current / Hold-down
- Packed beds
- Mixed beds

Historical Reference

AMBERLITE™ HPR9000 OH Ion Exchange Resin has previously been sold as AMBERJET™ 9000 OH Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Macroporous
Type	Strong base anion
Functional Group	Trimethylammonium
Physical Form	Light tan, opaque, spherical beads
Chemical Properties	
Ionic Form as Shipped	OH^-
Total Exchange Capacity	≥ 0.80 eq/L (OH^- form)
Water Retention Capacity	66.0 – 75.0% (OH^- form)
Ionic Conversion	
OH^-	≥ 95.0%
CO_3^{2-}	≤ 5.0%
Cl^-	≤ 0.20%
Particle Size	
Particle Diameter [§]	650 ± 50 µm
Uniformity Coefficient	≤ 1.20
< 300 µm	≤ 0.3%
< 425 µm	≤ 2.0%
> 850 µm	≤ 5.0%
Purity	
Metals, dry basis:	
Na	≤ 50 mg/kg
K	≤ 50 mg/kg
Fe	≤ 50 mg/kg
Cu	≤ 10 mg/kg
Ca	≤ 50 mg/kg
Mg	≤ 50 mg/kg
Al	≤ 50 mg/kg
Heavy Metals (as Pb)	≤ 10 mg/kg
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Cl^- \rightarrow OH^-$ ≤ 25%
Density	
Particle Density	1.05 g/mL
Shipping Weight	660 g/L

[§] For additional particle size information, please refer to the Particle Size Distribution Cross Reference Chart (Form No. 177-01775).

Suggested Operating Conditions

Temperature Range (OH^- form) [‡]	5 – 100°C (41 – 212°F)
pH Range (Stable)	0 – 14

[‡] Operating at elevated temperatures, for example above 60 – 70°C (140 – 158°F), may impact the purity of the loop and resin life. Contact our technical representative for details.

For additional information regarding recommended minimum bed depth, operating conditions, and regeneration conditions for mixed beds (Form No. 177-03705) or separate beds (Form No. 177-03729) in water treatment, please refer to our Tech Facts.

Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ HPR9000 OH Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR9000 OH as a function of service flowrate and temperature is shown in Figure 2. These pressure drop expectations are valid at the start of the service run with clean water.

Figure 1: Backwash Expansion

Temperature = 10 – 60°C (50 – 140°F)

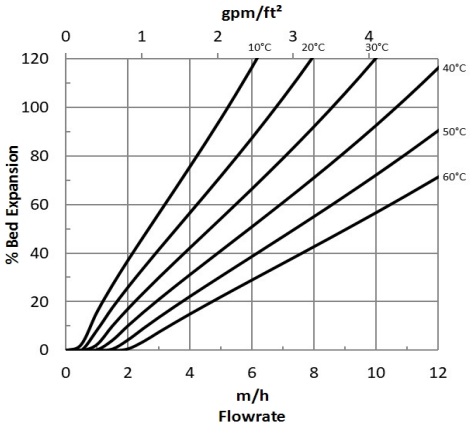
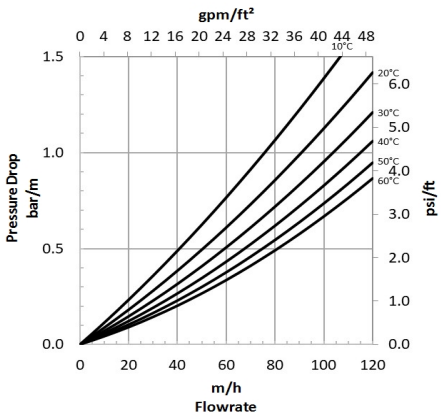


Figure 2: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)



Product Stewardship

DuPont has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with DuPont products— from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

DuPont strongly encourages its customers to review both their manufacturing processes and their applications of DuPont products from the standpoint of human health and environmental quality to ensure that DuPont products are not used in ways for which they are not intended or tested. DuPont personnel are available to answer your questions and to provide reasonable technical support. DuPont product literature, including safety data sheets, should be consulted prior to use of DuPont products. Current safety data sheets are available from DuPont.

Please be aware of the following:

- **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.

Have a question? Contact us at:

www.dupont.com/water/contact-us

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