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AMBERLITE™ IRN170

Nuclear Grade Mixed Bed Resin

Introduction

AMBERLITE IRN170 resin is a fully regenerated nuclear grade mixed bed resin designed for the ultimate performance in non-regenerable nuclear applications. The cation component of this mixed bed product is Amberlite IRN99 resin, which delivers the highest total capacity and the best oxidative stability of any available cation exchange resin. This revolutionary highly cross-linked gel cation resin is combined in a 1 to 1 equivalent ratio with the proven anion exchange resin, Amberlite IRN78 resin, to make Amberlite IRN170 resin. This new mixed bed is now the resin of choice for nuclear applications which demand the highest effluent purity, highest operating capacity, and longest resin life.

Amberlite IRN170 resin was originally developed for use in BWR condensate polishers to help achieve the lowest possible sulfate levels in reactor water. This is accomplished through a combination of the extraordinary oxidative stability of the cation resin, and a particle size balance between the cation and anion resins, which minimizes the formation of a re-separated cation resin layer on the bottom of the service vessels. The purchase of Amberlite IRN170 resin as a pre-mixed resin also allows for faster initial rinse- up prior to service, which minimizes rinse waste water volume.

The exceptionally high total capacity of Amberlite IRN170 resin delivers an important benefit, for many other nuclear applications including PWR steam generator blowdown treatment, PWR primary system CVCS resin beds, fuel pool demineralizers, and radioactive waste treatment. 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 exceed resin purchase cost, so higher resin capacity directly translates into lower costs in these non-regenerable nuclear applications. Longer bed life also brings significant operational benefits such as fewer bed change-outs, less resin handling, and fewer chances for radiation exposure.

Properties

Physical form	Mixture of dark and light amber translucent spherical beads	
Matrix	Styrene divinylbenzene copolymer	
Chemical form	1 to 1 equivalent mixture of H^+ and OH^- form resins	
Shipping weight	43 lb/ft^3 (690 g/L)	
	Cation resin	**Anion resin**
Functional group	Sulphonic acid	Quarternary ammonium
Total exchange capacity	≥ 2.40 eq/L (H^+ form) 37 to 43% (H^+ form)	≥ 1.2 eq/L (OH^- form) 54 to 60 % (OH^- form)
Moisture holding capacity	≥ 99 % H	≥ 95 % OH
% Regenerated sites	-	≤ 0.1 %
% Cl form sites	0.1 % max	

Particle size	
Retained on 50 Mesh (0.300 mm)	≥ 95 %
Whole beads	≥ 350 g/bead
Breaking weight (average)	≥ 95 % > 200 g/bead
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

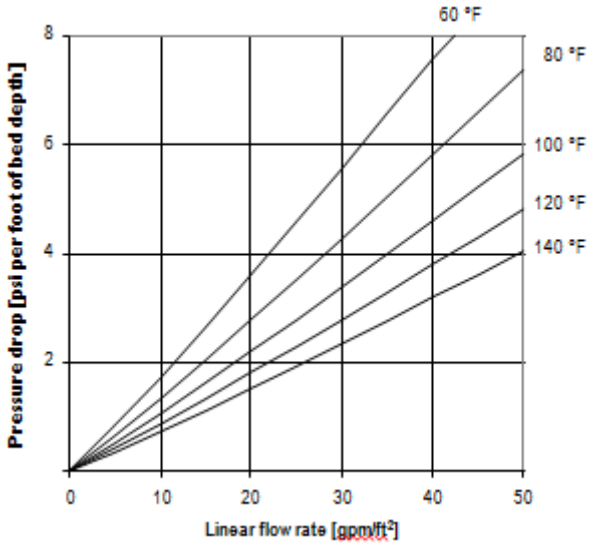
Suggested Operating Conditions

Maximum 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 for 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 IRN170 resin, 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 would increase.

Figure 1: Pressure Drop



Limits of use

AMBERLITE IRN170 resin 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.

For more information about DOW™ resins, call the Dow Water & Process Solutions business:

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