

**AMBERLITE™ IRC83 Ion Exchange Resin**

High Capacity Weak Acid Cation Resin for Industrial Water Dealkalization and Oil Field Softening

Description

AMBERLITE™ IRC83 Ion Exchange Resin is a macroporous weak acid cation exchange resin designed for water utility engineers and oil field operators concerned with water and chemical efficiency. The distinct polymer structure of AMBERLITE IRC83 offers up to 10% more operating capacity versus other weak acid cation exchange resins reducing regeneration water use and waste volume. When used in conjunction with strong acid cation exchange resin, significant chemical savings can also be realized.

The exceptional physical and chemical stability coupled with the high operating capacity makes AMBERLITE IRC83 an excellent choice to tackle the demanding conditions for oil field softening (SAGD) systems. In addition to these performance benefits, users are realizing the long-lasting quality provided by AMBERLITE™ Ion Exchange Resins of over 60 years.

Typical Physical and Chemical Properties**

Matrix	Polyacrylic, macroporous
Type	Weak acid cation
Functional Group	Carboxylic acid
Physical Form	Amber, opaque, spherical beads
Ionic Form as Shipped	H ⁺ Form
Total Exchange Capacity	≥ 4.50 eq/L
Water Retention Capacity	40 – 50%
Particle Size	
Particle Diameter ^b	500 – 750 μm
Uniformity Coefficient	≤ 1.70
< 300 μm	≤ 2.0%
Whole Uncracked Beads	≥ 95%
Swelling	H ⁺ → Na ⁺ : ≤ 60%
Bulk Density, as Shipped ^c	700 g/L

^b For additional particle size information, please refer to the [Particle Size Distribution Cross Reference Chart](#) (Form No. 177-01775).

^c As per the backwashed and settled density of the resin, determined by ASTM D-2187.

**Suggested
Operating
Conditions****

Maximum Operating Temperature	100°C (212°F)		
Bed Depth, min.	700 mm (2.3 ft)		
Flowrates			
Service	5 – 50 BV*/h		
Backwash	See Figure 1		
Regeneration			
HCl	2 – 4 BV/h		
H ₂ SO ₄	2 – 4 BV/h		
NaOH	2 – 4 BV/h		
Displacement Rinse	2 BV at 2 – 4 BV/h		
Fast Rinse	2 – 4 BV at service flowrate		
Regenerant (100% basis)			
Concentration	HCl	H ₂ SO ₄	NaOH
Level	2 – 5%	0.5 – 0.7%	2 – 4%
Dealkalization (% Operating Capacity)			
Softening (% Total Capacity)	105 – 110%	105 – 110%	110 – 160%
	110 – 160%	110 – 160%	110 – 160%

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

Hydraulic Characteristics

Bed expansion of AMBERLITE™ IRC83 Ion Exchange Resin as a function of backwash flowrate and temperature ranging from 10 – 60°C (50 – 140°F) is shown in Figure 1 for resin in the H⁺ form and in Figure 3 for the Na⁺ form.

Pressure drop data for AMBERLITE IRC83 as a function of service flowrate and temperature ranging from 10 – 60°C (50 – 140°F) is shown in Figure 2 for resin in the H⁺ form and in Figure 4 for the Na⁺ form. Pressure drop data are valid at the start of the service run with clean water and a correctly classified bed.

Figure 1: Backwash Expansion (H⁺ form)

Temperature = 10 – 60°C (50 – 140°F)

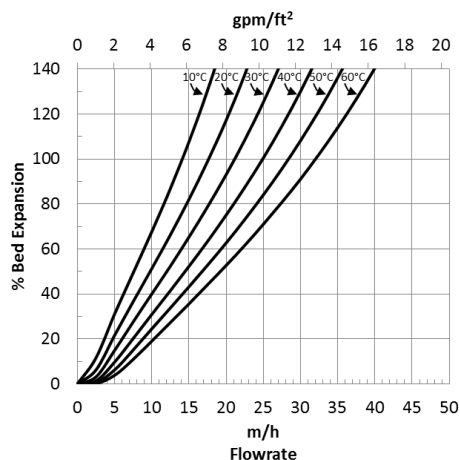


Figure 2: Pressure Drop (H⁺ form)

Temperature = 10 – 60°C (50 – 140°F)

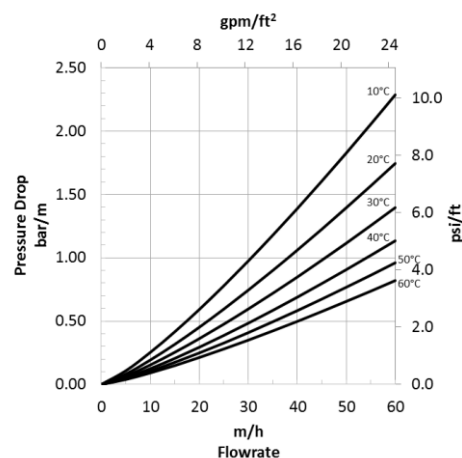


Figure 3: Backwash Expansion (Na⁺ form)

Temperature = 10 – 60°C (50 – 140°F)

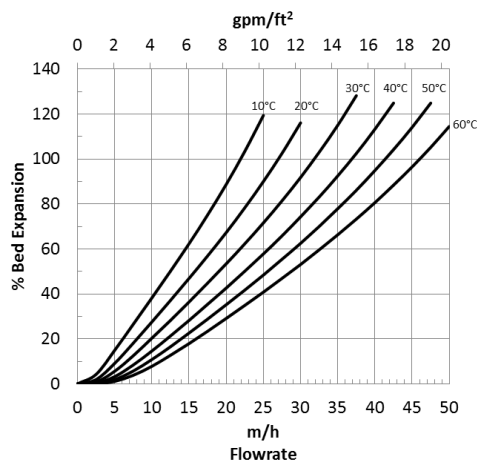
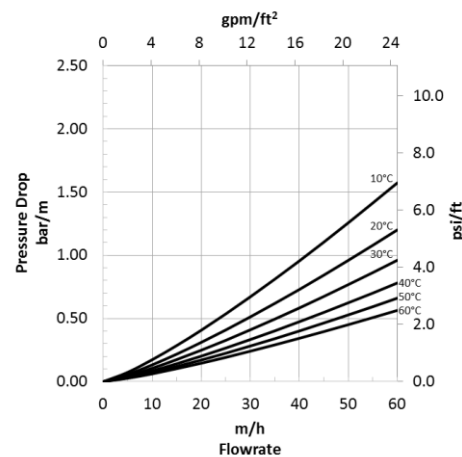


Figure 4: Pressure Drop (Na⁺ form)

Temperature = 10 – 60°C (50 – 140°F)



Application Information

Operating capacity

The operating capacity of AMBERLITE™ IRC83 Ion Exchange Resin is a function of water composition, temperature, and service flowrate. Contact your Dow representative if more specific information is required for your application.

Regeneration

AMBERLITE™ IRC83 Ion Exchange Resin is readily regenerated with as little as 1.05 times stoichiometric amounts of strong acids. If sulfuric acid is used, care must be taken to apply a low concentration of H₂SO₄ (0.7%) in order to minimize the potential of calcium sulfate precipitation.

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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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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