

## AMBERLITE™ XAD™18

### High Capacity/High Selectivity Pharmaceutical Processing Polymeric Adsorbent

#### Description

AMBERLITE XAD18 is the newest addition to the Rohm and Haas line of AMBERLITE XAD polymeric adsorbent resins. The product was designed with high capacity and excellent selectivity to enable the user to obtain optimal separation performance. AMBERLITE XAD18 offers the high surface area and controlled pore size features of our traditional XAD polymeric adsorbent resins. It also provides all the benefits of a closely controlled particle size to give an extra dimension to the challenge of chromatographic separation on the industrial scale.

AMBERLITE XAD18 possesses extremely high capacity for many biopharmaceutical molecules which translates to superior performance over existing materials. The combination of high capacity and excellent selectivity makes AMBERLITE XAD18 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 XAD18 is a highly cross-linked, polystyrenic adsorbent available in the form of white insoluble beads supplied in the fully hydrated, wetcake form. AMBERLITE XAD18 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.

#### Properties

##### Typical Properties

These properties are typical but do not constitute specifications.

Matrix	Macroreticular cross-linked aromatic polymer
Physical form, as supplied	White opaque spherical beads in a water wetcake, supplied in preservative salt solution
Shipping weight	Approx. 690 g/L
True Wet Density	1.03 g/ml
Swelling	See Table 1
Particle size	
Harmonic mean size	425 ± 50 µm
Uniformity coefficient	<1.7
Fines content (0.212 mm)	<2 %
Surface area	≥800 m <sup>2</sup> /g
Characteristic pore size	150 angstroms
Binding Capacity for Ceph C (1% breakthrough)	≥60 g/L

*Test methods are available on request.*

##### Typical Industrial Operating Conditions

pH stability range	From 1 to 14
Temperature range	4 to 150°C
Minimum bed depth	120 cm (for industrial conditions)
Flow rate range for loading, elution, regeneration, and rinse steps	0.50 to 2 BV/h

**Table 1: Swelling of AMBERLITE XAD18 Adsorbent in Various Solvents  
(Volume increase experienced during water to solvent transition)**

Solvent	Volume Increase (%)
Methanol	15 - 20
2-propanol	15 - 20
Acetone	10 - 15

### Recommended Pretreatment

AMBERLITE XAD18 adsorbent is supplied as a water wetcake product imbibed with sodium chloride (NaCl) and sodium carbonate (Na<sub>2</sub>CO<sub>3</sub>) 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 two to three bed volumes (BV) per hour until sufficiently low levels are present.

It is also recommended that after salts have been removed, AMBERLITE XAD18 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 eight BV of either 100% acetonitrile, acetone, ethanol, propanol, or methanol. Use a maximum flow rate of two BV/hour.
3. Next, equilibrate the column with five BV of a 50% solution of either acetonitrile, acetone, ethanol, propanol, or methanol in water. Use a maximum flow rate of one BV/hour.
4. The column is now ready for operation.

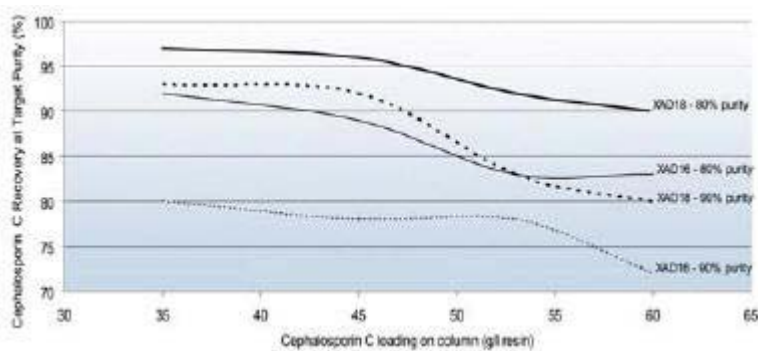
### Applications

**Key applications for AMBERLITE XAD18 are recovery and purification of antibiotics, natural products, amino acids, and proteins.**

AMBERLITE XAD18 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 to 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 1.

**Figure 1: Improved Performance of AMBERLITE XAD18**



Both the increased capacity and improved selectivity of AMBERLITE XAD18 provides a better solution for your purification needs.

## Regenerants/Eluting Agents

AMBERLITE XAD18 is compatible with the following regenerants in cleaning protocols:

- Water miscible organic solvents (methanol, ethanol, acetone, isopropanol, etc.) can be used for cleaning hydrophobic compounds, and regenerating adsorbent resins fouled by oils and antifoams.
- Alkaline solutions (e.g. 1 N NaOH) can be used for regenerating resins fouled with proteins, peptides and other components.
- Dilute acids (0.1 - 0.5% HCl) can be used for weakly basic compounds.
- Dilute oxidizing agents (<0.5%), such as hydrogen peroxide, can be used to enhance the removal of protein fouling.
- Hot nitrogen or steam (<150°C) can be used for removing volatile materials.

## Technical Support

Engineering of the overall system is a key point to consider during both scale and final plant design. Rohm and Haas personnel have many years of expertise in the use of AMBERLITE XAD adsorbent resins at industrial scale, and are qualified to provide design guidelines for the use of these materials. Please contact Rohm and Haas for more information.

## Hydraulic Characteristics

Figure 2 shows the bed expansion of AMBERLITE XAD18 as a function of backwash flow rate at a temperature of 20° C.

Figure 2: Bed Expansion

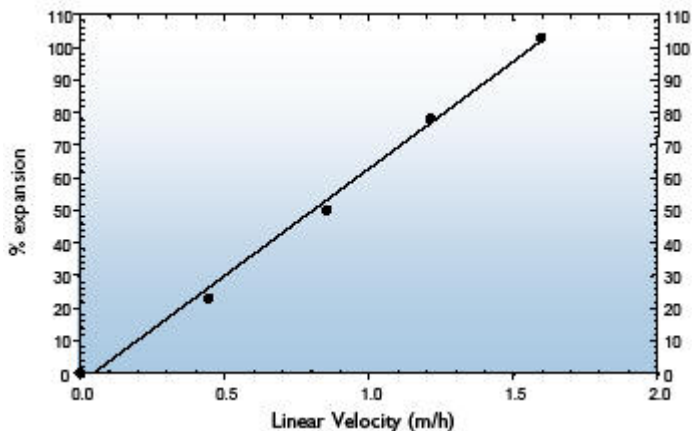
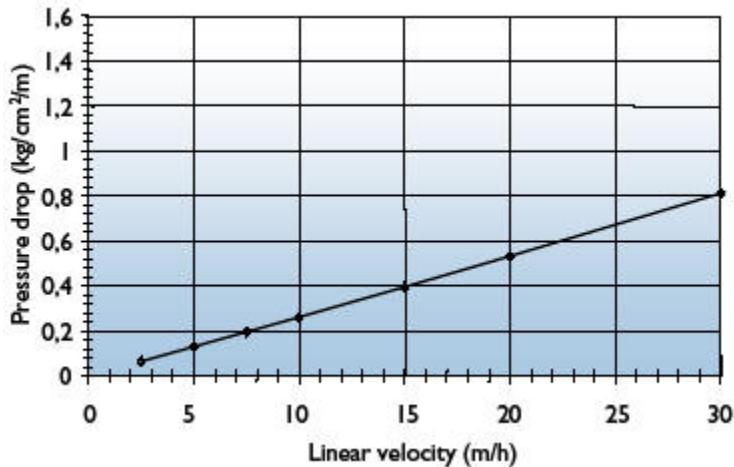


Figure 3 shows the pressure drop for AMBERLITE XAD18, as a function of service flow rate and at 20°C. Pressure drop data are valid at the start of the service run with a clear water and a correctly classified, settled, drained bed.

Figure 3: Pressure Drop



### Material Safety Data Sheets

Material Safety Data Sheets (MSDS) are available for all AMBERLITE polymeric adsorbents. These sheets contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products.

We recommend that you obtain copies of our MSDS from your local Rohm and Haas technical representative before using our products in your facilities. We also suggest that you contact your suppliers of other materials recommended for use with our products for appropriate health and safety precautions before using them.

### How to Order

SAP Code	Description	Qty
10285466	AMBERLITE XAD18	100 ml
10285467	AMBERLITE XAD18	1000 ml
10255294	AMBERLITE XAD18	25 l bag
10255293	AMBERLITE XAD18	200 l Drum

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Ion exchange resins and polymeric adsorbents, as produced, contain by-products resulting from the manufacturing process. The user must determine the extent to which organic by-products must be removed for any particular use and establish techniques to assure that the appropriate level of purity is achieved for that use. The user must ensure compliance with all prudent safety standards and regulatory requirements governing the application. Except where specifically otherwise stated, Rohm and Haas Company does not recommend its ion exchange resins or polymeric adsorbents, as supplied, as being suitable or appropriately pure for any particular use. Consult your Rohm and Haas technical representative for further information.

Acidic and basic regenerant solutions are corrosive and should be handled in a manner that will prevent eye and skin contact. Nitric acid and other strong oxidizing agents can cause explosive type reactions when mixed with Ion Exchange resins. Proper design of process equipment to prevent rapid buildup of pressure is necessary if use of an oxidizing agent such as nitric acid is contemplated. Before using strong oxidising agents in contact with Ion Exchange Resins, consult sources knowledgeable in the handling of these materials.

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