

## PRELIMINARY PRODUCT DATA SHEET

# AMBERLITE™ IRN317

## Li<sup>7</sup> / OH form Nuclear Grade Mixed Bed

AMBERLITE IRN317 resin is a stoichiometric equivalent mixed bed of gel strong acid cation resin in the Li<sup>7</sup> form and gel strong base anion resin in the OH form. Amberlite IRN317 resin is specifically designed for enhanced performance and long resin life in the Chemical and Volume Control System (CVCS) of Pressurized Water Reactors (PWR).

The cation resin used for this mixed bed is derived from Amberlite IRN99 resin, which is a uniform particle size, highly cross-linked gel cation exchanger. The anion exchange resin in this mixed bed is Amberlite IRN78 resin, which has a long established record of performance and reliability in nuclear applications.

The new highly crosslinked gel cation resin component of this mixed bed delivers the highest total capacity (typically 2.5 eq/L) and the best chemical and oxidative stability of any available nuclear grade resin. The enhanced oxidative stability significantly lowers the release of organic sulfonates thus reducing sulfate levels in the reactor coolant. The high level of crosslinking also provides substantially increased selectivity for removal of Cs<sup>137</sup> and other radioactive species.

For additional information on the component resins used in Amberlite IRN317 resin, see the data sheets for Amberlite IRN78 and Amberlite IRN99 resins.

### PROPERTIES

Physical Form _____	Mixture of dark and light amber translucent spherical beads	
Matrix _____	Polystyrene divinylbenzene copolymer	
Chemical Form _____	1 to 1 equivalent mixture of Li <sup>7</sup> and OH form resins	
Shipping Weight _____	45 lbs/ft <sup>3</sup> (720 g/L)	
	<b>Cation Resin</b>	<b>Anion Resin</b>
Functional Group _____	Sulfonic acid	Quaternary ammonium
Total Exchange Capacity _____	≥ 2.4 meq/ml (Li form)	≥ 1.2 meq/ml (OH form)
Moisture Content _____	33 - 40 % (Li form)	54 - 64 % (OH form)
% Regenerated Sites _____	99% Li <sup>7</sup> , minimum	95% OH, minimum
% Cl form sites _____	—	0.1 % maximum
Particle Size		
Retained on 20 mesh (0.850 mm) _____	5 % maximum	
Through 40 mesh (0.425 mm) _____	5 % maximum	
Through 50 mesh (0.300 mm) _____	0.1% maximum	
Na _____	50 mg/kg dry, maximum	
Fe _____	100 mg/kg dry, maximum	
Cu _____	50 mg/kg dry, maximum	
Al _____	50 mg/kg dry, maximum	
Pb _____	50 mg/kg dry, maximum	

### SUGGESTED OPERATING CONDITIONS

Maximum Operating Temperature _____	140 °F (60 °C)
Minimum Bed Depth _____	36 inches
Service Flow Rate (Linear Velocity) _____	10 to 30 gpm/ft <sup>2</sup>

## APPLICATION

AMBERLITE IRN317 resin is specifically designed for the purification of primary reactor coolant in PWR plants. This application requires the removal of Cs<sup>137</sup>, Co<sup>58</sup>, I<sup>131</sup>, other radioisotopes, and chemical contaminants such as chloride and sulfate which may appear in the reactor coolant. Since the reactor coolant contains high background levels of boric acid buffered with Li<sup>7</sup>OH, the mixed bed resins will operate in the borate and Li<sup>7</sup> form.

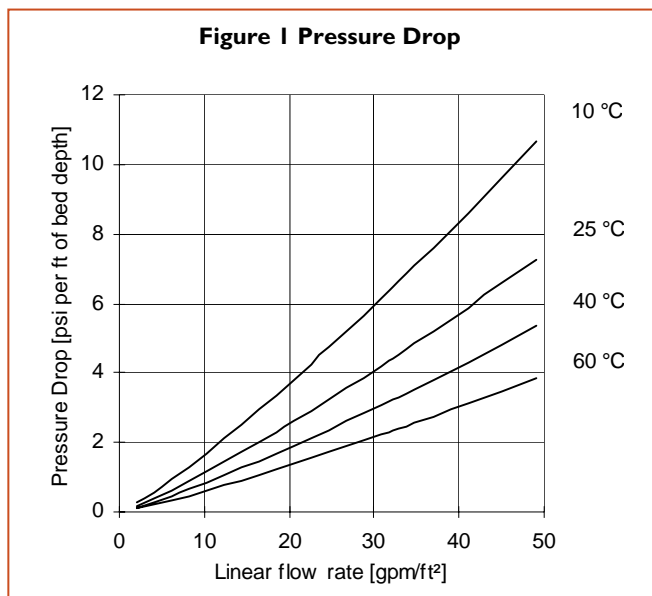
The cation resin component of Amberlite IRN317 resin is supplied in the Li<sup>7</sup> form in order to minimize fluctuations in the concentration of Li<sup>7</sup> in the reactor coolant when the mixed bed is first placed into service. Amberlite IRN317 resin is made using only certified isotopically pure Li<sup>7</sup>OH in order to minimize the undesirable reaction:



The anion resin component of Amberlite IRN317 resin is very highly regenerated to the OH form to insure that less than 0.1% of exchange sites are present in the chloride form or the sulfate form. Therefore Amberlite IRN317 resin can effectively control chloride and sulfate impurities even while operating at high background concentrations of lithium and borate.

## HYDRAULIC CHARACTERISTICS

The approximate pressure drop of Amberlite IRN317 resin in normal downflow operation is shown in the figure below as a function of service flow rate and water temperature. Pressure drop data are for clean beds which have not accumulated solids during the service run. If the bed accumulates solids, the pressure drop will increase.



All our products are manufactured in ISO 9001 certified facilities.

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Ion exchange resins and polymeric adsorbents, as produced, contain by-products resulting from the manufacturing process. The user must determine the extent to which organic by-products must be removed for any particular use and establish techniques to assure that the appropriate level of purity is achieved for that use. The user must ensure compliance with all prudent safety standards and regulatory requirements governing the application. Except where specifically otherwise stated, Rohm and Haas Company does not recommend its ion exchange resins or polymeric adsorbents, as supplied, as being suitable or appropriately pure for any particular use. Consult your Rohm and Haas technical representative for further information. Acidic and basic regenerant solutions are corrosive and should be handled in a manner that will prevent eye and skin contact. Nitric acid and other strong oxidising agents can cause explosive type reactions when mixed with Ion Exchange resins. Proper design of process equipment to prevent rapid buildup of pressure is necessary if use of an oxidising agent such as nitric acid is contemplated. Before using strong oxidising agents in contact with Ion Exchange Resins, consult sources knowledgeable in the handling of these materials.

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