LENNTECH Water treatment and Air purification

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AMBERLITE™ IRC748 Industrial Grade Chelating Resin for Metals Removal

Description

AMBERLITE IRC748 is an iminodiacetic acid chelating cation exchange resin with high selectivity for calcium, magnesium and strontium in chloralkali brines. Amberlite IRC748 also exhibits high selectivity for heavy metal cations over alkali metal ions found in various process and waste streams. Selectivity is achieved by the iminodiacetic acid functionality chemically bound to a macroreticular resin matrix. Because of the high preference of Amberlite IRC748 for metals and excellent kinetic performance, this resin can remove metals from solutions even in the presence of high concentrations of sodium or calcium salts, with very low metal leakage. The macroreticular structure of Amberlite IRC748 is highly resistant to osmotic shock and has excellent physical stability. The typical properties of Amberlite IRC748 are shown below.

Typical Properties

These properties are typical but do not constitute specifications.

Matrix	Macroporous styrene divinylbenzene
Functional groups	Iminodiacetic acid
Physical form	Opaque, beige beads
Ionic form as shipped	Na^+
Total exchange capacity [1]	≥ 1.35 eq/L (Na^+ form)
Moisture holding capacity [1]	60.0 to 65.0 % (Na^+ form)
Shipping weight	750 g/L (46.8 lb/ft^3)
Particle size	
Harmonic mean size [1]	0.50 - 0.65 mm
Uniformity coefficient	≤ 1.7
Fines content [1]	< 0.300 mm : 1.0 % max.
Coarse beads	> 1.100 mm : 5.0 % max.
Typical reversible swelling	$H^+ \rightarrow Na^+$: 30 %

[1] *Contractual value*
Test methods are available on request

Suggested Operating Conditions

Maximum operating temperature	90°C (195°F)
pH range	1.5 to 14 (depending on applications)
Service flow rate	6 to 32 BV*/h (0.75 to 4 gpm/ft^3)
Regenerant	HCl or H_2SO_4
Concentration	5 to 10 %
Flow rate	2 to 4 BV/h (0.25 to 0.50 gpm/ft^3)
Sodium form conversion	1 - 4 % NaOH, flow rate: 2 to 4 BV/h

** 1 BV (Bed Volume) = 1 m^3 solution per m^3 of resin*

Selectivity

The apparent selectivity of any ion exchange resin for a given metal depends upon concentration, the presence of other species and pH. This makes absolute selectivities very difficult to determine, especially for waste treatment applications. Because of this, laboratory testing is essential when a resin is required to remove one or more types of metal ions selectively. In general the selectivity follows the following order:

$Na^+ < < Ca^{2+} < Mn^{2+} < Fe^{2+} < Co^{2+} < Cd^{2+} < Zn^{2+} < Ni^{2+} < Pb^{2+} < Cu^{2+} < Hg^{2+} < Fe^{3+}$

The affinity for H^+ at pH 4 is situated between Pb^{2+} and Cu^{2+}. Consequently, for the metals with selectivities less than Cu^{2+}, the resin should be in the salt form (for example in the Na^+ form) to minimize metal leakage. At a pH of 2, the resin will be extensively in the H^+ form and will only efficiently remove Fe^{3+}, Cu^{2+} and Hg^{2+}. Selectivity at various pH conditions for Amberlite IRC748 are given below:

pH = 2		pH = 4		pH = 9*	
Metal ion	K $\frac{M}{Ca}$	Metal ion	K $\frac{M}{Ca}$	Metal ion	K $\frac{M}{Ca}$
Fe^{3+}	325 000	Hg^{2+}	2 800	Ni^{2+}	30
Cu^{2+}	130 000	Cu^{2+}	2 300	Cd^{2+}	14
Hg^{2+}	> 43 000	Pb^{2+}	1 200	Cu^{2+}	10
		Ni^{2+}	57	Zn^{2+}	3
		Zn^{2+}	17	Ca^{2+}	1.0
		Cd^{2+}	15		
		Co^{2+}	6.7		
		Fe^{2+}	4.0		
		Mn^{2+}	1.2		
		Ca^{2+}	1.0		

*** very high ammonium background, (200 g/L $(NH_4)_2SO_4$).**

Applications

AMBERLITE IRC748 is used in the following special applications:

- Purification of brine in the chloralkali industry
- Electronics industry (printed wiring boards)
- Purification of process streams containing trace metals
- Electroplating industry
- Recovery of heavy metals from hydrometallurgical leach streams

Hydraulic Characteristics

Figure 1 shows the bed expansion of AMBERLITE IRC748 as a function of backwash flow rate and temperature.

Figure 1 : % Bed Expansion in Water

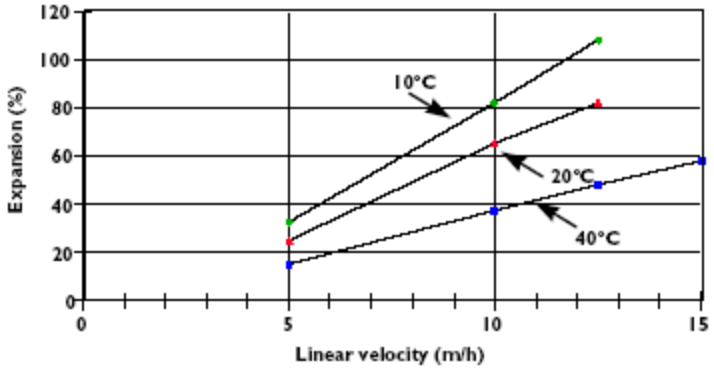
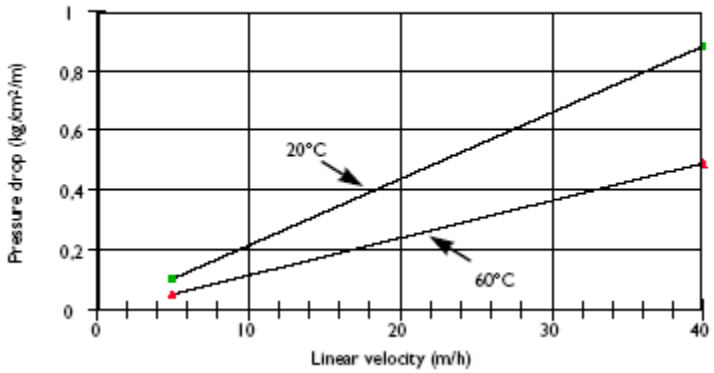


Figure 2 provides the pressure drop profile for AMBERLITE IRC748 in brine.

Figure 2 : Pressure Drop in Brine



Limits of Use

AMBERLITE IRC748 is suitable for industrial uses. For specific applications such as pharmaceutical, food processing or potable water applications, it is recommended that all potential users seek advice from Rohm and Haas in order to determine the best resin choice and optimum operating conditions.

All our products are produced in ISO 9002 certified manufacturing facilities.

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