



Tube-A-Lyzer[®] and Dynamic Dialysis System

Product Information and Operating Instructions



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Spectrum®'s Tube-A-Lyzer® meets strict quality control standards and is warranted against defects in material and workmanship for a period of one year from date of purchase.

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1. Introduction and General Description

Spectrum's Tube-A-Lyzer® is a ready-to-use, gentle separation device that combines convenience and disposability with the efficiency of dynamic dialysis to significantly increase the mass transfer rate and reduce the overall dialysis from 1-2 days to 4-8 hours. Available in 2 sample volume sizes (8-10 ml and 25-30 ml), this self-contained, disposable device incorporates a semi-permeable dialysis membrane tubing inside a clear reservoir housing to separate the sample chamber from the surrounding buffer solution chamber. Available in 6 MWCO's, the Cellulose Ester (CE) membrane tubing is impregnated with 20% glycerine for dry packaging. The membrane-defined sample chamber has a female Luer-Lok™ port on top that provides easy access for loading, withdrawing or in-process testing. The housing is designed to be a flow-through dialysate chamber and is equipped with hose barb inlet and outlet ports for connecting to a buffer source and a waste collection vessel, or for discharging directly to drain. Tube-A-Lyzer® devices are non-pyrogenic and can be sterilized (25 kGy gamma irradiation).

Mounted onto the support rack of the KrosFlo® Research II Pump System; Spectrum Laboratories part no. ACR2-021-01N (110V) or ACR2-022-01N (220V), the Tube-A-Lyzer® device can be operated as a single unit or in parallel when multiple units are combined using a Coupling Bracket (sold separately) into a multi-unit device. A second pump head can be mounted to the pump for operating coupled units in parallel. The Instructions that follow pertain to operating a single Tube-A-Lyzer® unit.



Single Tube-A-Lyzer® unit set-up on KrosFlo® Research II Pump (ACR2-021-01N) for buffer re-circulation.



“Coupled” Tube-A-Lyzer® units set-up for parallel operation in single-pass mode.

2. Specifications and Ordering Information

Part No.	MWCO	Sample Volume	Buffer Volume	Total Length	Total Dia	Membrane EL	Membrane Dia	Sample Port	Buffer Port	Pkg
137002	0.1-0.5 kD	8-10 ml	50-55 ml	23 cm	2.2 cm	14-16 cm	1.0 cm	FLL	6 mm HB	3/pkg
137004	3.5-5 kD									
137006	8-10 kD									
137008	20 kD									
137009	50 kD									
137010	100 kD									
137042	0.1-0.5 kD	25-30 ml	120-130 ml	50 cm	2.2 cm	36-38 cm	1.0 cm	FLL	6 mm HB	3/pkg
137044	3.5-5 kD									
137046	8-10 kD									
137048	20 kD									
137049	50 kD									
137050	100 kD									

ACCESSORY PART NO.	DESCRIPTION
137100	Sample Loading Kit , includes 30 cc syringes (3), dispensing tips (3) & coupling brackets (2)
137110	Replacement Dispensing Tips, 12/pkg
ACTU-E16-25N	Extended Life Silicone Tubing, Size 16, 1/8 in. (3.1 mm) ID, 25 ft (7.6 m)

3. Materials of Construction

PART DESCRIPTION	MATERIAL
Tubing end plug	Polycarbonate
Housing	Polycarbonate
End-caps	Polycarbonate
Membrane tubing	Cellulose Ester (CE) with glycerin
Potting Compound	Polyurethane
Male Luer-Lok™ Cap	Polypropylene

4. Typical Applications

Purification of labile proteins	Dialysis of viscous samples
Buffer & pH Change	Desalting
Protein Prep for Electrophoresis	Concentration of Antibodies
Removal of Contaminants	Binding Studies
Flow Dialysis / Batch Analysis	Temperature Regulated Dialysis
Tissue Culture Extract Purification	Remove Oligosaccharides

5. Set-up Instructions

1. Open the packaging and remove one unit. (Each package contains 3 units). Safely store the unused units in a dry environment at room temperature. Avoid exposing the stored units to humidity.
2. Cut two pieces of flexible tubing (silicon or PVP) long enough to reach the preferred feed buffer source and return vessel or drain. The flexible tubing should be 1/8" ID (part no. ACTU-E16-25N) or 3/16" ID. Connect a piece of flexible tubing to both the bottom inlet hose-barb and the upper (side) outlet hose-barb of the unit's dialysate chamber.
3. Mount the Tube-A-Lyzer® unit onto a standard lab stand or clamping mechanism in a vertical position with the sample port on the top and the dialysate inlet port on the bottom. (Spectrum's KrosFlo® Research II Pump is equipped with a stand and clamping mechanism.)
4. Thread the bottom inlet line through the peristaltic pump head. Direct/connect the bottom inlet line to the dialysate feed source and the upper outlet line to the return vessel. Note that for re-circulating the dialysate, the buffer source also serves as the return vessel. For single pass operation, the upper outlet line can be directed to drain.

6a. RECOMMENDED Sample Loading – Using Syringe & Dispensing Tip

(The best method for loading the Tube-A-Lyzer® is allowing air to escape while filling the sample chamber. This will require the use of a dispensing tip on a syringe.)

1. Connect a flexible dispensing tip to a syringe that is sufficiently sized to hold your sample volume. For example, use at least a 10 cc syringe for 8-10 ml samples and at least 30 cc syringe for 25-30 ml samples. Draw sample into syringe:

Sample Loading Kit (part no. 137100)

Dispensing Tips (part no. 137110).

2. Remove the male Luer-Lok™ cap of the sample chamber and direct the dispensing tip of the filled syringe as far as it will go into the sample port. **(Important! The port opening should not be occluded; allowing air to escape.)**
3. Slowly press down on the syringe plunger to dispense the sample into the sample chamber. As the sample chamber fills, air will simultaneously be expelled around the dispensing tip. Continue to load the sample until the entire sample volume is loaded or there is no more air left in the sample chamber. Do not over-fill the sample chamber.
4. Remove the syringe and secure the male Luer-Lok™ cap on the sample port to close this chamber.

6b. ALTERNATIVE Sample Loading – Using only Syringe

(An alternative but not preferred sample loading method is connecting a syringe directly to the sample port. **WARNING:** There is a risk of rupturing the membrane if all the air is not removed prior to loading the sample!)

1. Draw sample into a syringe that has at least twice the capacity as the sample volume. For example, use a 20 or 30 cc syringe for 8-10 ml samples and 60 cc syringe for 25-30 ml samples. Invert and expel any air in syringe leaving the syringe at most half-full with only sample and no air.
2. **IMPORTANT! BEFORE LOADING SAMPLE, FIRST REMOVE THE AIR FROM SAMPLE CHAMBER TO AVOID RUPTURING THE MEMBRANE.** Connect the half filled sample syringe to the sample chamber port. Pull the plunger to draw all the air out of the sample chamber into the sample syringe, collapsing (flattening) the membrane. Loading sample without first removing the air may rupture the membrane and render the Tube-A-Lyzer® unusable!

3. AFTER THE AIR HAS BEEN REMOVED FROM THE SAMPLE CHAMBER, slowly press syringe plunger down to load the sample as the membrane opens back into a tubular shape. If the membrane is completely opened up and there is still sample in the syringe, do not force it into the sample chamber. If there is still air in the sample chamber, pull back on the plunger to remove it and then press the plunger to replace it with remaining sample. If there is no air left to remove, do not attempt to load more sample. The maximum volume of sample has been loaded.
4. Remove the syringe and secure the male Luer-Lok™ cap on the sample port to close this chamber.

7. Priming, Continued Operation & In-Process Testing

1. Using the KrosFlo® Research II Pump or a similarly equipped peristaltic pump, slowly begin pumping the buffer (dialysate) solution into the Tube-A-Lyzer® buffer chamber via the bottom feed (inlet) line. Flow rates between 10 and 20 ml/min are preferable to conserve the dialysate solution. Priming will rinse expel the air from the dialysate chamber and rinse the glycerin in the dialysis membrane into the dialysate solution. Establish and maintain the desired dialysate flow rate.
2. Continue with the dynamic dialysis process until the desired separation endpoint is achieved.
3. In-process testing of the sample can be performed by first stopping the pump, and using a syringe to withdraw a small volume of sample to determine if desired endpoint of dialysis has been achieved.

8. Harvesting the Sample after Dialysis

1. Turn off the peristaltic pump and remove the feed line from the pump head while leaving it connected or directed to the feed source.
2. Drain the buffer out of the dialysate chamber by disconnecting the upper outlet line from the return vessel and raising it above the level of the Tube-A-Lyzer® unit. You may also need to lower the feed source below the level of the unit (or alternatively raise the unit above the level of the feed source). This will drain the dialysate buffer back into the feed source reservoir.
3. Remove the sample chamber cap and connect an appropriate volume size syringe. Remove the Tube-A-Lyzer® unit from the lab stand and clamping mechanism. Invert the unit so that the syringe is on the bottom and slowly pull back on the plunger to harvest the sample from the chamber, collapsing the membrane.
4. After the sample volume has been recovered, discard the used Tube-A-Lyzer® unit.

9. Shelf-Life and Storage

Storage: Store new and unused Tube-A-Lyzer® devices in a dry place at room temperature. Care must be taken to avoid humid environments. If the membrane becomes wet or moist and then dries out, it can crack and cause leaks during use.

Shelf Life: Approximately two years depending on storage conditions.

10. Sterilization

The following methods are approved for sterilizing the Tube-A-Lyzer®. Autoclaving is not recommended.

Gamma Irradiation at 25 KG Ethylene Oxide Gas exposure

11. Tolerance

Temperature Limits	4 - 37°C
pH Limits	2 - 9
Organic tolerance	Fair (refer to compatibility table for specific tolerance)

12. Membrane Compatibility Table

This chemical resistance chart is intended for use as a guide, not as a guarantee of chemical compatibility. Variables in temperature, concentrations, durations of exposure and other factors may affect the use of the product. It is recommended to test under your own conditions.

The following codes are used to rate chemical resistance:

R	Recommended
L	Limited Exposure
NR	Not Recommended
U	Unknown

Cellulose Ester (CE)		Cellulose Ester (CE)		Cellulose Ester (CE)	
Acetic acid (diluted-5%)	L	Freon®	R	Petroleum ether	R
Acetic acid (med conc-25%)	NR	Gasoline	R	Phenol (0.5%)	R
Acetic acid (glacial)	NR	Glycerine	R	Phenol (10%)	NR
Acetone	NR	Glycerol	R	Phosphoric acid (25%)	NR
Acetonitrile	NR	Hexane	R	Potassium hydroxide (1N)	L
Ammonium hydroxide (diluted)	NR	Hexanol	L	Potassium hydroxide (25%)	NR
Ammonium hydroxide (med conc)	NR	Hydrochloric acid (diluted-5%)	R	Potassium hydroxide (50%)	NR
Amyl acetate	NR	Hydrochloric acid (med conc-25%)	NR	Propanol	R
Amyl alcohol	L	Hydrochloric acid (con-37%)	NR	Pyridine	NR
Aniline	NR	Hydrofluoric acid (25%)	NR	Silicone oil	R
Benzene	NR	Hydrogen peroxide (30%)	NR	Sodium hydroxide (0.1N)	L
Benzyl alcohol	NR	Iodine solutions	NR	Sodium hydroxide (diluted-5%)	NR
Boric acid	R	Isobutyl alcohol	R	Sodium hydroxide (25%)	NR
Brine	R	Isopropanol	L	Sodium hydroxide (conc-50%)	NR
Bromoform	NR	Isopropyl acetate	NR	Sodium Hydroxide(Concentrated)	NR
Butyl acetate	NR	Isopropyl alcohol	L	Sodium Hypochlorite	R
Butyl alcohol	L	Isopropyl ether	L	Sulfuric acid (diluted-5%)	L
Butyl cellosolve	NR	Jet Fuel 640A	R	Sulfuric acid (med conc-25%)	NR
Butylaldehyde	NR	Kerosene	R	Sulfuric acid (6N)	NR
Carbon tetrachloride	NR	Lactic acid	R	Sulfuric Acid (concentrated)	NR
Cellosolve	NR	Methyl acetate	NR	Tetrahydrofuran	NR
Chloroacetic acid	NR	Methyl alcohol	L	Toluene	R
Chloroform	L	Methyl alcohol (98%)	L	Trichloroacetic acid (25%)	NR
Chromic acid	NR	Methyl cellosolve	L	Trichlorobenzene	NR
Cresol	NR	Methyl Chloride	NR	Trichloroethane	L
Cyclohexane	L	Methyl ethyl ketone	NR	Trichloroethylene	R
Cyclohexanone	NR	Methyl formate	NR	Triethylamine	NR
Diacetone alcohol	NR	Methyl isobutyl ketone	NR	Turpentine	NR
Dichloromethane	L	Methylene chloride	L	Urea	R
Dimethyl formamide	NR	N-Methyl-2-Pyrrolidone	NR	Urea (6N)	NR
Dimethylsulfoxide	NR	Mineral spirits	R	Water	R
"1,4 Dioxane"	NR	Monochlorobenzene	L	Xylene	NR
Ethers	NR	Nitric acid (diluted-5%)	L		
Ethyl acetate	NR	Nitric acid (med conc-25%)	NR		
Ethyl Alcohol	L	Nitric acid (6N)	NR		
Ethyl alcohol (15%)	R	Nitric acid (conc-70%)	NR		
Ethyl alcohol (95%)	L	Nitric acid (concentrated)	NR		
Ethylene dichloride	NR	Nitrobenzene	NR		
Ethylene glycol	L	Nitropropane	NR		
Ethylene oxide	NR	Oils, mineral	R		
Formaldehyde (2%)	L	Pentane	R		
Formaldehyde (30%)	L	Perchloric acid (25%)	NR		
Formic acid (25%)	NR	Perchloroethylene	NR		
Formic Acid (50%)	NR	Petroleum based oils	R		



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