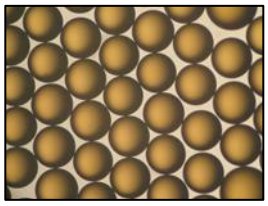
Product Data Sheet

AMBERLITE™ IRN97 H Ion Exchange Resin

Nuclear-grade, Uniform Particle Size, Gel, Strong Acid Cation Exchange Resin for Water Treatment Applications in the Nuclear Power Industry

Description



AMBERLITE™ IRN97 H Ion Exchange Resin is designed specifically for use in nuclear loops where highest resin purity and stability are required, and where the "as supplied" resin must have a minimum of ionic and non-ionic contamination. These high standards of resin purity enable plants to achieve reliable and safe production whilst reducing the need for equipment maintenance and minimizing the impact of unscheduled outages.

AMBERLITE IRN97 H is a higher capacity, 10% DVB cation resin used to remove cations for purification and pH control in primary water treatment. It contains a minimum of 99% of its exchange sites in the hydrogen form. The uniform particle size and the absence of fine resin beads results in a lower pressure drop compared to conventional resins.

The particle size of AMBERLITE IRN97 H is specifically designed to give an optimized balance of pressure drop, exchange kinetics, and resistance to separation from the anion exchange resin, AMBERLITE™ IRN78 OH Ion Exchange Resin, when used in a mixed bed.

Applications

- Primary water treatment:
  - Primary coolant purification
  - Treatment of primary coolant blowdown
  - Control of reactor coolant chemistry by removing excess ^{7}Li, potassium, or ammonium
- Fuel pool purification in single bed VVER systems in oxidative conditions
- Rad waste treatment and decontamination:
  - Removal of radioactive cations such as ^{137}Cs and cobalt isotopes
- PWR steam generation blowdown (APG)

Purity

AMBERLITE™ IRN Ion Exchange Resins are manufactured as nuclear-grade using specific procedures throughout the manufacturing process to keep the inorganic impurities at the lowest possible level. Special treatment procedures are also utilized to remove traces of soluble organic compounds to meet the rigorous demands of the nuclear industry. These high standards of resin purity will help keep nuclear systems free of contaminants and deposits, and prevent increases in radioactivity levels due to activation of impurities in the reactor core. IRN resins are recommended in both non-regenerable and regenerable single bed or mixed bed applications where reliable production of the highest quality water is required and where the "as supplied" resin must have an absolute minimum of ionic and non-ionic contamination.

Form No. 177-03750, Rev. 0
May 2018

Typical Physical and Chemical 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	H^+
Total Exchange Capacity	≥ 2.10 eq/L (H^+ form)
Water Retention Capacity	45.0 – 51.0% (H^+ form)
Ionic Conversion	
H^+	≥ 99%
Particle Size	
Particle Diameter §	525 ± 50 µm
Uniformity Coefficient	≤ 1.20
< 300 µm	≤ 0.2%
> 850 µm	≤ 5.0%
Purity	
Metals, dry basis:	
Na	≤ 20 mg/kg
K	≤ 20 mg/kg
Fe	≤ 20 mg/kg
Cu	≤ 5 mg/kg
Co	≤ 5 mg/kg
Ca	≤ 10 mg/kg
Mg	≤ 10 mg/kg
Al	≤ 10 mg/kg
Hg	≤ 20 mg/kg
Heavy Metals (as Pb)	≤ 10 mg/kg
Stability	
Whole Uncracked Beads	≥ 95%
Friability:	
Average	≥ 400 g/bead
> 200 g/bead	≥ 95%
Solubility in Water	≤ 0.10%
Density	
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 (H^+ form)	5 – 150°C (41 – 302°F)
pH Range (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™ IRN97 H Ion Exchange Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AMBERLITE IRN97 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)

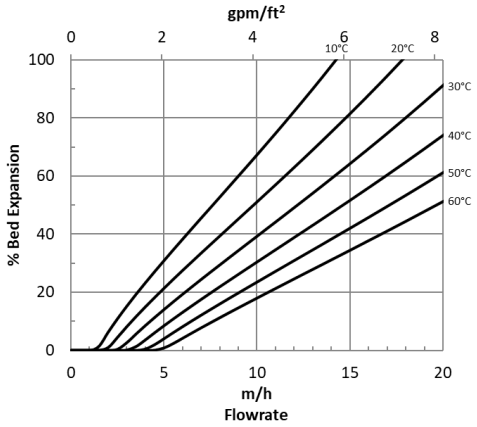
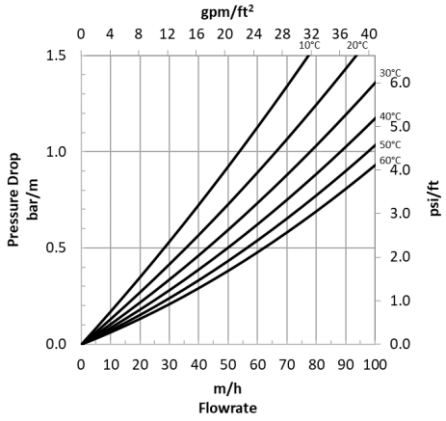


Figure 2: Pressure Drop

Temperature = 10 – 60°C (50 – 140°F)



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WARNING: Oxidizing agents such as nitric acid attack organic ion exchange resins under certain conditions. This could lead to anything from slight resin degradation to a violent exothermic reaction (explosion). Before using strong oxidizing agents, consult sources knowledgeable in handling such materials.

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Form No. 177-03750, Rev. 0
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