

XDB

Xpress Dialysis Box

Manual & Data Sheet



EFFICIENT

- Dialysis Box and dialysis cartridges fit SBS format
- Scalable number of samples up to 96 samples
- Removable inserts with 48 and 96 grid, fitted with dialysis cartridges
- Shared large buffer reservoir for short dialysis times
- Remove up to 99% of salts and other small molecules without changing buffer



AUTOMATABLE

- SBS compatible
- Suitable for multichannel pipettes
- Developed and tested for automated liquid handling devices*
- Secure positioning of cartridges, inserts and dialysis box

* Tested with CyBio Felix, Analytik Jena



MULTIFUNCTIONAL

- Mixing of the buffer by a magnetic stirrer
- Prepared for connection of a peristaltic pump (Luer Lock connections)
- Mixing the dialysis buffer by circulation
- Buffer change via peristaltic pump

Specifications

- Volume: 670-750 ml (depending on dialyzer model)
- Material: PP (box, grid)
- Autoclavable (box, grids, scienova Dialyzers)
- Dimensions: 127 mm × 85 mm × 100 mm (width × depth × height), weight: 100 g

Compatible for scienova Dialyzers

scienova Dialyzer	Sample Volume	Max. Sample Numbers	Max. buffer volume
MD100	10–100 µl	96	750 ml
MD300	50–300 µl	96	710 ml
MD1000	150–1000 µl	48	670 ml

Available variants

Choose according to your needs from the variants

scienova XDB Dialysis Box
(Empty Box)
Lid included, Fixing accessories



scienova XDB Refill-Kit
- 12 cartridges (MD100, MD300) for 96 samples or
- 8 cartridges (MD1000) for 48 samples
- Equipped and fixed in the insert 48-grid or 96-grid

- XDB Accessories**
- Set of fixing rubbers, fixing clips, support grid, and fixing bars
 - Empty support grid with fixing accessories
 - Lid for XDB

General information

The XDB Xpress Dialysis Box is suitable for the dialysis of many samples against a large buffer reservoir. The box can be assembled with refill kits containing various types of dialyzers with different sample volumes and several MW cut offs. The dialysis cartridges, inserts and dialysis box are securely fitted to allow safe handling. To decrease the dialysis time, the XDB Xpress Dialysis Box can be used with a magnetic stirrer. Luer tube connections are available in the upper and lower part of the XDB Dialysis Box to easily change or recirculate the buffer or to increase the buffer volume. The dialysis cartridges, support grids, and dialysis boxes can be secured for safe use with automatic liquid handling systems.

Starting dialysis

Fill the empty XDB box with 750 ml (MD100), with 710 ml (MD300), or 670 ml (MD1000) dialysis buffer if the dialyzer cartridges are filled to their rated capacity. If the sample volume is less than capacity, the buffer volume should be reduced to be at the same level as the sample. Place a refill kit next to the Xpress Dialysis Box and fill the Dialyzer cartridges with samples by using single or multi-channel lab pipettes. Please also refer to the instructions and Quick Guide for the corresponding scienova Xpress Dialyzer model. If you want to use less than the maximum number of cartridges, first remove the fixing bars (see Figures 6 & 7). Bend them carefully and pull the bars out of the insertion points. You can then remove the corresponding number of cartridges from the grid. Finally, put the fixing bars back in place and insert the support kit into the box. The orientation is determined by the notch on top side of the box (see Figure 1) and the slot in the support grid (see Figure 2). Apply the small fixing rubbers to secure the support grid on the box by connecting the upper anchor (see Figure 2) and the lower anchor (see Figure 1) as shown in Figure 8. Note that the dialysis starts immediately after filling the cartridge with samples. **Use the lid (see Figure 8) to reduce evaporation and contamination of the sample and buffer.**

Figure 1 | XDB Dialysis Box (top view)

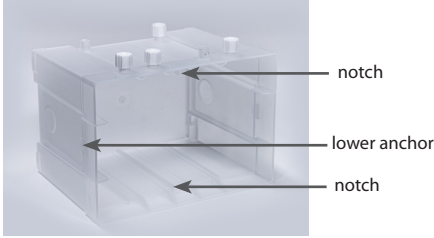


Figure 2 | XDB Refill kit for MD1000

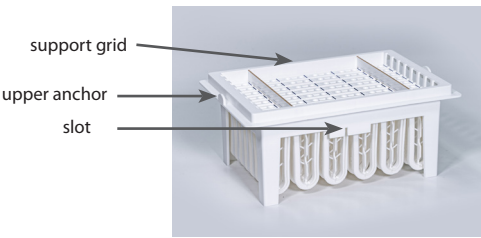


Figure 3 | XDB Refill kit for MD1000 with samples

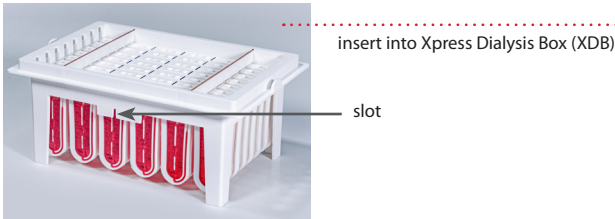


Figure 4 | XDB Dialysis Box (side view)

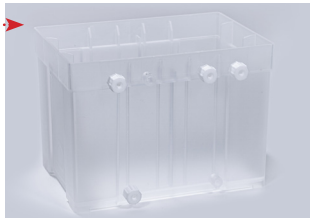


Figure 5 | XDB Refill Kit for MD300

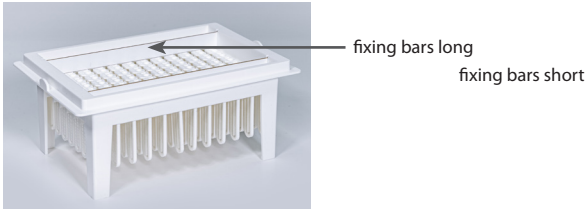


Figure 6 | XDB Refill Kit for MD1000

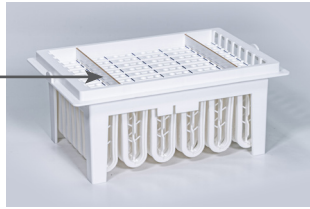


Figure 7 | XDB Refill Kit Accessories

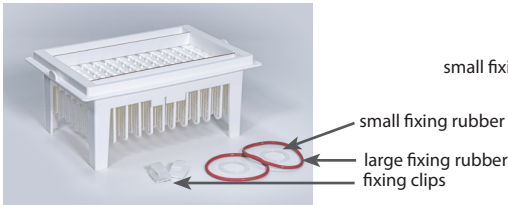


Figure 8 | XDB Dialysis Box with Refill Kit for MD1000 and Lid



Buffer exchange

To change the buffer, remove the small fixing rubbers and lift the support grid out of the dialysis box. Allow the buffer residues to drip off and place the support grid in a bowl or on a tissue. Remove the buffer from the XDB and wash the XDB with distilled water. New buffer can then be filled in. Reinsert the support grid and secure it with the small fixing rubbers.

Stopping dialysis

To stop the dialysis, remove the small fixing rubbers and lift the support grid out of the dialysis box. Allow the buffer residues to drip off and place the support grid in a bowl or on a tissue. Transfer your samples from the dialyzer cartridges into a microplate for further analysis or storage by using a multichannel or single lab pipette. Remove the buffer from the XDB and wash the XDB with distilled water. Discard the Refill Kit in accordance with the applicable regulations.

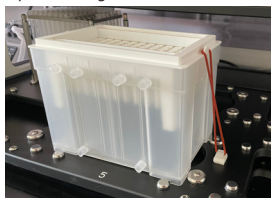
Usage on magnetic stirrer

The use of a magnetic stirrer is recommended for circulation. Place the magnetic stir bar in the XDB before inserting the refill kit.

Tube Connectors

The Xpress Dialysis Box is prepared for the connection of silicone tubes. The connectors are compatible with the Luer system and Luer adapters can be used accordingly. Use the optional XDB with drilled out openings and caps for this application (item no. #44041). The holes of the standard XDB Dialysis Box may be drilled out to allow these connections.

Figure 11 | XDB Dialysis Box in automated liquid handling device



Please note the height of the box (100 mm) in the deck configuration.

Figure 9 | XDB Dialysis Box with magnetic stirrer



Figure 10 | XDB Dialysis Box with peristaltic pump



Application in automated Liquid Handling Devices

To fix the box, fixing clips (see figures 7 & 11) can be attached to the table deck of the liquid handling device. For this purpose, use the large fixing rubbers and secure the rubber between the fixing clips and upper anchor. Tested* and suitable for: Pipetting, Sample purification, Buffer exchange.

(*) The XDB was tested with a CyBio® Felix liquid handling device.

Application example - Removal of a Dye

In this application note the dialysis of a dye is compared in the XDB Dialysis Box and Deep Well Plate (DWP) for scienova Xpress Dialyzer MD100, MD300, and MD1000 (figures 12, 13, and 14). The dialysis efficiency and speed is increased by the use of the XDB Dialysis Box. For example, with the MD100, 90 % dye removal is achieved in 1 hour with the XDB Box instead of 2 hours with the DWP. With no buffer exchange for the MD1000, 92 % removal is reached with the XDB Box compared to only 62 % for the DWP.

When needed, buffer exchange for the XDB Box is easily done by removing and reinserting the support grid. With the DWP, individual sample cells must be pipetted out and refilled.

Dialysis in XDB Dialysis Box were performed with complete equipped XDB Refill Kits. Dialysis in DWP were performed with single cartridges. 96-deep well plate were used for MD100, and MD300 while 48-deep well plates were used for MD1000.

Three samples (segments) were taken per timepoint and experiment.

Dialysis was performed at ambient temperatures. The buffer reservoirs and the Dialyzers were filled separately. The dialysis started by inserting the XDB Refill Kits or Dialyzer cartridges into the buffer in the XDB Dialysis Box or DWP. The buffer in the XDB Dialysis Box has been mixed with a magnetic stirrer.

All dialyzers used have a membrane with 6–8 kDa cut-off. The following sample volumes were used: 100 µl (MD100), 300 µl (MD300) and 1000 µl (MD1000) per segment. The samples (1 mM 4-nitrophenol) were loaded before insert into the buffer (PBS 1-fold, pH 7.4). Samples were taken on different time steps (0, 15, 30, 60, 120, 180, 240, 300, 360, and 420 minutes) and were transferred to micro plates. 50 µl sample volume were added to 100 µl PBS buffer (pH 7.4) and the absorption was measured.

Measurement: Absorption of 4-nitrophenol was measured at 405 nm (625 nm reference) with a micro plate spectrometer.

Figure 12 | Dialysis MD100 in XDB Dialysis Box vs. DWP

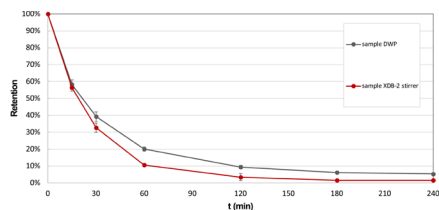


Figure 13 | Dialysis MD300 in XDB Dialysis Box vs. DWP

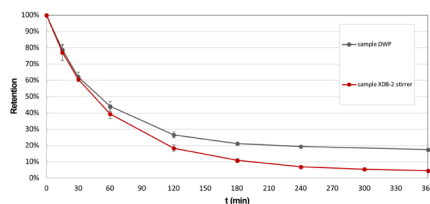
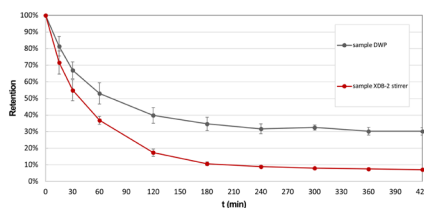


Figure 14 | Dialysis MD1000 in XDB Dialysis Box vs. DWP



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