



AMBERLITE™ IRN170 Resin

Nuclear Grade Mixed Bed Resin

Description

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, to make AMBERLITE IRN170. This 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. AMBERLITE IRN170 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.

Typical Physical and Chemical Properties

Physical form	Mixture of dark and light amber translucent beads
Matrix	Polystyrene divinylbenzene copolymer
Functional groups	Sulfonic acid / Quaternary Ammonium
Chemical form	1-to-1 equivalent mixture of H ⁺ and OH ⁻ form resins
Shipping density	690 g/L (43 lbs/ft ³)
< 0.300 mm, max.	0.2%
> 1.180 mm, max.	5.0%
Friability average, min.	350 g/bead
Friability > 200 g/bead, min.	95%
Na, dry basis, max.	50 mg/kg
Al, dry basis, max.	50 mg/kg
Fe, dry basis, max.	50 mg/kg
Cu, dry basis, max.	10 mg/kg
Heavy Metals as Pb	10 mg/kg

(This chart continues to the following page)

Component resin	Cation resin	Anion resin
Total exchange capacity	2.4 eq/L (52.4 kgr/ft ³ as CaCO ₃)	1.2 eq/L (26.2 kgr/ft ³ as CaCO ₃)
Moisture retention capacity	37–43%	54–60%
% Regenerated sites, min.	99% H	95% OH
% Cl form sites, max.	—	0.1%

Suggested Operating Conditions

Operating temperature	15–60°C / 60–140°F
Minimum bed depth	900 mm (3 ft)
Service flow rate for condensate polishing (LV)	120 m/h (50 gpm/ft ³) max.
Service flow rate other applications (SV)	8–50 BV*/h (1.0–6.3 gpm/ft ³)

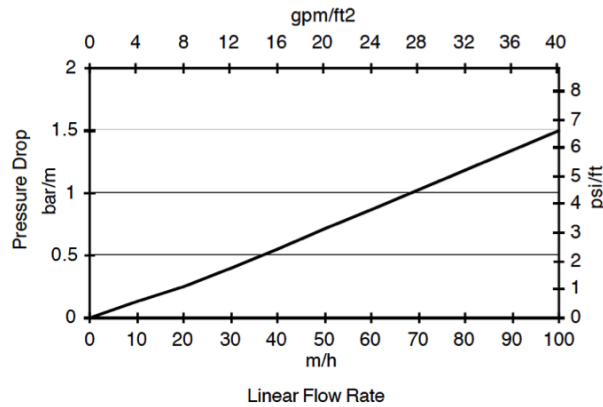
*1 BV (Bed Volume) = 1 m³ solution per m³ resin or 7.5 gals per ft³ resin

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.

Figure 1. Pressure Drop

Temperature = 20° C (68° F)



For other temperatures use:

$$P_T = P_{20^\circ\text{C}} / (0.026 T_{\text{°C}} + 0.48), \text{ where } P \equiv \text{bar/m}$$

$$P_T = P_{68^\circ\text{F}} / (0.014 T_{\text{°F}} + 0.05), \text{ where } P \equiv \text{psi/ft}$$

Packaging

25 liter bags or 7 cubic foot drums

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

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

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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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