

PRODUCT DATA SHEET

AMBERLITE™ IRN217
Industrial Nuclear Grade Mixed Bed Resin

AMBERLITE IRN217 resin is a mixture of uniform particle size gelular polystyrene cation and anion exchange resins. AMBERLITE IRN217 resin as supplied contains a stoichiometric equivalent of the strongly acidic cation resin, fully converted in the ⁷Li form, and the strongly basic anion exchange resins. It is supplied in the Li⁺/OH⁻ form. AMBERLITE IRN217 resin is designed

for use in primary water chemistry control in PWR nuclear power operations. Only LiOH of certified isotopic purity greater than 99.9 % ⁷Li is used in manufacturing the cation component of AMBERLITE IRN217 resin. The resin combines the properties of high capacity and excellent resistance to bead fracture from attrition and osmotic shock.

PROPERTIES

Physical form _____	Uniform particle size spherical beads	
Matrix _____	Styrene divinylbenzene copolymer	
Shipping weight _____	690 g/L	
Functional group _____	Cation resin	Anion resin
Ionic form as shipped _____	Sulphonic acid	Trimethylammonium
Total exchange capacity ^[1] _____	⁷ Li ⁺	OH ⁻
Strong base capacity ^[2] _____	≥ 1.75 eq/L (⁷ Li ⁺ form)	≥ 1.2 eq/L (OH ⁻ form)
Moisture holding capacity ^[2] _____	-	≥ 90 %
Particle size	49 -55 % (H ⁺ form)	54 - 60 % (OH ⁻ form)
Uniformity coefficient _____	≤ 1.2 (for each component)	
Harmonic mean size _____	0.650 ± 0.05 mm	0.630 ± 0.05 mm
< 0.300 mm	0.2 % max	
Whole beads _____	98 % minimum	
Ionic conversion ^[2] _____	99 % min ⁷ Li ⁺	95 % min OH ⁻ ^[2]
CO ₃ ⁼ _____	-	5 % max
Cl ⁻ _____	-	0.1 % max
SO ₄ ⁼ _____	-	0.1 % max

^[1] Average value calculated from statistical quality control

^[2] Contractual value

Test methods and SQC charts are available on request.

RECOMMENDED OPERATING CONDITIONS

Maximum operating temperature _____	60 °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 m³ solution per m³ resin

PURITY

AMBERLITE IRN217 resin is designated as a nuclear grade resin and is manufactured using special processing procedures. These procedures, combined with a Rohm and Haas process to reduce the chloride content of the anion component, produce material of the ultimate purity and yield a product meeting the exacting demands of the nuclear industry.

AMBERLITE IRN217 resin is recommended in any non regenerable mixed bed application where reliable production of the highest 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
Al	≤ 50	≤ 50
Ca	≤ 50	≤ 50
Co	≤ 30	≤ 30
Cu	≤ 10	≤ 10
Fe	≤ 50	≤ 50
Hg	≤ 20	≤ 20
K	≤ 40	≤ 40
Mg	≤ 50	≤ 50
Na	≤ 50	≤ 20
Pb	≤ 10	≤ 10
Total Cl		≤ 500
SiO ₂		≤ 100
Total SO ₄		≤ 600

APPLICATIONS

AMBERLITE IRN217 resin is specifically designed for mixed beds for purification in the chemical and volumetric control system of pressurised water reactors. This application requires the mixed bed to remove radioisotopes such as 137 Cesium, 58 Cobalt and 131 Iodine, and also chemical contaminants such as Cl and SO₄. Since the primary reactor coolant contains relatively high background levels of boric acid buffered with 7LiOH, the mixed bed resins will operate in the 7Li/Borate form.

All our products are manufactured in ISO 9001 certified facilities.

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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.

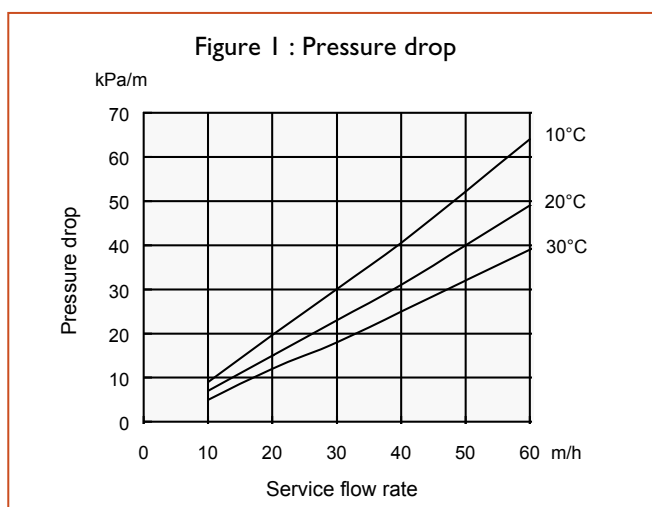
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The cation resin component of AMBERLITE IRN217 resin is supplied in the 7 Lithium form in order to minimise fluctuations in the concentration in 7 Li in the reactor coolant, when a new purification mixed bed is put into service. AMBERLITE IRN217 is made only using certified isotopically pure 7LiOH in order to minimise the undesirable reaction $6Li+n \rightarrow 3H+@$.

The anion resin component of AMBERLITE IRN217 resin is very highly regenerated to the hydroxide form to insure that less than 0.1 equivalent percent of the sites on the resin are in the chloride form and 0.1 percent equivalent in the sulphate form. Therefore, AMBERLITE IRN217 resin can effectively control chloride and sulphate impurities while operating in a 7Li/Borate solution.

HYDRAULIC CHARACTERISTICS

The approximate pressure drop for each meter of bed depth of AMBERLITE IRN217 resin in normal downflow operation at various temperatures and flow rates is shown in the graph below.



RESIN HANDLING

To retain the high purity standards of nuclear grade resins, deionised water should be used for all resin handling. Contact of the resin with air should also be minimised to avoid CO₂ pickup and subsequent loss of capacity of the anion resin.