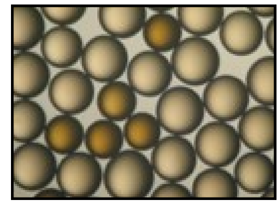
Product Data Sheet

AmberLite™ IRN164 Li/OH Ion Exchange Resin

Mixture of Nuclear-grade, Uniform Particle Size, Gel, Strong Acid Cation and Strong Base Anion Exchange Resins for Water Treatment Applications in the Nuclear Power Industry

Description



AmberLite™ IRN164 Li/OH 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™ IRN164 Li/OH is composed of AmberLite™ IRN97 H Ion Exchange Resin converted to the natural Li form and AmberLite™ IRN78 OH Ion Exchange Resin, supplied together on a 1:1 equivalent basis.

AmberLite™ IRN164 Li/OH is designed for use in CANDU reactor heat transport systems and closed-loop cooling systems. It is intended for use in non-regenerable systems which demand high effluent purity and long resin life. The properties of this mixed bed resin make it less separable helping to eliminate the formation of a cation layer at the bottom of the service vessel when transferring from one location to another. In addition, the mixed bed is specially processed to have a good slurrying capability.

As a pre-mixed resin, it allows for faster change-out and initial rinse-up prior to service, which minimizes start-up time and rinse wastewater volume.

Applications

- Primary water treatment:
  - Primary coolant purification

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.

Historical Reference

AmberLite™ IRN164 Li/OH Ion Exchange Resin has previously been sold as AmberLite™ IRN164 Ion Exchange Resin.

Form No. 45-D01211-en, Rev. 2
November 2019

Typical Properties

	AmberLite™ IRN97 H (→Li) Cation Resin	AmberLite™ IRN78 OH Anion Resin
Physical Properties		
Copolymer	Styrene-divinylbenzene	Styrene-divinylbenzene
Matrix	Gel	Gel
Type	Strong acid cation	Strong base anion
Functional Group	Sulfonic acid	Trimethylammonium
Physical Form	Amber, translucent, spherical beads	Amber, translucent, spherical beads
Ionic Ratio	1:1	1:1
Chemical Properties		
Ionic Form as Shipped	Li^+ (natural)	OH^-
Total Exchange Capacity	≥ 2.10 eq/L (H^+ form)	≥ 1.20 eq/L (OH^- form)
Water Retention Capacity	45.0 – 51.0% (H^+ form)	54.0 – 60.0% (OH^- form)
Ionic Conversion		
Li^+	≥ 99.0%	
OH^-		≥ 95%
CO_3^{2-}		≤ 5%
Cl^-		≤ 0.05%
SO_4^{2-}		≤ 0.1%
Particle Size §		
Particle Diameter	525 ± 50 µm	630 ± 50 µm
Uniformity Coefficient	≤ 1.20	≤ 1.10
< 300 µm	≤ 0.2%	≤ 0.2%
< 425 µm		≤ 0.5%
> 850 µm	≤ 5.0%	
> 1180 µm		≤ 2.0%
Purity		
Metals, dry basis:		
Na	≤ 40 mg/kg	≤ 20 mg/kg
K	≤ 20 mg/kg	≤ 20 mg/kg
Fe	≤ 20 mg/kg	≤ 20 mg/kg
Cu	≤ 5 mg/kg	≤ 5 mg/kg
Co	≤ 5 mg/kg	≤ 5 mg/kg
Ca	≤ 10 mg/kg	≤ 10 mg/kg
Mg	≤ 10 mg/kg	≤ 10 mg/kg
Al	≤ 10 mg/kg	≤ 10 mg/kg
Hg	≤ 20 mg/kg	≤ 20 mg/kg
Heavy Metals (as Pb)	≤ 10 mg/kg	≤ 10 mg/kg
Other, dry basis:		
Cl		≤ 250 mg/kg
SiO_2		≤ 10 mg/kg
Stability		
Whole Uncracked Beads	≥ 95%	≥ 95%
Friability:		
Average	≥ 400 g/bead	≥ 600 g/bead
> 200 g/bead	≥ 95%	≥ 95%
Solubility in Water	≤ 0.10%	≤ 0.10%
Density		
Shipping Weight	690 g/L (AmberLite™ IRN164 Li/OH)	

§ 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 (Li^+/OH^- form) ‡	5 – 100°C (41 – 212°F)
pH Range (Stable)	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.

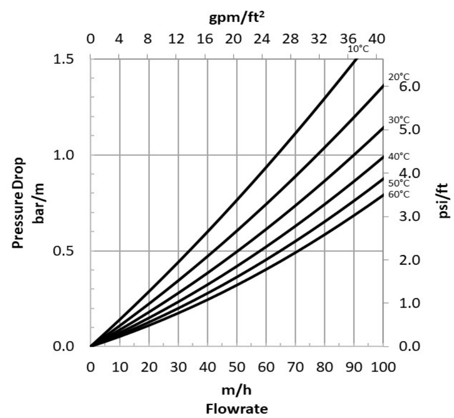
For additional information regarding recommended minimum bed depth, operating conditions, and regeneration conditions for mixed beds (Form No. 45-D01127-en) or separate beds (Form No. 45-D01131-en) in water treatment, please refer to our Tech Facts.

Hydraulic Characteristics

Estimated pressure drop for AmberLite™ IRN164 Li/OH Ion Exchange Resin as a function of service flowrate and temperature is shown in Figure 1. These pressure drop expectations are valid at the start of the service run with clean water.

Figure 1: 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.

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Form No. 45-D01211-en, Rev. 2
November 2019