

DEXSORB®

Renewable Adsorbent for Selective Removal of PFAS

Features and Benefits

DEXSORB® is a class of novel cyclodextrin adsorbents, designed to be compatible with various engineered solutions for the removal of PFAS (poly- and perfluoroalkyl substances) in diverse water systems, such as drinking water, groundwater, surface water, wastewater, and landfill leachate. Extensive lab and pilot studies have demonstrated superior properties: (i) rapid kinetics, (ii) high treatment capacity, (iii) resistance to fouling, (iv) easy regeneration, and (v) long life cycle. These properties derive from host-guest complexations occurring in the 0.78 nm cyclodextrin cavities. The sub-nanometer interiors make the hydrophobic cups ideally suited to PFAS through size-inclusion, and resistant to fouling by larger organic matter through size-exclusion.

Chemical and Physical Characteristics

Polymer Structure	crosslinked cyclodextrin
Appearance	yellow powder or granule
Adsorption Mechanism	hydrophobic & electrostatic
Bulk Density (wet)	0.40 g/mL; 0.40 kg/L
Specific Gravity	1.1
Effective Size (powder)	20 to 150 µm
Effective Size (granule)	200 to 2000 µm
Thermal Stability	300 °C (572 °F)

Rapid Kinetics + High Operating Capacity

DEXSORB+ has demonstrated high removal capacity for PFAS, including the analytes listed in the Appendix. Kinetic studies show removal for most PFAS reaches equilibrium within five minutes. Isotherm data for PFAS indicate q_{max} for PFOA and PFOS above 180 mg/g and 90 mg/g for GenX, showing its ability for removal of short and long chain PFAS. DEXSORB works equally well in water environments with high (ppm) and low (ppt) levels of PFAS contamination.



**Home
Filtration**



**Industrial
Purification**



**Municipal
Drinking Water**



**Municipal
Wastewater**



**Analytical
Testing**

Flexible Use

Powdered DEXSORB can be prepared in form factors like extruded block, compress molded block, and loaded filter paper, which are well suited for in home applications. Granular DEXSORB, with high mechanical strength, spherical form, and well controlled particle size, is compatible with packed bed filtration.

Engineered Treatment Systems

Powdered DEXSORB is well suited for batch adsorption treatment processes. Due to rapid kinetics, DEXSORB is adaptable to varying hydraulic retention times (HRT), which can be as short as 5 minutes. Granular DEXSORB is well suited for applications of both gravity and pressure packed-bed filtration processes. Cyclopure is piloting its own PBF system using compact pressure vessels in an integrated solution. DEXSORB's performance remains constant across all types of water matrices from drinking water to RO concentrate from landfill leachate.

Superior Life Cycle

Matrix effects of groundwater, surface water, and wastewater have been compared with Granular Activated Carbon (GAC) and ion exchange resins (IXR). Benefiting from size-exclusion, DEXSORB outperformed GAC and IXR, exhibiting greater capacity and resistance to fouling.

Reuse and Waste Disposal

DEXSORB can be regenerated for up to 10 cycles of re-use, providing superior life cycle benefits over GAC and IXR single use adsorbents. Desorbed PFAS can be isolated from regeneration solvent through evaporation, which allows for complete destruction by Cyclopure proprietary mechanochemical processes. Fully exhausted DEXSORB media is PFAS-free, which enables safe disposal by incineration or landfill without creating secondary PFAS contamination.

