ROHM AND HAAS

LENNTECH Water treatment and Air purification

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PRODUCT DATA SHEET

AMBERLITE™ IRN77

Nuclear Grade Strong Acid Cation Resin

AMBERLITE IRN77 resin is a uniform particle size strongly acidic gel type polystyrene cation exchanger supplied in the hydrogen form. This resin is Nuclear Grade and processed to the highest purity standards to meet the most stringent requirements of the nuclear power industry. AMBERLITE IRN77 resin contains a minimum of 99 % of its exchange sites in the hydrogen form.

The uniform particle size and the absence of fine resin beads results in a lower pressure drop compared to conventional resins.

PHYSICAL CHARACTERISTICS

Physical form	Spherical amber beads
Matrix	Styrene divinylbenzene copolymer
Functional group	Sulfonic acid
Ionic form as shipped	H^+
Total exchange capacity [2]	≥ 1.90 eq/L (H^+ form)
Moisture holding capacity [1]	49 to 55 % (H^+ form)
Shipping weight	800 g/L
Particle size	
Uniformity coefficient [1]	≤ 1.2
Harmonic mean size [1]	0.600 to 0.700mm
< 0.300 mm [1]	0.2 % max
Whole beads	≥ 95 %
Breaking weight (average)	≥ 350 g/bead
> 200 g/bead	≥ 95 %
Ionic conversion [1]	≥ 99 % H^+

[1] *Contractual value*
[2] *Average value calculated from statistical quality control*

SUGGESTED OPERATING CONDITIONS

Maximum operating temperature	120 °C
Minimum bed depth	800 mm
Service flow rate	8 to 50 BV*/h
Service velocity	60 m/h maximum

** 1 BV (Bed Volume) = 1 m^3 solution per m^3 resin*

PURITY

The manufacturing process for this resin is controlled to keep inorganic impurities at the lowest possible level. Special treatment procedures are also used to remove traces of soluble organic compounds. 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.

Purity	mg/kg dry resin
Al	≤ 50
Ca	≤ 50
Co	≤ 30
Cu	≤ 10
Fe	≤ 50
Hg	≤ 20
K	≤ 40
Mg	≤ 50
Na	≤ 50
Pb	≤ 10

APPLICATIONS

AMBERLITE IRN77 resin has proved highly effective in the following applications:

Primary water treatment:

Removal of fission products, activated corrosion products, and suspended matter. It is also used to control the pH of the reactor coolant stream by removing the excess ^{7}Lithium.

Radwaste treatment:

Removal of radioactive cations such as ^{137}Cesium from waste streams.

Decontamination:

Removal of cationic radioactive material from spent decontaminating solutions.

HYDRAULIC CHARACTERISTICS

Resin handling

To maintain the high purity of nuclear grade resins, deionised water should be used for all resin handling. If the resin requires backwashing, the bed should be expanded a minimum of 50%. See figure 1.

Figure 1: Bed Expansion

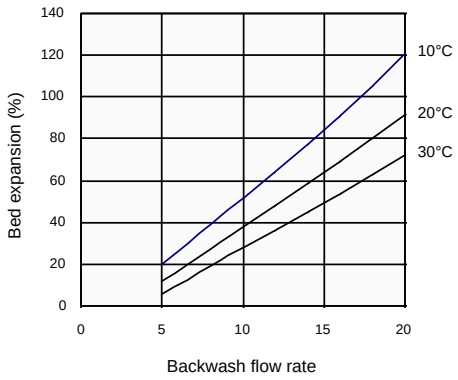

Figure 2 shows the approximate pressure drop for each meter of bed depth of AMBERLITE IRN77 resin in normal downflow operation at various temperatures and flow rates. Pressure drop data are valid at the start of the service run with clear water.

Figure 2: Pressure Drop

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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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