



AMBERLITE® XAD4

Industrial Grade Polymeric Adsorbent

PRODUCT DATA SHEET

AMBERLITE XAD4 is a polymeric adsorbent, supplied as white insoluble beads. It is a non ionic crosslinked polymer which derives its adsorptive properties from its patented macroreticular structure (containing both a continuous polymer phase and a continuous pore phase), high surface area, and the aromatic nature of its surface (Figure 1). This structure gives AMBERLITE XAD4 polymeric adsorbent

excellent physical, chemical and thermal stability. AMBERLITE XAD4 polymeric adsorbent can be used through repeated cycles, in column or batch modes, to adsorb hydrophobic molecules from polar solvents or volatile organic compounds from vapor streams. Its characteristic pore size distribution makes AMBERLITE XAD4 an excellent choice for the adsorption of organic substances of relatively low molecular weight.

PROPERTIES

| | |
|--|---|
| Matrix _____ | Macroreticular crosslinked aromatic polymer |
| Physical form _____ | White translucent beads |
| Moisture holding capacity ^[1] _____ | 54 to 60 % |
| Shipping weight _____ | 680 g/L |
| Specific gravity _____ | 1.01 to 1.03 |
| Particle size _____ | |
| Harmonic mean size _____ | 0.49 - 0.69 mm |
| Uniformity coefficient _____ | ≤ 2.0 |
| Fines content ^[1] _____ | < 0.350 mm : 5.0 % max |
| Coarse beads _____ | > 1.18 mm : 5.0 % max. |
| Maximum reversible swelling _____ | see Table 1 |
| Surface area ^[2] _____ | ≥ 750 m ² /g |
| Porosity ^[2] _____ | ≥ 0.50 ml/ml |

^[1] Contractual value

^[2] Values based on statistical quality control (SQC)

Test methods are available on request

SUGGESTED OPERATING CONDITIONS

| | |
|---------------------------------|---------------|
| pH range _____ | 0 - 14 |
| Maximum temperature limit _____ | 150°C |
| Minimum bed depth _____ | 75 cm |
| Flow rate _____ | |
| Loading _____ | 2 to 16 BV*/h |
| Displacement _____ | 1 to 4 BV/h |
| Regeneration _____ | 1 to 4 BV/h |
| Rinse _____ | 2 to 16 BV/h |

* BV (Bed Volume) = 1 m³ solution per m³ resin

PROPERTIES (CONTD.)

Figure 1 : Chemical structure of AMBERLITE XAD4 polymeric adsorbent

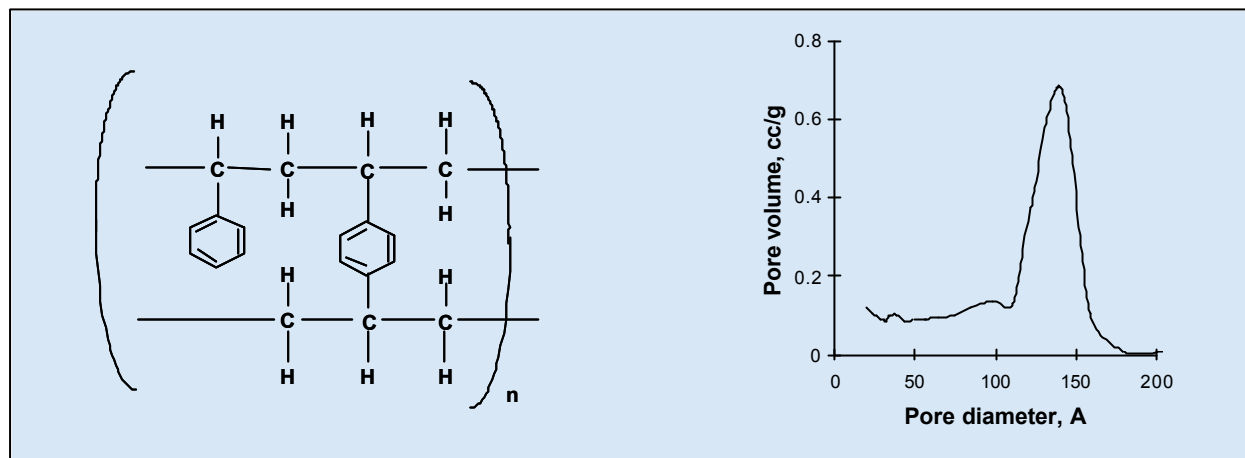


Figure 3 : Infrared Spectrum of Amberlite XAD4 polymeric adsorbent

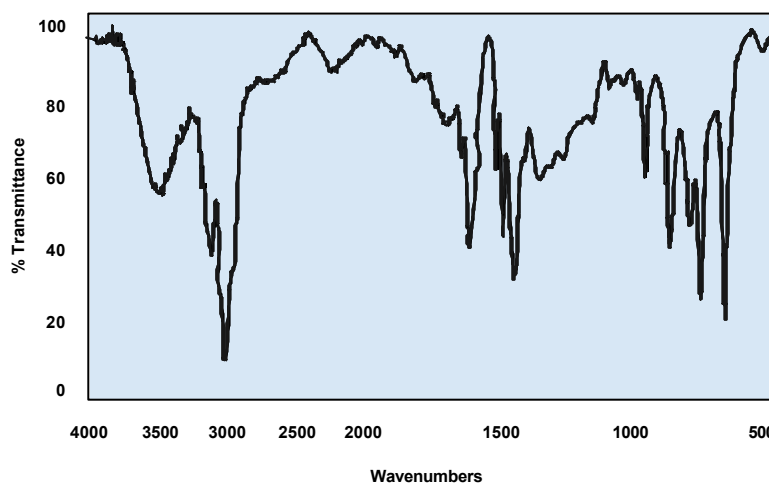


Table 1: Percent swelling of Amberlite XAD4 polymeric adsorbent in various solvents (Water: Solvent)

| Solvent | % Increase from as-received volume |
|-------------------------|------------------------------------|
| Methanol | 20 |
| 2-propanol | 20 |
| Acetone | 20 |
| p-Xylene (via methanol) | 25 |

PRETREATMENT

AMBERLITE XAD4 polymeric adsorbent is shipped as a water wet product imbibed with sodium chloride (NaCl) and sodium carbonate (Na₂CO₃) salts to retard bacterial growth. These salts must be washed from the adsorbent prior to use and it is suggested that this be achieved by washing with water at a linear flowrate of 5-10 m/h until the required level is

achieved. In some sensitive applications, residual monomeric or oligomeric compounds may be required to be removed from the adsorbent. A regeneration with the proposed regenerant is also recommended prior to beginning the first service cycle. If the regenerant is an alcohol, it must be displaced with water prior to beginning the first loading cycle.

APPLICATIONS

- Removal of organic pollutants from aqueous wastes, ground water, and vapor streams.
- Removal of organic compounds from aqueous process streams and polar solvents.
- Recovery / recycle of phenolic and aromatic compounds.
- Removal of chlorinated solvents, herbicides, and pesticides from aqueous streams.
- Recovery of organic compounds in environmental and clinical analysis for subsequent identification.

REGENERANTS / ELUTING AGENTS

- Water miscible organic solvents (methanol, ethanol, acetone, isopropanol, etc.) for hydrophobic compounds.
- Pure solvents for regenerating resin fouled by oils and antifoams.
- Dilute bases (0.1 - 0.5% NaOH) for eluting weakly acidic compounds.
- Strong bases (2-4% NaOH) for regenerating resins fouled with proteins, peptides.
- Dilute acids (0.1 - 0.5% HCl) for weakly basic compounds.
- Dilute oxidising agents (< 0.5%) such as peroxide to enhance the removal of protein fouling.
- Buffer elution for pH sensitive compounds
- Water where adsorption is from an ionic solution.
- Hot nitrogen or steam for volatile materials.

FDA CLEARANCE

- AMBERLITE XAD4 polymeric adsorbent has clearance under FDA Food Additive Regulation 21 CFR 173.65 - Divinylbenzene Copolymer. The product may be used for the removal of organic substances from aqueous foods under the prescribed conditions outlined in 21CFR173.65.

HYDRAULIC CHARACTERISTICS

Figure 4 shows the bed expansion of AMBERLITE XAD4 as a function of backwash flow rate and water temperature. Figure 5 shows the pressure drop for AMBERLITE XAD4 as a function of service flow rate and water temperature. Pressure drop data are valid at the start of the service run with a clear water and a correctly classified bed.

Figure 4 : Bed Expansion

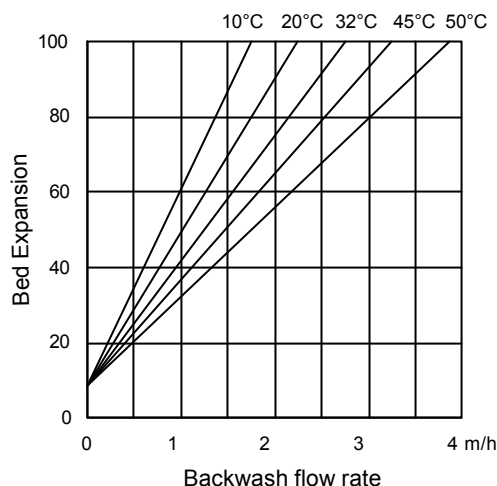
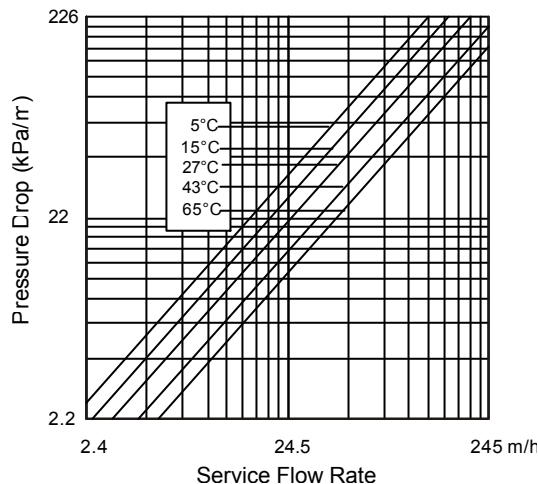


Figure 5 : Pressure Drop



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.

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