Product Data Sheet
DuPont™ Polymeric Adsorbent

DuPont™ AmberLite™ XAD™4 Polymeric Adsorbent

Macroporous, Adsorbent Resin

Key Features

- White insoluble non-ionic, crosslinked polymeric beads.
- Macroporous structure.
- High surface area.
- Excellent chemical and thermal stability.

Key Applications

- Removal of organic compounds, including chlorinates and phenolic compounds, from aqueous streams or polar solvent.
- Removal of detergents in vaccines purification.
- Capture of antibiotics.
- Adsorption hydrophobic molecules from polar solvents or volatile organic compounds from vapor streams.

Typical Properties

Physical Properties	
Copolymer	Crosslinked DVB
Matrix	Macroporous
Type	Adsorbent
Physical Form	White, opaque, spherical beads
Nitrogen BET	
Surface Area	~880 m^2/g
Average Pore Diameter	~100 Å
Total Pore Volume	~1.3 cc/g
Chemical Properties	
Ionic Form as Shipped	Not applicable
Total Exchange Capacity	Not applicable
Water Retention Capacity	54 – 60%
Particle Size [§]	
Particle Diameter	490 – 690 µm
< 300 µm	≤ 5.0%
> 1180 µm	≤ 5.0%
Swelling (in solvent)	
Methanol	20%
2-Propanol	20%
Acetone	20%
p-Xylene (via methanol)	25%
Density	
Particle Density	1.01 – 1.03 g/mL
Shipping Weight	680 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.	760 mm (2.5 ft)
Flowrates	
Loading	2 – 16 BV*/h
Elution/Desorption	1 – 4 BV*/h
Regeneration	1 – 4 BV*/h
Rinse	2 – 16 BV*/h
Regenerants or Eluting Agents	• Water-miscible organic solvents (methanol, ethanol, isopropanol, acetone, etc.) for hydrophobic compounds • Pure solvents for regenerating resin fouled by oils and antifoams • Dilute bases (0.1 – 0.5% NaOH) for 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 when adsorption is from an ionic solution • Hot nitrogen or steam for volatile materials

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

Hydraulic Characteristics

Estimated bed expansion of DuPont™ AmberLite™ XAD™4 Polymeric Adsorbent as a function of backwash flowrate and temperature is shown in Figure 1.

Estimated pressure drop for AmberLite™ XAD™4 as a function of service flowrate and water temperature is shown in Figure 2. These pressure drop expectations are valid at the start of the service run with clean feed and a well-classified bed.

Figure 1: Backwash Expansion

Temperature = 10 – 51.7°C (50 – 125°F)

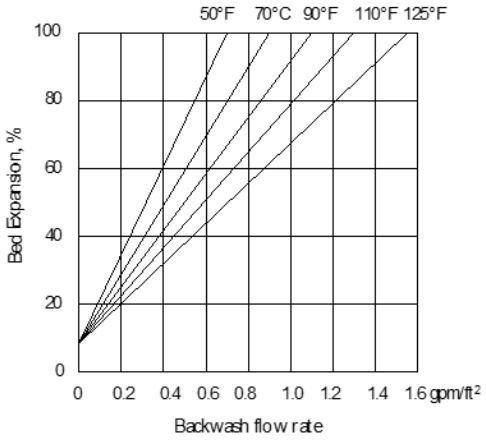
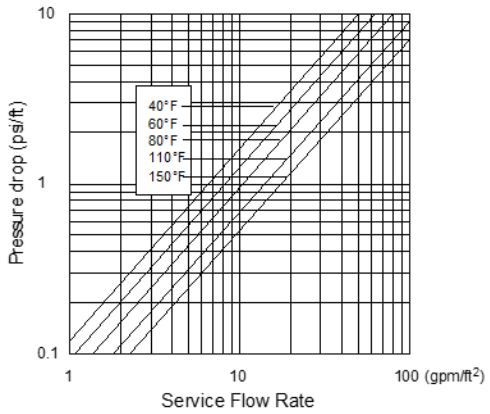


Figure 2: Pressure Drop

Temperature = 4.4 – 65.6°C (40 – 150°F)



General Information

Pretreatment

DuPont™ AmberLite™ XAD™4 Polymeric Adsorbent is shipped as a water-wet product imbibed with sodium chloride (NaCl) and sodium carbonate (Na_2CO_3) 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.

Important Information

- Polymeric adsorbents, as produced, contain by-products resulting from the manufacturing process. The user must determine the extent to which organic by-product must be removed for any particular use and establish techniques to assure that the appropriate level of purity is achieved for that use.
- **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.

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