Thermal Stability and Storage

Temperature of use	2-30°C (36-86°F)
Shipping temperature	Ambient
Storage temperature	2-30°C (36-86°F) (2-8°C / 36-46°F once opened)
Recommended storage solution (between runs)	Neutral buffer containing a bacteriostatic agent such as 20% (v/v) ethanol.
Caution	Must never be frozen

Ordering information

Pack size	Part Number
5 mL	20033-065
25 mL	20033-031
100 mL	20033-023
1 L	20033-015
5 L	20033-056
10 L	20033-049

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BioSepra® SDR HyperD®

SDR HyperD®

Solvent-Detergent Removal Sorbent

Product Description

Solvent-Detergent Removal (SDR) **HyperD** sorbent is made of silica beads in which the pore volume is filled with a three-dimensional cross-linked hydrophobic polymer.

The particle size distribution (40-100 µm), the small pore size of the silica beads and the hydrophobic nature of the chemical groups make SDR **HyperD** sorbent an excellent tool for specific solvent-detergent removal from biological liquids, after a virus inactivation step, for instance.

The silica moiety confers a good efficiency in detergent capture and a high degree of rigidity, which allows the sorbent to withstand high pressures. Its microporosity prevents non-specific protein capture from the biological liquid. The polymer moiety provides hydrophobicity for an efficient solvent capture (e.g. Tri-n-Butyl Phosphate – or TnBP). The resulting polymeric network confers an excellent chemical stability in both aqueous and organic solvents, while non specific sorptions are dramatically minimized.

SDR **HyperD** sorbent is available as ready-to-use labpacks suspended in 20% ethanol as bacteriostatic.

- Properties

Particle size	40-100 µm (av.)
Exclusion limit	10 kDa
Binding capacity for Triton* X100	≥ 90 mg/mL*
Operating pH range	2-12
Volume changes due to pH and ionic strength	Non compressible
Pressure resistance	70 bar (1,000 psi)

* Determined using 5 mg/mL Triton* X100 in PBS, pH 7.4, 10% break-through, 300 cm/h.

- Main benefits

- Microporous, rigid and hydrophobic sorbent.
- High mass transfer (good resolution and dynamic capacity) for small molecules due to **HyperD** sorbent.
- Low non-specific adsorptions.
- Mechanical stability.
- Chemical stability in acid and polar organic solutions.
- Physical stability at high temperature.
- Sterilizable with oxidizing agents.

• Chemical composition and structure

SDR **HyperD** is a rigid sorbent in spherical bead form constituted of a network of silica and hydrophobic polymer. The particle size is 40-100 µm.

The polymer is uniformly distributed in any empty space of the microporous silica skeleton, allowing the specific interaction of solvent-detergent with silanol and hydrophobic groups on the matrix contrary to proteins or any macromolecule for steric hindrance reasons. The polymer is highly cross-linked, to prevent any leakage during separation operation and cleaning steps.

• Porosity

SDR **HyperD** sorbent has a microporous structure (10 KDa exclusion limit) and offers the following advantages :

- Sieving phenomena avoiding non-specific trapping of proteins or others macromolecules.

- High specific area (200 m^2/g) providing high solvent-detergent dynamic capacity.

• Capacity

The solvent-detergent sorption capacity of SDR **HyperD** sorbent depends on :

- The residence time of the sample on the column,
- The flow rate,
- The characteristics of the biological liquid.

Sorption capacities for bovine plasma are :

- Triton* X100: 60-80 mg/mL
- TnBP: 40 to 50 mg/mL

Table 1: Solvent-Detergent Depletion Example

		Before depletion	After depletion	Removal efficiency
IgG	TnBP	5 mg/mL	< 0.4 ppm	< 99.9%
	Triton* X100	10 mg/mL	< 10 ppm	< 99.5%
ATIII	TnBP	5 mg/mL	< 0.4 ppm	< 99.9%
	Triton* X100	10 mg/mL	< 10 ppm	< 99.5%
Bovine serum	TnBP	5 mg/mL	< 0.4 ppm	< 99.9%
	Triton* X100	10 mg/mL	< 10 ppm	< 95.5%

Sample volume: 3.6 cv, Flow rate: 150 cm/h; Column length: 10 cm (3.9 in.); Residence time: 4 min.

• Mechanical stability

SDR **HyperD** sorbent is non-compressible.

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• Chemical stability

SDR **HyperD** sorbent is insoluble in water and in organic solvents. It is also very stable to strong denaturing agents, detergents, and chaotropic agents. Its stability in acidic aqueous solutions is exceptionally high. SDR **HyperD** packings can be washed repeatedly with 0.01 to 0.1 N hydrochloric acid or water-miscible organic solvent without undergoing substantial modification of the general properties of the matrix. This means that classical chemical treatments (except strong alkaline solution, for silica degradation reasons) for cleaning or pyrogen removal can be performed without changing the properties of SDR **HyperD** sorbent. For more drastic cleanings, see specific section below.

• Thermal stability

Based on silica and chemically cross-linked polymer, SDR **HyperD** sorbent is stable over a wide range of temperatures. It can be autoclaved (20 min at 121°C / 250°F).

Recommendations of use

• Column

For a first use, a column length of 15 cm (5.9 in.) minimum and a working flow rate between 100 and 300 cm/h are recommended.

• Adsorption conditions

- Equilibrate the column in PBS buffer using the working flow rate, until the pH, ionic strength and UV baselines are stable.

- Inject 5 to 10 cv of the clean sample containing the solvent-mixture to be removed (e.g. 1% Triton* X100 and 0.5% TnBP) into the column, followed by the starting buffer.

• Washing conditions

The most commonly used procedure to desorb solvent-detergent molecules from the hydrophobic sorbent is to inject 1 cv of PBS / EtOH 95° (50/50) followed by 3 cv of EtOH 95°. If necessary, 2-isopropanol can also be used. According to the sample composition, 10 cv of PBS / EtOH 95° (50/50) can be used, followed by 10 cv of EtOH 95° and 10 cv of 2-isopropanol.

Sanitization

After packing and/or between runs, it may be necessary to sterilize and eliminate pyrogens from the column. This may be performed as follows :

Method	Procedure
Alcohol/acid treatment	Wash with at least 3 cv of a solution of 20% (v/v) ethanol containing 1 M acetic acid. This solution should be injected after removal of dissolved gas at a flow rate of 10-20 cm/h (1 hour contact time). After treatment, reequilibrate with normal sterile pyrogen-free buffer.

For more information, please contact our technical service.