



AmberLite™ XAD™18 Polymeric Adsorbent

Macroporous, High-capacity, High-selectivity, Adsorbent Resin

Description

AmberLite™ XAD™18 Polymeric Adsorbent is a macroporous, non-ionic resin with high capacity and excellent selectivity to enable the user to obtain optimal separation performance. AmberLite™ XAD™18 offers high surface area and controlled pore size like other AmberLite™ XAD™ resins, but also has all the benefits of a closely controlled particle size to give an extra dimension to the problem of chromatographic separation on the industrial scale.

AmberLite™ XAD™18 possesses extremely high capacity for many biopharmaceutical molecules which translates to excellent performance over existing materials. The combination of high capacity and excellent selectivity makes AmberLite™ XAD™18 the choice of many biopharmaceutical process professionals. The particle size for this adsorbent is a balance between the smaller particle size required to achieve optimal separation (increased theoretical plates) and the need for high flow capabilities for an adsorbent resin at industrial scale.

AmberLite™ XAD™18 is a highly crosslinked, polystyrenic adsorbent available in the form of white insoluble beads supplied in the fully hydrated, wetcake form. AmberLite™ XAD™18 has excellent physical and thermal stability. For example, it exhibits lower swelling changes between aqueous and organic solvents than many other adsorbents. Although this resin may be used in a batch operation, the principal applications are in columnar operations. Due to the particle size and particle size distribution of this adsorbent, either fixed bed mode or simulated moving bed (SMB) operations are applicable.

Applications

- Recovery and purification of antibiotics, natural products, amino acids, and proteins

Typical Properties

Physical Properties	
Matrix	Macroporous, crosslinked DVB
Type	Adsorbent
Functional Group	None
Physical Form	White, opaque, spherical beads
Nitrogen BET	
Surface Area	~700 m ² /g
Average Pore Diameter	~150 Å
Chemical Properties	
Ionic Form as Shipped	Not applicable
Total Exchange Capacity	Not applicable
Binding Capacity for Ceph C (1% breakthrough)	≥ 60 g/L
Particle Size §	
Particle Diameter	425 ± 50 µm
Uniformity Coefficient	≤ 1.7%
< 212 µm	≤ 2%
Swelling (in solvent)	
Methanol	15 – 20%
2-Propanol	15 – 20%
Acetone	10 – 15%
Density	
Particle Density	1.03 g/mL
Shipping Weight	650 g/L

§ For additional particle size information, please refer to the [Particle Size Distribution Cross Reference Chart](#) (Form No. 45-D00954-en).

Suggested Operating Conditions

Maximum Operating Temperature	150°C (302°F)
pH Range (Stable)	1 – 14
Bed Depth, min.	
Industrial Conditions	1200 mm (3.9 ft)
Flowrates	
Loading	0.50 – 2 BV*/h
Elution/Desorption	0.50 – 2 BV/h
Regeneration	0.50 – 2 BV/h
Rinse	0.50 – 2 BV/h
Regenerants or Eluting Agents	- Water-miscible organic solvents (methanol, ethanol, isopropanol, acetone, etc.) for hydrophobic compounds, and for regenerating adsorbent resins fouled by oils and antifoams - Alkaline solutions (e.g., 1 N NaOH) for regenerating resins fouled with proteins, peptides, and other compounds - Dilute acids (0.1 – 0.5% HCl) for weakly basic compounds - Dilute oxidizing agents (< 0.5%) such as peroxide to enhance the removal of protein fouling - Hot nitrogen or steam for volatile materials

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

Hydraulic Characteristics

Estimated bed expansion of AmberLite™ XAD™ 18 Polymeric Adsorbent as a function of backwash flowrate at 20°C (68°F) is shown in Figure 1.

Estimated pressure drop for AmberLite™ XAD™ 18 as a function of service flowrate is shown in Figure 2. These pressure drop expectations are valid at the start of the service run with clean feed.

Figure 1: Backwash Expansion

Temperature = 20°C (68°F)

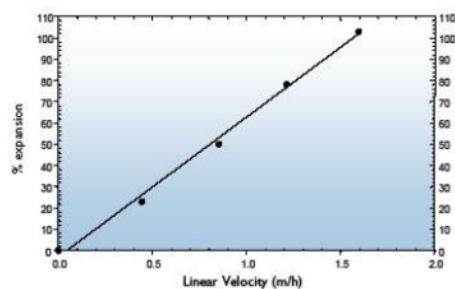
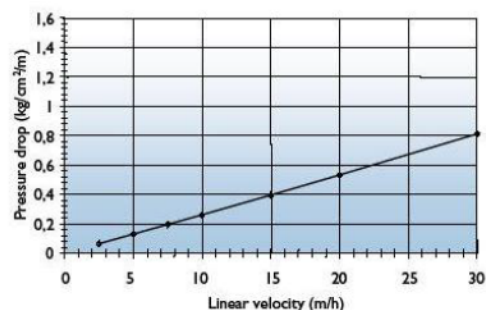


Figure 2: Pressure Drop



Application Information

Pretreatment

AmberLite™ XAD™ 18 Polymeric Adsorbent is supplied as a water wetcake product imbibed with sodium chloride (NaCl) and sodium carbonate (Na₂CO₃) salts to inhibit bacterial growth. These salts must be washed from the adsorbent prior to use. It is suggested that this be done by washing the resin in the column with deionized water at a flowrate of 2 – 3 bed volumes (BV) per hour until sufficiently low levels are present.

It is also recommended that after salts have been removed, AmberLite™ XAD™ 18 adsorbent then be equilibrated with organic solvent in order to ensure optimal performance in use. The following equilibration procedure is recommended:

1. Connect the column outlet to a suitable waste container or vessel. Do not connect the column to a detector at this stage.
2. Equilibrate the column with a total of 8 BV of either 100% acetonitrile, acetone, ethanol, propanol, or methanol. Use a maximum flowrate of 2 BV/h.
3. Next, equilibrate the column with 5 BV of a 50% solution of either acetonitrile, acetone, ethanol, propanol, or methanol in water. Use a maximum flowrate of 1 BV/h.
4. The column is now ready for operation.

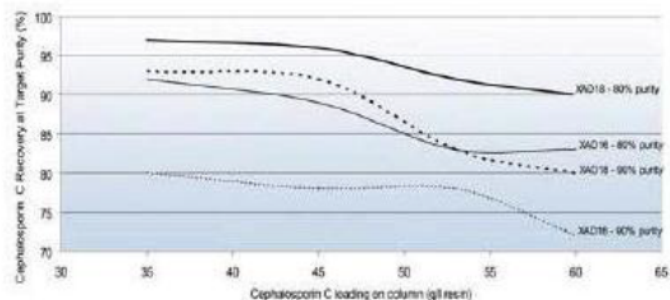
Applications

Key applications for AmberLite™ XAD™ 18 Polymeric Adsorbent are recovery and purification of antibiotics, natural products, amino acids, and proteins.

AmberLite™ XAD™ 18 was designed to combine both higher capacity and improved selectivity for these applications, compared to existing materials. Higher capacity translates to improved plant productivity and better process economics; a range of 20 – 40% improvement is often seen versus existing products.

Improved selectivity translates to higher purity, even at high loading levels. This feature is clearly demonstrated in the example Cephalosporin C purification in Figure 3.

Figure 3: Improved Performance of AmberLite™ XAD™ 18



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Please be aware of the following:

- **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.



info@lennotech.com Tel. +31-152-610-900
www.lennotech.com Fax. +31-152-616-289

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