Product Data Sheet

AMBERSEP™ IRC748 Chelating Resin

Industrial-grade Chelant for Chemical Processing

Description

AMBERSEP™ IRC748 Chelating Resin is a macroporous resin containing iminodiacetic groups. The chemical nature of these groups is such that they form complexes with metal ions. It is highly resistant to osmotic shock and has excellent physical stability. This resin features a heterodispersed particle size distribution so it is well-suited for systems which are not constrained by pressure drop.

AMBERSEP IRC748 features very high capacity for calcium and is especially useful when treating brines that have a high strontium content. Under these conditions, the resin offers an improved cycle time, displaying also very good removal efficiency for strontium with very low metal leakage.

AMBERSEP IRC748 is also used for metal recovery in hydrometallurgical applications because it also exhibits high selectivity for heavy metal cations over alkali metal ions found in various process and waste streams.

Applications

- Chloralkali (brine purification)
- Electronics (printed wiring boards)
- Electroplating
- Process streams (trace metal removal)
- Hydrometallurgy (recovery of heavy metals from leach streams)

Typical Physical and Chemical Properties**

Matrix	Styrene-divinylbenzene, macroporous
Type	Chelant
Functional Group	Iminodiacetic acid
Physical Form	Hard, opaque, beige, spherical beads
Ionic Form as Shipped	Na^+
Total Exchange Capacity	1.35 eq/L
Dry Weight Capacity	≥ 4.45 eq/kg
Water Retention Capacity	60 – 65%
Particle Size	
Particle Diameter §	500 – 650 µm
Uniformity Coefficient	≤ 1.7
< 300 µm	≤ 1.0%
> 1000 µm	≤ 5.0%
Whole Uncracked Beads	≥ 95%
Swelling, maximum reversible	$H^+ \rightarrow Na^+$: 30%
Bulk Density, as Shipped	750 g/L

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

Form No. 177-03609, Rev. 2
November 2017

Suggested Operating Conditions**

Maximum Operating Temperature	90°C (194°F)	
Operating pH	1.5 – 14 (depends on the application)	
Flowrates		
Service	6 – 32 BV*/h (0.75 – 4 gpm/ft^3)	
Regeneration	2 – 4 BV/h (0.25 – 0.50 gpm/ft^3)	
Regenerant	HCl	H_2SO_4
	5 – 10%	5 – 10%
Conversion to Na^+ form	1 – 4% NaOH at flowrate of 2 – 4 BV/h	

* 1 BV (Bed Volume) = 1 m^3 solution per m^3 resin or 7.5 gal per ft^3 resin

Hydraulic Characteristics

Bed expansion of AMBERSEP™ IRC748 Chelating Resin as a function of backwash flowrate and temperature is shown in Figure 1.

Pressure drop data for AMBERSEP IRC748 as a function of service flowrate and temperature in brine is shown in Figure 2.

Figure 1: Backwash Expansion

Temperature = 10°C, 20°C, 40°C

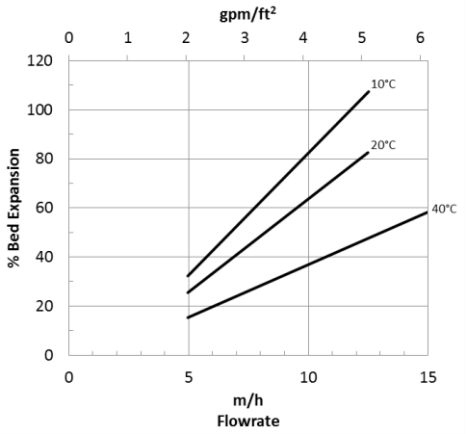
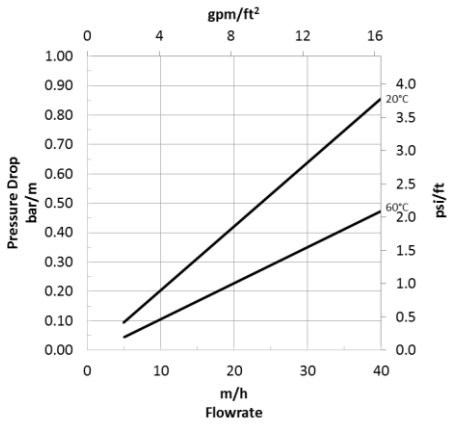


Figure 2: Pressure Drop

Temperature = 20°C, 60°C



Application Information

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 selectively remove one or more types of metal ions. In general, the selectivity for AMBERSEP™ IRC748 Chelating Resin follows the following order:

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

The affinity for H^+ at pH 4 is situated between Cu^{2+} and Pb^{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 pH 2, the resin will be extensively in the H^+ form and will only efficiently remove Fe^{3+}, Hg^{2+}, and Cu^{2+}. Selectivity at various pH conditions for AMBERSEP IRC748 are given below:

The resin can operate in a neutral, acidic, or alkaline medium, but since its capacity depends on the pH, the following minimum pH values are recommended for various cations:

pH = 2		pH = 4		pH = 9†	
Metal Ion	**K (M/Ca)**	**Metal Ion**	**K (M/Ca)**	**Metal Ion**	**K (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 $(NH_4)_2SO_4$

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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.

Form No. 177-03609, Rev. 2
November 2017