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DUPONT ION EXCHANGE RESINS

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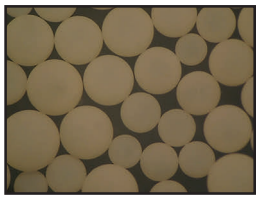
AMBERLITE™ IRC83 H

DUPONT™

AMBERLITE™ IRC83 H Ion Exchange Resin

Gaussian, Acrylic, Macroporous, Weak Acid Cation Exchange Resin for Industrial Demineralization, Softening, and Dealkalization Applications

Description



AMBERLITE™ IRC83 H Ion Exchange Resin is a general-purpose dealkalization and softening resin with a long-established track record of reliable performance in the industry. This industry-staple resin is designed for co-flow regenerated systems in variety of industrial water treatment applications.

When AMBERLITE™ IRC83 H is operated in the Na-form, it will remove total hardness even in high salinity waters such as those in oilfield SAGD systems. When operated in the H-form, it will remove only the hardness associated with alkalinity—a weak acid cation resin operated in the H-form is well-suited for use with strong acid cation resins to improve overall efficiency and throughput of a demineralization system by reducing the hardness exposure on the strong acid cation resin.

In Na-form softening operation, AMBERLITE™ IRC83 H enables improved operating capacity for total hardness versus other weak acid cation resins currently available, which allows more competitive vessel design or extended production capacity when installed in existing systems.

In dealkalization, AMBERLITE™ IRC83 H has demonstrated improved operating capacity versus other weak acid cation resins currently available, which allows users to simultaneously minimize operating costs and environmental impacts while also preserving precious raw water resources under the right conditions.

In reverse osmosis pretreatment, AMBERLITE™ IRC83 H can protect the membrane from hardness scaling, which can improve system recovery and operational reliability and can eliminate the use of chemicals such as antiscalants or acids for RO feedwater pH control. The resin's ability to soften high-salinity feedwaters enables the RO to reliably operate under extremely variable and/or harsh conditions, such as with wastewater reuse or minimal liquid discharge.

Applications

- Demineralization, ideally when treating water with:
  - High oxidant level (among WAC resins)
  - Total hardness to alkalinity ratio > 0.8
- Industrial softening
- High-salinity softening (operated in the Na-form)
- Dealkalization
- Reverse osmosis pretreatment
- Steam-assisted gravity drainage (SAGD)

System Designs

- Co-current

Historical Reference

AMBERLITE™ IRC83 H Ion Exchange Resin has previously been sold as AMBERLITE™ IRC83 Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Crosslinked acrylic
Matrix	Macroporous
Type	Weak acid cation
Functional Group	Carboxylic acid
Physical Form	Off-white, opaque, spherical beads
Chemical Properties	
Ionic Form as Shipped	H^+
Total Exchange Capacity	≥ 4.7 eq/L (H^+ form)
Water Retention Capacity	40.0 – 50.0% (H^+ form)
Particle Size §	
Particle Diameter	500 – 750 µm
Uniformity Coefficient	≤ 1.6
< 300 µm	≤ 1.0%
> 1180 µm	≤ 1.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$H^+ \rightarrow Na^+$ ≤ 60%
Density	
Particle Density	1.21 g/mL
Shipping Weight	760 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	
H^+ form	5 – 120°C (41 – 248°F)
Na^+ form	5 – 120°C (41 – 248°F)
pH Range	
Service Cycle	6 – 14
Stable	0 – 14

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

Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ IRC83 H Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ IRC83 H 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 and a well-classified bed.

Figure 1: Backwash Expansion
Temperature = 10 – 60°C (50 – 140°F)

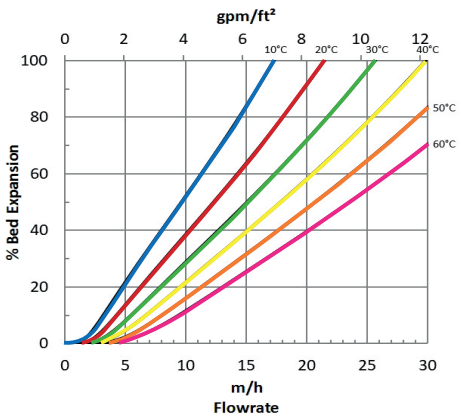
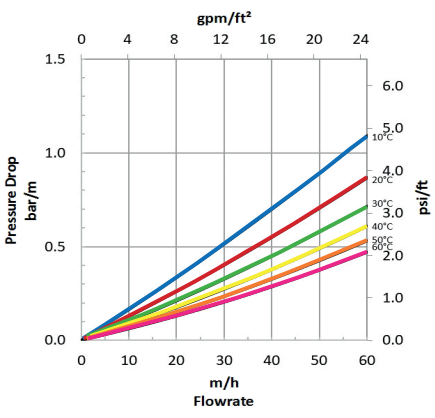


Figure 2: Pressure Drop
Temperature = 10 – 60°C (50 – 140°F)



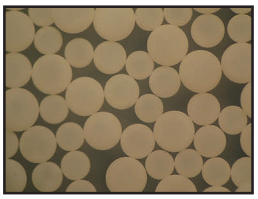
AMBERLITE™ HPR8300 H

DUPONT™

AMBERLITE™ HPR8300 H Ion Exchange Resin

Acrylic, Macroporous, Weak Acid Cation Exchange Resin for Industrial Demineralization, Softening, and Dealkalization Applications

Description



AMBERLITE™ HPR8300 H Ion Exchange Resin is a high-quality resin for use in industrial demineralization and softening applications when high performance and cost-effective operation is required. The exceptionally high total capacity and the particle size of the resin help yield excellent operating capacity and rinse characteristics, while reducing chemical regenerant and water usage.

When AMBERLITE™ HPR8300 H is operated in the Na-form, it will remove total hardness even in high salinity waters. When operated in the H-form, it will remove only the hardness associated with alkalinity—a weak acid cation resin operated in the H-form is well-suited for use with strong acid cation resins to improve overall efficiency and throughput of a demineralization system by reducing the hardness exposure on the strong acid cation resin.

In Na-form softening operation, AMBERLITE™ HPR8300 H enables improved operating capacity for total hardness versus other weak acid cation resins currently available, which allows more competitive vessel design or extended production capacity when installed in existing systems.

In dealkalization, AMBERLITE™ HPR8300 H has demonstrated improved operating capacity versus other weak acid cation resins currently available, which allows users to simultaneously minimize operating costs and environmental impacts while also preserving precious raw water resources under the right conditions.

In reverse osmosis pretreatment, AMBERLITE™ HPR8300 H can protect the membrane from hardness scaling, which can improve system recovery and operational reliability and can eliminate the use of chemicals such as antiscalants or acids for RO feedwater pH control. The resin's ability to soften high-salinity feedwaters enables the RO to reliably operate under extremely variable and/or harsh conditions, such as with wastewater reuse or minimal liquid discharge.

AMBERLITE™ HPR8300 H is compatible with all system designs and bed configurations. In layered beds, AMBERLITE™ HPR8300 H should be paired with gel AMBERLITE™ HPR1300 H Ion Exchange Resin for the highest operating capacity and for more challenging circumstances, AMBERLITE™ HPR2800 H Ion Exchange Resin would be the preferred option.

Applications

- Demineralization, ideally when treating water with:
  - High oxidant level (among WAC resins)
  - Total hardness to alkalinity ratio > 0.8
- Industrial softening
- High-salinity softening (operated in the Na-form)
- Dealkalization
- Reverse osmosis pretreatment

System Designs

Compatible with all system technologies and bed configurations:

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

Historical Reference

AMBERLITE™ HPR8300 H Ion Exchange Resin has previously been sold as DOWEX MARATHON™ 8300 Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Crosslinked acrylic
Matrix	Macroporous
Type	Weak acid cation
Functional Group	Carboxylic acid
Physical Form	Off-white, opaque, spherical beads
Chemical Properties	
Ionic Form as Shipped	H^+
Total Exchange Capacity	≥ 4.7 eq/L (H^+ form)
Water Retention Capacity	40.0 – 50.0% (H^+ form)
Particle Size [§]	
Particle Diameter	450 – 600 µm
Uniformity Coefficient	≤ 1.4
< 300 µm	≤ 0.1%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$H^+ \rightarrow Na^+$: 60%
Density	
Particle Density	1.21 g/mL
Shipping Weight	760 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	
H^+ form	5 – 120°C (41 – 248°F)
Na^+ form	5 – 120°C (41 – 248°F)
pH Range	
Service Cycle	6 – 14
Stable	0 – 14

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

Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ HPR8300 H Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR8300 H 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 and a well-classified bed.

Figure 1: Backwash Expansion

Temperature = 10 – 60°C (50 – 140°F)

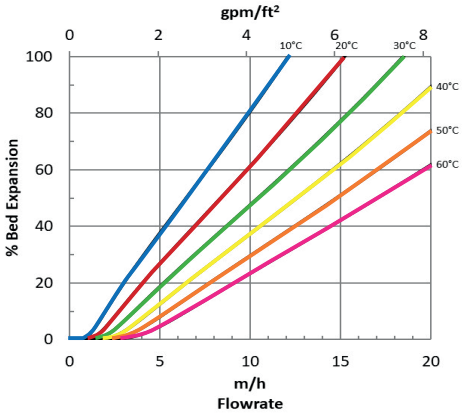
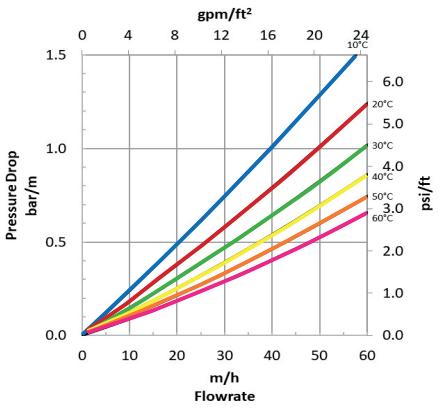


Figure 2: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)



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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.

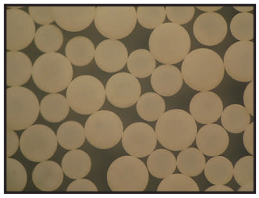
AMBERLITE™ HPR8400 H

DUPONT™

AmberLite™ HPR8400 H Ion Exchange Resin

Acrylic, Macroporous, Weak Acid Cation Exchange Resin for Industrial Demineralization, Softening, and Dealkalization Applications

Description



AmberLite™ HPR8400 H Ion Exchange Resin is a high-quality resin for use in industrial demineralization and softening applications when high performance and cost-effective operation is required. The exceptionally high total capacity and the larger particle size of the resin help yield excellent operating capacity with low pressure drop, while reducing chemical regenerant and water usage.

When operated in the H-form, it will remove only the hardness associated with alkalinity—a weak acid cation resin operated in the H-form is well-suited for use with strong acid cation resins to improve overall efficiency and throughput of a demineralization system by reducing the hardness exposure on the strong acid cation resin.

AmberLite™ HPR8400 H offers increased total capacity compared to the existing WAC resins available, which could allow users to simultaneously minimize operating costs and environmental impacts while also preserving precious raw water resources under the right operating conditions.

When AmberLite™ HPR8400 H is operated in the Na-form, it will remove total hardness even in high salinity waters.

In Na-form softening operation, AmberLite™ HPR8400 H enables improved operating capacity for total hardness versus other weak acid cation resins currently available, which allows more competitive vessel design or extended production capacity when installed in existing systems.

In reverse osmosis pretreatment, AmberLite™ HPR8400 H can protect the membrane from hardness scaling, which can improve system recovery and operational reliability and can eliminate the use of chemicals such as antiscalants or acids for RO feedwater pH control. The resin's ability to soften high-salinity feedwaters enables the RO to reliably operate under extremely variable and/or harsh conditions, such as with wastewater reuse or minimal liquid discharge.

Applications

- Demineralization, ideally when treating water with:
  - High oxidant level (among WAC resins)
  - Total hardness to alkalinity ratio > 0.8
- Industrial softening
- High-salinity softening (operated in the Na-form)
- Dealkalization
- Reverse osmosis pretreatment

System Designs

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

Typical Properties

Physical Properties	
Copolymer	Crosslinked acrylic
Matrix	Macroporous
Type	Weak acid cation
Functional Group	Carboxylic acid
Physical Form	Off-white, opaque, spherical beads
Chemical Properties	
Ionic Form as Shipped	H^+
Total Exchange Capacity	≥ 4.7 eq/L (H^+ form)
Water Retention Capacity	40.0 – 50.0% (H^+ form)
Particle Size §	
Particle Diameter	600 – 800 µm
Uniformity Coefficient	≤ 1.5
< 300 µm	≤ 0.1%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$H^+ \rightarrow Na^+$: 60%
Density	
Particle Density	1.21 g/mL
Shipping Weight	760 g/L

§ For additional particle size information, please refer to the Particle Size Distribution Cross Reference Chart (Form No. 45-D00954-en).

Suggested Operating Conditions

Temperature Range	
H^+ form	5 – 120°C (41 – 248°F)
Na^+ form	5 – 120°C (41 – 248°F)
pH Range	
Service Cycle	6 – 14
Stable	0 – 14

For additional information regarding recommended minimum bed depth, operating conditions, and regeneration conditions for separate beds (Form No. 45-D01131-en) in water treatment, please refer to our Tech Fact.

Hydraulic Characteristics

Estimated bed expansion of AmberLite™ HPR8400 H Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.
Estimated pressure drop for AmberLite™ HPR8400 H 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 and a well-classified bed.

Figure 1: Backwash Expansion

Temperature = 10 – 60°C (50 – 140°F)

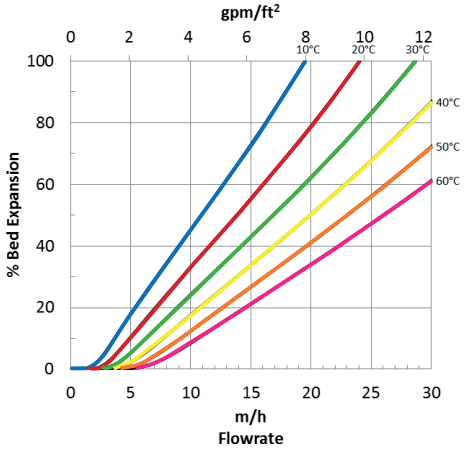
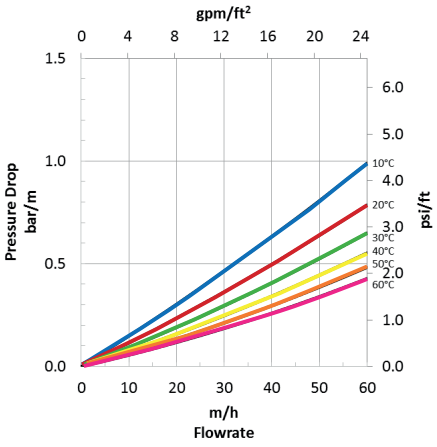


Figure 2: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)



TAPTEC™ HCRSS Na

DUPONT™

TAPTEC™ HCRSS Na Ion Exchange Resin

Description

Drinking Water-grade, Gel, Strong Acid Cation Exchange Resin for Domestic Softening

TAPTEC™ HCRSS Na Ion Exchange Resin is a high-capacity, gel, strong acid cation exchange resin with excellent kinetics and good physical, chemical, and thermal stability. TAPTEC™ HCRSS Na can be used for domestic softening applications.

Applications

Domestic softening

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Gel
Type	Strong acid cation
Functional Group	Sulfonic acid
Physical Form	White to amber, translucent, spherical beads
Chemical Properties	
Ionic Form as Shipped	Na^+
Total Exchange Capacity	≥ 1.9 eq/L
Water Retention Capacity	48 – 52%
Acidity Range	7.0 – 10.5
Particle Size §	
300 – 1200 µm	≥ 90%
< 300 µm	≤ 1%
Purity	
Color Throw, as packaged	≤ 20 APHA units
Stability	
Whole Uncracked Beads	≥ 90%
Swelling	$Ca^{2+} \rightarrow Na^+$: 5%
Density	
Particle Density	1.3 g/mL
Shipping Weight	800 g/L

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

Suggested Operating Conditions

Maximum Operating Temperature	120°C (248°F)
pH Range	0 – 14
Bed Depth, min.	800 mm (2.6 ft)
Flowrates	
Service	5 – 50 BV*/h (0.63 – 6.3 gpm/ft^3)
Backwash	See Figure 1
Regeneration	1 – 10 m/h (0.4 – 4 gpm/ft^2)
Displacement Rinse	1 – 10 m/h (0.4 – 4 gpm/ft^2)
Fast Rinse	5 – 50 BV/h (0.63 – 6.3 gpm/ft^3)
Total Rinse Requirement	3 – 6 BV
Regenerant	NaCl
Concentration	8 – 12%

* 1 BV (Bed Volume) = 1 m^3 solution per m^3 resin or 7.5 gal per ft^3 resin

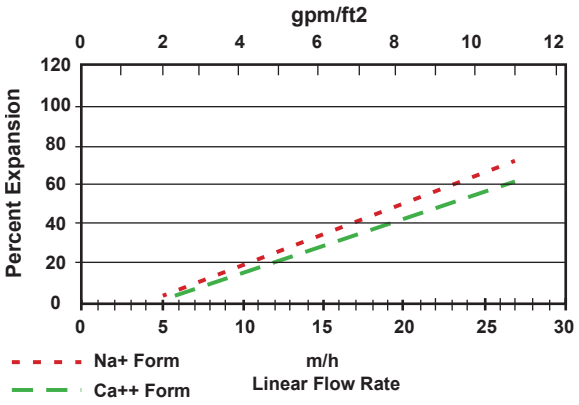
Hydraulic Characteristics

Estimated bed expansion of TAPTEC™ HCRSS Na Ion Exchange Resin as a function of backwash flowrate and ionic form at 25°C (77°F) is shown in Figure 1. The flowrate necessary to achieve a desired bed expansion for other water temperatures can be calculated with the provided equations.

Estimated pressure drop for TAPTEC™ HCRSS Na as a function of service flowrate at 20°C (68°F) is shown in Figure 2. These pressure drop expectations are valid at the start of the service run with clean water and a well-classified bed. Estimated pressure drop at other water temperatures can be calculated with the provided equations.

Figure 1: Backwash Expansion

Temperature = 25°C (77°F)



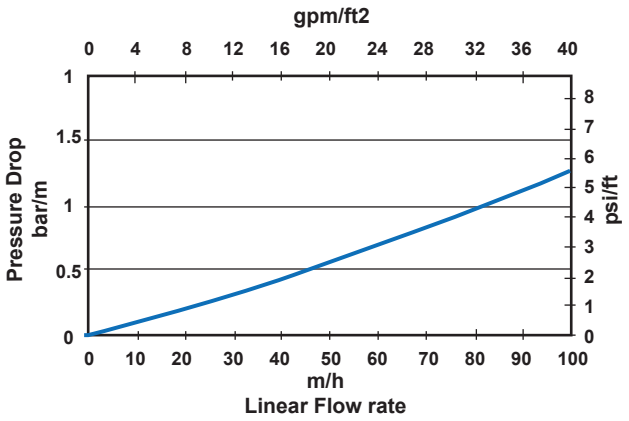
For other temperatures use:

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

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

Figure 2: Pressure Drop

Temperature = 20°C (68°F)



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

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.

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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.

Regulatory Note

This product may be subject to drinking water application restrictions in some countries; please check the application status before use and sale.

AMBERLITE™ FPC88

DUPONT™

AMBERLITE™ FPC88 Ion Exchange Resins

Macroporous, Strong Acid Cation Resin for Sweetener Applications

Description

AMBERLITE™ FPC88 Ion Exchange Resins are macroporous, strong acid cation resins for use in deashing sweeteners to produce low-conductivity syrups, decalcifying beet sugar, purifying organic acids, or deashing/demineralizing fruit juices and other beverages. The macroporous matrix provides excellent mechanical strength and good operating capacity.

AMBERLITE™ FPC88 H Ion Exchange Resin is shipped in the regenerated (H^+) ionic form for deashing processes.

AMBERLITE™ FPC88 Na Ion Exchange Resin is shipped in the Na^+ ionic form for softening/decalcification processes, or when the most stable ionic form is desired for long-duration shipments or inventory safety stock.

Applications

- Corn and starch sweetener deashing
- Beet sugar decalcification
- Citric and lactic acid deashing
- Fruit juice deashing
- Beverage demineralization

Typical Properties

Physical Properties		
Copolymer	Styrene-divinylbenzene	
Matrix	Macroporous	
Type	Strong acid cation	
Functional Group	Sulfonic acid	
Physical Form	White to yellow, opaque, spherical beads	
Chemical Properties		
Ionic Form as Shipped	**H^+**	**Na^+**
Total Exchange Capacity	≥ 1.7 eq/L	≥ 1.8 eq/L
Water Retention Capacity	46 – 56%	42 – 48%
Particle Size [§]		
Particle Diameter	300 – 1200 µm	300 – 1200 µm
< 400 µm	≤ 5%	≤ 5%
> 1180 µm	≤ 5%	≤ 5%
Stability		
Whole Uncracked Beads	≥ 95%	≥ 95%
Swelling	$Na^+ \rightarrow H^+$: 5%	$Na^+ \rightarrow H^+$: 5%
Density		
Particle Density	1.2 g/mL	1.2 g/mL
Shipping Weight	770 g/L	800 g/L

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

Suggested Operating Conditions

Maximum Operating Temperature (H^+ form)	93°C (200°F)
pH Range	0 – 14
Bed Depth, min.	910 mm (3.0 ft)
Flowrates	
Service	2 – 4 BV*/h
Backwash	See Figure 1
Fast Rinse (if applicable)	2 – 10 BV/h
Contact Time	
Regeneration	≥ 30 – 45 minutes
Displacement Rinse	≥ 30 – 45 minutes
Total Rinse Requirement	3 – 6 BV
Regenerant	HCl
Concentration	7%
Level, 100% basis ‡	96 – 112 kg/m^3 (6 – 7 lb/ft^3)
Temperature, max.	93°C (200°F)

* 1 BV (Bed Volume) = 1 m^3 solution per m^3 resin or 7.5 gal per ft^3 resin
‡ Regeneration level may be lower for counter-current regeneration systems.

Hydraulic Characteristics

Bed expansion of AMBERLITE™ FPC88 Ion Exchange Resin as a function of backwash flowrate at 25°C (77°F) is shown in Figure 1. The flowrate necessary to achieve a desired bed expansion for other water temperatures can be calculated with the provided equations.

Pressure drop data for AMBERLITE™ FPC88 as a function of service flowrate and viscosity is shown in Figure 2. These pressure drop expectations are valid at the start of the service run with clean feed.

Figure 1: Backwash Expansion

Temperature = 25°C (77°F)

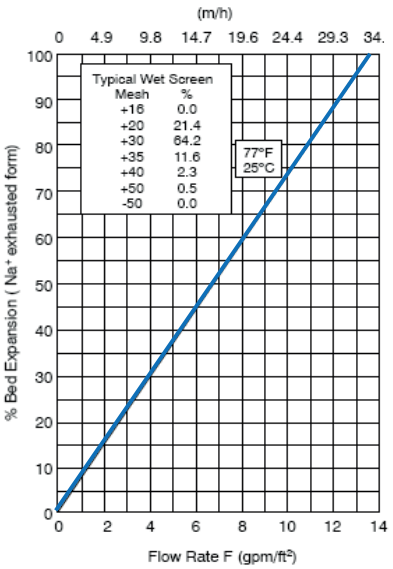
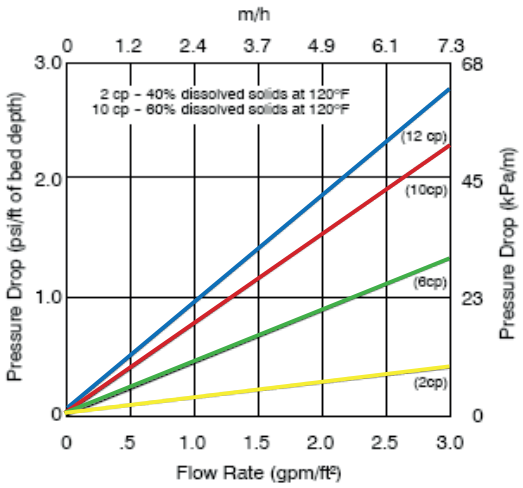


Figure 2: Pressure Drop

Viscosity = 2 – 12 cP



For other temperatures use:

AMBERLITE™ IRA910 Cl

AMBERLITE™ IRA910 Cl Ion Exchange Resin

Macroporous, Strong Base Anion (Type II) Exchange Resin for Industrial Demineralization Applications

Description

AMBERLITE™ IRA910 Cl Ion Exchange Resin is a general-purpose demineralization resin with a long-established track record of reliable performance in co-flow regenerated industrial water treatment systems.

The macroporous structure of AMBERLITE™ IRA910 Cl provides excellent resistance to organic fouling and physical stresses. When operated under challenging conditions, it allows increased resin lifetime in operation compared to a gel Type II resin.

Compared to a Type I strong base anion resin, a Type II resin will yield greater operating capacity due to more complete regeneration. It is best-suited to treat water in which silica and carbon dioxide do not exceed 30% of the total anions and the service and caustic regeneration temperature does not consistently exceed 35°C (95°F).

For systems that require low silica in the effluent or that operate at higher temperatures, a Type I strong base anion resin is recommended, such as AMBERLITE™ IRA900 Cl Ion Exchange Resin.

Applications

- Demineralization, when the treatment goal is:
  - High organic fouling potential
  - Removal of strong and weak acids
- Dealkalization

System Designs

- Co-current

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Macroporous
Type	Strong base anion, Type II
Functional Group	Dimethylethanolammonium
Physical Form	Pale yellow, opaque, spherical beads
Chemical Properties	
Ionic Form as Shipped	Cl^-
Total Exchange Capacity	≥ 1.0 eq/L (Cl^- form)
Water Retention Capacity	54.0 – 61.0% (Cl^- form)
Particle Size §	
Particle Diameter	530 – 800 µm
Uniformity Coefficient	≤ 1.80
< 300 µm	≤ 2.0%
> 1180 µm	≤ 5.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Cl^- \rightarrow OH^-$: 15%
Density	
Particle Density	1.09 g/mL
Shipping Weight	700 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 – 35°C (41 – 95°F)
Cl^- form	5 – 80°C (41 – 176°F)
pH Range	
Service Cycle	1 – 14
Stable	0 – 14

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

Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ IRA910 Cl Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ IRA910 Cl 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 and a well-classified bed.

Figure 1: Backwash Expansion
Temperature = 10 – 60°C (50 – 140°F)

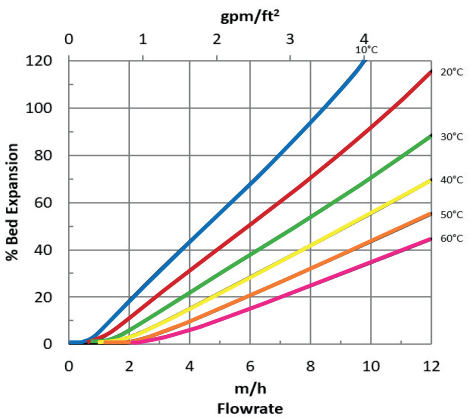
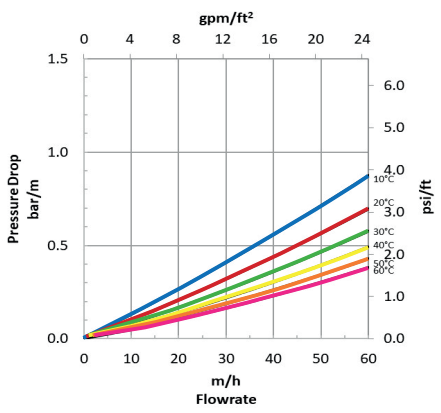


Figure 2: Pressure Drop
Temperature = 10 – 60°C (50 – 140°F)



AMBERLITE™ 62i

DUPONT

AMBERLITE™ 62i Inert Resin

Polyethylene, Inert Resin for Industrial Demineralization Applications

Description

AMBERLITE™ 62i Inert Resin is a floating, non-functionalized, transparent, amorphous-shaped resin with properties specifically designed for use as an upper layer in up-flow regenerated ion exchange systems, such as UPCORE™ Packed Bed Systems. This inert resin has a specific gravity lower than water, which ensures it will stay above the ion exchange resin bed. Its self-distributing properties allow it to evenly cover the available cross-sectional area, forming a protective layer that allows dirt and resin fragments to pass through while retaining the resin bed during the compaction/bed-lift step prior to regeneration.

Applications

- Demineralization
- Industrial softening
- Condensate polishing

System Designs

- Packed beds
  - for UPCORE™ Packed Bed Systems or other up-flow regenerated packed beds
  - configured as a layered bed
- Counter-current / Air hold-down

Historical Reference

AMBERLITE™ 62i Inert Resin has previously been sold as DOWEX UPCORE™ IF-62 Inert Resin.

Typical Properties

Physical Properties	
Polymer	Polyethylene
Type	Inert
Functional Group	None
Physical Form	White pellets
Particle Size	
Particle Diameter	2.5 – 4.0 mm
Density	
Particle Density	0.95 g/mL
Shipping Weight	620 g/L

Suggested Operating Conditions

Temperature Range	5 – 110°C (41 – 230°F)
pH Range	0 – 14

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

Hydraulic Characteristics

Estimated pressure drop for AMBERLITE™ 62i Inert Resin as a function of service flowrate and temperature is shown in Figure 1a and a magnified scale of the same is shown in Figure 1b. These estimated pressure drop expectations are valid at the start of the service run with clean water and a well-classified bed.

Figure 1a: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)

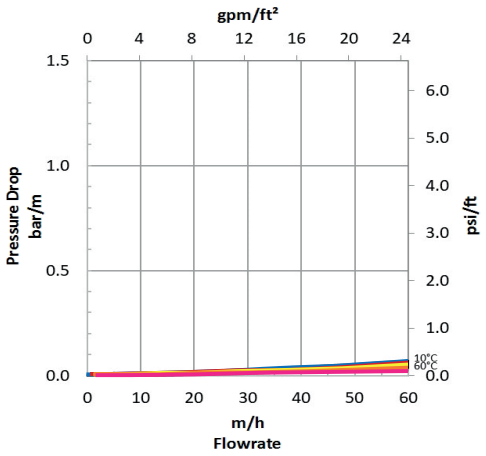
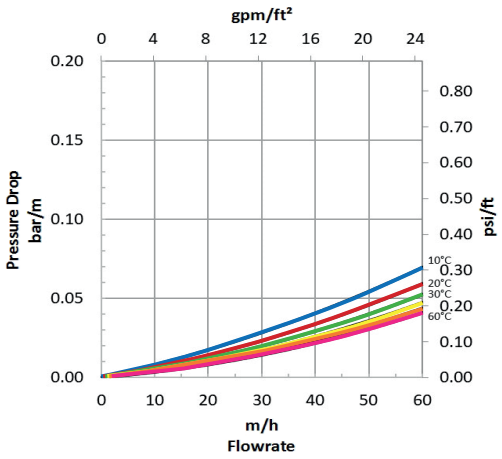


Figure 1b: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)



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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.

AMBERLITE™ MB20 H/OH

DUPONT™

AMBERLITE™ MB20 H/OH Ion Exchange Resin

Mixture of Gaussian, Gel, Strong Acid Cation and Strong Base Anion Exchange Resins for Industrial Demineralization Applications

Description

AMBERLITE™ MB20 H/OH Ion Exchange Resin is an equilibrated, homogeneous mixture of a dark strong acid cation and a clear strong base anion exchange resins. It is fully regenerated, ready-to-use, pre-mixed resin developed for the production of high-purity water in working and mixed bed polishing applications. The pre-mixed resin also allows for faster initial rinse-up prior to service, which minimizes rinse wastewater volume.

AMBERLITE™ MB20 H/OH is most commonly used in service deionization for a full demineralization of water when complete removal of silica and CO_2 is required. In most of the applications, the conductivity of the treated water is much lower than 0.1 µS/cm and the pH is neutral. If necessary, the resin can be regenerated after exhaustion. Both components must be separated by backwashing and regenerated separately.
AMBERLITE™ MB20 H/OH is the reference mixed bed for service deionization. The resin mixture is prepared from high-quality components and the proprietary manufacturing process ensures consistency from batch to batch. This enables the resin to perform in a highly stable manner delivering high-quality treated water consistently in both working and polishing mixed beds. The consistency in quality combined with visible separation of cation and anion resins prior to regeneration make AMBERLITE™ MB20 H/OH a trusted choice for mixed bed pool systems.

Applications

- Service deionization
- Working mixed bed on tap water in small installations
- Mixed bed polishing on RO or demineralized water

System Designs

- Externally-regenerated mixed beds
- Non-regenerated mixed beds

Historical Reference

AMBERLITE™ MB20 H/OH Ion Exchange Resin has previously been sold as AMBERLITE™ MB20 Ion Exchange Resin.

Typical Properties

	Cation Resin	Anion Resin
Physical Properties		
Copolymer	Styrene-divinylbenzene	Styrene-divinylbenzene
Matrix	Gel	Gel
Type	Strong acid cation	Strong base anion, Type I
Functional Group	Sulfonic acid	Trimethylammonium
Physical Form	Dark amber, translucent, spherical beads	Clear amber, translucent, spherical beads
Volume Ratio	38 – 44%	62 – 56%
Chemical Properties		
Ionic Form as Shipped	H^+	OH^-
Particle Size [§]		
< 300 µm	≤ 3.0%	
Density		
Shipping Weight	710 g/L	

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

Product Performance

Operating Capacity

The operating capacity of AMBERLITE™ MB20 H/OH Ion Exchange Resin can be estimated using the following formula, which gives an approximate determination of volume of water that can be treated:

$$BV = \frac{500}{TDS\ (meq/L)} \quad \text{or} \quad {}^{gal}/_{ft^3} = \frac{187000}{TDS\ (as\ ppm\ CaCO_3)}$$

where BV (Bed Volume) is the number of liters of a feedwater containing a TDS (Total Dissolved Solids) given in meq/L that can be demineralized with one liter of the resin mixture when run to exhaustion (or US gallons per cubic foot of the resin with TDS as ppm $CaCO_3$).

Treated Water Quality

AMBERLITE™ MB20 H/OH Ion Exchange Resin provides a high-quality demineralized water with a conductivity < 0.1 µS/cm and neutral pH that will satisfy most of the cartridge and laboratory applications.

Suggested Operating Conditions

Temperature Range (H^+/OH^- form) ‡	5 – 60°C (41 – 140°F)
pH Range	0 – 14

‡ Operating mixed beds 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 the cation component (Figure 1a) and of the anion component (Figure 1b) of AMBERLITE™ MB20 H/OH Ion Exchange Resin as a function of backwash flowrate and temperature are shown.

Estimated pressure drop for AMBERLITE™ MB20 H/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 and a well-classified bed.

Figure 1a: Backwash Expansion – Cation

Temperature = 10 – 60°C (50 – 140°F)

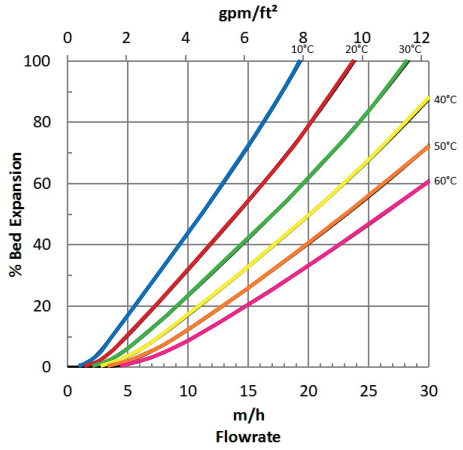


Figure 2: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)

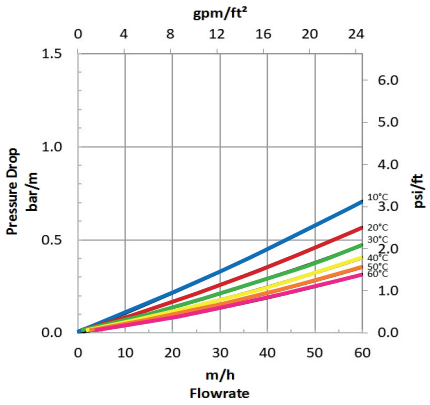
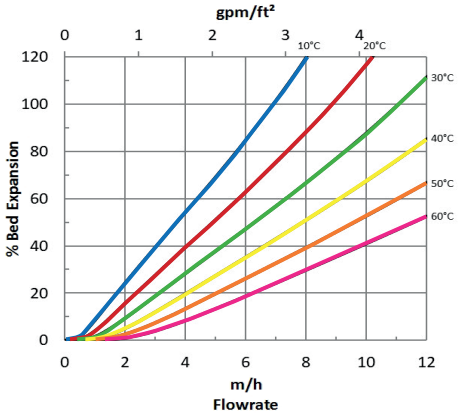


Figure 1b: Backwash Expansion – Anion

Temperature = 10 – 60°C (50 – 140°F)



TAPTEC™ 350 UPS Na

DUPONT™

TAPTEC™ 350 UPS Na Ion Exchange Resin

Drinking Water-grade, Uniform Particle Size, Strong Acid Cation Exchange Resin for Domestic Softening with High Salt Efficiency

Description

TAPTEC™ 350 UPS Na Ion Exchange Resin is a uniform particle size, gel, strong acid cation resin. The small, 350-µm beads yield an outstanding operating capacity, which results in a high regeneration efficiency.

TAPTEC™ 350 UPS Na has excellent mechanical strength and very good stability to oxidation.

Applications

Domestic softening

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Gel
Type	Strong acid cation
Functional Group	Sulfonic acid
Physical Form	White to yellow, translucent, spherical beads
Chemical Properties	
Ionic Form as Shipped	Na^+
Total Exchange Capacity	≥ 2.2 eq/L
Water Retention Capacity	38 – 45%
Particle Size §	
Particle Diameter	350 ± 50 µm
Uniformity Coefficient	≤ 1.1
< 200 µm	≤ 0.5%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Ca^{2+} \rightarrow Na^+$: 4%
Density	
Particle Density	1.30 g/mL
Shipping Weight	830 g/L

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

Suggested Operating Conditions

Maximum Operating Temperature	130°C (266°F)
pH Range	0 – 14
Bed Depth, min.	200 mm (0.7 ft)
Flowrates	
Service	5 – 200 m/h (2 – 80 gpm/ft^2)
Backwash	See Figure 1
Regeneration	5 – 20 m/h (2 – 8 gpm/ft^2)
Displacement Rinse	5 – 20 m/h (2 – 8 gpm/ft^2)
Fast Rinse	5 – 200 m/h (2 – 80 gpm/ft^2)
Total Rinse Requirement	2 – 5 BV*
Regenerant	NaCl
Concentration	5 – 25%

* 1 BV (Bed Volume) = 1 m^3 solution per m^3 resin or 7.5 gal per ft^3 resin

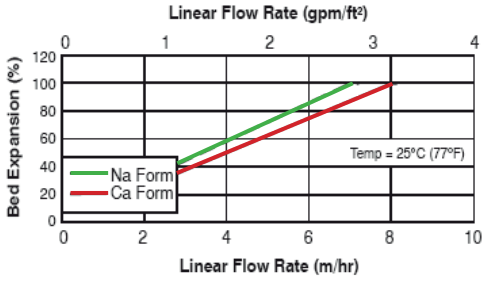
Hydraulic Characteristics

Estimated bed expansion of TAPTEC™ 350 UPS Na Ion Exchange Resin as a function of backwash flowrate and ionic form at 25°C (77°F) is shown in Figure 1. The flowrate necessary to achieve a desired bed expansion for other water temperatures can be calculated with the provided equations.

Estimated pressure drop for TAPTEC™ 350 UPS Na as a function of service flowrate at 20°C (68°F) is shown in Figure 2. These pressure drop expectations are valid at the start of the service run with clean water. Estimated pressure drop at other water temperatures can be calculated with the provided equations.

Figure 1: Backwash Expansion

Temperature = 25°C (77°F)



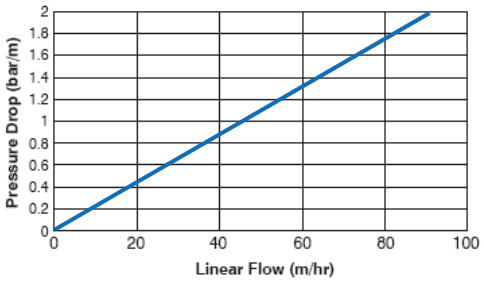
For other temperatures use:

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

$F_T = F_{77°F}$ [1 + 0.008 ($T_{°F}$ − 77)], where F ≡ gpm/ft²

Figure 2: Pressure Drop

Temperature = 20°C (68°F)



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

Product Stewardship

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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.

Regulatory Note

This product may be subject to drinking water application restrictions in some countries; please check the application status before use and sale.

AMBERLITE™ HPR1100 Na

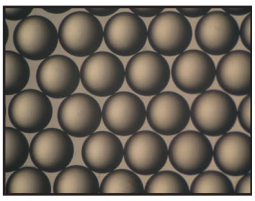
DUPONT

AMBERLITE™ HPR1100 Na Ion Exchange Resin

Uniform Particle Size, Gel, Strong Acid Cation Exchange Resin for Industrial Softening Applications

Description

AMBERLITE™ HPR1100 Na Ion Exchange Resin is a high-quality resin for use in industrial softening applications when high performance and cost-effective operation is required. The chemical properties and particle size of the resin have been optimized to help yield excellent operating capacity and rinse characteristics, while reducing chemical regenerant and rinse water usage.



Applications

- Industrial softening

System Designs

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

Historical Reference

AMBERLITE™ HPR1100 Na Ion Exchange Resin has previously been sold as DOWEX MARATHON™ C Na Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Gel
Type	Strong acid cation
Functional Group	Sulfonic acid
Physical Form	Amber, translucent, spherical beads
Chemical Properties	
Ionic Form as Shipped	Na^+
Total Exchange Capacity	≥ 2.0 eq/L (Na^+ form)
Water Retention Capacity	42.0 – 48.0% (Na^+ form)
Particle Size §	
Particle Diameter	585 ± 50 µm
Uniformity Coefficient	≤ 1.10
< 300 µm	≤ 0.5%
> 850 µm	≤ 5.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Ca^{2+} \rightarrow Na^+$: 5% $Na^+ \rightarrow H^+$: 8%
Density	
Particle Density	1.29 g/mL
Shipping Weight	850 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 (Na^+ form)	5 – 150°C (41 – 302°F)
pH Range	
Service Cycle	1 – 14
Stable	0 – 14

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

Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ HPR1100 Na Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR1100 Na 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)

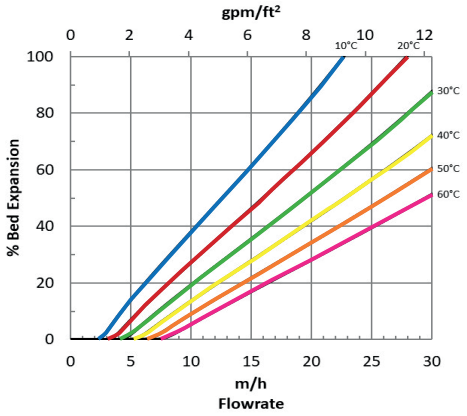
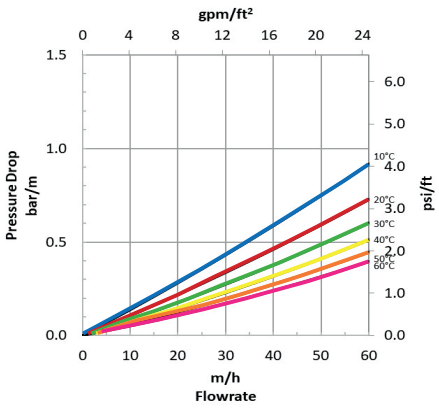


Figure 2: Pressure Drop
Temperature = 10 – 60°C (50 – 140°F)



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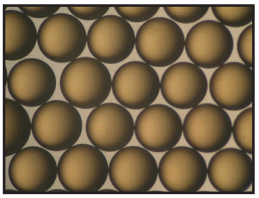
AMBERLITE™ HPR1200 Na

AMBERLITE™ HPR1200 Na Ion Exchange Resin

Uniform Particle Size, Gel, Strong Acid Cation Exchange Resin for Industrial Softening Applications

Description



AMBERLITE™ HPR1200 Na Ion Exchange Resin is a high-quality resin for use in industrial softening applications when high performance and cost-effective operation is required. The chemical properties and particle size of the resin have been optimized to help yield excellent operating capacity and rinse characteristics, while reducing chemical regenerant and rinse water usage.

AMBERLITE™ HPR1200 Na is compatible with all system technologies. It is available for demineralization applications when the sodium-form is preferred by the user. For more details on the use of this product for demineralization, refer to the product data sheet for AMBERLITE™ HPR1200 H Ion Exchange Resin.

Applications

- Industrial softening
- Demineralization (when the sodium-form is preferred by the user)

System Designs

Compatible with all system technologies:

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

Historical Reference

AMBERLITE™ HPR1200 Na Ion Exchange Resin has previously been sold as DOWEX MARATHON™ 1200 Na Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Gel
Type	Strong acid cation
Functional Group	Sulfonic acid
Physical Form	Dark brown, translucent, spherical beads
Chemical Properties	
Ionic Form as Shipped	Na^+
Total Exchange Capacity	≥ 2.0 eq/L (Na^+ form)
Water Retention Capacity	43.0 – 50.0% (Na^+ form)
Particle Size §	
Particle Diameter	585 ± 50 µm
Uniformity Coefficient	≤ 1.10
< 300 µm	≤ 0.1%
> 850 µm	≤ 3.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Ca^{2+} \rightarrow Na^+$: 5% $Na^+ \rightarrow H^+$: 8%
Density	
Particle Density	1.29 g/mL
Shipping Weight	820 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 (Na^+ form)	5 – 150°C (41 – 302°F)
pH Range	
Service Cycle	1 – 14
Stable	0 – 14

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™ HPR1200 Na Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR1200 Na 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)

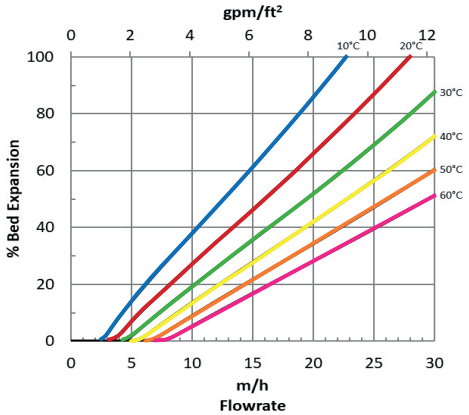
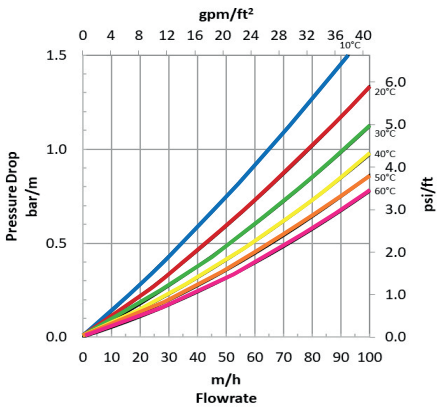


Figure 2: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)



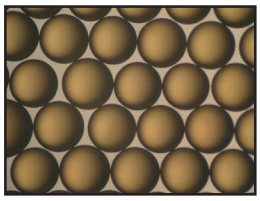
AMBERLITE™ HPR1200 H

DUPONT™

AMBERLITE™ HPR1200 H Ion Exchange Resin

Uniform Particle Size, Gel, Strong Acid Cation Exchange Resin for Industrial Demineralization Applications

Description



AMBERLITE™ HPR1200 H Ion Exchange Resin is the go-to, high-quality resin for use in industrial demineralization applications when high performance and cost-effective operation is required. The chemical properties and particle size of the resin have been optimized to help yield excellent operating capacity and rinse characteristics, while reducing chemical regenerant and rinse water usage.

AMBERLITE™ HPR1200 H is compatible with all system technologies; it has the flexibility to be used in both the lead cation bed and in mixed bed polishers, allowing users to inventory only one strong acid cation resin for their demineralization needs. In mixed bed applications, the dark color of this cation resin is designed to allow easy visual distinction from the light-colored anion resin following backwash separation.
AMBERLITE™ HPR1200 Na Ion Exchange Resin is available for industrial softening or demineralization applications when the sodium-form is preferred by the user.

Resin Pairings

Recommended pairing:
- AMBERLITE™ HPR4200 OH Ion Exchange Resin (gel)
- AMBERLITE™ HPR4800 OH Ion Exchange Resin (gel)

Additional pairing:
- AMBERLITE™ HPR4200 Cl Ion Exchange Resin (gel)
- AMBERLITE™ HPR4800 Cl Ion Exchange Resin (gel)
- AMBERLITE™ HPR4700 OH or Cl Ion Exchange Resin (gel)

Applications

- Demineralization
- Mixed bed polishing

System Designs

Compatible with all system technologies:
- Co-current
- Counter-current / Hold-down
- Packed beds
- Mixed beds

Historical Reference

AMBERLITE™ HPR1200 H Ion Exchange Resin has previously been sold as DOWEX MARATHON™ 1200 H Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Gel
Type	Strong acid cation
Functional Group	Sulfonic acid
Physical Form	Dark brown, translucent, spherical beads
Chemical Properties	
Ionic Form as Shipped	H^+
Total Exchange Capacity	≥ 1.8 eq/L (H^+ form)
Water Retention Capacity	50.0 – 56.0% (H^+ form)
Particle Size §	
Particle Diameter	600 ± 50 µm
Uniformity Coefficient	≤ 1.10
< 300 µm	≤ 0.1%
> 850 µm	≤ 3.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Na^+ \rightarrow H^+$: 8%
Density	
Particle Density	1.20 g/mL
Shipping Weight	785 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 (H^+ form)	5 – 120°C (41 – 248°F)
pH Range	
Service Cycle	1 – 14
Stable	0 – 14

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™ HPR1200 H Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR1200 H 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)

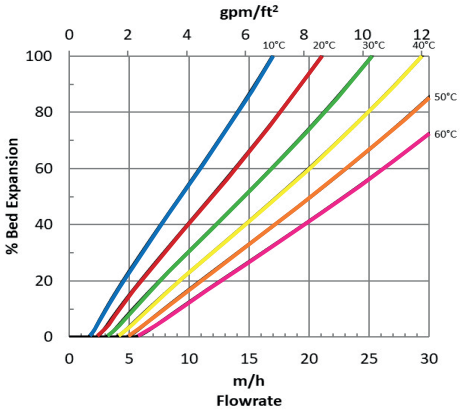
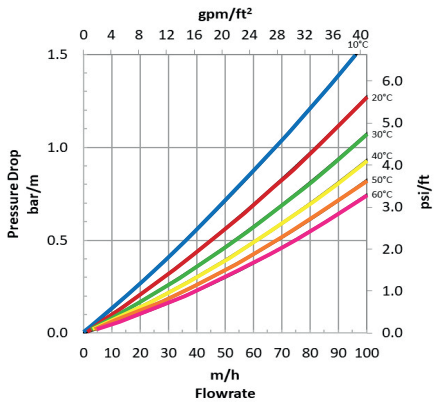


Figure 2: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)



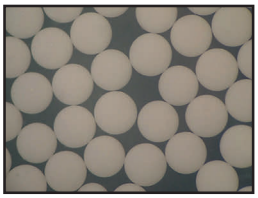
AMBERLITE™ HPR9500

DUPONT™

AMBERLITE™ HPR9500 Ion Exchange Resin

Uniform Particle Size, Macroporous, Weak Base Anion Exchange Resin for Industrial Demineralization Applications

Description



AMBERLITE™ HPR9500 Ion Exchange Resin is a high-quality resin for use in industrial demineralization applications when high performance and cost-effective operation is required. The chemical properties and particle size of the resin have been optimized to help yield excellent operating capacity and rinse characteristics, while reducing chemical regenerant and water usage.

Weak base anion resins are well-suited for use with strong base anion resins to improve overall efficiency and throughput of a demineralization system. It effectively removes mineral acids and organics, reducing the ionic load on the strong base anion resin and also protecting it from organic fouling. The weak base anion resin increases a system's overall capacity to remove organics.

AMBERLITE™ HPR9500 displays excellent thermal stability. It has high kinetics, which yields good operating capacity even in low-temperature operations. The macroporous structure allows for easy release of natural organic molecules providing good organic fouling resistance.

AMBERLITE™ HPR9500 offers a quick start-up in a single bed or when paired with an OH-form strong base anion in layered bed systems.

Applications

- Demineralization, ideally when treating water with:
  - High organic fouling potential
  - High percentage of mineral acidity (FMA)
- Partial demineralization when weak acid removal is not required

System Designs

Compatible with all system technologies and bed configurations:

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

Historical Reference

AMBERLITE™ HPR9500 Ion Exchange Resin has previously been sold as DOWEX MARATHON™ WBA Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Macroporous
Type	Weak base anion
Functional Group	Tertiary amine
Physical Form	Off-white, opaque, spherical beads
Chemical Properties	
Ionic Form as Shipped	Free base (FB)
Total Exchange Capacity	≥ 1.3 eq/L (FB form)
Water Retention Capacity	54.0 – 60.0% (FB form)
Particle Size §	
Particle Diameter	550 ± 50 µm
Uniformity Coefficient	≤ 1.1
< 300 µm	≤ 0.2%
> 850 µm	≤ 1.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	FB → HCl : 20%
Density	
Particle Density	1.05 g/mL
Shipping Weight	640 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 (FB form)	5 – 60°C (41 – 140°F)
pH Range	
Service Cycle	0 – 6
Stable	0 – 14

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

Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ HPR9500 Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR9500 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)

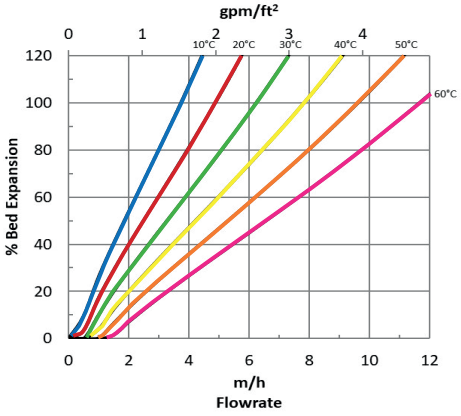
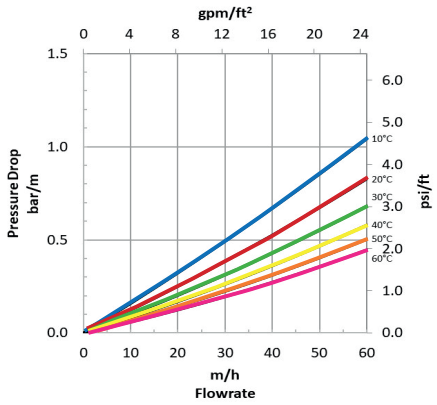


Figure 2: Pressure Drop
Temperature = 10 – 60°C (50 – 140°F)

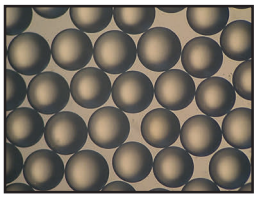


AMBERLITE™ HPR4800 Cl

AMBERLITE™ HPR4800 Cl Ion Exchange Resin

Uniform Particle Size, Gel, Strong Base Anion Exchange Resin for Industrial Demineralization Applications

Description



AMBERLITE™ HPR4800 Cl Ion Exchange Resin is a high-quality resin for use in industrial demineralization applications when high performance and cost-effective operation is required. The chemical properties and particle size of the resin have been optimized to help yield excellent operating capacity and rinse characteristics, while reducing chemical regenerant and rinse water usage.

AMBERLITE™ HPR4800 Cl is compatible with all system technologies; it has the flexibility to be used in the lead single anion bed and in mixed bed polishers. In mixed bed applications, the particle size is designed to enhance separability, and the light color of this anion resin allows easy visual distinction from the dark-colored cation resin following backwash separation.

Resin Pairings

Recommended pairing in mixed bed applications:

- AMBERLITE™ HPR1200 H Ion Exchange Resin (gel)
- AMBERLITE™ HPR1300 H Ion Exchange Resin (gel)

Applications

- Demineralization
  - Ideally when treating water with:
    - High percentage of silica
  - When the treatment goal is:
    - Removal of strong and weak acids
    - Lowest silica leakage
- Mixed bed polishing

System Designs

Compatible with all system technologies:

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

Historical Reference

AMBERLITE™ HPR4800 Cl Ion Exchange Resin has previously been sold as DOWEX MARATHON™ A Cl Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Gel
Type	Strong base anion, Type I
Functional Group	Trimethylammonium
Physical Form	Amber, translucent, spherical beads
Chemical Properties	
Ionic Form as Shipped	Cl^-
Total Exchange Capacity	≥ 1.3 eq/L (Cl^- form)
Water Retention Capacity	49.0 – 58.0% (Cl^- form)
Particle Size §	
Particle Diameter	575 ± 50 µm
Uniformity Coefficient	≤ 1.1
< 300 µm	≤ 0.3%
> 850 µm	≤ 1.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Cl^- \rightarrow OH^-$: 20%
Density	
Particle Density	1.08 g/mL
Shipping Weight	670 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 – 60°C (41 – 140°F)
Cl^- form	5 – 100°C (41 – 212°F)
pH Range	
Service Cycle	1 – 14
Stable	0 – 14

‡ Operating at elevated temperatures, for example above 60 – 70°C (140 – 158°F), may impact 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™ HPR4800 Cl Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR4800 Cl 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)

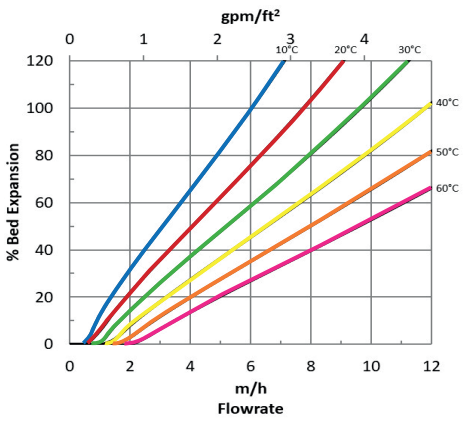
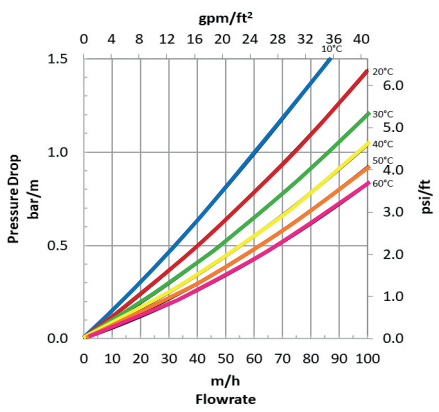


Figure 2: Pressure Drop
Temperature = 10 – 60°C (50 – 140°F)



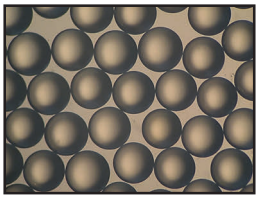
AMBERLITE™ HPR4800 OH

DUPONT™

AMBERLITE™ HPR4800 OH Ion Exchange Resin

Uniform Particle Size, Gel, Strong Base Anion Exchange Resin for Industrial Demineralization Applications

Description



AMBERLITE™ HPR4800 OH Ion Exchange Resin is a high-quality resin for use in industrial demineralization applications when high performance, high purity water, and cost-effective operation is required. The chemical properties and particle size of the resin have been optimized to help yield excellent operating capacity and rinse characteristics, while reducing chemical regenerant and rinse water usage.

AMBERLITE™ HPR4800 OH is compatible with all system technologies; it has the flexibility to be used in the lead single anion bed and in mixed bed polishers. The OH-form offers a quick start-up in single beds. In mixed bed applications, the particle size is designed to enhance separability, and the light color of this anion resin allows easy visual distinction from the dark-colored cation resin following backwash separation.

Resin Pairings

Recommended pairing in mixed bed applications:

- AMBERLITE™ HPR1200 H Ion Exchange Resin (gel)
- AMBERLITE™ HPR1300 H Ion Exchange Resin (gel)

Applications

- Demineralization
  - Ideally when treating water with:
    - High percentage of silica
  - When the treatment goal is:
    - Removal of strong and weak acids
    - Lowest silica leakage
- Mixed bed polishing

System Designs

Compatible with all system technologies:

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

Historical Reference

AMBERLITE™ HPR4800 OH Ion Exchange Resin has previously been sold as DOWEX MARATHON™ A OH Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Gel
Type	Strong base anion, Type I
Functional Group	Trimethylammonium
Physical Form	Amber, translucent, spherical beads
Chemical Properties	
Ionic Form as Shipped	OH^-
Total Exchange Capacity	≥ 1.0 eq/L (OH^- form)
Water Retention Capacity	58.0 – 74.0% (OH^- form)
Ionic Conversion	
OH^-	≥ 95%
CO_3^{2-}	≤ 5%
Particle Size §	
Particle Diameter	610 ± 50 µm
Uniformity Coefficient	≤ 1.1
< 300 µm	≤ 0.3%
> 850 µm	≤ 1.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Cl^- \rightarrow OH^-$: 20%
Density	
Particle Density	1.07 g/mL
Shipping Weight	640 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 – 60°C (41 – 140°F)
Cl^- form	5 – 100°C (41 – 212°F)
pH Range	
Service Cycle	1 – 14
Stable	0 – 14

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

Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ HPR4800 OH Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR4800 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)

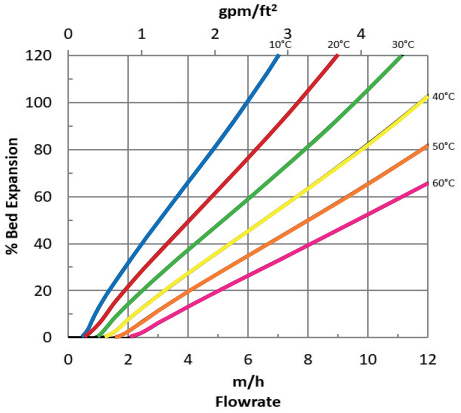
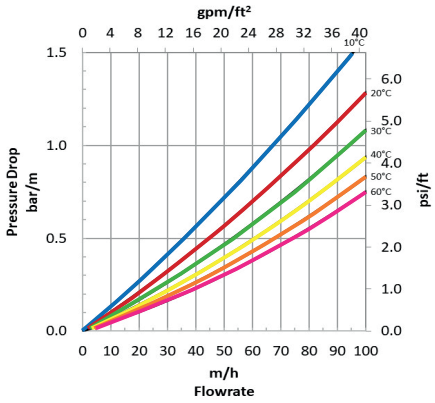


Figure 2: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)

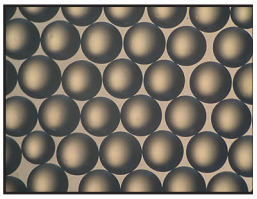


AMBERLITE™ HPR550 Cl

AMBERLITE™ HPR550 Cl Ion Exchange Resin

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

Description



AMBERLITE™ HPR550 Cl Ion Exchange Resin is a premium-quality, high-capacity resin specifically designed for use in high purity industrial demineralization applications and condensate polishing beds at power stations when the chloride-form is preferred by the user.

This resin provides exceptional bead integrity and rapid exchange kinetics due to its small average particle size, making it ideally suited to the high flowrate demands commonly encountered in power plant condensate polishing systems. The bead size uniformity and a distinguishable light color is tailored to complement the larger, denser, cationic, gel AMBERLITE™ HPR650 H Ion Exchange Resin. The color distinction between this pair of resins allows easy visual confirmation of separation following backwash.

For post-RO mixed bed polishing with a strict silica specification and/or the need to maximize silica removal capacity, AMBERLITE™ HPR550 Cl is an alternative to the OH-form.

Resin Pairings

Recommended pairing:

- AMBERLITE™ HPR650 H Ion Exchange Resin (gel)

Additional options:

- AMBERLITE™ HPR1600 H Ion Exchange Resin (gel)
- AMBERLITE™ HPR2000 H Ion Exchange Resin (macroporous) – in external regeneration systems

Applications

- Mixed bed condensate polishing in fossil power plants
- Mixed bed polishing in industrial demineralization
- Demineralization
  - Ideally when treating water with:
    - High percentage of silica
  - When the treatment goal is:
    - Removal of strong and weak acids
    - Lowest silica leakage
  - Single bed industrial demineralization requiring high water purity

Historical Reference

AMBERLITE™ HPR550 Cl Ion Exchange Resin has previously been sold as DOWEX MONOSPHERE™ 550A Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Gel
Type	Strong base anion
Functional Group	Trimethylammonium
Physical Form	White to yellow, translucent, spherical beads
Chemical Properties	
Ionic Form as Shipped	Cl^-
Total Exchange Capacity	≥ 1.35 eq/L (Cl^- form)
Water Retention Capacity	42.0 – 49.0% (Cl^- form)
Particle Size [§]	
Particle Diameter	550 ± 50 µm
Uniformity Coefficient	≤ 1.1
< 300 µm	≤ 0.5%
> 850 µm	≤ 1.0%
Stability	
Whole Uncracked Beads	≥ 95%
Friability:	
Average	≥ 350 g/bead
> 200 g/bead	≥ 95%
Swelling	$Cl^- \rightarrow OH^-$ ≤ 25%
Density	
Particle Density	1.09 g/mL
Shipping Weight	690 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™ HPR550 Cl Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR550 Cl 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)

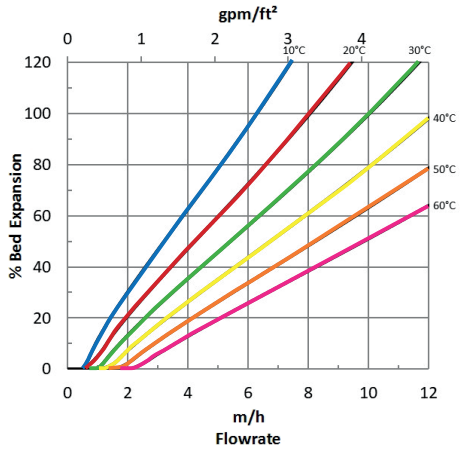
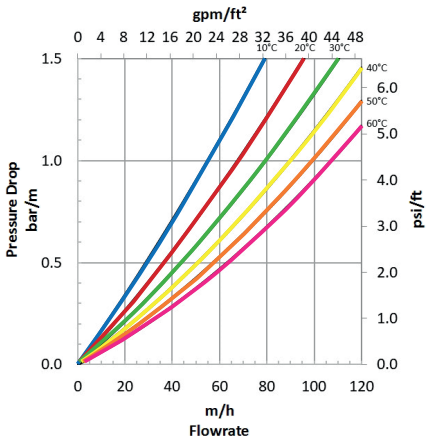


Figure 2: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)

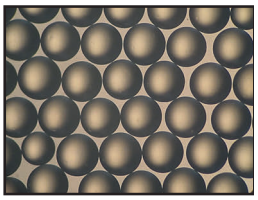


AMBERLITE™ HPR550 OH

AMBERLITE™ HPR550 OH Ion Exchange Resin

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

Description



AMBERLITE™ HPR550 OH Ion Exchange Resin is a premium-quality, high-capacity resin designed specifically for use in nuclear condensate polishing mixed beds when highest resin purity and water quality are required.

This resin provides exceptional bead integrity and rapid exchange kinetics due to its small average particle size, making it ideally suited to the high flowrate demands commonly encountered in power plant condensate polishing systems. The bead size uniformity and a distinguishable light color is tailored to complement the larger, denser, cationic, gel AMBERLITE™ HPR650 H Ion Exchange Resin. The color distinction between this pair of resins allows easy visual confirmation of separation following backwash. Together, these resins offer exceptional separation in mixed beds, which combined with excellent water quality and resin purity, has made them known throughout the industry as a premium mixed bed pairing.

Resin Pairings

Recommended pairing:

- AMBERLITE™ HPR650 H Ion Exchange Resin (gel)

Additional options:

- AMBERLITE™ HPR1600 H Ion Exchange Resin (gel)
- AMBERLITE™ HPR2000 H Ion Exchange Resin (macroporous) – in external regeneration systems

Applications

- Mixed bed condensate polishing in PWR nuclear power plants
- Mixed bed condensate polishing in fossil power plants
- Mixed bed polishing in industrial demineralization
- Demineralization
  - Ideally when treating water with:
    - High percentage of silica
  - When the treatment goal is:
    - Removal of strong and weak acids
    - Lowest silica leakage
  - Single bed industrial demineralization requiring high water purity

Historical Reference

AMBERLITE™ HPR550 OH Ion Exchange Resin has previously been sold as DOWEX MONOSPHERE™ 550A (OH) Ion Exchange Resin.

Typical Properties

Physical Properties			
Copolymer	Styrene-divinylbenzene		
Matrix	Gel		
Type	Strong base anion		
Functional Group	Trimethylammonium		
Physical Form	White to yellow, translucent, spherical beads		
Chemical Properties			
Ionic Form as Shipped	OH^-		
Total Exchange Capacity	≥ 1.1 eq/L (OH^- form)		
Water Retention Capacity	55.0 – 65.0% (OH^- form)		
Ionic Conversion			
OH^-	≥ 95%		
CO_3^{2-}	≤ 5%		
Cl^-	≤ 0.5%		
Particle Size §			
Particle Diameter	590 ± 50 µm		
Uniformity Coefficient	≤ 1.10		
< 300 µm	≤ 0.5%		
> 850 µm	≤ 1.0%		
Purity			
Metals, dry basis:			
Na	≤ 50 mg/kg	Ca	≤ 50 mg/kg
K	≤ 50 mg/kg	Mg	≤ 50 mg/kg
Fe	≤ 50 mg/kg	Al	≤ 50 mg/kg
Cu	≤ 10 mg/kg	Heavy Metals (as Pb)	≤ 10 mg/kg
Stability			
Whole Uncracked Beads	≥ 95%		
Friability:			
Average	≥ 350 g/bead		
> 200 g/bead	≥ 95%		
Swelling	$Cl^- \rightarrow OH^-$ ≤ 25%		
Density			
Particle Density	1.08 g/mL		
Shipping Weight	660 g/L		

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.

Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ HPR550 OH Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR550 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)

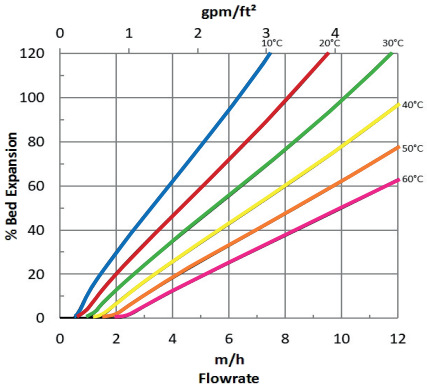
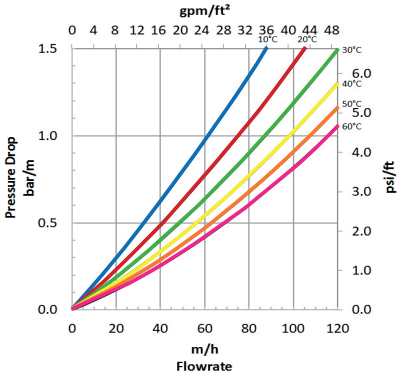


Figure 2: Pressure Drop
Temperature = 10 – 60°C (50 – 140°F)



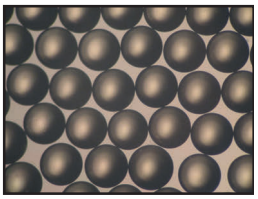
AMBERLITE™ HPR4100 Cl

DUPONT

AMBERLITE™ HPR4100 Cl Ion Exchange Resin

Uniform Particle Size, Gel, Strong Base Anion (Type II) Exchange Resin for Industrial Demineralization Applications

Description



AMBERLITE™ HPR4100 Cl Ion Exchange Resin is a high-quality resin for use in industrial demineralization applications when a balance of operating performance and simple, cost-effective operation is required. The chemical properties and particle size of the resin have been optimized to help yield excellent operating capacity and rinse characteristics, reducing chemical regenerant and rinse water usage while maintaining a superior physical stability.

Compared to a Type I strong base anion resin, a Type II resin will yield greater operating capacity due to more complete regeneration. It is best-suited to treat water in which silica and carbon dioxide do not exceed 30% of the total anions and the service and caustic regeneration temperature does not consistently exceed 35°C (95°F).

For systems that require low silica in the effluent or that operate in higher temperatures, a Type I strong base anion resin is recommended, such as:

- AMBERLITE™ HPR4200 Cl or OH Ion Exchange Resin
- AMBERLITE™ HPR4800 Cl or OH Ion Exchange Resin

Applications

- Demineralization, when the treatment goal is:
  - Removal of strong and weak acids
- Dealkalization

System Designs

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

Historical Reference

AMBERLITE™ HPR4100 Cl Ion Exchange Resin has previously been sold as DOWEX MARATHON™ A2 Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Gel
Type	Strong base anion, Type II
Functional Group	Dimethylethanolammonium
Physical Form	White to amber, translucent, spherical beads
Chemical Properties	
Ionic Form as Shipped	Cl^-
Total Exchange Capacity	≥ 1.2 eq/L (Cl^- form)
Water Retention Capacity	45.0 – 54.0% (Cl^- form)
Particle Size §	
Particle Diameter	550 ± 50 µm
Uniformity Coefficient	≤ 1.1
< 300 µm	≤ 0.3%
> 850 µm	≤ 1.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Cl^- \rightarrow OH^-$: 15%
Density	
Particle Density	1.10 g/mL
Shipping Weight	690 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 – 35°C (41 – 95°F)
Cl^- form	5 – 80°C (41 – 176°F)
pH Range	
Service Cycle	1 – 14
Stable	0 – 14

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

Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ HPR4100 Cl Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR4100 Cl 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)

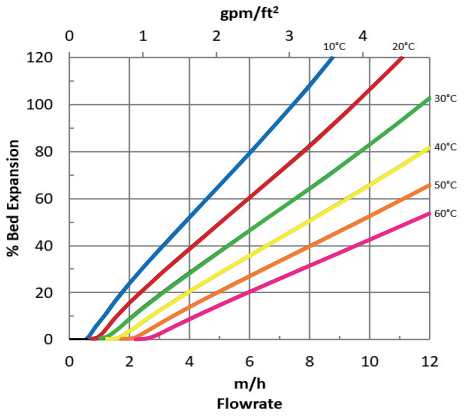
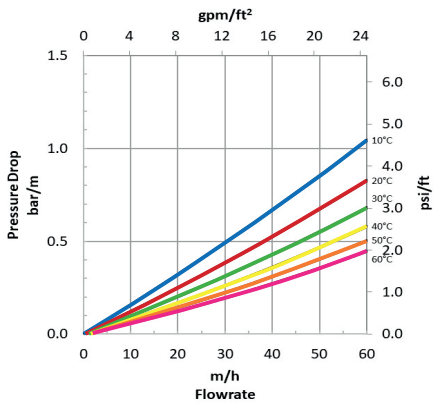


Figure 2: Pressure Drop
Temperature = 10 – 60°C (50 – 140°F)

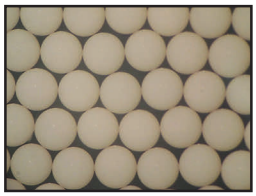


AMBERLITE™ HPR2900 Na

AMBERLITE™ HPR2900 Na Ion Exchange Resin

Uniform Particle Size, Macroporous, Strong Acid Cation Exchange Resin for Industrial Softening Applications

Description



AMBERLITE™ HPR2900 Na Ion Exchange Resin is a robust, high-quality resin for use in industrial softening applications when a combination of exceptional physical stability, simple and reliable operation, and long resin life is required.

Its high degree of crosslinking provides exceptional stability, which gives it great resistance to chemical oxidation and to mechanical, thermal, or osmotic stress. The properties of this macroporous resin have been designed for optimal kinetics.

AMBERLITE™ HPR2900 Na is recommended for hot process softeners, sodium-cycle or amine-cycle condensate treatment, and other systems involving appreciable oxidative potential or high temperatures.

AMBERLITE™ HPR2900 Na is available for demineralization applications when the sodium-form is preferred by the user.

Applications

- Industrial softening, ideally when treating water with:
  - High oxidant level
  - High temperature on the cation resin
- Sodium-cycle or amine-cycle condensate treatment
- Hot process softening
- Demineralization (when the sodium-form is preferred by the user)

System Designs

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

Historical Reference

AMBERLITE™ HPR2900 Na Ion Exchange Resin has previously been sold as DOWEX MARATHON™ MSC Na Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Macroporous
Type	Strong acid cation
Functional Group	Sulfonic acid
Physical Form	White, opaque, spherical beads
Chemical Properties	
Ionic Form as Shipped	Na^+
Total Exchange Capacity	≥ 1.8 eq/L (Na^+ form)
Water Retention Capacity	46.0 – 52.0% (Na^+ form)
Particle Size §	
Particle Diameter	550 ± 50 µm
Uniformity Coefficient	≤ 1.10
< 300 µm	≤ 0.3%
> 850 µm	≤ 3.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Ca^{2+} \rightarrow Na^+$: 3% $Na^+ \rightarrow H^+$: 4%
Density	
Particle Density	1.28 g/mL
Shipping Weight	785 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 (Na^+ form)	5 – 150°C (41 – 302°F)
pH Range	
Service Cycle	1 – 14
Stable	0 – 14

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

Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ HPR2900 Na Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR2900 Na 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)

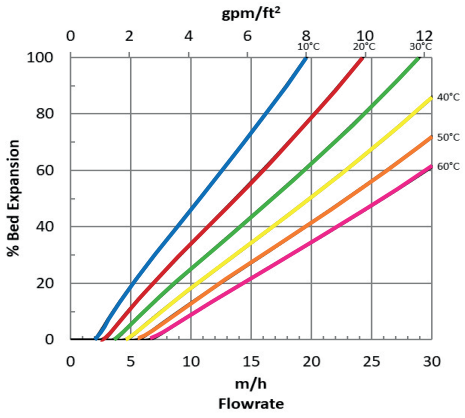
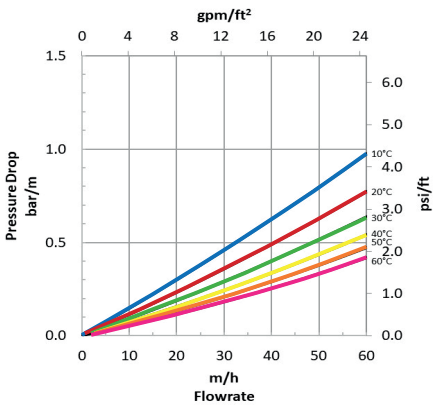


Figure 2: Pressure Drop
Temperature = 10 – 60°C (50 – 140°F)



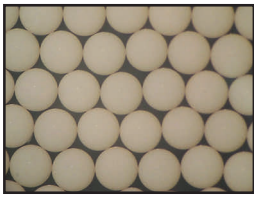
AMBERLITE™ HPR2900 H

DUPONT™

AMBERLITE™ HPR2900 H Ion Exchange Resin

Uniform Particle Size, Macroporous, Strong Acid Cation Exchange Resin for Industrial Demineralization Applications

Description



AMBERLITE™ HPR2900 H Ion Exchange Resin is a robust, high-quality resin for use in industrial demineralization applications when a combination of exceptional physical stability, simple and reliable operation, and long resin life is required.

Its high degree of crosslinking provides exceptional stability, which gives it great resistance to chemical oxidation and to mechanical, thermal, or osmotic stress. The properties of this macroporous resin have been designed for optimal kinetics.

AMBERLITE™ HPR2900 Na Ion Exchange Resin is available for industrial softening or demineralization applications when the sodium-form is preferred by the user.

Applications

- Systems requiring exceptionally high osmotic stability
- Demineralization, ideally when treating water with:
  - High oxidant level
  - High temperature on the cation resin
- Amine-cycle condensate treatment

System Designs

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

Historical Reference

AMBERLITE™ HPR2900 H Ion Exchange Resin has previously been sold as DOWEX MARATHON™ MSC H Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Macroporous
Type	Strong acid cation
Functional Group	Sulfonic acid
Physical Form	White, opaque, spherical beads
Chemical Properties	
Ionic Form as Shipped	H^+
Total Exchange Capacity	≥ 1.7 eq/L (H^+ form)
Water Retention Capacity	50.0 – 56.0% (H^+ form)
Particle Size [§]	
Particle Diameter	575 ± 50 µm
Uniformity Coefficient	≤ 1.10
< 300 µm	≤ 0.3%
> 850 µm	≤ 3.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Na^+ \rightarrow H^+$: 4%
Density	
Particle Density	1.20 g/mL
Shipping Weight	770 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 (H^+ form)	5 – 120°C (41 – 248°F)
pH Range	
Service Cycle	1 – 14
Stable	0 – 14

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

Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ HPR2900 H Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR2900 H 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)

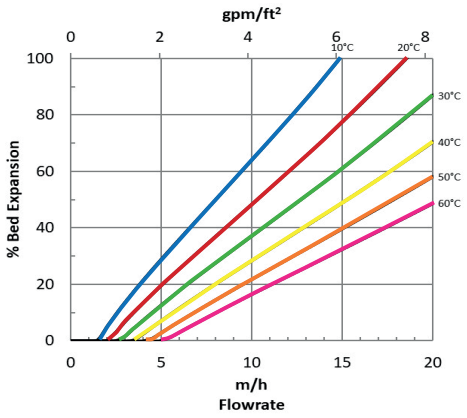
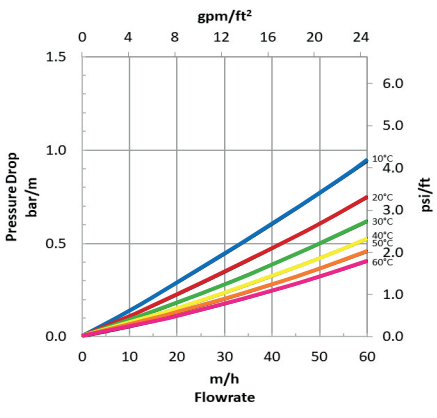


Figure 2: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)



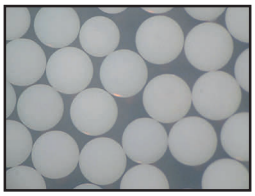
AMBERLITE™ HPR9200 CL

DUPONT

AMBERLITE™ HPR9200 Cl Ion Exchange Resin

Uniform Particle Size, Macroporous, Strong Base Anion Exchange Resin for Industrial Demineralization Applications

Description



AMBERLITE™ HPR9200 Cl Ion Exchange Resin is a robust, high-quality resin for use in industrial demineralization applications when a combination of exceptional physical stability, simple and reliable operation, and long resin life is required.

AMBERLITE™ HPR9200 Cl has exceptional physical stability, excellent resistance to osmotic shock, and very good organic fouling resistance. It is well-suited for use in demineralization of high organic waters.

AMBERLITE™ HPR9200 Cl is compatible with all system technologies; it has the flexibility to be used in lead single or in mixed bed polishers. In mixed bed applications, the light color of this anion resin is designed to allow easy visual distinction from the dark-colored cation resin following backwash separation.

Resin Pairings

Recommended pairing:

- AMBERLITE™ HPR1300 H Ion Exchange Resin (gel)
- AMBERLITE™ HPR2800 H Ion Exchange Resin (macroporous)

Applications

- 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
- Mixed bed polishing

System Designs

Compatible with all system technologies:

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

Historical Reference

AMBERLITE™ HPR9200 Cl Ion Exchange Resin has previously been sold as DOWEX MARATHON™ MSA Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Macroporous
Type	Strong base anion, Type I
Functional Group	Trimethylammonium
Physical Form	White, opaque, spherical beads
Chemical Properties	
Ionic Form as Shipped	Cl^-
Total Exchange Capacity	≥ 1.1 eq/L (Cl^- form)
Water Retention Capacity	56.0 – 66.0% (Cl^- form)
Particle Size [§]	
Particle Diameter	640 ± 50 µm
Uniformity Coefficient	≤ 1.1
< 300 µm	≤ 0.3%
> 850 µm	≤ 1.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Cl^- \rightarrow OH^-$: 15%
Density	
Particle Density	1.06 g/mL
Shipping Weight	675 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 – 60°C (41 – 140°F)
Cl^- form	5 – 100°C (41 – 212°F)
pH Range	
Service Cycle	1 – 14
Stable	0 – 14

[‡] Operating at elevated temperatures, for example above 60 – 70°C (140 – 158°F), may impact 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™ HPR9200 Cl Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR9200 Cl 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)

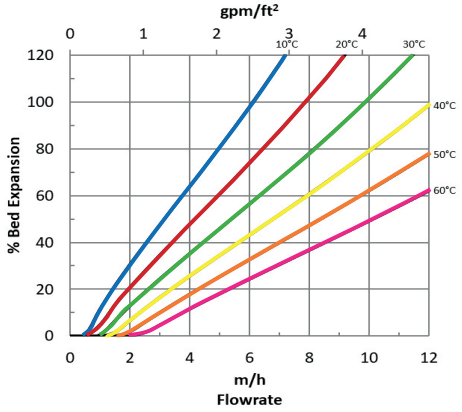
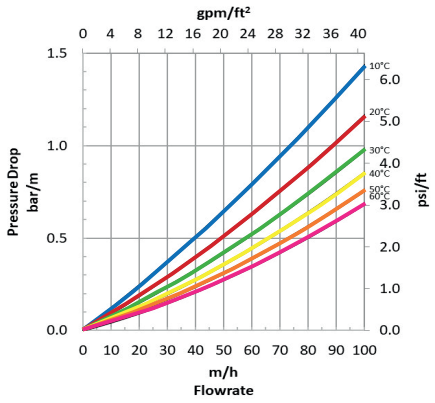


Figure 2: Pressure Drop
Temperature = 10 – 60°C (50 – 140°F)



AMBERLITE™ HPR4811 CL

DUPONT

AMBERLITE™ HPR4811 Cl Ion Exchange Resin

Uniform Particle Size, Gel, Strong Base Anion Exchange Resin for Industrial Demineralization Applications

Description

AMBERLITE™ HPR4811 Cl Ion Exchange Resin is a high-quality resin for use in industrial demineralization applications when high performance and cost-effective operation is required. The chemical properties and particle size of the resin have been optimized to help yield excellent operating capacity and rinse characteristics, while reducing chemical regenerant and rinse water usage.

AMBERLITE™ HPR4811 Cl provides high capacity with excellent kinetics and very good resistance to organic fouling. It also has excellent resistance to osmotic shock and good physical and chemical stability. Its unique resistance to organic fouling enables this resin to be used in Cl-form as an organic scavenger with great success in a single bed unit.

Applications

- 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
- Scavenging

System Designs

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

Historical Reference

AMBERLITE™ HPR4811 Cl Ion Exchange Resin has previously been sold as DOWEX MARATHON™ 11 Ion Exchange Resin.

Typical Properties

Physical Properties	
Copolymer	Styrene-divinylbenzene
Matrix	Gel
Type	Strong base anion, Type I
Functional Group	Trimethylammonium
Physical Form	Amber, translucent, spherical beads
Chemical Properties	
Ionic Form as Shipped	Cl^-
Total Exchange Capacity	≥ 1.3 eq/L (Cl^- form)
Water Retention Capacity	50.0 – 60.0% (Cl^- form)
Particle Size §	
Particle Diameter	550 ± 50 µm
Uniformity Coefficient	≤ 1.10
< 300 µm	≤ 0.3%
> 850 µm	≤ 1.0%
Stability	
Whole Uncracked Beads	≥ 95%
Swelling	$Cl^- \rightarrow OH^-$: 20%
Density	
Particle Density	1.08 g/mL
Shipping Weight	675 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 – 60°C (41 – 140°F)
Cl^- form	5 – 100°C (41 – 212°F)
pH Range	
Service Cycle (demineralization)	1 – 14
Service Cycle (scavenging)	2 – 10
Stable	0 – 14

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

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

Hydraulic Characteristics

Estimated bed expansion of AMBERLITE™ HPR4811 Cl Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ HPR4811 Cl 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)

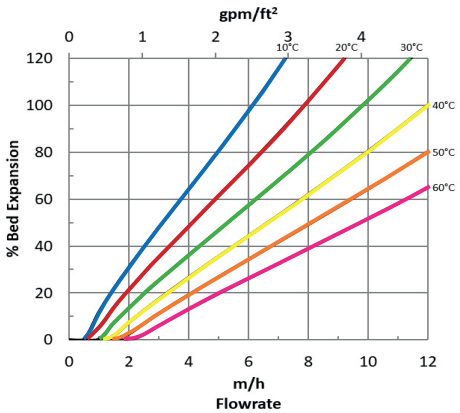
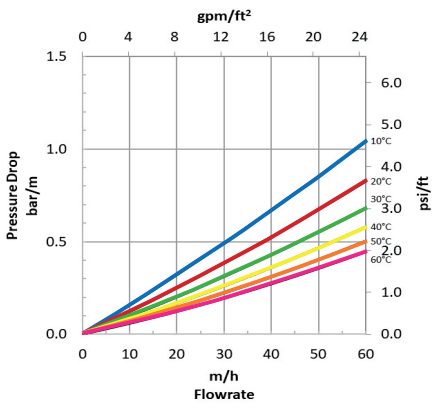


Figure 2: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)



AMBERLITE™ 600i

DUPONT

AMBERLITE™ 600i Inert Resin

Uniform Particle Size, Acrylic, Inert Resin for Condensate Polishing for the Power Industry and Industrial Demineralization Applications

Description

AMBERLITE™ 600i Inert Resin is a non-functionalized, spherical resin used in mixed beds. Its density and particle size are tightly controlled to have a terminal settling velocity that is intermediate to those of the cation exchange resin and anion exchange resin, creating an inert zone between the functional resins wherein the regenerant is collected. This inert zone reduces the risk of cross-regeneration, improving water quality and rinse time whether it is used in internally- or externally-regenerated mixed bed systems.

AMBERLITE™ 600i is used in condensate polishing systems for the electrical power generation industry and in other high-purity mixed bed systems.

Applications

- Mixed bed condensate polishing in fossil power plants
- Mixed bed polishing in industrial demineralization

System Designs

- Mixed beds

Historical Reference

AMBERLITE™ 600i Inert Resin has previously been sold as DOWEX MONOSPHERE™ 600i Inert Resin.

Typical Properties

Physical Properties	
Copolymer	Crosslinked acrylic
Type	Inert
Functional Group	None
Physical Form	Brown to amber, opaque, spherical beads
Particle Size [§]	
Particle Diameter	600 ± 50 µm
Uniformity Coefficient	≤ 1.2
Density	
Particle Density	1.15 g/mL
Shipping Weight	705 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	5 – 120°C (41 – 248°F)
pH Range	0 – 14

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™ 600i Inert Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE™ 600i 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)

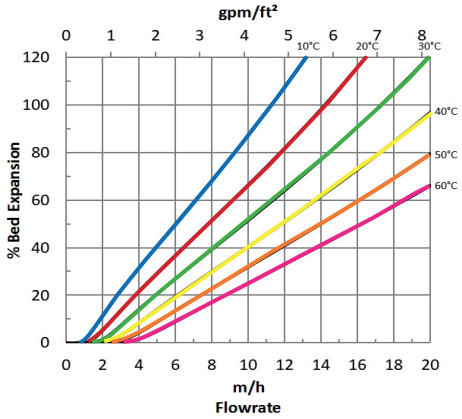
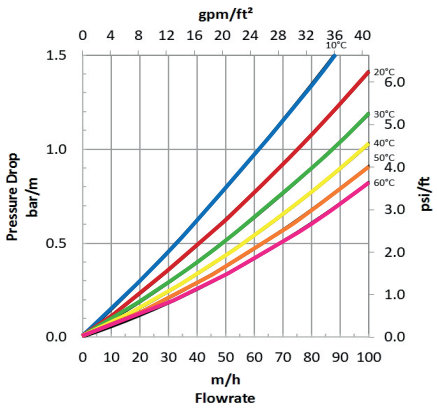


Figure 2: Pressure Drop

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.