AMBERLITE® IRN99

Nuclear Grade High Capacity Gel Cation Exchange Resin

PRELIMINARY PRODUCT DATA SHEET

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AMBERLITE IRN99 is a nuclear grade, gel type, strong acid cation exchange resin with a combination of very high capacity and oxidative stability that enables a completely new level of performance in nuclear power applications. It is sold in the fully regenerated Hydrogen form and intended for use in *non-regenerable* single bed or mixed bed nuclear systems which demand the ultimate in effluent purity, operating capacity, and resin life. The particle size of Amberlite IRN99 is specifically designed to give an optimized balance of pressure drop, exchange kinetics, and resistance to separation from the anion exchange resin, Amberlite IRN78, when used in a mixed bed.

In BWR condensate polishing, Amberlite IRN99 can help to achieve the lowest possible reactor water sulfate levels. The exceptionally high DVB crosslinker level of Amberlite IRN99 gives it the best oxidative stability of any gel cation resin available, thus minimizing the release of sulfonic acid leachables. Also Amberlite IRN99 is made at a particle size which reduces the chance of creating a separated cation resin layer at the bottom on the mixed bed service vessel.

The very high total capacity of Amberlite IRN99, typically **2.5 eq/L**, delivers another important benefit, not only in BWR condensate polishing, but also in other nuclear applications such as PWR steam generator blowdown treatment, PWR primary system CVCS resin beds, and even radioactive waste demineralizers. The high total cation exchange capacity can produce a 15 to 30% increase in operating throughput. Since the nuclear grade resins from all these applications are generally disposed of as rad waste, high capacity and long resin bed life are critical to minimizing rad waste disposal cost and volume. For most users, rad waste disposal cost will often exceed resin purchase cost, so high resin capacity directly translates into savings in these non-regenerable nuclear applications. Furthermore, longer bed life means fewer bed change-outs, less work, less resin handling, and less chance for radiation exposure.

PROPERTIES

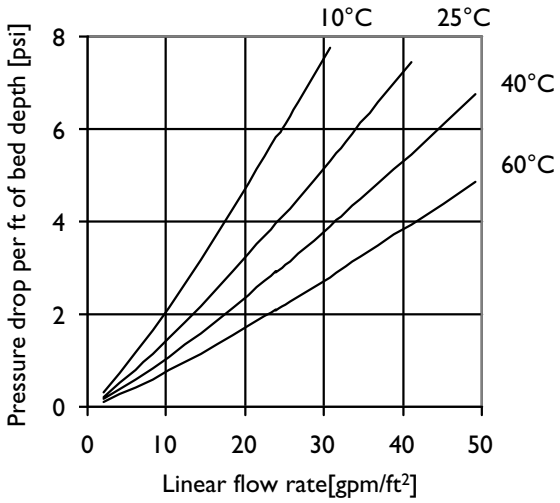
Matrix	Polystyrene divinylbenzene copolymer
Functional Groups	Sulfonic acid
Physical Form	Dark amber translucent beads
Conversion to H+ form	99% minimum
Total Exchange Capacity	2.4 meq/ml minimum (H^+ form)
Moisture Holding Capacity	37 to 43% (H^+ form)
Shipping Weight	52.4 lb/ft^3 (840 g/L)
Retained on 20 mesh (850 µm)	1.0% maximum
Through 50 mesh (300µm)	0.1% maximum
Uniformity Coefficient	1.2 maximum
Friability Average	350 g/bead minimum
Friability > 200 g/bead	95% minimum
Na	50 mg/kg dry, maximum
Al	50 mg/kg dry, maximum
Fe	50 mg/kg dry, maximum
Cu	10 mg/kg dry, maximum
Heavy Metals as Pb	10 mg/kg dry, maximum

SUGGESTED OPERATING CONDITIONS

Operating Temperature	60 to 140° F (15 to 60 °C)
Minimum Bed Depth	36 inches
Service Flow Rate for Condensate Polishing (LV)	50 gpm/ft^2
Service Flow Rate Other Applications (SV)	1 to 6 gpm/ft^3 (8 to 50 BV/h)

HYDRAULIC CHARACTERISTICS

The figure shows the pressure drop data for Amberlite IRN99 as a single component resin, as a function of service flow rate and water temperature. Pressure drop data are for clean, classified beds which have not accumulated solids during the service run. If the bed accumulates solids, the pressure drop would increase. The pressure drop of a mixed bed can be approximated by summing the component pressure drops.



LIMITS OF USE

AMBERLITE IRN99 is suitable for industrial uses. For other specific applications such as pharmaceutical, food processing or potable water applications, it is recommended that all potential users seek advice from Rohm and Haas in order to determine the best resin choice and optimum operating conditions.

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