



AMBERLITE™ IRN360

Nuclear Grade Mixed Bed Resin

Introduction

AMBERLITE™ IRN360 resin is a mixture of uniform particle size, gelular polystyrene cation and anion exchange resins. It is supplied in the H⁺/OH⁻ form and has a 2:1 cation to anion ratio by volume. AMBERLITE IRN360 resin is a nuclear grade mixed bed designed for use in PWR primary coolant and secondary circuit condensate polishing applications. The resin combines the properties of high cation exchange capacity with excellent resistance to bead fracture from attrition and osmotic shock. The high cation volume provides 50 to 70% more operating capacity than conventional 1:1 mixed beds, and is a way to reduce rad-waste in special nuclear circuits.

Typical Properties

(These are typical properties, not to be construed as specifications.)

Physical form	Uniform particle size spherical beads	
Matrix	Styrene divinylbenzene copolymer	
Shipping weight ^[1]	690 g/L (43 lb/ft ³)	
	Cation resin	Anion resin
Functional group	Sulphonic acid	Trimethylammonium
Ionic form as shipped	H ⁺	OH ⁻
Total exchange capacity	≥ 2.0 eq/L (H ⁺ form)	≥ 1.1 eq/L (OH ⁻ form)
Moisture holding capacity	45 to 51 % (H ⁺ form)	54 to 60 % (OH ⁻ form)
Particle size	≤ 1.2 (for each component)	
Uniformity coefficient	0.525 ± 0.05 mm 0.630 ± 0.05 mm	
Harmonic mean size	≤ 0.2 %	
< 0.300 mm	≥ 95 %	
Whole beads		
Friability	≥ 350 g/bead	
Average	≥ 95 %	
> 200 g/bead		
Ionic conversion	≥ 99 % H ⁺	≥ 95 % OH ⁻
CO ₃ ⁼		≤ 5 %
Cl ⁻		≤ 0.1 %
SO ₄ ⁼		≤ 0.1 %

^[1] Typical value - Test methods and SQC charts are available on request.

Suggested Operating Conditions

Maximum operating temperature	60 °C (140°F)
Minimum bed depth	900 mm (36 inches)
Service flow rate	8 to 80 BV*/h (1 to 10 gpm/ft ³)
Linear velocity	25 to 120 m/h (10 to 50 gpm/ft ²)

* 1 BV (Bed Volume) = 1 m³ solution per m³ resin

Purity

AMBERLITE™ IRN360 resin is manufactured as a nuclear grade resin using specific procedures throughout the manufacturing process. These procedures, combined with Dow's process to reduce the chloride content of the anion component, produce a material of high

purity and yield a product that addresses the rigorous demands of the nuclear industry. AMBERLITE™ IRN360 resin is recommended in any non regenerable mixed bed application where reliable production of high quality water is required and where the "as supplied" resin must have an absolute minimum of ionic and non ionic contamination.

Purity	Cation mg/kg dry resin	Anion mg/kg dry resin
Al	≤ 50	≤ 50
Ca	≤ 50	≤ 50
Cu	≤ 10	≤ 10
Fe	≤ 50	≤ 50
Mg	≤ 50	≤ 50
Na	≤ 50	≤ 20
Pb	≤ 10	≤ 10

Applications

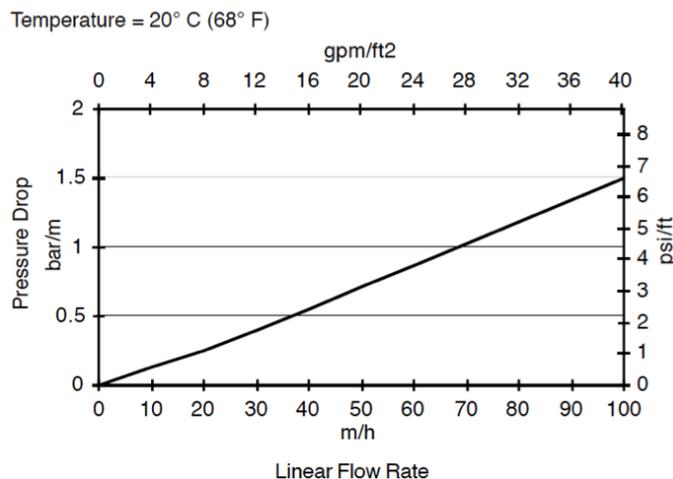
The purity and physical stability of AMBERLITE IRN360 resin provides exceptional performance in nuclear applications. The non separating feature of AMBERLITE IRN360 makes it an excellent choice for :

- PWR primary coolant treatment in place of De-Lithiation cation
- PWR secondary circuit purification at start-up
- Demineralization of Steam Generator Blow down
- Mixed bed deionization of alkaline effluents

Hydraulic Characteristics

Pressure drop

The approximate pressure drop for each meter of bed depth of AMBERLITE IRN360 resin in normal downflow operation at various temperatures and flow rates is shown in the graph below. Pressure drop data are valid at the start of the service run with clean water.



For other temperatures use:

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

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

Handling Precautions	Before using this product, consult the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.
Storage	Store products in tightly closed original containers at temperatures recommended on the product label.
Disposal Considerations	<p>Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.</p> <p>It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Technical Representative for more information.</p>
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.
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