



NRW-35 Li7 B

NUCLEAR GRADE ION EXCHANGE RESIN
(FOR THE DECONTAMINATION OF RADIOACTIVE CIRCUITS)

Technical Data

PRODUCT DESCRIPTION

Purolite NRW-35 Li7B is a nuclear grade mixed bed resin especially designed for the removal of radioactive contaminants from primary circuits of nuclear power plants conditioned with lithium 7 isotope. The product is an equilibrium mixture (chemical equivalents) of **Purolite NRW160** carefully converted to the high purity lithium 7 isotope form, and **Purolite NRW400B** which is supplied highly converted to the borate form. The mixture is capable of removing both cationic and anionic contaminants while maintaining the concentration of lithium hydroxide conditioner at near the correct dose level within the sealed circuit. This product may be placed in service with minimum rinsing thereby minimizing radioactive waste volume and operator exposure.

Typical Chemical and Physical Characteristics

NRW-160 Li7 (Nuclear Cation) plus NRW-400B (Nuclear Anion)

Polymer Structure	Gel polystyrene crosslinked with divinylbenzene
Appearance	Spherical beads
Functional Groups	Sulphonic acid and quaternary amine
Ionic Form - as shipped.....	Li7 form 99% min/H ₂ BO ₃ form 95% min
Shipping Weight	720-755 kg/m ³ (45-47 lb/ft ³)
Screen Size Range (U.S. Standard Screen)	16-40 mesh wet
Particle Size Range (microns)	+1200 <2 % -425 <2%
Moisture Retention – as shipped.....	65 % max
Total Exchange Capacity	
Cation Component (H ⁺ Form)	2.0 ea/l min
Anion Component (H ₂ BO ₃ Form)	1.0 ea/l min
Percentage by volume	
Cation Component	35%
Anion Component	65%
Temperature Limit	
Li7/BO ₃ Form.....	60°C
pH Limits	
None	
Metals Content (ppm wet weight max)	
Na + K	50 ppm max
Fe	50 ppm max
Heavy Metals	40 ppm max
Cl	0.1% max
SO ₄	0.3% max

APPLICATION

The water circulating in a primary circuit must be clean, and in particular suspended matter must be eliminated. This reduces the risk of corrosion of the fuel rods. In this way contamination of the recirculating water with fission products normally contained in the fuel cans is avoided. To this end, the pH of the circuit is rendered alkaline using preferably lithium seven hydroxide. Natural lithium may be used, but has the disadvantage that tritium can be produced by neutron capture with the small % of ^6Li present in natural lithium. Potassium is also used as a cheaper alternative, but can give some possibilities for transfer of radioactivity. Any polishing mixed bed used in such circuits is preferably loaded with the metal ion used for the pH control.

The cooling water pH is maintained at 7.5-8.5 at reactor temperature. This corresponds to a concentration of 0.2-2 ppm depending upon the boric acid content.

Further details and a general view of this subject is given in "Purolite Resins For Use In Nuclear Power Plants"