

PRODUCT DATA SHEET

**AMBERLITE™ XAD™ I 180N**  
**Macroreticular Polymeric Adsorbent**

AMBERLITE XAD1180N is a polymeric adsorbent supplied as insoluble white beads. It is a non ionic, hydrophobic, cross-linked 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 also gives AMBERLITE XAD1180N polymeric adsorbent excellent physical, chemical, and thermal stability.

AMBERLITE XAD1180N polymeric adsorbent can be regenerated and used through repeated cycles, in either column or batch modes, to adsorb hydrophobic molecules from polar solvents. Its characteristic pore size distribution makes AMBERLITE XAD1180N polymeric adsorbent an excellent choice for the selective separation of a wide variety of large organic molecules from aqueous solutions or polar solvents such as plant extracts, antibiotics, and fermentation products.

**TYPICAL PROPERTIES**

|  |  |
|--|--|
| Matrix _____                                   | Macroreticular cross-linked aromatic polymer |
| Physical form _____                            | White translucent beads                      |
| Moisture holding capacity <sup>[1]</sup> _____ | 61 to 67 %                                   |
| Shipping weight _____                          | 690 g/L                                      |
| Specific gravity _____                         | 1.015 to 1.025                               |
| Particle size _____                            |  |
| Harmonic mean size _____                       | 0.350 - 0.600 mm                             |
| Uniformity coefficient _____                   | ≤ 1.8  |
| Fines content <sup>[1]</sup> _____             | < 0.250 mm : 5.0 % max                       |
| Coarse beads _____                             | > 0.850 mm : 10.0 % max.                     |
| Maximum reversible swelling _____              | see Table 1                                  |
| Surface area <sup>[2]</sup> _____              | ≥ 450 m <sup>2</sup> /g                      |
| Porosity <sup>[2]</sup> _____                  | ≥ 1.4 cc/g                                   |

<sup>[1]</sup> Contractual value

<sup>[2]</sup> 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 _____         | 750 mm (Capture) – 1500 mm (Chromatography) |
| Flow rate _____                 |   |
| Loading _____                   | 2 – 16 BV/h                                 |
| Displacement _____              | 1 – 4 BV/h                                  |
| Regeneration _____              | 1 – 4 BV/h                                  |
| Rinse _____                     | 1 – 8 BV/h                                  |

## PROPERTIES (CONTD.)

Figure 1 : Chemical structure of AMBERLITE XAD1180N polymeric adsorbent

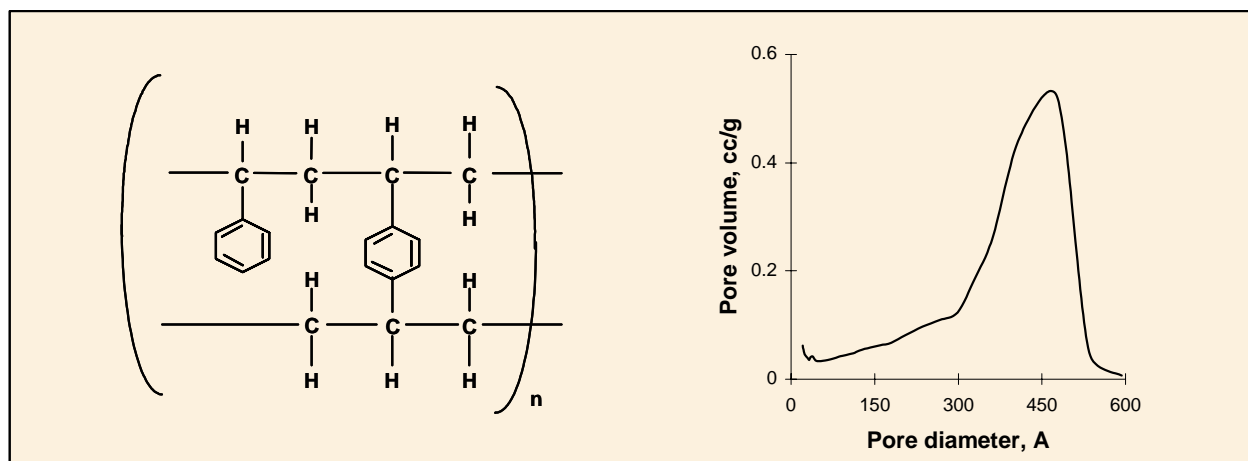


Figure 3 : Infrared Spectrum of Amberlite XAD1180N polymeric adsorbent

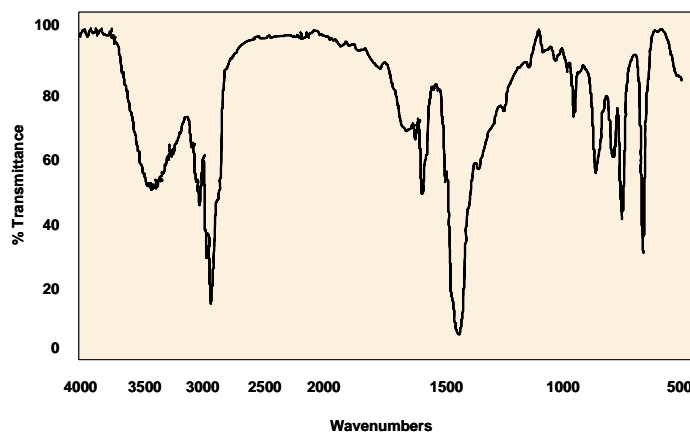


Table I: Percent swelling of Amberlite XAD1180N polymeric adsorbent in various solvents (Water: Solvent)

| Solvent                 | % Increase from as-received volume |
|-------------------------|------------------------------------|
| Methanol                | 10                                 |
| 2-propanol              | 15                                 |
| Acetone                 | 10                                 |
| p-Xylene (via methanol) | 10                                 |

## PRETREATMENT

AMBERLITE XAD1180N polymeric adsorbent is shipped as a water wet 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 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.

## SAMPLE PREPARATION FOR TESTING

Samples of Amberlite XAD1180N polymeric adsorbent must be pre-treated prior to laboratory testing to ensure proper results. Please refer to Rohm and Haas publication IE-245 "Laboratory Column Procedures and Testing of Amberlite and Duolite Polymeric Adsorbents", section "Preparation of Resins".

## APPLICATIONS

- **Recovery and purification of antibiotics, water soluble steroids, enzymes and proteins.**

AMBERLITE XAD1180N can be considered as a general purpose resin for these types of applications where relatively large solutes (> 1000D) are to be adsorbed. In these types of applications, the loading and elution flowrates are relatively low (0.5-2 BV/h). The pH of the solution has a significant effect on the loading and elution and as the feed is often derived from a fermentation, the regeneration tends to be aggressive - 4% NaOH at elevated temperatures and solvents. A primary concern in this type of application is the separation of two or more similar solutes. In these cases, the engineering is a key point to consider during both pilot scale and final plant design.

- **Recovery of plant extracts.**

The relatively large pores of AMBERLITE XAD1180N allow complex molecules to be adsorbed within its structure. Loading is performed at relatively low flowrates (0.5 - 2 BV/h). Elution tends to be performed with solvents at low temperatures or steam depending on the stability of the molecule of interest.

- **Enzyme immobilization.**

The relatively large pores of AMBERLITE XAD1180N make this resin an ideal candidate for the immobilization of enzymes.

- **Separation of non polar organic solutes from polar solvents.**

AMBERLITE XAD1180N would be a useful candidate for study if the solutes have a large molecular weight which resulted in a low operating capacity for either AMBERLITE XAD16 or AMBERLITE XAD4. An example of this type of application would be the removal of high molecular weight color from a process stream.

- **Scavenger or pre-column.**

Due to the large pore and better kinetics, AMBERLITE XAD1180N has been studied as a scavenger or pre-column in front of the main adsorption column, particularly when using AMBERLITE XAD1600.

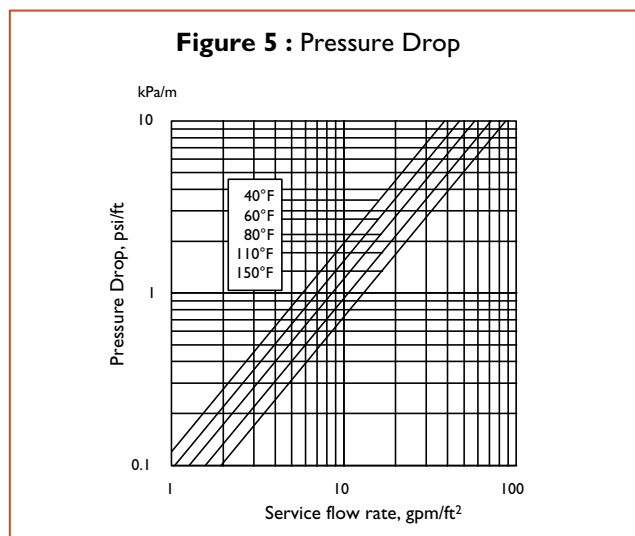
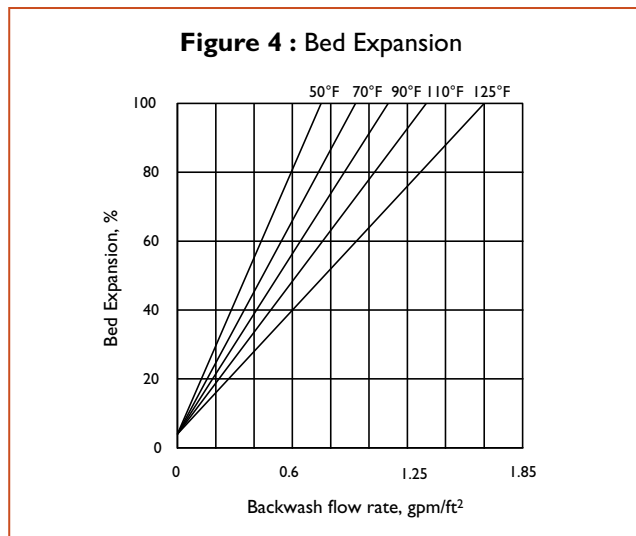
## REGENERANTS / ELUTING AGENTS

- 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 oxidizing 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.

## HYDRAULIC CHARACTERISTICS

Figure 4 shows the bed expansion of AMBERLITE XAD1180N as a function of backwash flow rate and water temperature. Figure 5 shows the pressure

drop for AMBERLITE XAD1180N, 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.



Note: 1 gpm/ft<sup>2</sup> = 2.45 m/h  
1 psi/ft = 22.73 kPa/m

## 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.

All our products are produced in ISO 9001 certified manufacturing facilities.

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