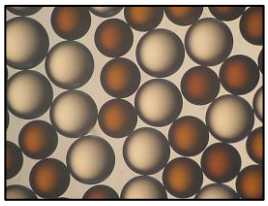
Product Data Sheet

# AMBERLITE™ IRN317 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™ IRN317 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 IRN317 Li/OH is composed of AMBERLITE™ IRN99 H Ion Exchange Resin converted to the $^{7}Li$ form at ≥ 99.9% isotopic purity and AMBERLITE™ IRN78 OH Ion Exchange Resin, supplied together on a 1:1 equivalent basis.

AMBERLITE IRN317 Li/OH is the premier resin designed to be used in primary water chemistry control in PWR nuclear power operation and offers the highest operating capacity and excellent resistance to bead fracture from attrition. Pre-mixed resin also 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## Historical Reference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™ IRN317 Li/OH Ion Exchange Resin has previously been sold as AMBERLITE™ IRN317 Ion Exchange Resin.



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## Typical Physical and Chemical Properties**

| | AMBERLITE™ IRN99 H (→ $^{7}Li$) 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 | Dark brown, translucent, spherical beads | Amber, translucent, spherical beads |
| **Ionic Ratio** | 1:1 | 1:1 |
| **Chemical Properties** | | |
| Ionic Form as Shipped | $^{7}Li^{+}$ | $OH^{-}$ |
| Total Exchange Capacity | ≥ 2.50 eq/L ($H^{+}$ form) | ≥ 1.20 eq/L ($OH^{-}$ form) |
| Water Retention Capacity | 37.0 – 43.0% ($H^{+}$ form) | 54.0 – 60.0% ($OH^{-}$ form) |
| Ionic Conversion | | |
| $^{7}Li^{+}$ | ≥ 99% | |
| $OH^{-}$ | | ≥ 95% |
| $CO_3^{2-}$ | | ≤ 5% |
| $Cl^{-}$ | | ≤ 0.05% |
| $SO_4^{2-}$ | | ≤ 0.1% |
| **Particle Size** | | |
| Particle Diameter § | 525 ± 25 µm | 630 ± 50 µm |
| Uniformity Coefficient | ≤ 1.20 | ≤ 1.10 |
| < 300 µm | ≤ 0.1% | ≤ 0.2% |
| < 425 µm | | ≤ 0.5% |
| > 850 µm | ≤ 0.5% | |
| > 1180 µm | | ≤ 2.0% |
| **Purity** | | |
| Metals, dry basis: | | |
| Na | ≤ 20 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 | ≥ 600 g/bead | ≥ 600 g/bead |
| > 200 g/bead | ≥ 95% | ≥ 95% |
| Solubility in Water | ≤ 0.10% | ≤ 0.10% |
| **Density** | | |
| Shipping Weight | 720 g/L (AMBERLITE™ IRN317 Li/OH) | |

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

## 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.

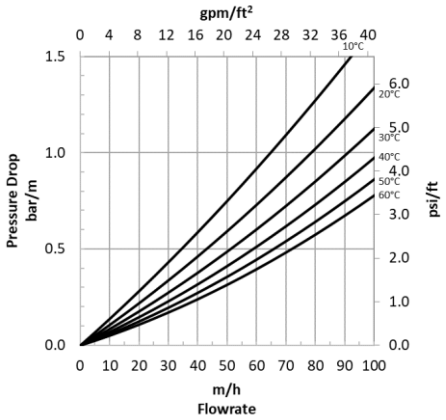
For additional information regarding recommended minimum bed depth, operating conditions, and regeneration conditions for mixed beds (Form No. 177-03705) or separate beds (Form No. 177-03729) in water treatment, please refer to our Tech Facts.

## Hydraulic Characteristics

Estimated pressure drop for AMBERLITE™ IRN317 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)



## Product Stewardship

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## Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

**For more information, contact our Customer Information Group:**

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|---|---|
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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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