



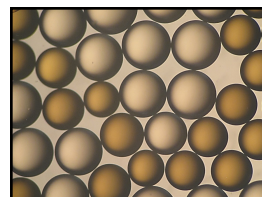
## Product Data Sheet

### **AmberLite™ IRN160 H/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™ IRN160 H/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™ IRN160 H/OH is a stoichiometric equivalent mixture of AmberLite™ IRN97 H Ion Exchange Resin and AmberLite™ IRN78 OH Ion Exchange Resin on a 1:1 equivalent basis. It is designed to minimize separation of anion and cation during installation and transfer due to the smaller cation resin particle size. The less-separating properties of this resin make it easily transferable from one location to another, helping to eliminate the formation of a cation layer at the bottom of the service vessel. As a pre-mixed resin, it also allows for faster change-out and initial rinse-up prior to service, which minimizes start-up time and rinse wastewater volume.

The smaller cation particle size also provides faster kinetics and higher exchange capacity leading to a reduction of rad waste compared to standard mixed beds. The higher capacity, 10% DVB cation resin also provides excellent chemical stability and resistance to bead fracture from attrition.

#### **Applications**

- Primary water treatment:
  - Treatment of primary coolant blowdown
  - Pre-outage cleanup
- Fuel pool purification
- Rad waste treatment and decontamination:
  - Removal of radioactive cations such as  $^{137}\text{Cs}$  and cobalt isotopes
  - Removal of anionic radioactive material
  - Removal of silver
- PWR steam generation blowdown (APG)
- BWR condensate polishing

**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™ IRN160 H/OH Ion Exchange Resin has previously been sold as AmberLite™ IRN160 Ion Exchange Resin.

## Typical Properties

|                               | AmberLite™ IRN97 H<br>Cation Resin  | AmberLite™ IRN78 OH<br>Anion Resin  |
|-------------------------------|-------------------------------------|-------------------------------------|
| <b>Physical Properties</b>    |                                     |                                     |
| 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 |
| <b>Ionic Ratio</b>            | 1:1                                 | 1:1                                 |
| <b>Chemical Properties</b>    |                                     |                                     |
| Ionic Form as Shipped         | H <sup>+</sup>                      | OH <sup>-</sup>                     |
| Total Exchange Capacity       | ≥ 2.10 eq/L (H <sup>+</sup> form)   | ≥ 1.20 eq/L (OH <sup>-</sup> form)  |
| Water Retention Capacity      | 45.0 – 51.0% (H <sup>+</sup> form)  | 54.0 – 60.0% (OH <sup>-</sup> form) |
| Ionic Conversion              |                                     |                                     |
| H <sup>+</sup>                | ≥ 99%                               |                                     |
| OH <sup>-</sup>               |                                     | ≥ 95%                               |
| CO <sub>3</sub> <sup>2-</sup> |                                     | ≤ 5%                                |
| Cl <sup>-</sup>               |                                     | ≤ 0.05%                             |
| SO <sub>4</sub> <sup>2-</sup> |                                     | ≤ 0.1%                              |
| <b>Particle Size</b> §        |                                     |                                     |
| 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%                              |
| <b>Purity</b>                 |                                     |                                     |
| 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 <sub>2</sub>              |                                     | ≤ 10 mg/kg                          |
| <b>Stability</b>              |                                     |                                     |
| 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%                             |
| <b>Density</b>                |                                     |                                     |
| Shipping Weight               | 720 g/L (AmberLite™ IRN160 H/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 (H <sup>+</sup> /OH <sup>-</sup> 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.

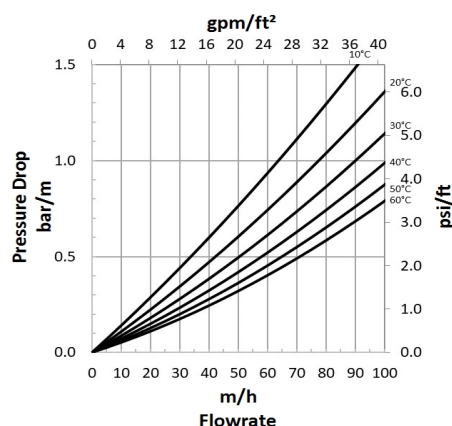
For additional information regarding recommended minimum bed depth, operating conditions, and regeneration conditions for [mixed beds](#) (Form No. 45-D01127-en) or [separate beds](#) (Form No. 45-D01131-en) in water treatment, please refer to our Tech Facts.

## Hydraulic Characteristics

Estimated pressure drop for AmberLite™ IRN160 H/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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