

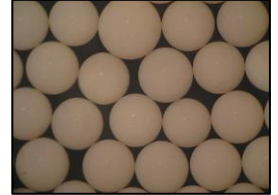


## **AMBERLITE™ HPR9000 SO<sub>4</sub> Ion Exchange Resin**

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

### **Description**

AMBERLITE™ HPR9000 SO<sub>4</sub> Ion Exchange Resin is specifically designed for use in regenerable mixed beds when a balance of operating performance, simple operation, long resin life, and cost-effective operation is required.



The special dimensioning and consistency of the macroporous structure of AMBERLITE HPR9000 SO<sub>4</sub> provides exceptional resistance to surface fouling as well as physical, osmotic, and oxidative stresses, which allows increased resin lifetime in operation.

AMBERLITE HPR9000 SO<sub>4</sub> 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 SO<sub>4</sub> can be perfectly paired with several cation exchange resins and the selection depends on your plant's 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.
- In the most oxidative environments, AMBERLITE™ HPR2000 H Ion Exchange Resin is the best choice due to its excellent oxidative stability.

When compliance with the China National Standard specifications for fossil power condensate polishing applications, including the China Strong Osmotic Ball Mill test, is important, AMBERLITE™ HPR2800 H Ion Exchange Resin is the recommended cation pair since both resins are compliant with the standard.

## Resin Pairings

Recommended pairing:

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

Additional options:

- AMBERLITE™ HPR2800 H Ion Exchange Resin (macroporous)

## Applications

- Mixed bed condensate polishing in fossil power plants
- 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
- 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 SO<sub>4</sub> Ion Exchange Resin has previously been sold as AMBERJET™ 9000C SO<sub>4</sub> Ion Exchange Resin.

## Typical Physical and Chemical Properties\*\*

<b>Physical Properties</b>	
Copolymer	Styrene-divinylbenzene
Matrix	Macroporous
Type	Strong base anion
Functional Group	Trimethylammonium
Physical Form	Light tan, opaque, spherical beads
<b>Chemical Properties</b>	
Ionic Form as Shipped	SO <sub>4</sub> <sup>2-</sup>
Total Exchange Capacity	≥ 1.0 eq/L (Cl <sup>-</sup> form)
Water Retention Capacity	60.0 – 68.0% (Cl <sup>-</sup> form)
<b>Particle Size</b>	
Particle Diameter §	650 ± 50 µm
Uniformity Coefficient	≤ 1.20
< 300 µm	≤ 0.3%
< 425 µm	≤ 2.0%
> 850 µm	≤ 5.0%
<b>Purity</b>	
Metals, dry basis:	
Fe	≤ 50 mg/kg
<b>Stability</b>	
Whole Uncracked Beads	≥ 95%
Strong Osmotic Ball Mill Test	≥ 92%
Swelling	Cl <sup>-</sup> → OH <sup>-</sup> ≤ 25%
	SO <sub>4</sub> <sup>2-</sup> → OH <sup>-</sup> ≤ 15%
<b>Density</b>	
Particle Density	1.09 g/mL
Shipping Weight	695 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 <sup>-</sup> 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.

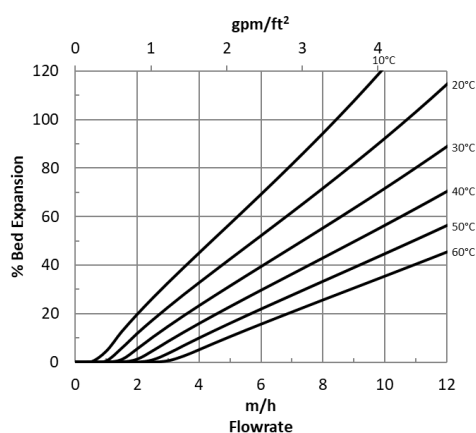
## Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ HPR9000 SO<sub>4</sub> Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE HPR9000 SO<sub>4</sub> 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.

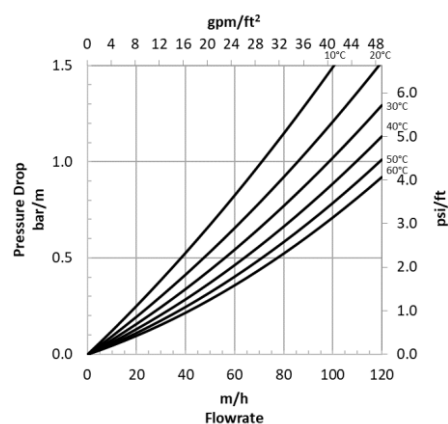
**Figure 1: Backwash Expansion**

Temperature = 10 – 60°C (50 – 140°F)



**Figure 2: Pressure Drop**

Temperature = 10 – 60°C (50 – 140°F)



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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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