



Laboratory Product Catalog

Laboratory Dialysis



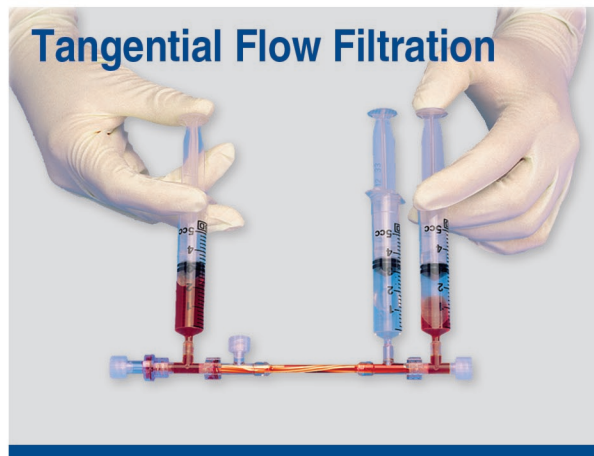
Ready-to-Use Dialysis



Laboratory Filtration



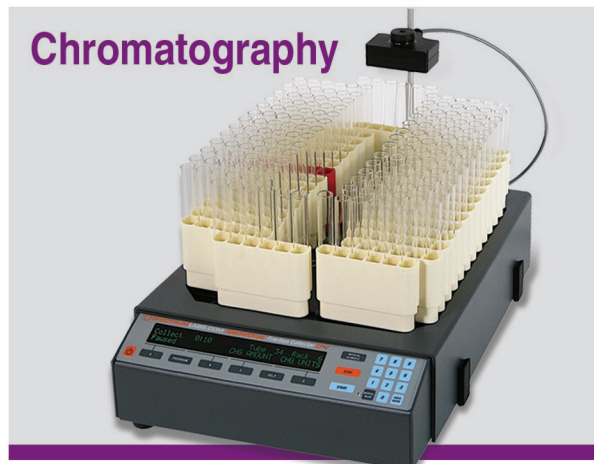
Tangential Flow Filtration



Labware



Chromatography



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Our membranes and membrane filters are used for macrofiltration, microfiltration, ultrafiltration, diafiltration and dialysis. With over 2,000 products ranging from small disposable membrane filter modules to high volume systems, you can be certain we have a product for your application.

We continue to make significant investments in R&D to develop and provide new products and advance separation technology as a whole. Spectrum's team of membrane scientists, engineers, technical experts and quality control personnel is always available to support your separation application. Our dedicated OEM group is available to work with our customers on special projects.

Spectrum is committed to providing quality products to all our customers. All membrane products are shipped with a certificate of conformance. We also publish comprehensive validation guides with details and results of all quality control procedures.

Spectrum has grown to become a global company with corporate headquarters in Rancho Dominguez, California and manufacturing facilities in Rancho Dominguez, CA; Houston, TX and Dallas, TX. Our European sales offices are located in Breda, Netherlands and Paris, France. Our Asian sales offices are located in Otsu-City, Shiga Japan and Shanghai, China. Spectrum also supplies products world-wide through a network of international distributors.

We personally invite you and your colleagues to visit us, tour our manufacturing facilities and review our quality program. To arrange a site visit, please contact our Rancho Dominguez office at (310) 885-4600 or email us via our website at www.spectrumlabs.com.

Thank you for your business and we look forward to providing you with quality products in the future.

Sincerely,

The Staff of Spectrum Laboratories, Inc.



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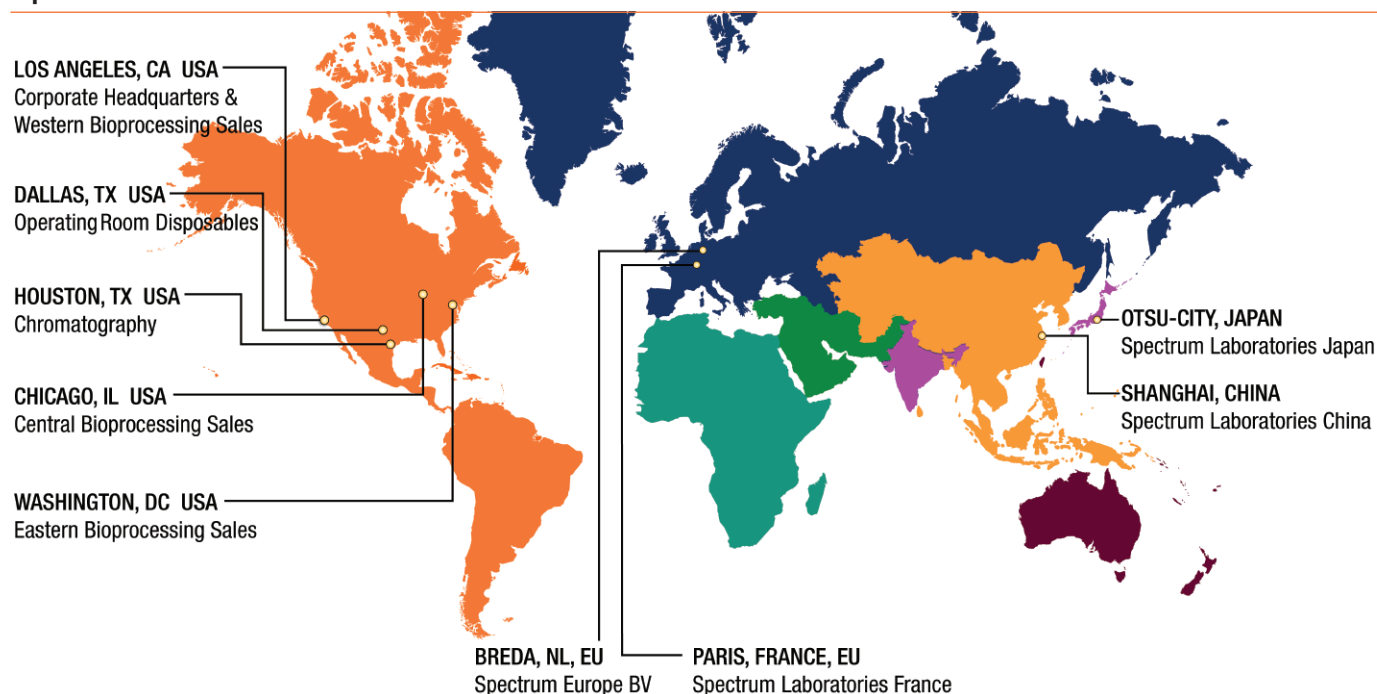
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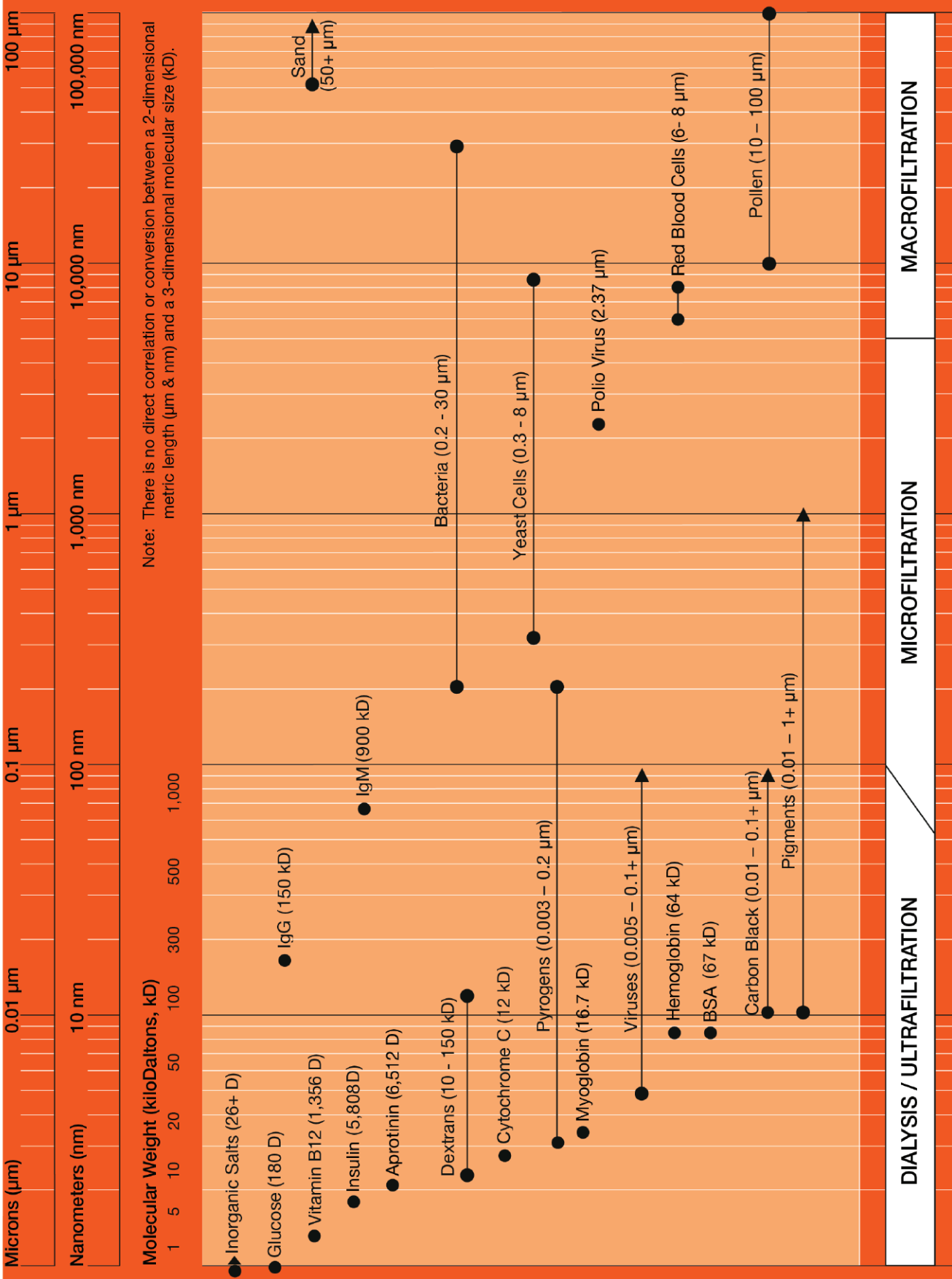
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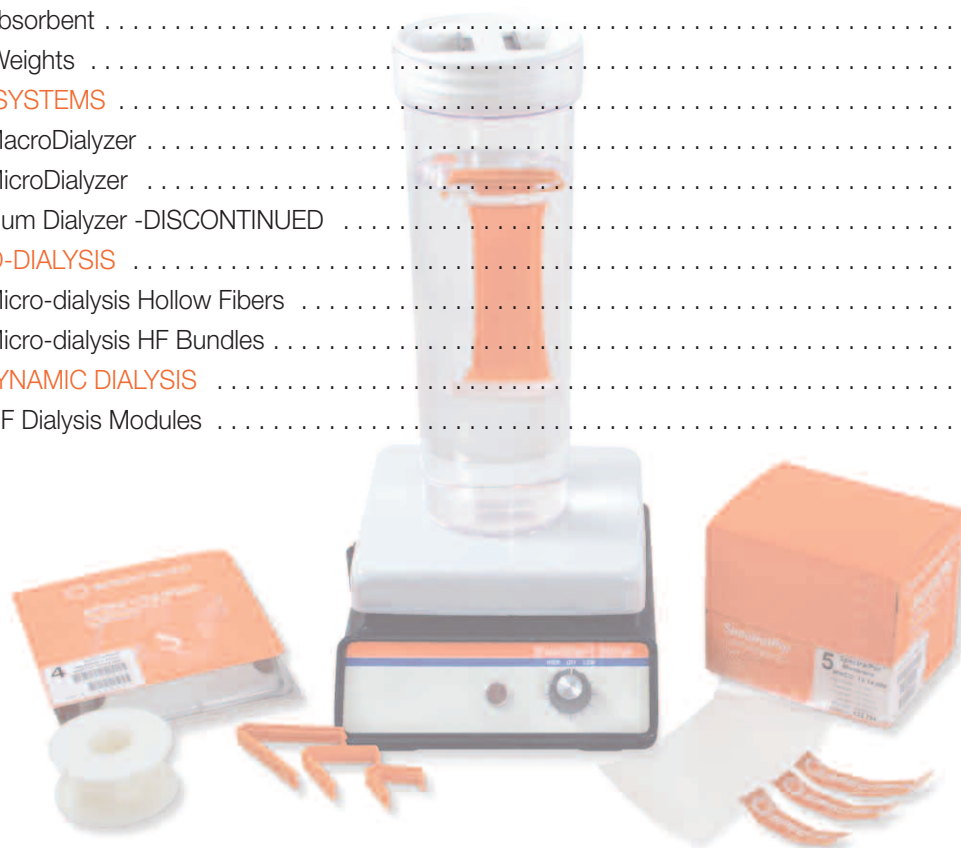
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SPECTRUMLABS.COM Relative Size Chart



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Fundamentals of Laboratory Dialysis

Dialysis is a simple process in which small solutes diffuse from a high concentration solution to a low concentration solution across a semi-permeable membrane until equilibrium is reached. Since the porous membrane selectively allows smaller solutes to pass while retaining larger species, dialysis can effectively be used as a separation technique based on size rejection. The conditions of dialysis can be controlled or manipulated to produce desired results for a variety of dialysis applications. The application depicts which Molecular Weight Cut Off (MWCO) yields the preferred molecular separation.

ADVANTAGES OF LAB DIALYSIS

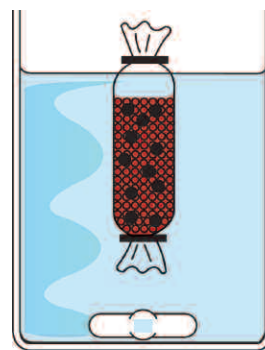
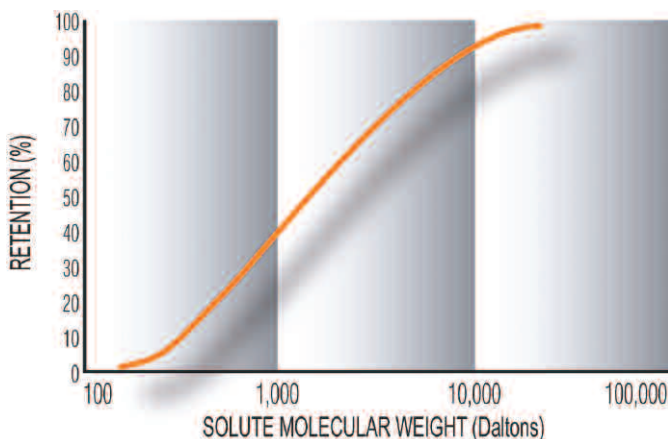
- Very Gentle Conditions
- Easy Operation
- Wide Range of Sample Volumes
- Many Membrane Types & MWCO's
- Inexpensive Materials
- Disposable Membranes & Devices

Typical Dialysis Applications

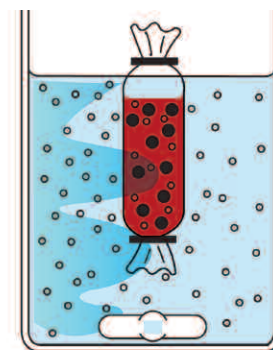
- Macromolecular Purification
- Solute Fractionation
- pH Change
- Buffer Exchange
- Electro-elution
- Protein Concentration
- Contaminant Removal
- Desalting
- Binding Studies

Selecting the Right Molecular Weight Cut Off (MWCO)

Since the dialysis membrane consists of a spongy matrix of cross-linked polymers, the pore rating referred to as Molecular Weight Cut Off (MWCO) is an indirect measure of the retention performance. More precisely, the membrane MWCO is determined as the solute size that is retained by at least 90%. However, since a solute's permeability is also dependent upon molecular shape, degree of hydration, ionic charge and polarity, it is recommended to select a MWCO that is 50-80% the size of the MW of the species to be retained and 100 times larger than the MW of the species intended to pass through.



Start Dialysis
(high concentration gradient)



End Dialysis
(equilibrium)

SPECTRUM DIALYSIS CHECK LIST

| | |
|----------------------------------|-------|
| Spectrum Dialysis Membrane | pg 7 |
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"THE DIALYSIS SHOP"... ON-LINE!

Spectrum provides the most comprehensive on-line product offering tailored to laboratory dialysis; including membranes, accessories and hardware. Spectrum's website also features product search and comparison tools and provides a wealth of technical information. Whether needing technical support, information or shopping, visit us at...

www.spectrumlabs.com

Spectrum® Dialysis Membrane

As the pioneer and leader in laboratory dialysis products, Spectrum offers the largest selection of dialysis membranes to meet the ever increasing and varied demands of the laboratory researcher. Keeping in mind MWCO, volume size, chemical compatibility, temperature, pH and solvent conditions; Spectrum has developed 2 fundamental grades of dialysis membranes, Standard and Biotech Grades, as well as 2 types of membranes, Regenerated Cellulose (RC) and Cellulose Ester (CE) to meet the demands of a large variety of dialysis applications.

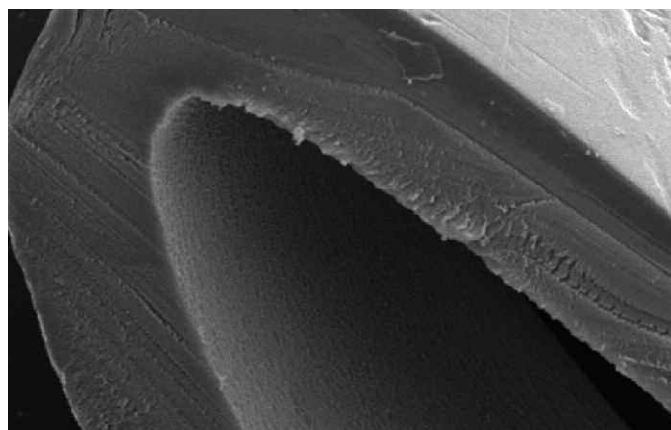
Membrane Configurations

Depending on the membrane grade and type, Spectrum offers the largest assortment of membrane configurations: Tubing, Ready-to-Use Dialysis Devices (RDD), flat-sheet and hollow fiber. Being the most conventional configuration, dialysis tubing is available dry with glycerin, pre-wetted or pre-treated. Offering the ultimate in convenience, dialysis tubing is also available pre-assembled into 3 types of RDD: Float-A-Lyzer G2, Micro Float-A-Lyzer and Tube-A-Lyzer. Flat-sheet membranes are available in standard RC sheets and discs for use with various types of dialysis apparatuses and systems also available from Spectrum. Hollow Fiber membrane provides very large surface area for the dialysis of micro-volumes.

Selecting “the Right Membrane”

The key to a successful dialysis separation is using the RIGHT MEMBRANE under the right conditions. There are 6 steps to follow when selecting a membrane:

1. Select grade (Biotech or Standard) based on application.
2. Select type (CE or RC) based on chemistry.
3. Select membrane configuration based on application (tubing, RDD, flat-sheet system or hollow fiber microdialysis).
4. Select from among 18 MWCO's based on solute size.
5. Select from among 7 volume sizes (disposable device) or from among 22 flat widths (tubing) based on volume.
6. Select the membrane treatment preferred for your application.



Spectra/Por® Biotech Grade Membranes

pg 14

Biotech membranes are specifically engineered for more critical separation constraints in which an ultrapure membrane with a precise MWCO is required. Since these synthetic membranes are manufactured using a process without metal salts, no pre-treatment or cleaning is required. Biotech tubings are available in 2 membrane types and dialysis devices are available in 1 membrane type:

| | | |
|---|---|-------|
| Biotech Cellulose Ester (CE) | wide range of selectivity & purity | pg 14 |
| Biotech Regenerated Cellulose (RC) | combined selectivity, purity & resistance | pg 14 |

For ultimate convenience and ease-of-use, Spectrum offers:

| | | |
|--|-------------------------------------|------|
| Biotech Ready-to-Use Dialysis Devices | small volumes & in-process sampling | pg 9 |
|--|-------------------------------------|------|

Spectra/Por® Standard Grade Membranes

pg 16

Ideal for basic, multi-purpose dialysis, this low cost membrane can be used for a wide variety of dialysis applications in which only general separations are required and low level membrane impurities are of little consequence. The standard RC type is composed of natural cellulose regenerated from cotton linters for strength and durability.

| | | |
|--|--|-------|
| Standard Regenerated Cellulose (RC) | broad range, low cost lab applications | pg 16 |
|--|--|-------|

Comparison Table of Dialysis Membrane Properties

| Membrane Grade: Membrane Type: | Biotech | | Standard |
|-----------------------------------|---|-----------------------------------|--|
| | CE | RC | RC |
| MWCO (Daltons): | 0.1-0.5K, 0.5-1.0K, 3.5-5K, 8-10K, 20K, 50K, 100K, 300K, 1000K | 3.5-5K, 8-10K, 20K | 1K, 2K, 3.5K 8K, 6-8K, 10K 12-14K, 15K 25K, 50K |
| Physical Properties: | Opaque Rigid Hydrophilic | Opaque Flexible Hydrophilic | Clear Flexible Hydrophilic |
| Organic Resistance: | Fair | Good | Good |
| pH Range: | 2 – 9 | 2 – 12 | 2 – 12 |
| Temperature Limit: | 37 °C | 60 °C | 121 °C (Autoclavable) |
| Flat Sheet: | Not Available | Not Available | Symmetric Porosity |
| Recommended Closures: | Universal only | Universal only | Universal or Spectra/Por |

For more help selecting the RIGHT MEMBRANE, go to www.spectrumlabs.com



Biotech Ready-to-Use Dialysis Devices (RDD)

Easy Dialysis of 100 μ L - 30 mL Volumes

Revolutionizing laboratory dialysis, Spectrum offers Biotech Ready-to-Use Dialysis Devices with a broad range of precise MWCO's and all the needed accessory components included. No need for closures, knots, additional buoys or pontoons, weights, etc. There are 3 types of Spectra/Por disposable dialysis devices, the Float-A-Lyzer G2, the Micro Float-A-Lyzer and the Tube-A-Lyzer. All consist of a volume-specific length of ultra-pure biotech grade CE tubing with a re-sealable cap at one end and sealed closed at the other. Follow 3 easy steps for using all types of Biotech RDD's:

QUICK & EASY!

1. Open screw cap.
2. Load sample with pipette or syringe.
3. Close cap and dialyze!

Only Spectrum's dialysis devices with re-sealable screw caps allow in process sample testing without struggling with closures, leaking knots, needle punctures and leaking perforated septums. Eliminating the frustrations typically associated with dialysis tubing and cassette type devices, Biotech Ready-to-Use Dialysis Devices are...

SAFE & CONVENIENT!

- Superior Handling & Leak Protection
- Ready-to-Use & Complete
- 95-98% Sample Recovery
- Volume Specific Dilution Control
- Highest Membrane Purity



Float-A-Lyzer® G2



Tube-A-Lyzer®



Micro Float-A-Lyzer®

Comparison of Ready-to-Use Dialysis Devices

| | Spectra/Por®: | | | Other: Cassette-type Device |
|-------------------------|-------------------------------|-----------------------------|----------------------|---|
| | Float-A-Lyzer® G2 | Micro Float-A-Lyzer® | Tube-A-Lyzer® | |
| Easy Handling | YES | YES | YES | YES |
| Accessories | Included | Included | Not Included | Not Included |
| Membrane Type | Biotech CE | Biotech CE | Biotech CE | Standard RC |
| Heavy Metals & Sulfides | NO | NO | NO | YES |
| Membrane Prep Required | NO | NO | NO | YES |
| Loading & Recovery | Disposable pipette (included) | Syringe (no needle) | Peristaltic Pump | Syringe & needle |
| Leakage Risks | None | None | None | Membrane puncture, perforated septum |
| Number of Sizes | 3 | 2 | 2 | 7 |
| Sample Dilution | NO | NO | NO | YES |
| Available MWCO's | 9 | 7 | 6 | 4 |



Spectra/Por® Float-A-Lyzer® G2

Ready-to-Use Features

- PP Screw-on cap: Open & close for in-process sampling
Color-coded for MWCO
- Silicon O-ring: Leak proof & re-sealable
- Top/Bottom Piece: Durable Polycarbonate
- Membrane: Ultra-pure with 3 volume specific sizes
- Floatation Ring: Device body inserts through center for buoyancy
- Potting: Polyurethane
- Sample Loading: Disposable pipette for 5 & 10 ml (included)
Micropipettor for 1 ml (not included)

Product Specifications

- Membrane type: Biotech grade Cellulose Ester (CE)
- 9 MWCO's: 0.1 – 0.5 kD, 0.5 – 1.0 kD, 3.5 - 5 kD,
8 - 10 kD, 20 kD, 50 kD, 100 kD
300 kD & 1000 kD
- Packaging: 12/pkg

Dimensions

| 3 Volume Sizes: | 1 ml | 5 ml | 10 ml |
|---------------------|-------|-------|-------|
| Nominal Length: | 5 cm | 10 cm | 16 cm |
| Membrane Diameter: | 10 mm | 10 mm | 10 mm |
| Top Piece Diameter: | 23 mm | 23 mm | 23 mm |
| Floatation Ring: | 38 mm | 38 mm | 38 mm |

Ordering Information: Spectra/Por® Float-A-Lyzer® G2

| | MWCO | | Sample Volume Sizes | | | Qty | |
|-----------------------------------|------------|------------|---------------------|---------|---------|---------|--------|
| | (kD) | Color Code | 1 ml | 5 ml | 10 ml | | |
| Spectra/Por® Float-A-Lyzer® G2 | Biotech CE | 0.1 - 0.5 | Green | G235025 | G235049 | G235061 | 12/pkg |
| | | 0.5 - 1.0 | Orange | G235027 | G235051 | G235063 | |
| | | 3.5 - 5 | Black | G235029 | G235053 | G235065 | |
| | | 8 - 10 | Yellow | G235031 | G235055 | G235067 | |
| | | 20 | Red | G235033 | G235057 | G235069 | |
| | | 50 | Violet | G235034 | G235058 | G235070 | |
| | | 100 | Blue | G235035 | G235059 | G235071 | |
| | | 300 | Amber | G235036 | G235060 | G235072 | |
| | | 1000 | Pink | G235037 | G235062 | G235073 | |

Related Product:

Spectra/Gel® Absorbent

pg 23

Easily concentrate samples in Ready-to-Use Dialysis Devices



Spectra/Por® Micro Float-A-Lyzer®

Ready-to-Use Features

- PP Luer-Lok™ cap: Open & close for in-process sampling
Color-coded for MWCO
Leak proof & re-sealable
- Body Piece: Polycarbonate, seals top/bottom ends of membrane, self-buoyant
- Membrane: Ultra-pure with 2 volume specific sizes
Potting: Polyurethane
- Sample Loading: Syringe (1 ml syringe included)

Product Specifications

- Membrane type: Biotech grade Cellulose Ester (CE)
- 7 MWCO's: 0.1 – 0.5 kD, 0.5 – 1.0 kD, 3.5 – 5 kD, 8 – 10 kD, 20 kD, 50 kD & 100 kD
- Packaging: 12/pkg

Dimensions

| 2 Volume Sizes: | 100-200 µl | 400-500 µl |
|----------------------|------------|------------|
| Height: | 4.4 cm | 6.3 cm |
| Width: | 4.5 cm | 4.5 cm |
| Thickness: | 1.9 cm | 1.9 cm |
| Membrane Flat Width: | 10 mm | 10 mm |
| Membrane Diameter: | 6.4 mm | 6.4 mm |



Ordering Information: Spectra/Por® Micro Float-A-Lyzer®

| | | MWCO | | Sample Volume Sizes | | Qty |
|--|-------------------|-----------|------------|---------------------|------------|--------|
| | | (kD) | Color Code | 100-200 µl | 400-500 µl | |
| Spectra/Por® Micro Float-A-Lyzer® | Biotech CE | 0.1 - 0.5 | Green | F235049 | F235061 | 12/pkg |
| | | 0.5 - 1.0 | Orange | F235051 | F235063 | |
| | | 3.5 - 5 | Black | F235053 | F235065 | |
| | | 8 - 10 | Yellow | F235055 | F235067 | |
| | | 20 | Red | F235057 | F235069 | |
| | | 50 | White | F235058 | F235070 | |
| | | 100 | Blue | F235059 | F235071 | |



Spectra/Por® Tube-A-Lyzer®

Disposable & Ready-to-Use Dynamic Dialysis Device

Reduces Dialysis from Days to Hours

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 reduce dialysis from 1-2 days to 4-12 hours. This self-contained, disposable device incorporates a semi-permeable membrane tubing that separates the sample chamber from the surrounding flow-through buffer chamber. The Biotech Grade Cellulose Ester (CE) membrane chamber is available in 6 MWCO's and in 2 volume sizes. The sample port provides easy access for loading, recovering and in-process testing. The housing is designed to be a flow-through dialysate chamber that can be connected to a buffer source and a waste collection vessel or discharging directly to drain.

Mounted on Spectrum's KrosFlo Research I pump and integrated stand (or any conventional stand), the Tube-A-Lyzer 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.

ADVANTAGES OF DYNAMIC DIALYSIS

- **Faster dialysis; 4-12 hours**
- **Ready-to-Use and disposable:**
no preparation required
- **Easy sample loading, testing & recovery**
- **Prevents membrane polarization & fouling**
- **No heavy metals & sulfide contaminants**
- **95-98% Recovery**

Features of Spectra/Por® Tube-A-Lyzer®

CE Membrane: 6 MWCO's: 0.1-0.5, 3.5-5, 8-10, 20, 50 & 100 kD

Sample Chamber: 2 Volume sizes: 8-10 ml & 25-30 ml
Biotech Grade Cellulose Ester (CE) Membrane
Polycarbonate top and bottom piece
Polyurethane potting
Female Luer-Lok™ sample port
Polypropylene male Luer-Lok™ cap

Buffer Chamber: Polycarbonate housing & end caps
6 mm (3/16 inch) hose-barb inlet / outlet port

Dynamic Pump Rate: 10-20 ml/min
(should be optimized for application)



Dimensions

| Sample Volume | Buffer Volume | Total Length | Total Diameter | Membrane Length | Membrane Diameter |
|---------------|---------------|--------------|----------------|-----------------|-------------------|
| 8-10 ml | 50-55 ml | 23 cm | 2.2 cm | 14-16 cm | 1.0 cm |
| 25-30 ml | 120-130 ml | 50 cm | 2.2 cm | 36-38 cm | 1.0 cm |

Ordering Information: Spectra/Por® Tube-A-Lyzer®

| | MWCO (kD) | Sample Volume Sizes | | Qty | |
|-----------------------------------|-------------------|--|----------|--------|-------|
| | | 8-10 ml | 25-30 ml | | |
| Spectra/Por® Tube-A-Lyzer® | Biotech CE | 0.1 - 0.5 | 137002 | 137042 | 3/pkg |
| | | 3.5 - 5 | 137004 | 137044 | |
| | | 8 - 10 | 137006 | 137046 | |
| | | 20 | 137008 | 137048 | |
| | | 50 | 137009 | 137049 | |
| | | 100 | 137010 | 137050 | |
| | Part No. | Description | | | |
| Accessories | 137100 | Tube-A-Lyzer Sample Loading Kit (includes 3 syringes (30 cc), 3 dispensing tips & 2 coupling brackets) | | | |
| | 137110 | Replacement Dispensing Tips, 12/pkg | | | |
| | ACTU-E16-25N | Extended Life Silicone Tubing, 1/8 in. (3.1 mm) ID, 25 ft (7.6 m) | | | |

Related Product:
KrosFlo® Research I Pump & Stand

pg 67



Spectra/Por® Biotech Grade Membranes: Cellulose Ester (CE) & Regenerated Cellulose (RC)

Only Spectrum offers Biotech Grade dialysis membrane for those critical applications requiring stringent MWCO's and membrane purity. Since these synthetic membranes are made using a process free of heavy metal contaminants and sulfides, they are ultra-pure and require no cleaning or pre-treatment. Simply rinse with DI water, apply Universal Closures* and load sample! Spectrum offers 2 types of Biotech grade membrane to meet the different demands of laboratory dialysis applications: Cellulose Ester (CE) & Regenerated Cellulose (RC).

ADVANTAGES OF BIOTECH MEMBRANES

- Ultrapure for critical separations
- Rigidly controlled porosity
- 2 types available for different applications (CE & RC)
- Large MWCO selection (100 - 1,000,000 Daltons)



Biotech Cellulose Ester (CE) Membrane

Biologically inert & ultra-pure, Biotech CE Membrane offers the largest and best selection of pore ratings and sizes for isolating ionic species and macromolecular purifications. Of the 2 types, Biotech CE is more sensitive to harsh conditions and solvents. In general, CE membrane will tolerate weak or dilute acids & bases as well as mild alcohols with only a slight change to the MWCO. Exposure to organic solvents will damage the CE membranes. Biotech CE should only be used with pH 2–9 & temp 4–37°C. CE dialysis tubing is available in 9 concise MWCO's.

Biotech Regenerated Cellulose (RC) Membrane

Synthetic Biotech RC Membrane is crafted from a regeneration process that yields improved physical tolerances and chemical compatibilities with the same high purity and rigidly controlled MWCO's as Biotech CE. RC Membrane can be used with concentrated-weak acids & bases, dilute-strong acids & bases, most alcohols and some mild or dilute organic solvents. Exposure to strong polar or organic solvents may damage RC membranes. Biotech RC can be used with pH 2–12 & temp 4–60°C. Biotech RC is available in dialysis tubing with 3 concise MWCO's.

*Universal Closures required for use with Biotech Tubing

Biotech Dialysis Tubing

Product Specifications: 2 Membrane Types

Cellulose Ester (CE)

- Properties: Hydrophilic, symmetric porosity
- 9 MWCO's: 0.1 – 0.5 kD, 0.5 – 1 kD, 3.5 – 5 kD, 8 – 10 kD, 20 kD, 50 kD, 100 kD, 300 kD & 1000 kD
- 4 Flat Widths: 10 mm, 16 mm, 24 mm & 31 mm
- Qty/Pkg: 10 m/roll, wet in 0.05% sodium azide

Regenerated Cellulose (RC)

- Properties: Hydrophilic, symmetric porosity
- 3 MWCO's: 3.5 – 5 kD, 8 – 10 kD & 20 kD
- 2 Flat Widths: 10 mm & 16 mm
- Qty/Pkg: 5 m/roll, dry with glycerin



NEW! Biotech Dialysis Trial Kits

Provides shorter length of Biotech CE or RC Dialysis tubing for membrane/application evaluation.

Product Specifications: 2 Membrane Types

- Kit Includes: Biotech dialysis tubing (CE or RC)
- 2 tubing closures
- 5 opening picks

Cellulose Ester (CE)

- Properties: Hydrophilic, symmetric porosity
- 9 MWCO's: 0.1 – 0.5 kD, 0.5 – 1 kD, 3.5 – 5 kD, 8 – 10 kD, 20 kD, 50 kD, 100 kD, 300 kD & 1000 kD
- 1 Flat Width: 16 mm
- Qty/Kit: 1 m/roll, wet in 0.05% sodium azide

Regenerated Cellulose (RC)

- Properties: Hydrophilic, symmetric porosity
- 3 MWCO's: 3.5 – 5 kD, 8 – 10 kD & 20 kD
- 1 Flat Width: 16 mm
- Qty/Kit: 0.5 m/roll, dry with glycerin



Ordering Information: Biotech Dialysis Tubing & Trial Kits

| | MWCO | Tubing Dimensions: Flat Width / Diameter / Volume per length | | | | Qty | NEW! Dialysis Trial Kits | | | |
|----------------------------------|-----------|--|------------|-----------|-----------|--------|--------------------------|-------------------|-----------|---------|
| | | 10 mm | 16 mm | 24 mm | 31 mm | | MWCO | Flat Width: 16 mm | | |
| | | 6.4 mm | 10 mm | 15 mm | 20 mm | | (kD) | Diameter: 10 mm | | |
| | (kD) | 0.32 ml/cm | 0.79 ml/cm | 1.8 ml/cm | 3.1 ml/cm | | Vol/length: 0.79 ml/cm | | | |
| Biotech Membrane Dialysis Tubing | CE Tubing | 0.1 - 0.5 | 131048 | 131054 | 131057 | 131060 | 10 m (wet) | CE Trial Kit | 0.1 - 0.5 | 131054T |
| | | 0.5 - 1.0 | 131084 | 131090 | 131093 | 131096 | | | 0.5 - 1.0 | 131090T |
| | | 3.5 - 5 | 131192 | 131198 | 131201 | 131204 | | | 3.5 - 5 | 131198T |
| | | 8 - 10 | 131264 | 131270 | 131273 | 131276 | | | 8 - 10 | 131270T |
| | | 20 | 131336 | 131342 | 131345 | 131348 | | | 20 | 131342T |
| | | 50 | 131372 | 131378 | 131381 | 131384 | | | 50 | 131378T |
| | | 100 | 131408 | 131414 | 131417 | 131420 | | | 100 | 131414T |
| | | 300 | - | 131450 | - | - | | | 300 | 131450T |
| | 1000 | - | 131486 | - | - | 1000 | 131486T | | | |
| | RC Tubing | 3.5 - 5 | 133192 | 133198 | - | - | 5 m (dry) | RC Trial Kit | 3.5 - 5 | 133198T |
| | | 8 - 10 | 133264 | 133270 | - | - | | | 8 - 10 | 133270T |
| | | 20 | 133336 | 133342 | - | - | | | 20 | 133342T |

Standard Grade RC Membrane: Spectra/Por® 1 - 7

Because Standard Regenerated Cellulose (RC) is composed of natural cellulose polymer from cotton linters, these membranes are perfectly suited for a broad range of laboratory dialysis. This clear and flexible membrane type with symmetric porosity is economical and sturdy; ideal for desalting, buffer exchanges, macromolecular purifications and other general applications. Possessing a broad chemical compatibility range, Standard RC membranes can be used with dilute strong acids and bases, concentrated weak acids and bases, most alcohols and some mild or dilute organic solvents, including DMSO. Exposure to some strong organic solvents may damage RC membranes. Standard RC can be used with pH 2–12 & temperatures 4–121°C. While the low level heavy metal impurities in Standard RC typically pose no problem, they can easily be eliminated using Spectrum's Heavy Metal Cleaning Solution. Standard RC Membrane is available in



rolls of dialysis tubing (dry or pre-treated), dialysis trial kits, ready-to-use dialysis sacks & flat sheet (discs or square sheets).



There are 7 different categories of Standard RC Membrane, Spectra/Por 1 – 7, each possessing unique desirable properties to meet different application needs:

Spectra/Por® 1 Dialysis Membrane

MWCO: 6,000 – 8,000 Daltons

Properties: Standard RC with glycerol for general dialysis

Spectra/Por® 2 Dialysis Membrane

MWCO: 12,000 – 14,000 Daltons

Properties: Standard RC with glycerol in special membrane dimension and/or high permeability

Spectra/Por® 3 Dialysis Membrane

MWCO: 3,500 Daltons

Properties: Standard RC with glycerol for general dialysis

Spectra/Por® 4 Dialysis Membrane

MWCO: 12,000 – 14,000 Daltons

Properties: Standard RC with glycerol for general dialysis

Spectra/Por® 5 Dialysis Membrane

MWCO: 12,000 – 14,000 Daltons

Properties: Standard RC with glycerol reinforced with porous paper for large volume and weight

Spectra/Por® 6 Dialysis Membrane

MWCO: 1, 2, 3.5, 8, 10, 15, 25 & 50 kD

Properties: Standard RC in 0.05% sodium azide, pre-wetted

Spectra/Por® 7 Dialysis Membrane

MWCO: 1, 2, 3.5, 8, 10, 15, 25 & 50 kD

Properties: Standard RC in 0.05% sodium azide, pre-cleaned to minimize heavy metals & sulfides

Spectra/Por® Standard RC Dialysis Tubing (Dry Rolls)

Multi-purpose dialysis tubing ideal for general dialysis for a variety of applications and volumes.

Product Specifications

| Membrane Type | MWCO | 15 Flat Widths (mm) |
|---------------|------------|------------------------------|
| Spectra/Por 1 | 6 – 8 kD | 10, 23, 32, 40, 50, 100, 120 |
| Spectra/Por 2 | 12 – 14 kD | 10, 25, 45, 105, 120 |
| Spectra/Por 3 | 3.5 kD | 18, 45, 54 |
| Spectra/Por 4 | 12 – 14 kD | 10, 25, 32, 45, 75 |
| Spectra/Por 5 | 12 – 14 kD | 75, 140 |

Properties: Hydrophilic, symmetric porosity
 Quantity: 15 or 30 m roll (depending on Type and Flat Width)
 Packaging: Dry with glycerol (rinse out with water)

Related Products: [Tubing Closures \(Universal & Spectra/Por®\)](#) pg 20
[Heavy Metal Cleaning Solution](#) pg 23



NEW! Spectra/Por® Standard RC Dialysis Trial Kits

Provides 5 m lengths of standard RC Dialysis tubing for membrane application evaluation

Product Specifications

Kit Includes: 5 m roll of Spectra/Por 1, 2 or 3
 1 standard Spectra/Por Closure
 1 weighted Spectra/Por Closure
 5 opening picks

| Membrane Type | MWCO | 6 Flat Widths (mm) |
|---------------|------------|--------------------|
| Spectra/Por 1 | 6 – 8 kD | 32 & 50 |
| Spectra/Por 2 | 12 – 14 kD | 25 & 45 |
| Spectra/Por 3 | 3.5 kD | 18 & 54 |



Ordering Information: Spectra/Por® 1, 2, 3, 4 & 5 Tubing & Dialysis Kits

| | MWCO | Flat Width (mm) | Diameter (mm) | Vol/Length (ml/cm) | Part No. | | NEW Trial Kits |
|--------------------------------------|------------|-----------------|---------------|--------------------|-----------|-----------|----------------|
| | | | | | 15 m/roll | 30 m/roll | 5 m/roll |
| Standard RC Membrane Dialysis Tubing | 6 - 8 kD | 10 | 6.4 | 0.32 | 132645 | - | - |
| | | 23 | 14.6 | 1.7 | - | 132650 | - |
| | | 32 | 20.4 | 3.3 | - | 132655 | 132655T |
| | | 40 | 25.5 | 5.1 | - | 132660 | - |
| | | 50 | 32 | 7.9 | - | 132665 | 132665T |
| | | 100 | 64 | 32 | 132670 | - | - |
| | 12 - 14 kD | 120 | 76 | 46 | 132675 | - | - |
| | | 10 | 6.4 | 0.32 | 132676 | - | - |
| | | 25 | 16 | 2.0 | 132678 | - | 132678T |
| | | 45 | 29 | 6.4 | 132680 | - | 132680T |
| | | 105 | 67 | 34 | 132682 | - | - |
| | 3.5 kD | 120 | 76 | 46 | 132684 | - | - |
| | | 18 | 11.5 | 1.1 | 132720 | - | 132720T |
| | | 45 | 29 | 6.4 | 132724 | - | - |
| | 12 - 14 kD | 54 | 34 | 9.3 | 132725 | - | 132725T |
| | | 10 | 6.4 | 0.32 | - | 132697 | - |
| | | 25 | 16 | 2.0 | - | 132700 | - |
| | | 32 | 20.4 | 3.3 | - | 132703 | - |
| 12 - 14 kD | 45 | 29 | 6.4 | - | 132706 | - | |
| | 75 | 48 | 18 | 132709 | - | - | |
| | 75 | 48 | 18 | 132754 | - | - | |
| 12 - 14 kD | 140 | 89 | 62 | 132757 | - | - | |



Standard RC Ready-to-Use Dialysis Sacks

Designed for the general dialysis of larger sample volumes, the Ready-to-Use Sack consists of a 60 cm length of Spectra/Por 1, 2, 3 or 4 tubing, sealed at one end with a Spectra/Por Closure and a funnel attached to the other for easy filling. Simply fill, apply closure & cut.

Product Specifications

- 4 Membrane Types: Spectra/Por 1, 2, 3 & 4
- 2 Volume Sizes: 1 – 40 ml, 50 – 400 ml
- Properties: Hydrophilic, symmetric porosity
- Packaging: Wet in 0.05% sodium azide
- Quantity: 10/pkg

Ordering Information: Spectra/Por® 1, 2, 3, 4 & 5 Sacks

| | | MWCO | Flat Width (mm) | Diameter (mm) | Volume (ml) | Part No. | Qty |
|---|----------------|------------|-----------------|---------------|-------------|----------|--------|
| Standard RC Membrane Ready-to-Use Sacks | Spectra/Por® 1 | 6 - 8 kD | 23 | 14.6 | 1 to 40 | 132651 | 10/pkg |
| | | | 50 | 32 | 50 to 400 | 132666 | |
| | Spectra/Por® 2 | 12 - 14 kD | 25 | 16 | 1 to 40 | 132679 | |
| | | | 45 | 29 | 50 to 400 | 132681 | |
| | Spectra/Por® 3 | 3.5 kD | 18 | 11.5 | 1 to 40 | 132721 | |
| | | | 54 | 34 | 50 to 400 | 132726 | |
| | Spectra/Por® 4 | 12 - 14 kD | 25 | 16 | 1 to 40 | 132701 | |
| | | | 45 | 29 | 50 to 400 | 132707 | |



Standard RC Dialysis Discs & Sheets

Pre-cut membrane discs for use with Spectra/Por MacroDialyzers and Equilibrium Dialyzers. Cut square membrane sheets to use with Spectra/Por MicroDialyzer or as needed for a variety of dialysis equipment.

Product Specifications

- 5 Membrane Types: Spectra/Por 1, 2, 3, 4 & 5
- 3 Disc Diameters: 33 mm, 47 mm, 100 mm (used with Macro & Eq. Dialyzer)
- Sheet Size: (refer to ordering information)
- Properties: Hydrophilic, symmetric porosity
- Packaging: Dry with glycerol (rinse out with water)
- Quantity: 50/pkg (discs), 25/pkg (sheets)

Related Products: [MacroDialyzer & Equilibrium Dialyzer](#)

pg 24-26

Ordering Information: Spectra/Por® 1, 2, 3, 4 & 5 Discs & Sheets

| | | MWCO | Disc Diameter | | | Qty | Sheet (Dimensions - mm) | Qty |
|--|----------------|------------|---------------|--------|--------|--------------|-------------------------|---------------|
| | | | 33 mm | 47 mm | 100 mm | | | |
| Standard RC Membrane Dialysis Discs & Sheets | Spectra/Por® 1 | 6 - 8 kD | 132478 | 132476 | 132474 | 50 discs/pkg | 132677 (240 x 240) | 25 sheets/pkg |
| | Spectra/Por® 2 | 12 - 14 kD | 132482 | 132480 | 132477 | | 132686 (200 x 200) | |
| | Spectra/Por® 3 | 3.5 kD | 132488 | 132486 | 132484 | | 132723 (108 x 108) | |
| | Spectra/Por® 4 | 12 - 14 kD | 132498 | 132496 | 132494 | | 132712 (150 x 150) | |
| | Spectra/Por® 5 | 12 - 14 kD | - | - | - | | 132759 (275 x 275) | |

Standard RC Dialysis Tubing, Pre-treated (Wet Rolls)

Multi-purpose dialysis tubing with more MWCO's available. Pre-wetted Spectra/Por 6 tubing is ready-to-use, not requiring soaking to remove glycerol. Spectra/Por 7 is further pre-cleaned to minimize trace levels of heavy metals & sulfides.

Product Specifications: 2 Treatment Types

Spectra/Por® 6: Pre-wetted
 8 MWCO's: 1 kD, 2 kD, 3.5 kD, 8 kD, 10 kD, 15 kD, 25 kD & 50 kD
 13 Flat Widths: 8 mm, 10mm, 12 mm, 18 mm, 24 mm, 28 mm, 32 mm, 34 mm, 38 mm, 40 mm, 45 mm, 50 mm & 54 mm
 Qty & Pkg: 10 m roll, wet in 0.05% sodium azide

Spectra/Por® 7: Pre-cleaned to reduce trace-level contaminants
 8 MWCO's: 1 kD, 2 kD, 3.5 kD, 8 kD, 10 kD, 15 kD, 25 kD & 50 kD
 12 Flat Widths: 8 mm, 12 mm, 18 mm, 24 mm, 28 mm, 32 mm, 34 mm, 38 mm, 40 mm, 45 mm, 50 mm & 54 mm
 Qty & Pkg: 5 m roll, wet in 0.05% sodium azide



Ordering Information: Spectra/Por® 6 & Spectra/Por® 7 Tubing

| | MWCO (kD) | Flat Width (mm) | Diameter (mm) | Volume/Length (ml/cm) | Spectra/Por® 6 | Spectra/Por® 7 |
|--|-----------|-----------------|---------------|-----------------------|----------------|----------------|
| | | | | | (pre-wetted) | (pre-cleaned) |
| Standard RC Membrane Pre-treated Tubing | 1 | 18 | 11.5 | 1.1 | 132636 | 132103 |
| | | 38 | 24 | 4.6 | 132638 | 132104 |
| | | 45 | 29 | 6.4 | 132640 | 132105 |
| | 2 | 18 | 11.5 | 1.1 | 132620 | 132107 |
| | | 38 | 24 | 4.6 | 132625 | 132108 |
| | | 45 | 29 | 6.4 | 132633 | 132109 |
| | 3.5 | 18 | 11.5 | 1.1 | 132590 | 132110 |
| | | 45 | 29 | 6.4 | 132592 | 132111 |
| | | 54 | 34 | 9.3 | 132594 | 132112 |
| | 8 | 8 | 5.1 | 0.20 | 128056 | 128356 |
| | | 12 | 7.5 | 0.45 | 132579 | 132113 |
| | | 18 | 11.5 | 1.1 | 128058 | 128358 |
| 24 | | 15 | 1.8 | 132580 | 132114 | |
| 32 | | 20.4 | 3.3 | 132582 | 132115 | |
| 40 | | 25.5 | 5.1 | 132584 | 132116 | |
| 50 | | 32 | 7.9 | 132586 | 132131 | |
| 10 | 8 | 5.1 | 0.20 | 128106 | 128406 | |
| | 12 | 7.5 | 0.45 | 132570 | 132117 | |
| | 18 | 11.5 | 1.1 | 128118 | 128418 | |
| | 24 | 15 | 1.8 | 132572 | 132118 | |
| | 32 | 20.4 | 3.3 | 132574 | 132119 | |
| 15 | 45 | 29 | 6.4 | 132576 | 132120 | |
| | 8 | 5.1 | 0.20 | 128156 | 128456 | |
| | 12 | 7.5 | 0.45 | 132560 | 132121 | |
| | 18 | 11.5 | 1.1 | 128158 | 128458 | |
| | 24 | 15 | 1.8 | 132562 | 132122 | |
| 25 | 32 | 20.4 | 3.3 | 132564 | 132123 | |
| | 45 | 29 | 6.4 | 132566 | 132124 | |
| | 8 | 5.1 | 0.20 | 128206 | 128506 | |
| | 12 | 7.5 | 0.45 | 132550 | 132125 | |
| | 18 | 11.5 | 1.1 | 128218 | 128518 | |
| 50 | 24 | 15 | 1.8 | 128224 | 128524 | |
| | 28 | 18 | 2.5 | 132552 | 132126 | |
| | 34 | 22 | 3.7 | 132554 | 132127 | |
| | 10 | 6.4 | 0.32 | 132539 | - | |
| | 12 | 7.5 | 0.45 | 132540 | 132128 | |
| Qty | 28 | 18 | 2.5 | 132542 | 132129 | |
| | 34 | 22 | 3.7 | 132544 | 132130 | |
| | | | | 10 m | 5 m | |

Dialysis Tubing Closures

Using resealable closures is the preferred method for sealing dialysis tubing without the risk of leaking. Opening and resealing tied knots is difficult and often results in damaged, leaking membranes. Spectrum offers two classes of Dialysis Tubing Closures: Universal Closures for use with all tubing membrane types and Spectra/Por Closures for use only with Standard Grade RC tubing. Specialized Spectra/Por Closures also offer additional functional benefits.

- Leak-proof & Re-sealable
- 2 Classes of Closures (Universal & Spectra/Por®)
- 3 Functional Types & 1 Paired Combination

For best results, select a pair of closures that has a sealing width 4 to 10 mm longer than the flat width of the dialysis tubing. This assures a proper seal without membrane tearing or leaking.



Universal Closures

Specially designed with gentle sealing ridges, Universal Closures are the ideal all-purpose closure that create a reliable seal for all membrane grades, types and thicknesses of tubing. Available in a variety of colors for easy sample identification.

Product Specifications

| | |
|---------------------|--|
| Functional Benefit: | Universal, seals all tubing membrane types |
| Membrane Types: | Biotech CE & RC; Standard RC |
| 4 Sealing Widths: | 50 mm, 70 mm, 110 mm, 150 mm |
| 6 Colors: | White, Red, Yellow, Blue, Green, Black |
| Qty: | 10/pkg |
| Material: | Nylon |
| Temperature: | 0 – 90 °C |
| Sterilization: | Gamma irradiation or ethylene oxide (not autoclavable) |



Ordering Information: Universal Closures

| | Color | Closure Sealing Width | | | | Qty |
|--|--------|-----------------------|--------|--------|--------|--------|
| | | 50 mm | 70 mm | 110 mm | 150 mm | |
| Universal Closures Required for Biotech Grade RC & CE Dialysis Tubing | White | 142150 | 142170 | 142110 | 142250 | 10/pkg |
| | Red | 142152 | 142172 | 142112 | 142252 | |
| | Yellow | 142153 | 142173 | 142113 | 142253 | |
| | Blue | 142154 | 142174 | - | - | |
| | Green | 142155 | 142175 | - | - | |
| | Black | 142156 | 142176 | - | - | |

Spectra/Por® Closures

3 functional types & one pair combination for use with Standard RC.

Standard Closure Type

Since Spectra/Por Standard Closures float, they aid in buoyancy and vertical orientation when applied to the tubing top end. Autoclavable and available in a variety of colors for easy sample identification.

Product Specifications

| | |
|---------------------|--|
| Functional Benefit: | Sample buoyancy & vertical orientation |
| Membrane Types: | Standard RC only |
| 5 Sealing Widths: | 12 mm, 23 mm, 35 mm, 55 mm, 75 mm |
| 4 Colors: | orange, white, green, blue |
| Qty: | 10/pkg |
| Material: | Polypropylene |
| Temperature: | 0 – 121°C (autoclavable) |

Weighted Closure Type

Autoclavable, Spectra/Por Weighted Closures encase an acid-washed, fluorocarbon coated, stainless steel bar. When applied to the bottom end of the dialysis tubing, the Weighted Closure acts like an anchor to maintain a vertical orientation of the sample.

Product Specifications

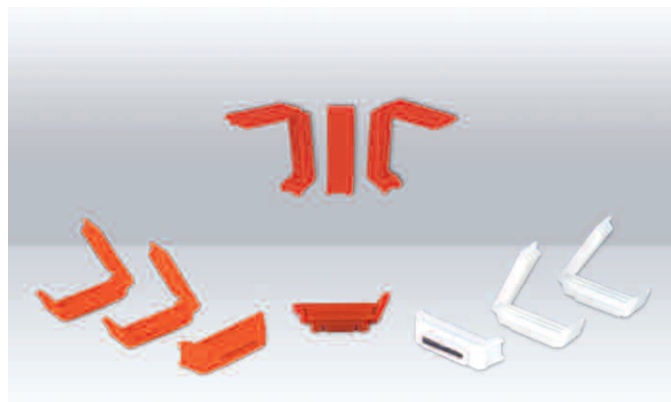
| | |
|---------------------|--|
| Functional Benefit: | Weighted for vertical sample orientation |
| Membrane Types: | Standard RC only |
| 5 Sealing Widths: | 12 mm, 23 mm, 35 mm, 55 mm, 75 mm |
| 1 Color: | White |
| Qty: | 10/pkg |
| Material: | Polypropylene |
| Temperature: | 0 - 121°C (autoclavable) |

Magnetic Closure Type

Autoclavable, Spectra/Por Magnetic-Weighted Closures contain a magnetic fluorocarbon coated stainless steel bar, eliminating the need for conventional stir bars. Applied to the bottom end of the dialysis tubing, this closure provides complete submersion and gentle rotation of the sample on a stir plate.

Product Specifications

| | |
|---------------------|---|
| Functional Benefit: | Weighted & magnetic for submersion & stirring |
| Membrane Types: | Standard RC only |
| 4 Sealing Widths: | 23 mm, 35 mm, 55 mm, 75 mm |
| 1 Color: | Red |
| Qty: | 2/pkg |
| Material: | Polypropylene |
| Temperature: | 0 - 121 °C (autoclavable) |



Paired Standard & Weighted Closures

The ultimate sample buoyancy and vertical orientation can be achieved by applying both a Standard and a Weighted Spectra/Por Closure to opposite ends of the same dialysis tubing. The Paired Closures are autoclavable.

Product Specifications

| | |
|---------------------|-----------------------------------|
| Functional Benefit: | Buoyancy and vertical orientation |
| Membrane Types: | Standard RC only |
| 5 Sealing Widths: | 12 mm, 23 mm, 35 mm, 55 mm, 75 mm |
| Paired colors: | Orange/White |
| Qty: | 10 standard & weighted pairs/pkg |
| Material: | Polypropylene |
| Temperature: | 0 - 121°C (autoclavable) |

Ordering Information: Spectra/Por® Closures (Standard, Weighted, Magnetic & Paired)

| | Color | Closure Sealing Width | | | | | Qty | |
|---|----------------------------|-----------------------|--------|--------|--------|--------|--------|--------------|
| | | 12 mm | 23 mm | 35 mm | 55 mm | 75 mm | | |
| Spectra/Por® Closures (only use with Standard Grade RC Tubing) | Standard Type | Orange | 132734 | 132735 | 132736 | 132737 | 132738 | 10/pkg |
| | | White | 142734 | 142735 | 142736 | 142737 | 142738 | |
| | | Green | 142834 | 142835 | 142836 | 142837 | 142838 | |
| | | Blue | 142934 | 142935 | 142936 | 142937 | 142938 | |
| | Weighted Type | White | 132742 | 132743 | 132744 | 132745 | 132746 | 10/pkg |
| | Magnetic Type | Red | - | 132760 | 132762 | 132764 | 132766 | 2/pkg |
| | Paired Standard & Weighted | Orange/White | 132749 | 132750 | 132751 | 132752 | 132753 | 10 pairs/pkg |

Dialysis Membrane Accessories



Spectra/Por® Dialysis Reservoirs

These polystyrene cylindrical reservoirs provide the optimum environment for laboratory dialysis. The included stir-bar creates a vortex that draws the dialysis tubing or Ready-to-Use Dialysis Device (RDD) into the center, maximizing dialysis efficiency.

Spectrum offers 2 volume sizes:

600 ml for RDD's up to 1 ml & tubing flat widths up to 16 mm
1,800 ml for any size RDD & tubing flat widths up to 80 mm

| Part No. | Description | Volume | Height | Diameter |
|----------|---------------------------|---------|---------|----------|
| 132002 | Dialysis Reservoir, small | 600 ml | 12.5 cm | 11.5 cm |
| 132005 | Dialysis Reservoir, large | 1800 ml | 30 cm | 11.5 cm |



Spectra/Por® Membrane Kit

The Spectra/Por Membrane Kit features Biotech Grade Regenerated Cellulose (RC) dialysis tubing in 3 different MWCO's and all the accessories required for a complete dialysis package. Instead of guessing the MWCO, the Membrane Kit is the perfect solution for dialysis applications where there are either a range of solute sizes or the solute size is unknown.

The Spectra/Por® Membrane Kit includes:

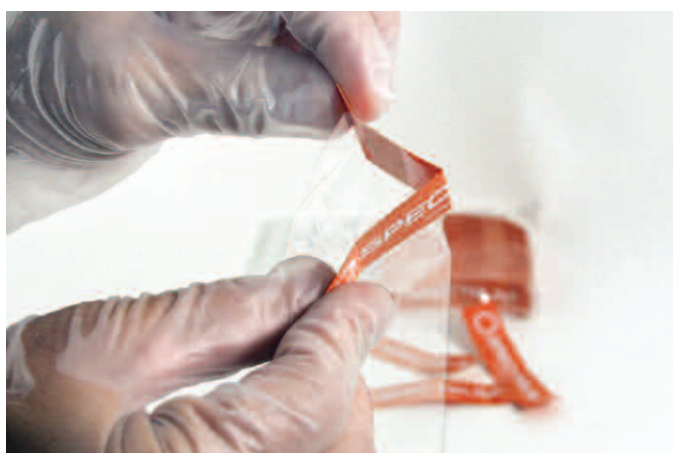
1.5 m of Biotech Grade RC Tubing (16 mm flat width) in 3 MWCO's:
0.5 m of 3.5 - 5 kD Biotech Tubing
0.5 m of 8 - 10 kD Biotech Tubing
0.5 m of 20 kD Biotech Tubing

7 Spectra/Por Closures:

3 Standard
3 Weighted
1 Magnetic-Weighted

1 Spectra/Por Dialysis Reservoir (1800 ml) with stir bar

| Part No. | Description |
|----------|--------------------------|
| 132000 | Spectra/Por Membrane Kit |



Spectra/Por® Openers

Spectra/Por Openers have an adhesive inside surface that grips the dry tubing and allows you to easily pull the membrane sides apart for sample loading. Peel off adhesive cover, fold over the dry tubing so both vertical edges of the adhesive align with the center of tubing, firmly press together and then slowly pull the folds apart.

| Part No. | Description | Qty |
|----------|---------------------|---------|
| 132730 | Spectra/Por Openers | 100/pkg |

Heavy Metal Cleaning Solution

While rinsing Spectra/Por dialysis membrane in water is typically sufficient to remove glycerine or preservative, Spectrum offers Heavy Metal Cleaning Solution for the removal of the trace levels of heavy metals introduced during the manufacturing process of Spectra/Por 1, 2, 3, 4, 5 & 6. (Note that Spectra/Por 7 is already pre-cleaned.) Heavy Metal Cleaning Solution is recommended for ultra-sensitive dialysis applications like binding studies and equilibrium dialysis or when low levels of these contaminants may interfere with subsequent analyses of the dialysis samples.

| Part No. | Description | Volume |
|----------|-------------------------------|---------------|
| 132908 | Heavy Metal Cleaning Solution | 8 oz (236 ml) |



Spectra/Gel® Absorbent

Ideal for concentrating protein and large molecular species in dialysis tubing and ready-to-use dialysis devices. Apply the dry polyacrylate-polyalcohol compound to the outside of any MWCO dialysis membrane to draw-out and bind water and efficiently reduce sample volume. Then simply wipe or rinse away the hydrated absorbent. Compound is too large to enter membrane.

Features & Benefits

Easy, safe & cost effective

Achieve 10-fold concentration in 1 hour with 100 g

| Part No. | Description | Qty |
|----------|-----------------------|-------|
| 292600 | Spectra/Gel Absorbent | 500 g |



Glass Dialysis Weights

Glass Dialysis Weights can be inserted into any membrane type of tubing to help maintain vertical orientation during dialysis. The quantity of weights required depends on the tubing length, flat-width and amount of head-space. Glass Dialysis Weights are inert and non-binding. Average diameter for glass weights is 15 mm.

| Part No. | Description | Qty |
|----------|------------------------|--------|
| 132740 | Glass Dialysis Weights | 50/pkg |



Flat-Sheet Dialysis Systems

Since many dialysis applications do not conform to using conventional dialysis tubing, Spectrum offers 3 dialysis systems that utilize flat-sheet membranes to increase the efficiency of dialysis for more demanding applications: MacroDialyzers, MicroDialyzers and Equilibrium Dialyzers.

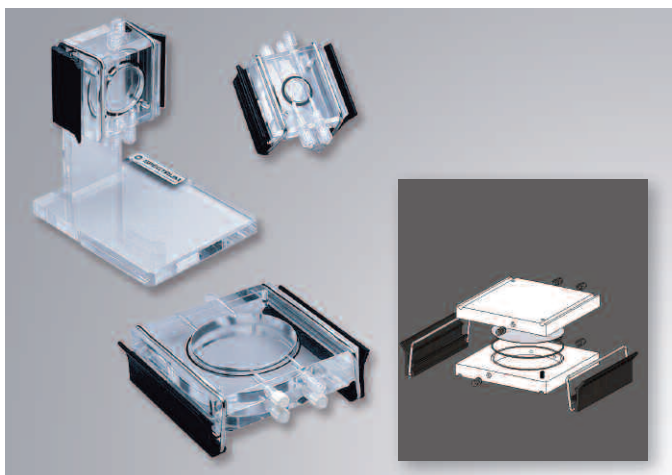
Applications:

- Binding Studies of proteins, drugs, dyes, metals & ligands
- Preparation of protein solutions for electrophoresis
- Buffer exchange for HPLC or chromatography fractions
- Adjusting electrolyte concentration & composition
- Desalting and/or pH change of macromolecular solutions
- Virus purification post sucrose gradient centrifugation

Spectra/Por® MacroDialyzer

Rapid Dialysis of 1 - 50 ml Samples

Designed for the continuous circulation of both the sample solution and the dialysate buffer, Spectra/Por MacroDialyzers increase the rate of dialysis by allowing significant flow agitation while maintaining a more effective concentration gradient. Available in 4 volume sizes (1 ml, 5 ml, 10 ml and 50 ml), MacroDialyzers consist of two half-cell chambers with a dialysis membrane disc clamped between to separate the sample solution from the dialysate. Each half-cell has 3 female Luer fitting ports, 1 for sample loading and 2 that allow for dynamic dialysis flow of at least 2 times the half-cell volume of sample and no limit on buffer volume. Both the sample and the buffer half-cell chambers can also be operated in static dialysis mode by capping off the flow ports and incorporating a magnetic stir bar.



Features & Benefits

Circulation of sample & dialysate provides rapid dialysis
Dialysis of up to 2x half-cell chamber volume and more
Static dialysis or continuous circulation operation
No limit on dialysate volume increases dialysis efficiency

Product Specifications

- 4 Half Cell Sizes: 1 ml, 5 ml, 10 ml, 50 ml
- Cell Dimensions: (refer to ordering information)
- Membranes: Standard RC Membrane Discs

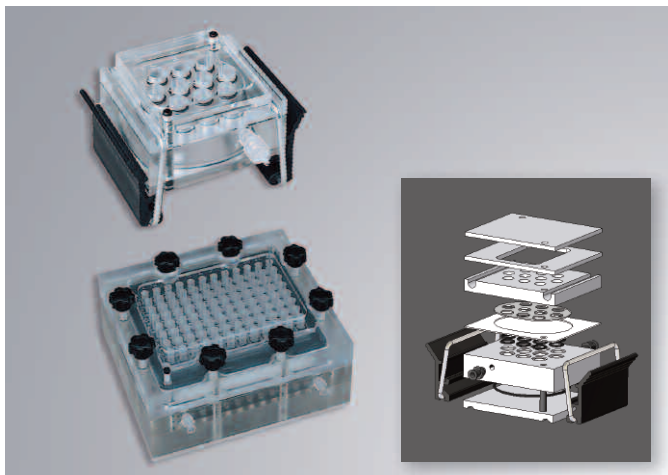
Components

- 2 Half-Cell Chambers: Polished acrylic
- Chamber O-ring: Viton®
- 2 Locking Clamps: Nylon & stainless steel
- 6 Fittings: Polypropylene, threaded-female Luer-Lok™
- 6 Fitting Caps: Polypropylene, male Luer-Lok™
- 6 Fitting O-rings: Buna

Spectra/Por® MicroDialyzer

Rapid Dialysis of Micro-Volume Samples

The Spectra/Por MicroDialyzer is designed for the simultaneous dialysis of multiple micro-volume samples separated from a common dialysate chamber by a single membrane to provide uniform conditions for all samples. The dialysate chamber can either accommodate a magnetic stir bar for agitation in static mode or be connected via female Luer fittings for circulation of a larger buffer volume to maintain a more effective concentration gradient in dynamic dialysis. The MicroDialyzer multi-layer design consists of a dialysate chamber, flat-sheet membrane & multi-well sample plate clamped together (bolted for 96-well) with sample reservoir and cover plates to protect the samples. Available in 2 sample well configurations, 10 - 500 µl wells or 96 - 150 µl wells.



Features & Benefits

Simultaneous dialysis of multiple micro-volume samples
Common dialysis membrane & dialysate for uniform conditions
Static dialysis or continuous buffer circulation
No limit on buffer volume increases gradient efficiency

Product Specifications

- 2 well configurations: 10-500 µl or 96-150 µl
- Dimensions: (refer to ordering information)
- Membranes: RC Membrane Flat-sheets

Components

- 5 Assembly Plates: Polished acrylic (bottom, chamber, sample well, reservoir & cover)
- 2 Guide Posts: Delrin
- Chamber O-ring: Viton® (10 well only)
- Chamber Gasket: Buna-N (96 well only)
- 2 Locking Clamps: Nylon & stainless steel (10 well only)
- 8 Locking Bolts: Nylon head, SS threaded shaft (96-well only)
- 2 Fittings: Polypropylene, threaded-female Luer-Lok™
- 2 Fitting caps: Polypropylene, male Luer-Lok™
- 2 Fitting O-rings: Buna

Ordering Information: Spectra/Por® MacroDialyzer & Spectra/Por® MicroDialyzer

| | | Part No. | Description | Half-Cell Volume Size | Cell Chamber Dia. x Depth (mm) | Membrane Disc Dia. |
|-----------------------------------|--------------------------|----------|-------------------------------|-----------------------|--|--------------------|
| Spectra/Por® MacroDialyzer | Systems | 132374 | Spectra/Por MacroDialyzer | 1.0 ml | 20 x 10 | 33 mm |
| | | 132376 | | 5.0 ml | 38 x 10 | 47 mm |
| | | 132377 | | 10 ml | 38 x 20 | 47 mm |
| | | 132379 | | 50 ml | 80 x 20 | 100 mm |
| | | Part No. | Description | Half-Cell Volume Size | Contents & Qty | |
| Spectra/Por® MacroDialyzer | Replacement Parts | 132338 | MacroDialyzer Replacement Kit | 1.0 ml | 6 luer sets, 3 3-way valves, 2 O-rings | |
| | | 132339 | | 5.0 ml & 10 ml | | |
| | | 132340 | | 50 ml | | |

| | | Part No. | Description | Well Volume | Dimensions L x W x H (cm) | Chamber Volume |
|-----------------------------------|--------------------------|----------|-----------------------------------|-------------|---------------------------|----------------|
| Spectra/Por® MicroDialyzer | Systems | 132321 | Spectra/Por 10-Well MicroDialyzer | 500 µl | 7.5 x 6.4 x 4.0 | 30 ml |
| | | 132326 | Spectra/Por 96-Well MicroDialyzer | 150 µl | 15.2 x 13.3 x 5.0 | 112 ml |
| | | Part No. | Description | Well Volume | Contents & Qty | |
| Spectra/Por® MicroDialyzer | Replacement Parts | 132328 | 10-Well Sample Plate | 500 µl | 1 plate | |
| | | 132330 | 96-Well Sample Plate | 150 µl | | |
| | | 132334 | Sample Well O-rings | 500 µl | 20 O-rings | |

Related Products:

Standard RC Membrane Discs & Flat-Sheets

Robust dialysis membrane with broad range compatibility

pg 18



Hollow Fiber Micro-Dialysis

Only Spectrum brings micro-dialysis to the laboratory by offering hollow fiber membranes for conducting micro-dialysis applications for critically small volumes. Made from Standard Regenerated Cellulose (RC) impregnated with glycerin, these hollow fiber membranes have a 0.2 mm ID. While tubular membranes have lower and less effective Q-factors (surface area to volume ratio), hollow fiber micro-dialysis membranes possess a Q-factor of 20 making them very efficient and ideal for working with samples less than 0.5 ml. Spectrum's 13 and 18 kD MWCO hollow fiber membranes are available as individual fibers for *in vivo* micro-dialysis or bundled for *in vitro* or rapid micro-dialysis.

Hollow Fiber Specifications

| | |
|------------------------|-------------------------|
| 2 MWCO's: | 13 and 18 kD |
| Fiber OD: | 216 µm |
| Fiber ID: | 200 µm |
| Working Volume: | 5 µl/fiber |
| Surface Area / Length: | 6.3 mm ² /cm |
| Volume / Length: | 0.31 µl/cm |
| Q-Factor: | 20 |

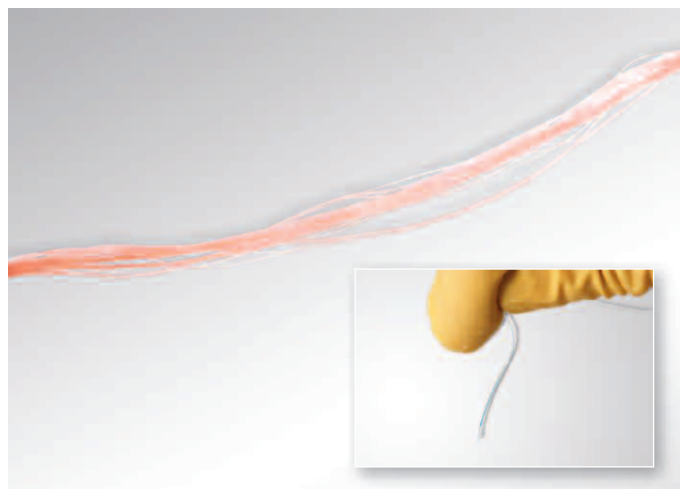
Spectra/Por® Micro-dialysis Hollow Fibers

in vivo Dialysis of Micro-liter Volumes

Implantation of individual micro-dialysis hollow fibers are ideal for the recovery or introduction of micro-quantity biologicals or pharmaceutical materials in a localized tissue environment. After injecting sample into the lumen with a syringe, simply dip the ends of the fiber in epoxy to seal, allow to dry and then implant. 20 individual RC hollow fibers cut in 15.24 cm (6 in.) lengths available in 13 kD and 18 kD MWCO's.

in vivo MicroDialysis Applications:

- Introduction of pharmaceuticals for drug discovery
- Localized tissue toxicity studies
- Radio-isotope metabolite studies
- Mutagenicity experimentation
- Inter-cerebral dialysis of transmitters (catecholamines and neuropeptides)
- Micro-dialysis of intracellular adenosine



Features & Benefits

Biologically inert regenerated cellulose membrane
0.2 mm lumen ID for efficient dialysis of microliter volumes
Sealable with epoxy for implantation

Ordering Information

| Part No. | Description | MWCO | Length | Qty |
|----------|--------------------------------------|-------|----------|--------|
| 132294 | <i>in vivo</i> Micro-dialysis Fibers | 13 kD | 15.24 cm | 20/pkg |
| 132295 | <i>in vivo</i> Micro-dialysis Fibers | 18 kD | 15.24 cm | 20/pkg |

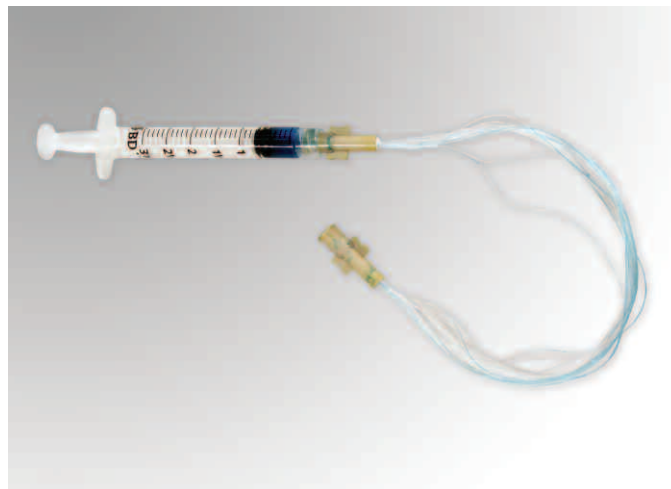
Spectra/Por® Micro-dialysis HF Bundles

Rapid or *in vitro* Dialysis of Small Volumes

Whether conducting a simple desalting or a complex *in vitro* study, hollow fiber micro-dialysis bundles are ideal for the rapid and efficient dialysis of small volume samples that are valuable and difficult to attain. Available in 13 kD and 18 kD, the hollow fiber bundles consist of 20 fibers with 0.2 mm ID potted together on both ends to a pair of female Luer-Lok™ ports. The hollow fiber bundle can be capped off with the sample encapsulated or connected for capillary circulation (3 ml/hr/fiber) and submerged in a standard buffer for lab dialysis or a simulated true-to-life environment for *in vitro* studies.

in vitro MicroDialysis Applications:

- Micro-dialysis of metabolites for pharmacology
- Comparison to *in vivo* micro-dialysis studies
- Dialysis studies in an artificial capillary
- Preparation of micro-samples for gel electrophoresis or *in vivo* implantation



Features & Benefits

Biologically inert regenerated cellulose membrane
0.2 mm lumen ID for efficient dialysis of microliter volumes
Female Luer-Lok™ connection ports for sample circulation

Ordering Information

| Part No. | Description | MWCO | No. of Fibers | Hold-up Vol. |
|----------|---------------------|-------|---------------|--------------|
| 132274 | Hollow Fiber Bundle | 13 kD | 20 | 140 µl |
| 132266 | Hollow Fiber Bundle | 18 kD | 20 | 140 µl |

Fundamentals of Dynamic Dialysis

While standard static dialysis is very popular in the laboratory, Dynamic Dialysis uses flow dynamics to increase both the rate and efficiency of dialysis. Circulating the sample and/or the dialysate creates the highest possible concentration gradient to significantly decrease dialysis time. Other benefits of the sweeping action is that it prevents membrane fouling and in some situations generates a pressure differential. This supplemental driving force increases the hypo-osmotic mass transfer rate across the semi-permeable membrane and allows for sample concentration during the dialysis process. Depending on the application requirements, there are two basic sample conditions that can be utilized for different reasons or purposes in Dynamic Dialysis:

1. Streaming Dialysate & Static Sample

- Increased rate of dialysis
- Small volume sample
- Delicate sample
- Large volume dialysate

2. Streaming Dialysate & Streaming Sample (Counter-Current Dialysis)

- Maximum rate of dialysis
- Large volume sample
- More durable sample
- Large volume dialysate

ADVANTAGES OF DYNAMIC DIALYSIS

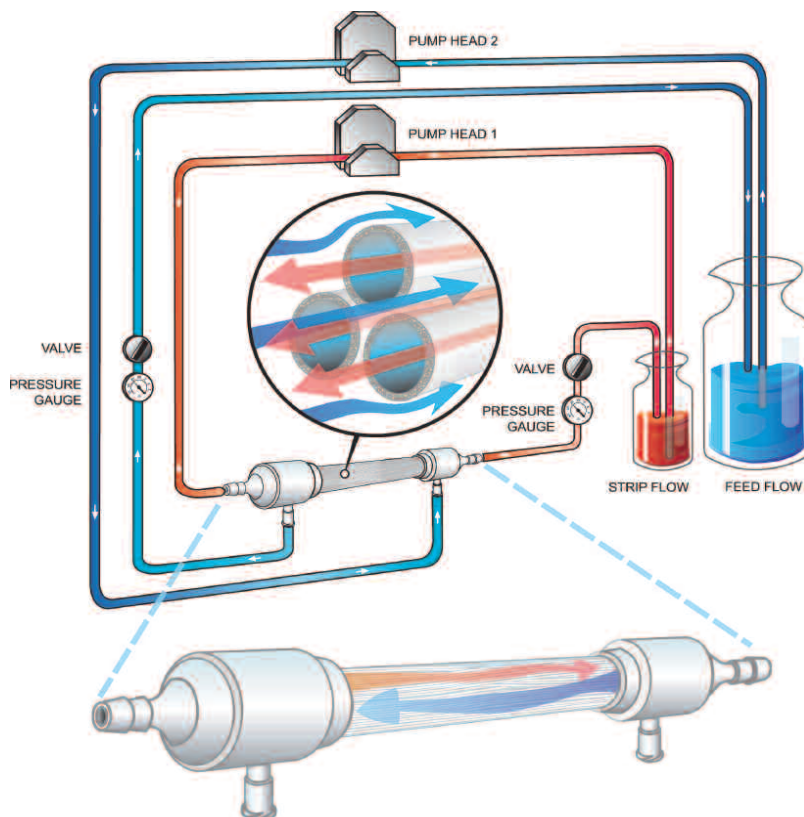
- Rapid and Efficient Dialysis
- Saves Valuable Time
- Dialysis of Larger Sample Volumes
- Flow Stream Prevents Membrane Fouling & Maintains Suspension of Solutes
- Eliminates Need for Dialysate Changes
- Open System: dialysate goes to drain
- Closed System: dialysate recirculated

Counter-Current Dialysis for Maximum Efficiency

Maximum “clearance” can be achieved by circulating the sample stream and the dialysate stream on different sides of the semi-permeable membrane in opposite (counter-current) directions to provide the largest concentration gradient. Clearance (C_d) is defined as the overall mass transfer rate of a solute per unit of time (ml/min) and is proportional to the feed flow rate of a solution (Q_f) and to the concentration difference across the membrane barrier ($C_{bi} - C_{bo}$) less the sweep solution concentration (C_{di}).

$$C_S = Q_f (C_{bi} - C_{bo}) / C_{bi} - C_{di}$$

(Note that C_{di} is essentially 0 in an open system with sweep flow to drain.)



Applications:

- Desalting or pH Change
- Plasma / Serum Concentration
- Protein Preparation
- Electrophoresis Gels
- Antibody Concentration
- Clarification and Purification
- Binding Studies
- Temperature Regulated Dialysis
- Open System & Batch Dialysis

3 MEMBRANE CONFIGURATIONS AVAILABLE FOR DYNAMIC DIALYSIS

Ready-to-Use Tubular Membrane Device:

Spectra/Por® Tube-A-Lyzerpg 12

Flat Sheet Membrane Dialysis Systems:

Spectra/Por® MacroDialyzer & MicroDialyzerpg 24

Hollow Fiber Membrane Device:

Spectra/Por® HF Dialysis Modulespg 30

Spectra/Por® HF Dialysis Modules

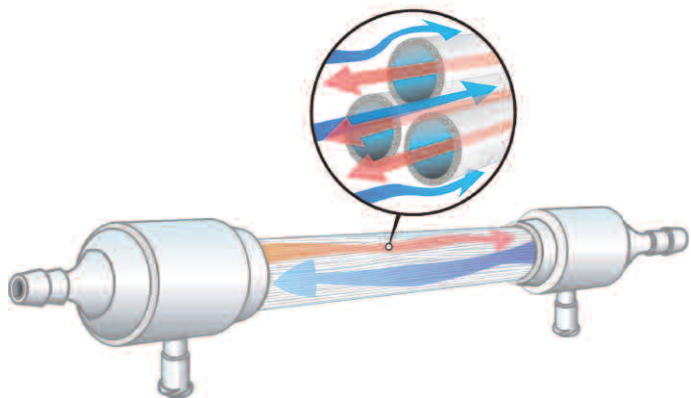
Highly Efficient Dialysis of Multi-liter Volumes!

Only Spectrum offers a highly efficient, counter-current dialysis device convenient and easy enough to operate in the laboratory. Based on the mechanics of a kidney, the Spectra/Por HF Dialysis Module is designed to provide more efficient performance than a conventional dialysis membrane used in a typical “static” dialysis set-up. The dialysis module consists of an open-ended bundle of hollow fiber membrane potted in a tubular housing to create two distinct flow chambers, lumen and extracapillary, each with inlet and outlet port access. The semi-permeable hollow fiber membrane that separates the two chambers selectively permits passage based on size and concentration gradient of solutes while restricting other solutes from passing between the 2 chambers. By operating the module in a counter-current flow mode, the solutes passing through the membrane are quickly swept away and diluted into a large volume of dialysate solution (“sweep”), maintaining the largest concentration gradient possible.

QUICK & EFFICIENT DIALYSIS!

- Complete Dialysis in Hours
- Dialysis of 100 ml to Multi-liter Samples
- Achieve Higher Purities
- Concentration of Delicate Macromolecules

Two Membrane Performance Types Available: HP & SP



Spectra/Por HF Dialysis Modules are available in two performance types: “High Performance” (HP) Membrane offers much higher flux rates to significantly reduce the total time for dialysis, while “Standard Performance” (SP) helps control the effects of osmotic pressure to reduce sample dilution and high turgor pressures in high salt conditions.

Ordering Information

| Part No. | Membrane Performance Type | MWCO | HF Dimensions ID x OD | HF Surface Area ID x OD |
|----------|---------------------------|-------|-----------------------|-----------------------------|
| 500-016 | HP Polysulfone | 10 kD | 200 x 280 µm | 6500 x 9100 cm ² |
| 500-017 | SP Polysulfone | 10 kD | 200 x 280 µm | 6500 x 9100 cm ² |
| 600-085 | HP Polysulfone | 30 kD | 200 x 320 µm | 4870 x 7800 cm ² |

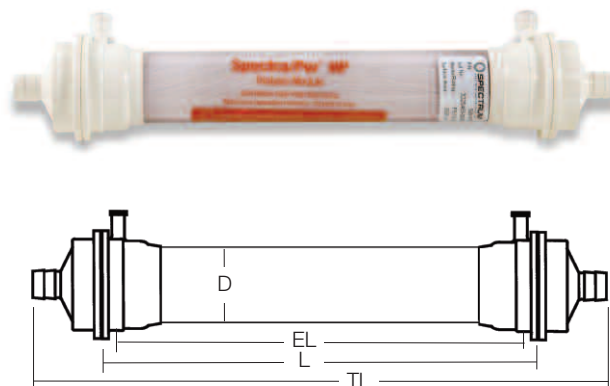
Major Design Features

- Hollow Fiber Membrane Geometry**
Drastically larger surface area increases the rate of dialysis
- Inlet / Outlet “Flow-stream” Connection Ports**
Dialysis of multi-liter volumes of sample & dialysate
Dialysate to drain connection for single pass sweep
Static encapsulation of delicate sample in extracapillary chamber
- Counter-current “Flow-stream” Design**
Prevents membrane polarization & fouling
Continuous mixing & suspension of sample & dialysate
Maintains the largest concentration gradient possible
Highest mass transfer rate significantly reduces dialysis time
- Two Membrane Performance Types**
HP for increased membrane flux
SP for better control of osmotic pressure effects

Product Specifications & Components

| | |
|---------------------|---------------------------------|
| Housing: | Polysulfone (PS) |
| Inlet/Outlet Ports: | ½” Hose Barb (HB) |
| Permeate Ports: | Female Luer-Lok™ (FLL) |
| Potting: | Polyurethane |
| 2 Membrane Types: | HP Polysulfone & SP Polysulfone |
| 2 MWCO's: | 10 kD & 30 kD |
| Sample Volume: | 100 ml – 10+ liters |
| Packaging: | Dry |

Product Dimensions: 1 Module Size



D = diameter, TL = total length, L = fiber length, EL = effective fiber length

| Flow-Path Size (FP) | D (mm) | TL (cm) | L (cm) | EL (cm) |
|---------------------|--------|---------|--------|---------|
| 1x FP | 31.2 | 27.6 | 22.3 | 20.8 |

Related Product:

KrosFlo® Research I Pump & Stand pg 67



FUNDAMENTALS OF LABORATORY FILTRATION32

MICROFILTRATION: STERILIZING GRADE DIRECT FLOW FILTRATION33

 MiniKap® Point-of-Use HF Filters33

 MediaKap® & MediaKap® Plus HF Filters34

 CultureGard® HF Perfusion Filters35

 DynaGard® Hydrophilic (Blue) Syringe Tip Filters36

 DynaGard® Hydrophobic (White) Syringe Tip Filters37

MACROFILTRATION38

 Spectra/Mesh® Woven Filters38

TANGENTIAL FLOW FILTRATION (TFF)40

 MicroKros® Hollow Fiber TFF Modules40



Fundamentals of Laboratory Filtration

Filtration is a technology that utilizes a porous barrier to separate suspended or dissolved materials in solution based on size or molecular weight, eliminating the need for centrifugation, solvent phase changes or methods that may damage product. Application of a positive or negative pressure differential across the selective permeable filter drives the separation in a sieve-like manner. Smaller constituents pass through the membrane while the larger solutes are retained.

Spectrum offers a complete range of filtration solutions. Products are categorized by macrofiltration, microfiltration and ultrafiltration applications and techniques; as well as, Direct Flow Filtration and Tangential Flow Filtration.

Macrofiltration

Filtration of particles 5 μm or larger

Being the simplest and least expensive, macrofiltration is conventionally defined as the filtration of particles that are 5 μm or larger.

Spectrum offers a large assortment of Spectra/Mesh® screens in several polymer types with mesh opening sizes ranging from 5 μm to 1 mm. Spectra/Mesh screens are offered in various sizes that can be used with common laboratory funnels and glassware.

See Spectra/Mesh Products Starting on **Pg 38**

Microfiltration

Filtration of particles 0.05 μm to 0.5 μm

Microfiltration is the separation of particles like cells, bacteria, macrophages and cellular debris from a solution. Membranes used in microfiltration applications have 0.05-0.5 μm pore sizes. Spectrum offers Direct Flow Filter (DFF) and Tangential Flow Filter (TFF) filter modules in various membrane chemistries for microfiltration applications.

See DFF Products Starting on **Pg 33**

See TFF Products Starting on **Pg 40**

Ultrafiltration

Filtration of particles 1 kD to 1000 kD

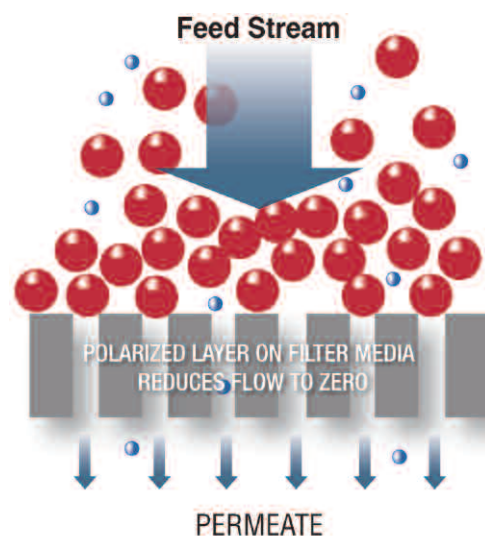
Ultrafiltration is used for the purification or concentration of small particles like proteins, viruses or nanoparticles. Ultrafiltration membranes are characterized based on a nominal molecular weight cut off (MWCO) that retains at 90%. Spectrum offers Tangential Flow Filtration filter modules in various membrane chemistries for ultrafiltration applications.

See Ultrafiltration Products Starting on **Pg 40**

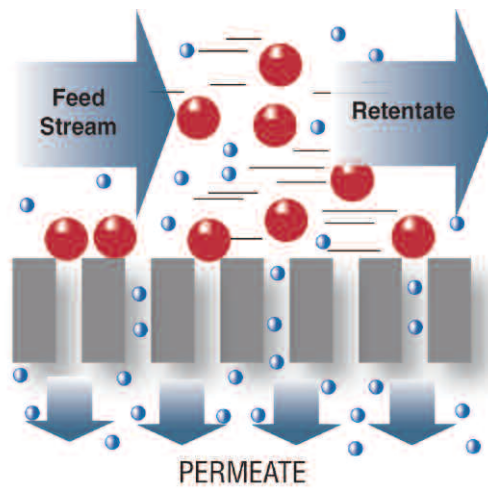
Direct Flow Filtration (DFF) vs. Tangential Flow Filtration (TFF)

Spectrum Labs provides two unique filtration methods, Direct Flow Filtration (DFF) and Tangential Flow Filtration (TFF) also known as cross flow filtration.

DFF is preferable for applications in which the filtrate is desired, such as bacterial and virus removal. TFF is preferable for applications in which fast permeate rates are desired and the retentate is desired, such as protein concentration and cell washing.



Direct Flow Filtration
(low permeate rate)



Tangential (Cross) Flow Filtration
(high permeate rate)

Microfiltration Sterilizing Grade Direct Flow Filtration

Spectrum's Hollow Fiber (HF) Microfilters are ideal for cold sterilization, sample clarification or point-of-use filtration. They are designed with a 0.2 µm mixed cellulose ester DynaFibre® membrane looped in a small filter device to maximize surface area (SA) and flow rate while minimizing membrane plugging and protein-binding (< 2 µg/cm²). This efficiency is only possible with hollow fiber filter devices because filtration occurs from outside the porous fibers into the multiple lumen that pass the filtrate to a common outlet port. Spectrum also incorporates a hydrophobic vent fiber in the microfilters (except DynaGards) that readily passes air bubbles to avoid "air lock", a problem that commonly blocks flow in other filter devices. Spectrum offers 5 Hollow Fiber Microfiltration devices: MiniKap, MediaKap, MediaKap Plus, CultureGard and DynaGard.



MiniKap® Point-of-Use Hollow Fiber Filters

Efficient Laboratory Liquid & Gas Filtration

Excellent for water & gas filtration systems, MiniKap Hollow Fiber filters have the filtration efficiency of the DynaFibre® and air vent fiber in a device with a 1/4" MNPT, Luer-Lok™ or hose barb inlet/outlet connections.

Features:

- 0.2 µm DynaFibre® Hollow Fiber Membrane
- High Surface Area in Compact Device
- Includes an Automatic Vent to Prevent Air Lock
- High Flux Rate
- USP XXI Class VI Tested and Approved
- Non-Pyrogenic with LAL Testing
- 100% Integrity Tested

Product Specifications

- Liquid Pore Rating: 0.2 µm
- Gas Pore Rating: 0.01 µm (for low humidity gas only)
- Membrane SA: 225 or 500 cm²
- Inlet/Outlet Conn.: 1/4" MNPT, variable hose barb, Luer-Lok™
- Packaging: 6/pkg, irradiated or non-sterile



Components

- HF Membrane: Mixed cellulose ester
- HF Vent: Polypropylene
- Potting Material: Polyurethane
- Housing: Polycarbonate
- End-caps: Clear & pigmented polysulfone

Ordering Information: MiniKap®

| | | Part No. | Description | Pore Rating | Surface Area | Suggested Volume | IN / OUT Connections | IRR | Qty/Pkg |
|-----------------------------------|-----------------|--------------|-------------|-------------|--------------|------------------|----------------------|-----|---------|
| Direct Flow Filtration | MiniKap® | MK2M-201-V6S | MiniKap | 0.2 µm | 225 cm² | 50 - 100 L | FLL / MLL | YES | 6 |
| | | MK2M-204-V6N | | | | | 1/4MNPT / 1/4MNPT | NO | |
| | | MK2M-210-V6S | | | | | 1/4MNPT / VarHB | YES | |
| | | MK2M-212-V6S | | | | | VarHB / VarHB | YES | |
| | | MK2M-512-V6S | | | | | VarHB / VarHB | YES | |

FLL = Female Luer-Lok™, MLL = Male Luer-Lok™

MediaKap® & MediaKap® Plus HF Filters

Sterile Filtration of Culture Medium with Serum

MediaKap Filters with 0.2 µm Dynafibre membrane are designed to efficiently sterilize and clarify culture media or buffer solutions. MediaKap Plus Filters have an advanced Dynafibre® membrane that increases filtration efficiency and dramatically reduces the time required to filter serum-enriched medium. Both filters can be operated by gravity or under pressure by a peristaltic pump or pressure vessel. Sterile MediaKap and MediaKap Plus Filters are available in 5 different sizes that can filter 2, 5, 10, 25 or 50 liter volumes in 15 – 20 minutes. Each is available with an optional filling bell that protects the sterile environment and reduces the risk of contamination.

Features

- 0.2 µm Dynafibre® Hollow Fiber Membrane
- Biocompatible
- High Surface Area in Compact Device
- Includes an Automatic Vent to Prevent Air Lock
- High Flux Rate
- USP XXI Class VI Tested and Approved
- Non-Pyrogenic with LAL Testing
- 100% Integrity Tested

Product Specifications

2 Filter Types: MediaKap & MediaKap Plus
 5 Volume Sizes: 2, 5, 10, 25 and 50 liter
 Pore Rating: 0.2 µm
 Membrane SA: refer to Ordering Information below
 Inlet/Outlet Conn.: refer to Ordering Information below
 Packaging: Irradiated

Components

HF Membrane: Mixed cellulose ester
 HF Vent: Polypropylene
 Potting Material: Polyurethane
 Housing: Polycarbonate
 End-caps: Clear & pigmented polysulfone
 Filling Bell: PVC (if present)



Performance Specifications

| Filter Size & Type | Water Flow @ 10 psig | DMEM w/o serum | DMEM w/ serum |
|--------------------|----------------------|----------------|---------------|
| MediaKap-2 | 400 ml/min | 0.2 – 2 L | - |
| MediaKap-5 | 750 ml/min | 2 – 5 L | - |
| MediaKap-10 | 1000 ml/min | 5 – 10 L | - |
| MediaKap-25 | 1400 ml/min | 10 – 25 L | - |
| MediaKap-50 | 2000 ml/min | 25 – 50 L | - |
| MediaKap-2 Plus | 400 ml/min | 5 L | 0.2 – 2 L |
| MediaKap-5 Plus | 750 ml/min | 10 L | 2 – 5 L |
| MediaKap-10 Plus | 1000 ml/min | 20 L | 5 – 10 L |
| MediaKap-25 Plus | 1400 ml/min | 50 L | 10 – 25 L |
| MediaKap-50 Plus | 2000 ml/min | 100 L | 25 – 50 L |

Ordering Information: MediaKap® & MediaKap® Plus

| | | Part No. | Description | Pore Rating | Surface Area | Suggested Volume | IN / OUT Connections | IRR | Filling Bell | Qty/Pkg | | | |
|------------------------|----------------|------------------|---------------------|-------------|---------------------|---------------------|----------------------|-----|----------------------|---------|---------------|-----|----|
| Direct Flow Filtration | MediaKap® | ME2M-02B-12S | MediaKap-2 | 0.2 µm | 35 cm ² | 0.2 - 2 L | FLL / Male Slip Luer | YES | YES | 12 | | | |
| | | ME2M-02O-18S | | | | | | | NO | 18 | | | |
| | | ME2M-05B-12S | MediaKap-5 | | 70 cm ² | 2 - 5 L | | | YES | 12 | | | |
| | | ME2M-05O-18S | | | | | | | NO | 18 | | | |
| | | ME2M-10B-12S | MediaKap-10 | | 100 cm ² | 5 - 10 L | | | 1/4HB / 1/4HB | YES | 12 | | |
| | | ME2M-10O-18S | | | | | | | NO | 18 | | | |
| | | ME2M-25B-06S | MediaKap-25 | | 185 cm ² | 10 - 25 L | | | VarHB / VarHB | YES | 6 | | |
| | ME2M-50B-03S | MediaKap-50 | 440 cm ² | | 25 - 50 L | YES | 3 | | | | | | |
| | MediaKap® Plus | MP2M-02B-12S | MediaKap-2 Plus | | 0.2 µm | 35 cm ² | 0.2 - 2 L* | | FLL / Male Slip Luer | YES | YES | 12 | |
| | | MP2M-02O-18S | | | | | | | | | NO | 18 | |
| | | MP2M-05B-12S | MediaKap-5 Plus | | | 70 cm ² | 2 - 5 L* | | | | YES | 12 | |
| | | MP2M-05O-18S | | | | | | | | | NO | 18 | |
| | | MP2M-10B-12S | MediaKap-10 Plus | | | 100 cm ² | 5 - 10 L* | | | | 1/4HB / 1/4HB | YES | 12 |
| | | MP2M-25B-06S | MediaKap-25 Plus | | | 185 cm ² | 10 - 25 L* | | | | VarHB / VarHB | YES | 6 |
| MP2M-50B-03S | | MediaKap-50 Plus | 440 cm ² | 25 - 50 L* | | 3 | | | | | | | |

*Volumes for serum-enriched media

FLL = Female Luer-Lok™

CultureGard® Perfusion Filters

Sterile Protection for Culture Feeding & Harvesting

CultureGard Hollow Fiber (HF) Filters are designed to reduce the risk of contamination to continuous perfusion cultures. The use of two filters in series allows the user to easily remove the first filter if it becomes plugged or contaminated while the second filter maintains the downstream sterile barrier for continued perfusion. Luer-Lok™ connectors provide a convenient retrofit to any hollow fiber or deep tank bioreactor system. All CultureGard units are manufactured with DynaFibre®, a 0.2 µm microporous, naturally hydrophilic filter membrane. The use of DynaFibre results in low extractable and excellent biocompatibility. The CultureGard also contains hydrophobic polypropylene vent fibers that prevents "air lock" by allowing air bubbles in stream to pass. Manufactured to the highest standards, CultureGard units are nonpyrogenic, non-cytotoxic, 100% integrity tested and pass USP XXI Class VI toxicity testing.

Features

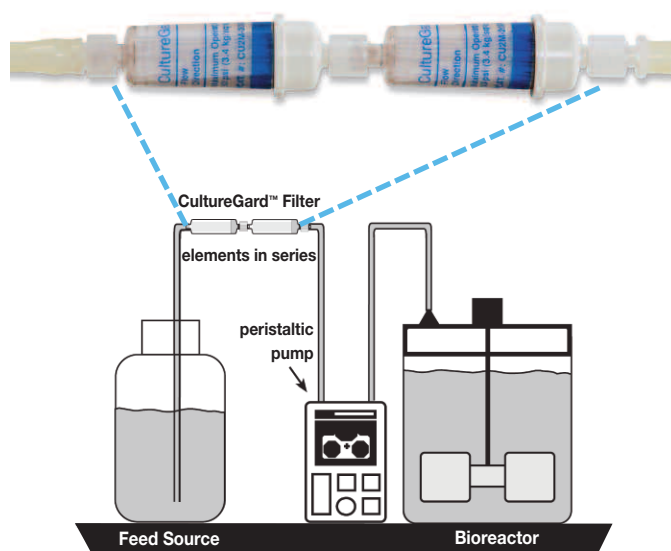
- 0.2 µm DynaFibre® Hollow Fiber Membrane
- Autoclavable
- Biocompatible
- High Surface Area in Compact Device
- Includes an Automatic Vent to Prevent Air Lock
- High Flux Rate
- USP XXI Class VI Tested and Approved
- Non-Pyrogenic with LAL Testing
- 100% Integrity Tested

Product Specifications

| | |
|---------------------|---------------------|
| Pore Rating: | 0.2 µm |
| Membrane SA: | 70 cm ² |
| Inlet/Outlet Conn.: | FLL / MLL |
| Packaging: | 12/pkg, non-sterile |

Components

| | |
|-------------------|-------------------------------|
| HF Membrane: | Mixed cellulose ester |
| HF Vent: | Polypropylene |
| Potting Material: | Polyurethane |
| Housing: | Clear polysulfone |
| End-caps: | Pigmented polysulfone |
| 1/8" HB Adaptors: | Polypropylene (4 MLL & 4 FLL) |



Ordering Information: CultureGard®

| | Part No. | Description | Pore Rating | Surface Area | Suggested Volume | IN / OUT Connections | IRR | Filling Bell | Qty/Pkg | |
|--------------------------|---------------------|--------------|-------------|--------------|--------------------|----------------------|-----------|--------------|---------|----|
| Perfusion Filters | CultureGard® | CU2M-205-12N | CultureGard | 0.2 µm | 70 cm ² | 2 - 50 L | FLL / MLL | NO | NO | 12 |

FLL = Female Luer-Lok™, MLL = Male Luer-Lok™

DynaGard® Hydrophilic Syringe Tip Filters

Mixed Cellulose (ME) Membrane for Aqueous Solutions

Uniquely designed with looped 0.2 µm DynaFibre® membrane, blue Dynagard filters provide a large surface area and high flux rate. The narrow housing design minimizes hold-up volume while enabling easy aspiration and dispensing in ampules, test tubes & other small vessels. Compared to flat sheet disk filters, DynaGards can filter highly viscous solutions more gently and efficiently.

Features

- 0.2 µm hydrophilic DynaFibre® Hollow Fiber Membrane
- Ultra Low Hold Up Volume
- Narrow Tip for Easy Access
- High Flux Rate
- USP XXI Class VI Tested and Approved
- Non-Pyrogenic with LAL Testing
- 100% Integrity Tested

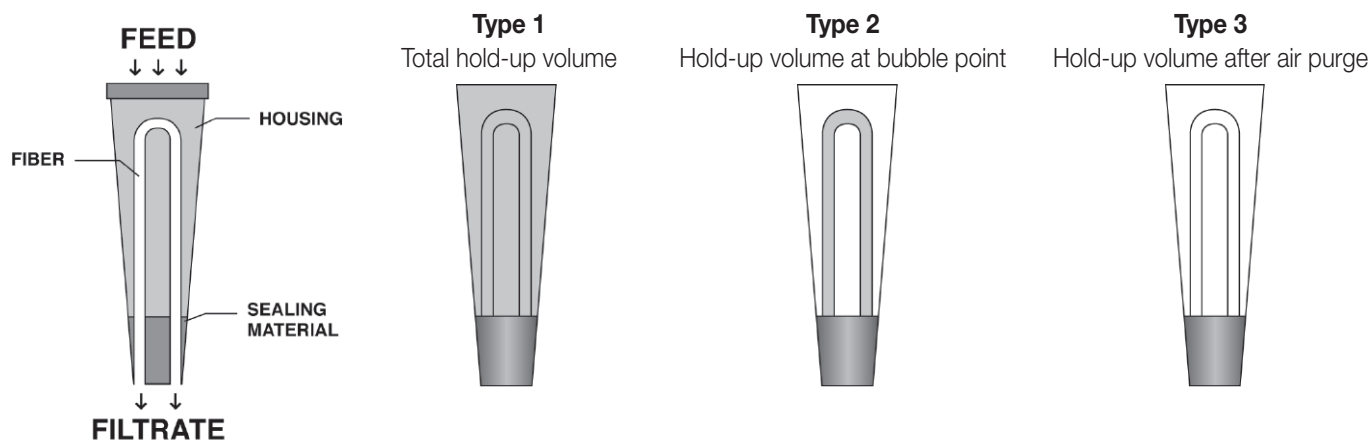
Product Specifications: 3 Sizes Available

| | | | |
|------------------------|---------------------|---------------------|---------------------|
| Membrane SA: | 2.5 cm ² | 3.4 cm ² | 5.5 cm ² |
| Filtration Volume: | < 5 ml | 1 – 10 ml | 5 – 20 ml |
| Type 1 Hold-up Volume: | < 260 µl | < 375 µl | < 485 µl |
| Type 2 Hold-up Volume: | < 45 µl | < 80 µl | < 120 µl |
| Type 3 Hold-up Volume: | < 18 µl | < 23 µl | < 35 µl |
| Pore Rating: | 0.2 µm | 0.2 µm | 0.2 µm |
| Housing Length: | 3.0 cm | 4.3 cm | 5.4 cm |
| Housing Diameter: | 0.6 cm | 0.6 cm | 0.6 cm |
| Top End: | FLL | FLL | FLL |
| Bottom End: | ML Slip | MLL | ML Slip |
| Available Irradiated: | YES | YES | YES |



Components

Housing: Polycarbonate (blue)
 HF Membrane: Hydrophilic Mixed Cellulose Ester (ME)
 Potting: Epoxy



Ordering Information: DynaGard® Blue - Mixed Cellulose Ester (ME) for Aqueous Solutions

| | Part No. | Description | Pore Rating | Surface Area | Suggested Volume | IN / OUT Connections | IRR | Filling Bell | Qty/Pkg |
|------------------------|--------------|---------------|-------------|---------------------|------------------|----------------------|-----|--------------|---------|
| Direct Flow Filtration | DG2M-110-50S | DynaGard - ME | 0.2 µm | 2.5 cm ² | < 5 ml | FLL / ML Slip | YES | N/A | 50 |
| | DG2M-110-200 | | | | | | NO | | 200 |
| | DG2M-23L-50S | | | 3.4 cm ² | 1 - 10 ml | FLL / ML | YES | | 50 |
| | DG2M-23L-100 | | | | | | NO | | 100 |
| | DG2M-330-50S | | | 5.5 cm ² | 5 - 20 ml | FLL / ML Slip | YES | | 50 |
| | DG2M-330-100 | | | | | | NO | | 100 |

FLL = Female Luer-Lok™, ML = Male Luer-Lok™

DynaGard® Hydrophobic Syringe Tip Filters

Polypropylene (PP) Membrane for Organic Solutions

Specifically designed for filtering HPLC, solvent and organic samples, the white hydrophobic DynaGard Filters feature a polypropylene hollow fiber membrane incorporated in a highly efficient, sleek housing. DynaGard filters provide minimum hold-up volume and maximum sample recovery.

Polypropylene DynaGards are available in 0.2 µm membrane pore rating and 2 filter surface areas. The narrow design provides easy aspiration and injection of fluids into and out of vials, ampules, test tubes and other vessels with small openings.

Features

- High Chemical Resistance
- 0.2 µm Hydrophobic Polypropylene Membrane
- Ultra Low Hold Up Volume
- Narrow Tip for Easy Access
- High Flux Rate
- 100% Integrity Tested

Product Specifications: 2 Sizes Available

| | | |
|--------------------------------------|---------------------|---------------------|
| Membrane SA: | 0.8 cm ² | 3.9 cm ² |
| Filtration Volume: | < 5 ml | 5 - 20 ml |
| Hold-up Volume (after air purge): | < 8 µl | < 30 µl |
| Pore Rating: | 0.2 µm | 0.2 µm |
| Housing Length: | 3.0 cm | 5.4 cm |
| Housing Diameter: | 0.6 cm | 0.6 cm |
| Top End: | FLL | FLL |
| Bottom End: | ML Slip | ML Slip |
| Available Irradiated: | NO | NO |

Components

| | |
|--------------|--------------------------------|
| Housing: | Polypropylene (white) |
| HF Membrane: | Hydrophobic Polypropylene (PP) |
| Potting: | Epoxy |



Ordering Information: DynaGard® White - Polypropylene (PP) for HPLC and Solvent Filtration Applications

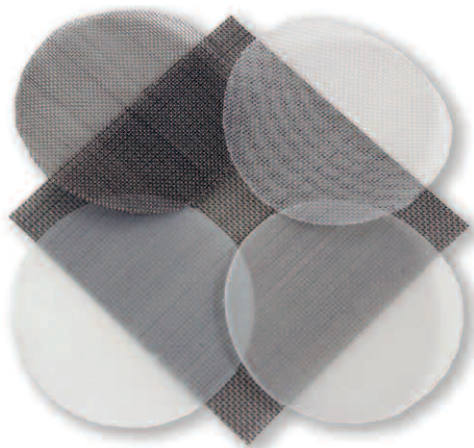
| | | Part No. | Description | Pore Rating | Surface Area | Suggested Volume | IN / OUT Connections | IRR | Qty/Pkg |
|------------------------|--------------|--------------|---------------|-------------|---------------------|------------------|----------------------|-----|---------|
| Direct Flow Filtration | DynaGard® PP | DG2P-110-200 | DynaGard - PP | 0.2 µm | 0.8 cm ² | < 5 ml | FLL / ML Slip | NO | 200 |
| | | DG2P-320-100 | | | 3.9 cm ² | 5 - 20 ml | | | 100 |

FLL = Female Luer-Lok™, ML = Male Luer-Lok™

Macrofiltration

Macrofiltration is the separation of suspended materials visible to the naked eye by means of a size selective barrier with an opening $\geq 5 \mu\text{m}$. There is a wide range of filter types available to meet the various macrofiltration applications with woven polymeric or stainless steel mesh being among the most popular.

Spectra/Mesh® Woven Filters



Spectra provides a broad range of monofilament woven mesh screens, characterized by precise mesh openings, percent open area and mesh thickness.

Mesh Opening is the distance between the strands and is expressed in microns.

Open Area represents the proportion of total area that is open space and is expressed as a percentage.

Mesh Thickness is the thickness of the woven screen (approximately two strands) and is expressed in microns.

U.S. Standard Sieve Size Reference Table

The U.S. Bureau of Standard and American Society of Testing Materials adopted the following "Sieve Size" specification as a means to standardize filtration mesh screens. The sieve number is an arbitrary designation and does not refer to a mesh count/inch.

| Mesh Size | Mesh Opening (μm) | Mesh Size | Mesh Opening (μm) |
|-----------|-------------------|-----------|-------------------|
| 5 | 4000 | 45 | 354 |
| 6 | 3360 | 50 | 297 |
| 7 | 2830 | 60 | 250 |
| 8 | 2380 | 70 | 210 |
| 10 | 2000 | 80 | 177 |
| 12 | 1680 | 100 | 149 |
| 14 | 1410 | 120 | 125 |
| 16 | 1190 | 140 | 105 |
| 18 | 1000 | 170 | 88 |
| 20 | 841 | 200 | 74 |
| 25 | 707 | 230 | 63 |
| 30 | 545 | 270 | 53 |
| 35 | 500 | 325 | 44 |
| 40 | 420 | 400 | 37 |

Spectra/Mesh® Application Selection Guide

There are five polymer types to select from depending on the macrofiltration application: Nylon (N), Polyester (P), Polypropylene (PP), PEEK (PK) and Stainless Steel (SS).

| Macrofiltration Application | Spectra/Mesh® Type | | | | |
|---|--------------------|---|----|----|----|
| | N | P | PP | PK | SS |
| ENVIRONMENTAL | | | | | |
| Hazardous Waste | ✓ | | | ✓ | |
| Drinking Water Purification | ✓ | ✓ | ✓ | ✓ | |
| Acid Rain Measurement | ✓ | | | ✓ | ✓ |
| Suspended Soils | ✓ | ✓ | ✓ | ✓ | ✓ |
| Rock Grading | | | ✓ | | ✓ |
| Air / Asbestos | ✓ | ✓ | | | ✓ |
| Coal Dust Analysis | ✓ | ✓ | | | ✓ |
| Oceanography | ✓ | | | | ✓ |
| Trace Element Analysis | ✓ | ✓ | ✓ | ✓ | |
| Fertilizers | ✓ | ✓ | ✓ | ✓ | ✓ |
| PHARMACEUTICAL | | | | | |
| Aqueous Serum Clarification | ✓ | ✓ | ✓ | | |
| Organic Serum Clarification | | ✓ | ✓ | ✓ | |
| Immunological & Diagnostic Assays | ✓ | ✓ | ✓ | | |
| Solution Manufacturing | ✓ | ✓ | ✓ | ✓ | ✓ |
| CHEMICAL | | | | | |
| Bacteria Removal | ✓ | ✓ | ✓ | ✓ | ✓ |
| Particulate Removal | ✓ | ✓ | ✓ | ✓ | ✓ |
| Solvent Filtration | ✓ | ✓ | ✓ | | |
| Gas Filtration | | | ✓ | ✓ | ✓ |
| Fuel Testing | | | ✓ | ✓ | ✓ |
| RESEARCH | | | | | |
| Cellular Separations | ✓ | ✓ | ✓ | ✓ | |
| Tissue Culture | ✓ | ✓ | ✓ | ✓ | |
| Colony Transfer | ✓ | ✓ | | | |
| Plaque Lifts | ✓ | ✓ | ✓ | ✓ | |
| Immunology | ✓ | ✓ | | | |
| HPLC Sample Preparation | ✓ | ✓ | | | |
| Cellular & Bacterial Analysis | | ✓ | | | |
| Protein & Virus Purification | ✓ | ✓ | | ✓ | |
| Trace Element Analysis | | ✓ | | ✓ | |
| RNA & DNA Hybridization | ✓ | | ✓ | | |
| Electron Microscopy | ✓ | ✓ | ✓ | ✓ | ✓ |
| INDUSTRY | | | | | |
| Photoresist / Semi-conductor | ✓ | | ✓ | | |
| Electronic Fluid Filtration | ✓ | | ✓ | ✓ | ✓ |
| Air Venting | | ✓ | ✓ | | ✓ |
| Tank Venting | | ✓ | ✓ | ✓ | ✓ |
| Steam Sterilization | | | | ✓ | ✓ |
| Business Machines & Appliances | ✓ | ✓ | | | ✓ |
| Automotive Equipment | ✓ | ✓ | | | ✓ |
| Pulp & Paper Production | ✓ | ✓ | ✓ | ✓ | ✓ |
| Food Processing | ✓ | ✓ | | | |
| Cosmetic Processing | ✓ | ✓ | ✓ | | |
| Wine & Beer Clarification/Sterilization | ✓ | | | | |

Product Specifications & Properties

| Material Type | Nylon | Polyester | Polypropylene | PEEK | Stainless Steel |
|----------------------|-------------|--------------------|----------------------------|------------------|----------------------------|
| Mesh Openings: | 5 - 1000 µm | 5 - 300 µm | 105 - 1000 µm | 35 - 800 µm | 30 - 914 µm |
| Water Affinity: | hydrophilic | mildly hydrophobic | hydrophobic | very hydrophobic | hydrophilic |
| Strength/Durability: | high | high | high (wet) | medium | very high |
| Adsorption: | high | low | low (inert) | very low (inert) | high |
| Best Resistance: | corrosives | alkalis / organics | acids / alkalis / organics | nearly all | corrosives |
| pH Resistance: | pH 3 - 10 | pH 3 - 13 | pH 2 - 14 | pH 1 - 14 | pH 4 - 12 |
| Thermal Stability: | up to 180°C | up to 140°C | up to 130°C | up to 250°C | up to 180°C |
| Sterilization: | irradiation | autoclavable | autoclavable | autoclavable | autoclavable / irradiation |

Ordering Information: Spectra/Mesh® Woven Filters

| | | Mesh | | | Disc Diameter | | | | | Sheet |
|------------------------|-----------|--------------|-----------------|----------------|---------------|-----------|-----------|----------|----------|------------|
| | | Opening (µm) | Open Area (%) | Thickness (µm) | 25 mm | 47 mm | 55 mm | 90 mm | 150 mm | 30 x 30 cm |
| Nylon | 5 | 2 | 100 | 148100 | 148130 | 145816 | 145925 | 145580 | 146519 | |
| | 8 | 1 | 75 | 148101 | 148131 | 145815 | 145924 | 145581 | 146518 | |
| | 10 | 2 | 45 | 148102 | 148132 | 145813 | 145922 | 145582 | 146514 | |
| | 20 | 14 | 55 | 148104 | 148134 | 145811 | 145920 | 145583 | 146510 | |
| | 25 | 16 | 55 | 148105 | 148135 | 145810 | 145919 | 145576 | 146508 | |
| | 30 | 21 | 64 | 148106 | 148136 | 145809 | 145918 | 145584 | 146506 | |
| | 41 | 33 | 60 | 148108 | 148138 | 145807 | 145916 | 145585 | 146502 | |
| | 46 | 37 | 65 | 148109 | 148139 | 145806 | 145915 | 145572 | 146500 | |
| | 53 | 36 | 60 | 148110 | 148140 | 145805 | 145914 | 145586 | 146498 | |
| | 60 | 45 | 55 | 148111 | 148141 | 145803 | 145912 | 145587 | 146494 | |
| | 70 | 36 | 70 | 148113 | 148143 | 145801 | 145910 | 145588 | 146490 | |
| | 100 | 47 | 78 | 148115 | 148145 | 145799 | 145908 | 145589 | 146488 | |
| | 200 | 55 | 125 | 148116 | 148146 | 145798 | 145907 | 145566 | 146487 | |
| | 300 | 50 | 200 | 148117 | 148147 | 145797 | 145906 | 145564 | 146486 | |
| | 600 | 51 | 445 | - | - | - | - | - | 146483 | |
| | 710 | 45 | 350 | - | - | - | - | - | 146482 | |
| 1000 | 58 | 1350 | - | - | - | - | - | 146479 | | |
| Polyester | 5 | 2 | 65 | 148240 | 148270 | 145828 | 145937 | 148315 | 146521 | |
| | 10 | 2 | 55 | 148242 | 148272 | 145831 | 145939 | 145591 | 146524 | |
| | 15 | 8 | 55 | 148243 | 148273 | 145832 | 145948 | 148316 | 146525 | |
| | 21 | 15 | 70 | 148244 | 148274 | 145833 | 145940 | 145592 | 146526 | |
| | 37 | 25 | 65 | 148247 | 148277 | 145836 | 145952 | 148318 | 146529 | |
| | 43 | 29 | 70 | 148248 | 148278 | 145837 | 145942 | 145594 | 146530 | |
| | 60 | 29 | 87 | 148250 | 148280 | 145840 | 145954 | 148319 | 146533 | |
| | 74 | 36 | 90 | 148252 | 148282 | 145842 | 145956 | 148320 | 146535 | |
| | 80 | 39 | 90 | 148253 | 148283 | 145843 | 145945 | 145597 | 146536 | |
| 300 | 44 | 258 | 148257 | 148287 | 148300 | 145962 | 148323 | 148390 | | |
| Polypropylene | 105 | 26 | 212 | 148496 | 148516 | 145775 | 145884 | 145608 | 146436 | |
| | 149 | 34 | 193 | 148498 | 148518 | 145773 | 145882 | 145609 | 146432 | |
| | 210 | 34 | 308 | 148500 | 148520 | 145771 | 145880 | 145610 | 146428 | |
| | 250 | 31 | 430 | 148501 | 148521 | 145770 | 145879 | 148538 | 146426 | |
| | 297 | 36 | 420 | 148502 | 148522 | 145769 | 145878 | 145611 | 146424 | |
| | 350 | 34 | 525 | 148503 | 148523 | 145767 | 145876 | 145612 | 146422 | |
| | 500 | 39 | 610 | 148505 | 148525 | 145765 | 145874 | 145613 | 146418 | |
| | 840 | 46 | 725 | 148508 | 148528 | 145762 | 145871 | 148541 | 146412 | |
| 1000 | 45 | 1020 | 148509 | 148529 | 145761 | 145870 | 145615 | 146410 | | |
| PEEK | 35 | 22 | 71 | 148800 | 148801 | 148802 | 148803 | 148804 | 146802 | |
| | 115 x 145 | 56 | 50 | 148840 | 148841 | 148842 | 148843 | 148844 | 146804 | |
| | 220 | 56 | 128 | 148860 | 148861 | 148862 | 148863 | 148864 | 146806 | |
| | 300 | 36 | 370 | 148880 | 148881 | 148882 | 148883 | 148884 | 146808 | |
| 800 | 45 | 750 | 148940 | 148941 | 148942 | 148943 | 148944 | 146814 | | |
| | | | Qty/Pkg: | 10 | 10 | 10 | 10 | 5 | 3 | |
| Stainless Steel | 30 | 30 | 50 | - | - | 145827 | 145936 | - | 148985 | |
| | 51 | 42 | 56 | - | - | 145826 | 145935 | - | 148986 | |
| | 104 | 45.2 | 102 | - | - | 145825 | 145934 | - | 146439 | |
| | 213 | 49.8 | 178 | - | - | 145823 | 145932 | - | 146438 | |
| | 500 | 57 | 330 | - | - | 145817 | 145926 | - | 148987 | |
| 914 | 52 | 712 | - | - | 148931 | 148934 | - | 148989 | | |
| | | | Qty/Pkg: | | | 5 | 5 | | 2 | |

Tangential Flow Filtration (TFF)

Two of the most common methods for concentrating, purifying and clarifying biological materials or other particulate solutions are filtration and centrifugation. Centrifugation requires several hours for serial spinning, decanting and pellet re-suspension that typically results in damaged product, poor yields and only moderate purity. The most common type of filtration used in the laboratory setting is direct flow filtration that can also take many hours due to membrane plugging. Tangential flow filtration is the answer for faster separation. In less than an hour, hollow fiber TFF filter modules can concentrate, purify and/or clarify while providing higher purities and recoveries.

MicroKros® Hollow Fiber Filter Modules for Micro and Ultra Tangential Flow Filtration

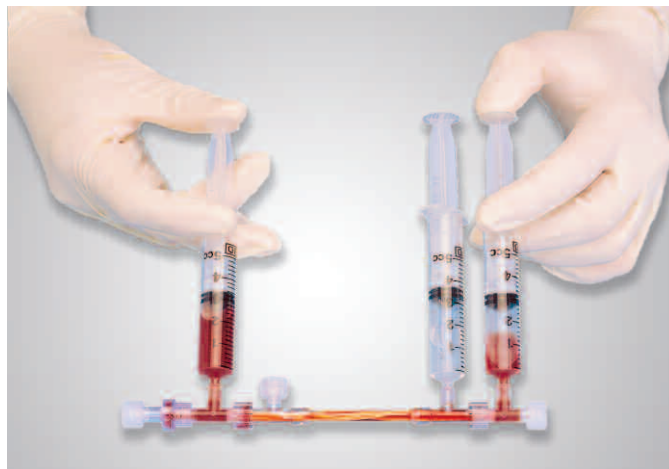
Designed for gentle tangential flow filtration of small volumes ranging from 1 – 100 ml, Single-Use MicroKros Hollow Fiber Filter Modules are the first efficient and practical tangential flow filtration devices for R&D scale volumes. While a peristaltic pump typically is used with MicroKros filters, these devices also offer the unique advantage of manual operation for quick and convenient separations of small volumes. Concentration utilizes two retentate syringes connected to the luer inlet/outlet ports to pass the sample back and forth through the membrane lumen while a third syringe collects the filtrate through one of the side-ports. A fourth syringe can be used to either supply more sample for concentration or buffer for diafiltration.

QUICK & EFFICIENT FILTRATION

- 5 - 30 minute Separations
- 2 modes: Pump Operation & Manual Operation
- Gentle Processing
- 90 – 99% Product Purity
- 85 – 95% Product Recovery

LABORATORY APPLICATIONS

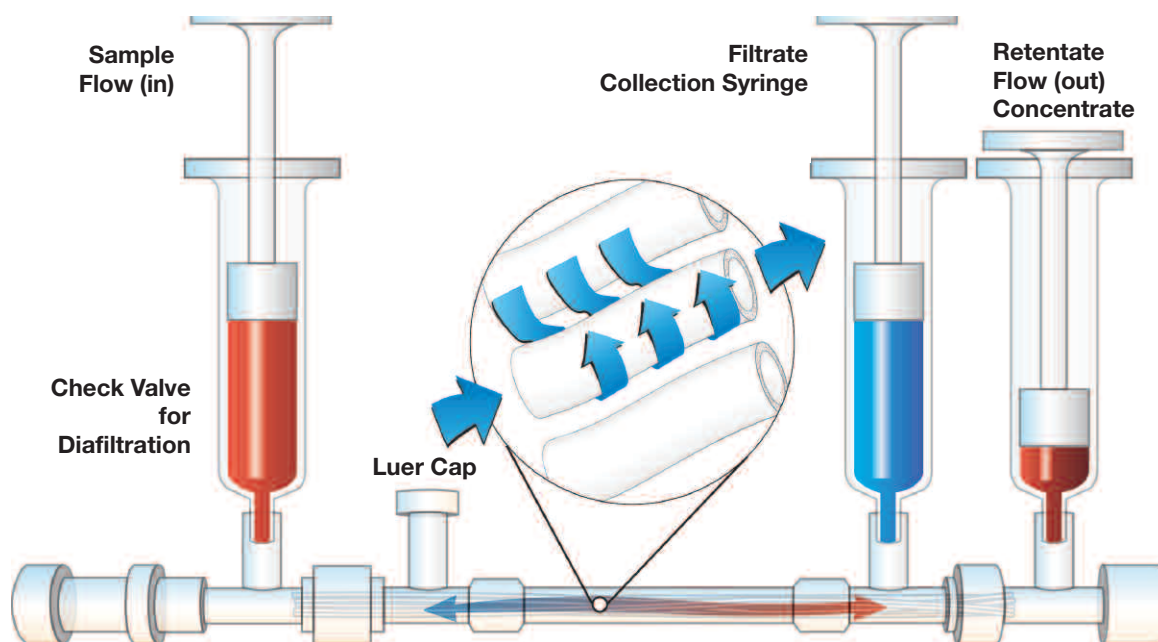
- Cell Concentration
- Cell Diafiltration
- Virus Purification
- Virus Diafiltration
- Virus Clarification
- Lysate Clarification
- Bacteria Concentration
- Bacteria Diafiltration
- Protein Purification
- Protein Concentration
- Protein Diafiltration
- Micro-particle Diafiltration
- Nanoparticle Diafiltration
- Nucleic Acid Concentration



Concentration



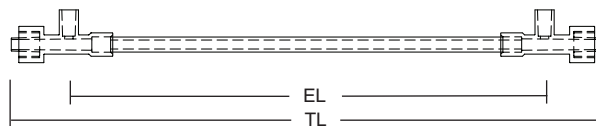
Diafiltration



Product Specifications & Components

- Housing: Polysulfone
- Inlet/Outlet Ports: Male Luer-Lok™ (MLL)
- Permeate Ports: Female Luer-Lok™ (FLL)
- Potting: Epoxy
- Process Volume: 1 – 100 ml
- Surface Area (SA): 13 – 28 cm²
- Effective Length: 20 cm
- Packaging: Dry, pre-wetted or sterile

Product Dimensions



| FL* | Surface Area (cm ²) | D (mm) | TL (cm) | EL (cm) |
|--------|---------------------------------|--------|---------|---------|
| 1 x FL | 13 – 28 | 3.5 | 23 | 20 |

D = diameter, TL= total filter module length, EL = effective fiber length

*Used for HF module scale-up, FL is relative EL with 1FL MicroKros being the standard.

See pages 42 and 43 for complete Ordering Information

Related Product:

KrosFlo® Research I Pump & Stand pg 67



Ordering Information: MicroKros® Accessories Kit

| | Part Number | Description | Components | Qty/Kit |
|-----------------|--------------|---------------------------|-------------------------------------|---------|
| Accessories Kit | ACPX-400-01N | MicroKros Accessories Kit | 5 ml syringes | 10 |
| | | | Male Luer Cap | 15 |
| | | | Male Luer x 3/16" Hose Barb Fitting | 10 |
| | | | Check Valve | 5 |
| | | | Female Luer T connector | 10 |

Ordering Information: MicroKros® Hollow Fiber Filter Modules

| | Membrane | | Hollow Fiber | | Packaging | | Part No. |
|---------------------------------|-------------|--------------|---------------|--------------------|-----------|---------------|---------------|
| | Pore Rating | Type | ID | Surface Area | Qty | Condition | |
| MicroKros® Hollow Fiber Modules | 3 kD | NEW! mPES | 0.5 mm | 20 cm ² | 1 | Dry | C02-E003-05-N |
| | | | | | 1 | Sterile | C02-E003-05-S |
| | 10 kD | NEW! mPES | 0.5 mm | 20 cm ² | 1 | Dry | C02-E010-05-N |
| | | | | | 1 | Sterile | C02-E010-05-S |
| | | PS | 0.5 mm | 28 cm ² | 1 | Dry | C02-S010-05-N |
| | | | | | 1 | Wet | C02-S010-05-P |
| | 1 | Sterile | C02-S010-05-S | | | | |
| | 30 kD | NEW! mPES | 0.5 mm | 20 cm ² | 1 | Dry | C02-E030-05-N |
| | | | | | 1 | Sterile | C02-E030-05-S |
| | 50 kD | NEW! mPES | 0.5 mm | 20 cm ² | 1 | Dry | C02-E050-05-N |
| | | | | | 1 | Sterile | C02-E050-05-S |
| | | PS | 0.5 mm | 28 cm ² | 1 | Dry | C02-S050-05-N |
| 1 | | | | | Wet | C02-S050-05-P | |
| 1 | | | | | Sterile | C02-S050-05-S | |

For the availability of additional pore sizes, please contact Spectrum Labs Customer Service (see page 2 for all contact info).

Ordering Information: MicroKros® Hollow Fiber Filter Modules

| | Membrane | | Hollow Fiber | | Packaging | | Part No. |
|---------------------------------|-------------|--------------|--------------------|--------------------|-----------|---------------|---------------|
| | Pore Rating | Type | ID | Surface Area | Qty | Condition | |
| MicroKros® Hollow Fiber Modules | 70 kD | NEW! mPES | 0.5 mm | 20 cm ² | 1 | Dry | C02-E070-05-N |
| | | | | | 1 | Sterile | C02-E070-05-S |
| | 100 kD | NEW! mPES | 0.5 mm | 20 cm ² | 1 | Dry | C02-E100-05-N |
| | | | | | 1 | Sterile | C02-E100-05-S |
| | 500 kD | NEW! mPES | 0.5 mm | 20 cm ² | 1 | Dry | C02-E500-05-N |
| | | | | | 1 | Sterile | C02-E500-05-S |
| | | PS | 0.5 mm | 28 cm ² | 1 | Dry | C02-S500-05-N |
| | | | | | 1 | Wet | C02-S500-05-P |
| | | | | | 1 | Sterile | C02-S500-05-S |
| | | | | | 1 | Sterile | C02-S500-05-S |
| | 0.05 µm | PS | 0.5 mm | 28 cm ² | 1 | Dry | C02-S05U-05-N |
| | | | | | 1 | Wet | C02-S05U-05-P |
| | | | | | 1 | Sterile | C02-S05U-05-S |
| | 0.1 µm | ME | 0.63 mm | 20 cm ² | 1 | Dry | C02-M10U-06-N |
| | | | | | 1 | Sterile | C02-M10U-06-S |
| | 0.2 µm | ME | 0.63 mm | 20 cm ² | 1 | Dry | C02-M20U-06-N |
| | | | | | 1 | Sterile | C02-M20U-06-S |
| | | | 1.0 mm | 13 cm ² | 1 | Dry | C02-M20U-10-N |
| | | | | | 1 | Sterile | C02-M20U-10-S |
| | | PES | 0.5 mm | 28 cm ² | 1 | Dry | C02-P20U-05-N |
| 1 | | | | | Sterile | C02-P20U-05-S | |
| 1.0 mm | | | 13 cm ² | 1 | Dry | C02-P20U-10-N | |
| | | | | 1 | Sterile | C02-P20U-10-S | |
| 0.5 µm | PES | 0.5 mm | 28 cm ² | 1 | Dry | C02-P50U-05-N | |
| | | | | 1 | Sterile | C02-P50U-05-S | |
| | | 1.0 mm | 13 cm ² | 1 | Dry | C02-P50U-10-N | |
| | | | | 1 | Sterile | C02-P50U-10-S | |

For the availability of additional pore sizes, please contact Spectrum Labs Customer Service (see page 2 for all contact info).

KrosFlo® Research IIi TFF System

A fully *integrated* Tangential Flow Filtration System
for processing R&D volumes



NEW! The completely redesigned KrosFlo Research IIi Tangential Flow Filtration (TFF) System is the ideal system for R&D scale microfiltration or ultrafiltration. The system consists of the KrosFlo Research IIi Pump and Pump Head, now with an integrated KrosFlo Digital Pressure Monitor, KF Comm Data Collection Software, Disposable flow-path kit and Fittings kit, all of which have features that ensure efficient and reproducible Tangential Flow Filtration processing.

- Fully *integrated*
- Compact and Easy-to-Use
- Faster Processing Time
- Controls and Records Process Parameters
- Controls Transmembrane Pressure
- Maximum Product Recovery
- Makes Scale-up from R&D to Production Easy

| | |
|---|-----|
| MEDIA FILTRATION | .52 |
| MediaKap® & MediaKap® Plus Hollow Fiber Filters | .52 |
| CultureGard® Hollow Fiber Perfusion Filters | .53 |
| DynaGard® Hydrophilic (Blue) Syringe Tip Filters | .54 |
| DynaGard® Hydrophobic (White) Syringe Tip Filters | .55 |
| FUNDAMENTALS OF ENCAPSULATION / IMPLANTATION | .56 |
| KROSFLO® Implant Hollow Fiber Membrane | .57 |
| CELL CULTURE ACCESSORIES AND LABORATORY CONSUMABLES | .58 |
| TransferTube® Sampling Pipette | .58 |
| Clear Bath® Water Treatment Solution | .59 |
| Bessman Tissue Pulverizer | .59 |



Media Filtration

Spectrum's Hollow Fiber (HF) microfilters are ideal for cold sterilization, sample clarification and media filtration. They are designed with a 0.2 µm mixed cellulose ester DynaFibre® membrane looped in a small filter device to maximize surface area (SA) and flow rate while minimizing membrane plugging and protein-binding (< 2 µg/cm²). This efficiency is only possible with hollow fiber filter devices because filtration occurs from outside the porous fibers into the multiple lumen that pass the filtrate to a common outlet port. Spectrum also incorporates a hydrophobic vent fiber in the microfilters (except DynaGards) that readily passes air bubbles to avoid "air lock", a problem that commonly blocks flow in other filter devices. Spectrum offers 4 Hollow Fiber media filtration devices: MediaKap, MediaKap Plus, CultureGard and DynaGard.

MediaKap® & MediaKap® Plus HF Filters

Sterile Filtration of Culture Medium with Serum

MediaKap Filters with 0.2 µm Dynafibre membrane are designed to efficiently sterilize and clarify culture media or buffer solutions. MediaKap Plus Filters have an advanced DynaFibre® membrane that increases filtration efficiency and dramatically reduces the time required to filter serum-enriched medium. Both filters can be operated by gravity or under pressure by a peristaltic pump or pressure vessel. Sterile MediaKap and MediaKap Plus Filters are available in 5 different sizes that can filter 2, 5, 10, 25 or 50 liter volumes in 15 – 20 minutes. Each is available with an optional filling bell that protects the sterile environment and reduces the risk of contamination.



Product Specifications

- 2 Filter Types: MediaKap & MediaKap Plus
- 5 Volume Sizes: 2, 5, 10, 25 and 50 liter
- Pore Rating: 0.2 µm
- Membrane SA: refer to Ordering Information below
- Inlet/Outlet Conn.: refer to Ordering Information below
- Packaging: Irradiated

Components

- HF Membrane: Mixed cellulose ester
- HF Vent: Polypropylene
- Potting Material: Polyurethane
- Housing: Polycarbonate
- End-caps: Clear & pigmented polysulfone
- Filling Bell: PVC (if present)

Performance Specifications

| Filter Size & Type | Water Flow @ 10 psig | DMEM w/o serum | DMEM w/ serum |
|--------------------|----------------------|----------------|---------------|
| MediaKap-2 | 400 ml/min | 0.2 – 2 L | - |
| MediaKap-5 | 750 ml/min | 2 – 5 L | - |
| MediaKap-10 | 1000 ml/min | 5 – 10 L | - |
| MediaKap-25 | 1400 ml/min | 10 – 25 L | - |
| MediaKap-50 | 2000 ml/min | 25 – 50 L | - |
| MediaKap-2 Plus | 400 ml/min | 5 L | 0.2 – 2 L |
| MediaKap-5 Plus | 750 ml/min | 10 L | 2 – 5 L |
| MediaKap-10 Plus | 1000 ml/min | 20 L | 5 – 10 L |
| MediaKap-25 Plus | 1400 ml/min | 50 L | 10 – 25 L |
| MediaKap-50 Plus | 2000 ml/min | 100 L | 25 – 50 |

Ordering Information: MediaKap® & MediaKap® Plus

| | Part No. | Description | Pore Rating | Surface Area | Suggested Volume | IN / OUT Connections | IRR | Filling Bell | Qty/Pkg | |
|------------------|------------------|---------------------|---------------------|---------------------|--------------------|----------------------|----------------------|--------------|---------------------|------------|
| Media Filtration | MediaKap® | ME2M-02B-12S | 0.2 µm | 35 cm ² | 0.2 - 2 L | FLL / Male Slip Luer | YES | YES | 12 | |
| | | ME2M-020-18S | | | | | | NO | 18 | |
| | | ME2M-05B-12S | | 70 cm ² | 2 - 5 L | | | YES | 12 | |
| | | ME2M-050-18S | | | | | | NO | 18 | |
| | | ME2M-10B-12S | | 100 cm ² | 5 - 10 L | | | YES | 12 | |
| | | ME2M-100-18S | | | | | | NO | 18 | |
| | ME2M-25B-06S | 185 cm ² | 10 - 25 L | VarHB / VarHB | YES | 6 | | | | |
| | ME2M-50B-03S | 440 cm ² | 25 - 50 L | | YES | 3 | | | | |
| | MediaKap® Plus | MP2M-02B-12S | MediaKap-2 Plus | 0.2 µm | 35 cm ² | 0.2 - 2 L* | FLL / Male Slip Luer | YES | YES | 12 |
| | | MP2M-020-18S | | | | | | | NO | 18 |
| | | MP2M-05B-12S | MediaKap-5 Plus | | 70 cm ² | 2 - 5 L* | | | YES | 12 |
| | | MP2M-050-18S | | | | | | | NO | 18 |
| MP2M-10B-12S | | MediaKap-10 Plus | 100 cm ² | | 5 - 10 L* | YES | | | 12 | |
| MP2M-25B-06S | | | | | | MediaKap-25 Plus | | | 185 cm ² | 10 - 25 L* |
| MP2M-50B-03S | MediaKap-50 Plus | 440 cm ² | 25 - 50 L* | VarHB / VarHB | YES | | 3 | | | |

FLL = Female Luer-Lok™ *Volumes for serum-enriched media

CultureGard® Perfusion Filters

Sterile Protection for Culture Feeding & Harvesting

CultureGard Hollow Fiber (HF) Filters are designed to reduce the risk of contamination to continuous perfusion cultures. The use of two filters in series allows the user to easily remove the first filter if it becomes plugged or contaminated while the second filter maintains the downstream sterile barrier for continued perfusion. Luer-Lok™ connectors provide a convenient retrofit to any hollow fiber or deep tank bioreactor system. All CultureGard units are manufactured with DynaFibre®, a 0.2 µm microporous hydrophilic filter membrane. DynaFibre hollow fiber membrane has low extractables and excellent biocompatibility. The CultureGard also contains hydrophobic polypropylene vent fibers that prevents "air lock" by allowing air bubbles in stream to pass. Manufactured to the highest standards, CultureGard units are nonpyrogenic, non-cytotoxic, 100% integrity tested and pass USP XXI Class VI toxicity testing.

Features

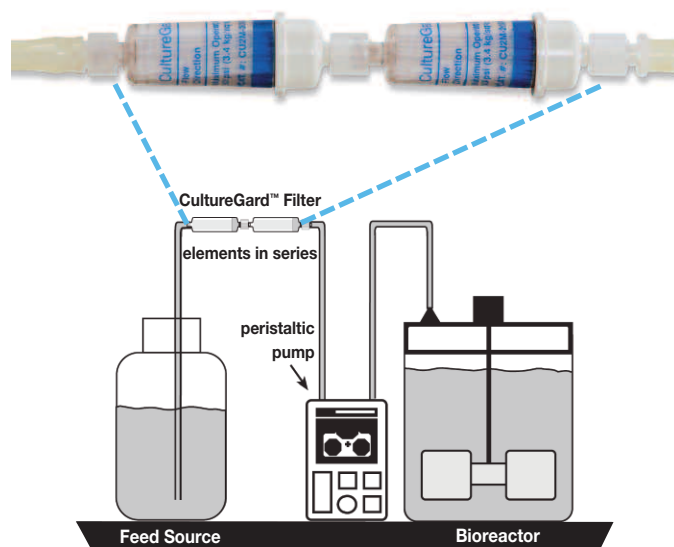
- 0.2 µm DynaFibre® Hollow Fiber Membrane
- Autoclavable
- Biocompatible
- High Surface Area in Compact Device
- Includes an Automatic Vent to Prevent Air Lock
- High Flux Rate
- USP XXI Class VI Tested and Approved
- Non-Pyrogenic with LAL Testing
- 100% Integrity Tested

Product Specifications

| | |
|---------------------|---------------------|
| Pore Rating: | 0.2 µm |
| Membrane SA: | 70 cm ² |
| Inlet/Outlet Conn.: | FLL / MLL |
| Packaging: | 12/pkg, non-sterile |

Components

| | |
|-------------------|-------------------------------|
| HF Membrane: | Mixed cellulose ester |
| HF Vent: | Polypropylene |
| Potting Material: | Polyurethane |
| Housing: | Clear polysulfone |
| End-caps: | Pigmented polysulfone |
| ½" HB Adaptors: | Polypropylene (4 MLL & 4 FLL) |



Ordering Information: CultureGard®

| | | Part No. | Description | Pore Rating | Surface Area | Suggested Volume | IN / OUT Connections | IRR | Filling Bell | Qty/Pkg |
|------------------|--------------|--------------|-------------|-------------|--------------------|------------------|----------------------|-----|--------------|---------|
| Media Filtration | CultureGard® | CU2M-205-12N | CultureGard | 0.2 µm | 70 cm ² | 2 - 50 L | FLL / MLL | NO | NO | 12 |

FLL = Female Luer-Lok™, MLL = Male Luer-Lok™

DynaGard® Hydrophilic Syringe Tip Filters

Mixed Cellulose (ME) Membrane for Aqueous Solutions

Uniquely designed with looped 0.2 µm DynaFibre® membrane, blue Dynagard filters provide a large surface area and high flux rate. The narrow housing design minimizes hold-up volume while enabling easy aspiration and dispensing in ampules, test tubes & other small vessels. Compared to flat sheet disk filters, DynaGards can filter highly viscous solutions more gently and efficiently.

Features

- 0.2 µm hydrophilic DynaFibre® Hollow Fiber Membrane
- Ultra Low Hold Up Volume
- Narrow Tip for Easy Access
- High Flux Rate
- USP XXI Class VI Tested and Approved
- Non-Pyrogenic with LAL Testing
- 100% Integrity Tested

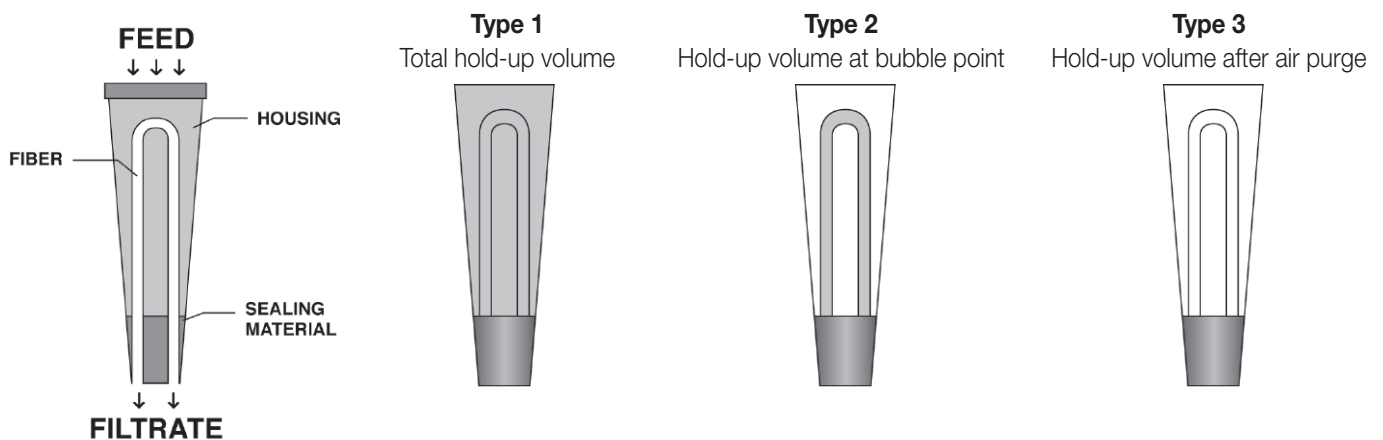
Product Specifications: 3 Sizes Available

| | 2.5 cm ² | 3.4 cm ² | 5.5 cm ² |
|------------------------|---------------------|---------------------|---------------------|
| Membrane SA: | 2.5 cm ² | 3.4 cm ² | 5.5 cm ² |
| Filtration Volume: | < 5 ml | 1 – 10 ml | 5 – 20 ml |
| Type 1 Hold-up Volume: | < 260 µl | < 375 µl | < 485 µl |
| Type 2 Hold-up Volume: | < 45 µl | < 80 µl | < 120 µl |
| Type 3 Hold-up Volume: | < 18 µl | < 23 µl | < 35 µl |
| Pore Rating: | 0.2 µm | 0.2 µm | 0.2 µm |
| Housing Length: | 3.0 cm | 4.3 cm | 5.4 cm |
| Housing Diameter: | 0.6 cm | 0.6 cm | 0.6 cm |
| Top End: | FLL | FLL | FLL |
| Bottom End: | ML Slip | MLL | ML Slip |
| Available Irradiated: | YES | YES | YES |



Components

Housing: Polycarbonate (blue)
 HF Membrane: Hydrophilic Mixed Cellulose Ester (ME)
 Potting: Epoxy



Ordering Information: DynaGard® Blue - Mixed Cellulose Ester (ME) for Aqueous Solutions

| | Part No. | Description | Pore Rating | Surface Area | Suggested Volume | IN / OUT Connections | IRR | Filling Bell | Qty/Pkg |
|------------------|--------------|---------------|-------------|---------------------|------------------|----------------------|-----|--------------|---------|
| Media Filtration | DG2M-110-50S | DynaGard - ME | 0.2 µm | 2.5 cm ² | < 5 ml | FLL / ML Slip | YES | N/A | 50 |
| | DG2M-110-200 | | | | | | NO | | 200 |
| | DG2M-23L-50S | | | 3.4 cm ² | 1 - 10 ml | FLL / MLL | YES | | 50 |
| | DG2M-23L-100 | | | | | | NO | | 100 |
| | DG2M-330-50S | | | 5.5 cm ² | 5 - 20 ml | FLL / ML Slip | YES | | 50 |
| | DG2M-330-100 | | | | | | NO | | 100 |

FLL = Female Luer-Lok™, ML = Male Luer-Lok™

DynaGard® Hydrophobic Syringe Tip Filters

Polypropylene (PP) Membrane for Organic Solutions

Specifically designed for filtering HPLC, solvent and organic samples, the white hydrophobic DynaGard Filters feature a polypropylene hollow fiber membrane incorporated in a highly efficient, sleek housing. DynaGard filters provide minimum hold-up volume and maximum sample recovery.

Polypropylene DynaGards are available in 0.2 µm membrane pore rating and 2 filter surface areas. The narrow design provides easy aspiration and injection of fluids into and out of vials, ampules, test tubes and other vessels with small openings.

Features

- High Chemical Resistance
- 0.2 µm Hydrophobic Polypropylene Membrane
- Ultra Low Hold Up Volume
- Narrow Tip for Easy Access
- High Flux Rate
- 100% Integrity Tested

Product Specifications: 2 Sizes Available

| | | |
|-----------------------|---------------------|---------------------|
| Membrane SA: | 0.8 cm ² | 3.9 cm ² |
| Filtration Volume: | < 5 ml | 5 - 20 ml |
| Hold-up Volume | | |
| (after air purge): | < 8 µl | < 30 µl |
| Pore Rating: | 0.2 µm | 0.2 µm |
| Housing Length: | 3.0 cm | 5.4 cm |
| Housing Diameter: | 0.6 cm | 0.6 cm |
| Top End: | FLL | FLL |
| Bottom End: | ML Slip | ML Slip |
| Available Irradiated: | NO | NO |

Components

| | |
|--------------|---------------------------|
| Housing: | Polypropylene (white) |
| HF Membrane: | Hydrophobic Polypropylene |
| Potting: | Epoxy |



Ordering Information: DynaGard® White - Polypropylene (PP) for HPLC and Solvent Filtration Applications

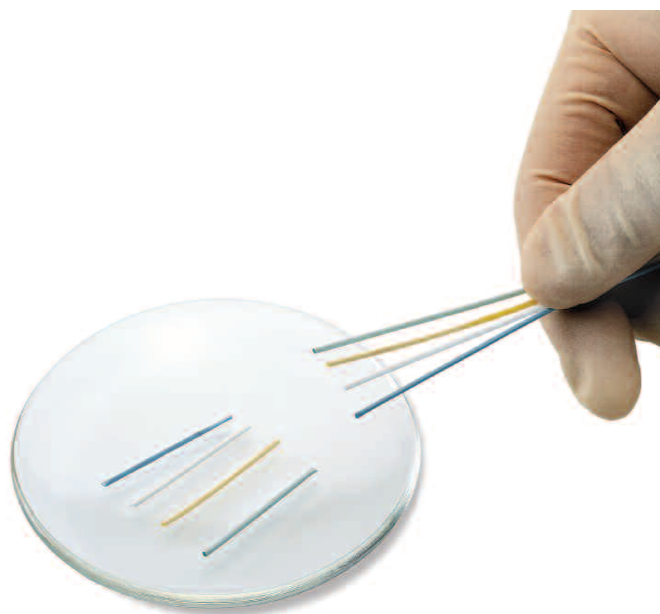
| | | Part No. | Description | Pore Rating | Surface Area | Suggested Volume | IN / OUT Connections | IRR | Qty/Pkg |
|------------------|--------------|--------------|---------------|-------------|---------------------|------------------|----------------------|-----|---------|
| Media Filtration | DynaGard® PP | DG2P-110-200 | DynaGard - PP | 0.2 µm | 0.8 cm ² | < 5 ml | FLL / ML Slip | NO | 200 |
| | | DG2P-320-100 | | | 3.9 cm ² | 5 - 20 ml | | | 100 |

FLL = Female Luer-Lok™, ML = Male Luer-Lok™

Fundamentals of Cell Encapsulation / Implantation with Hollow Fiber Membrane

Spectrum provides new technology developed by the National Cancer Institute for screening of anti-cancer compounds. Many researchers now routinely use this *in vivo* method of identifying compounds with potential therapeutic activity against cancer and HIV. The technology allows human cells to be implanted into host animals and subsequently retrieved in mass. While in the host, cells can be exposed to potential therapeutic compounds like antiviral agents and then retrieved from the animal to measure the impact of exposure to the compound. With this technology, target cells are macro-encapsulated in biocompatible hollow fibers. These macro-encapsulated cells are then implanted in the subcutaneous or intraperitoneal cavity of laboratory mice. This methodology is a significant step forward and results in significant savings of time, labor, amount of compound required, and the number of animals used in the evaluation of the potential therapeutic activity of candidate compounds. The hollow fiber assay is a unique *in vivo* model permitting the simultaneous evaluation of compound efficacy against six cell lines at subcutaneous and peritoneal sites (Hollingshead et al. Life Sci. 57; 131, 1995). This model was used to investigate the relationship between cell density and compound activity. Additionally, the model was adapted for mechanism of action studies. This technology is now used routinely by the National Cancer Institute of the NIH for testing compounds for anti-cancer activity. It is also being employed to look for antiviral compounds for HIV. Many different cancer cell lines, including some poorly tumorigenic lines, have been grown in KrosFlo Implant Membrane hollow fibers.

Spectrum's proprietary KrosFlo hollow fiber implant membranes provide a novel method for drug screening and cancer research. Perfectly suited for implantation, the modified Polyvinylidene Difluoride (mPVDF) hollow fiber membrane is biocompatible, hydrophobic and resistant to a wide variety of organic solvents, including most aqueous acids and bases. These hollow fibers can also be heat sealed and autoclaved without affecting the Molecular Weight Cut-Off (500,000 Dalton MWCO).



The surface of the KrosFlo Implant Membranes has demonstrated biocompatibility in various animal models. Multiple cell lines have been grown both *in vitro* and *in vivo* within the KrosFlo Implant Membranes. Cell lines grown within KrosFlo Implant Membranes, which have been implanted into a host animal, are not subject to immunological attack by the host animal. KrosFlo Implant Membranes containing cancer cell lines have been implanted into mice and used to screen for compounds having anti-cancer activity. Similarly, KrosFlo Implant Membranes containing HIV infected cell lines have been implanted into mice and used to screen for compounds having anti-HIV activity. Literature describing the implantation of KrosFlo Implant Membrane in animal models is available at www.spectrumlabs.com.

| Tumor Type | Cell Line | | | | | |
|-----------------|-----------|---------------------|------------|------------|----------|----------------------|
| Lung | A549/ATCC | NCI-H23 | NCI-H226 | NCI-H460 | NCI-H522 | |
| Colon | Colo-205 | HCC-2998 | HCT-15 | HCT-116 | HT29 | SW-620 |
| Lymphoid | CCRF-CEM | CEM-SS (HIV screen) | HL-60 (TB) | K-562 | MOLT-4 | RL U937 (HIV screen) |
| Prostate | DU-145 | JCA-1 | PC-3 | PC-3 (M) | | |
| Breast | MCF-7 | MDA-MB-231 | MDA-N | MDA-MB-435 | | |
| Melanoma | LOX IM VI | SK-MEL-5 | SK-MEL-28 | UACC-62 | UACC-257 | |
| CNS | SF-295 | SNB-75 | U251 | | | |
| Ovarian | IGROV1 | OVCAR-3 | OVCAR-5 | SK-OV-3 | | |
| Renal | A498 | CaKi-1 | RXF-393 | SN12C | | |

KROSFLO® Implant Hollow Fiber Membrane

For Drug Discovery and Development

Made from modified Polyvinylidene difluoride (PVDF), KrosFlo® Implant Membranes represent a revolutionary advance in separation technology. The membranes are biocompatible, hydrophobic and resistant to a wide variety of organic solvents as well as most aqueous acids and bases. The membranes can be heat sealed and autoclaved without affecting the molecular weight cut off (MWCO).

Encapsulated cells can be:

- Established cancer cell lines
- Virus infected cells
- Hematopoietic cells
- Bacteria
- Fungi

KROSFLO Implant Membranes isolate:

- Immune systems cells
- Viruses
- Mycoplasma

KROSFLO Implant Membranes have:

- Biocompatible inner and outer surface

Advantages over current xenographic model:

- 10 day assay versus 60 day assay
- Smaller assay variability, fewer animals needed
- Uses lesser amounts of test compounds
- Multiple cell lines can be tested simultaneously in same animal
- Compatible with different cell lines

Specifications:

Packaging: Wet in DI water and autoclaved or
Dry and not autoclaved

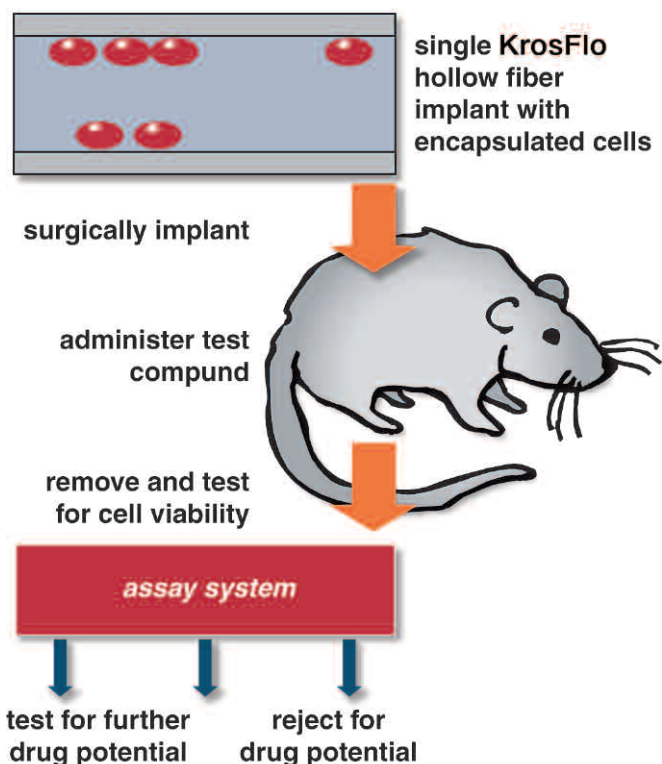
Material: PVDF

Inner Diameter: 1.0 mm

Outer Diameter: 1.2 mm

Length: 34 cm/fiber

Quantity: 3 fibers/pkg



Ordering Information: KROSFLO® Implant Membranes

| | Part No. | Material | MWCO | Storage | Pre-Autoclaved | Color | Length | Qty/Pkg |
|-------------------------------|----------|----------|--------|----------|----------------|--------|-------------|--------------|
| KROSFLO® Implant Membranes | M138615 | PVDF | 500 kD | DI water | YES | White | 34 cm/fiber | 3 fibers/pkg |
| | M138616 | | | | | Blue | | |
| | M138617 | | | | | Yellow | | |
| | M138618 | | | | | Green | | |
| | S9320101 | | | Dry | NO | White | | |
| | S9320102 | | | | | Blue | | |
| | S9320103 | | | | | Green | | |
| | S9320104 | | | | | Yellow | | |



TransferTube® Sampling Pipette

The disposable TransferTube is an innovative device for transferring liquid or coring solid samples with one hand. The large aperture is particularly useful for working with powders, suspensions, gels, creams, pastes and viscous fluids. Disposability reduces the risk of cross contamination associated with re-used pipettes and cutting instruments.

Applications

- Life Science: suspensions, mixtures & viscous solutions
- Microbiology: colony transfers
- Ecology/Environment: soil, mud, sludge & slurry coring
- Cosmetics: creams, gels, waxes & powders
- Food & Beverages: batters, pastes & sauces

Specifications

| | |
|------------------|-------------------------------|
| Material: | Polypropylene |
| Shaft & Plunger: | 153 mm length x 6 mm diameter |
| Finger Ring: | 16.5 mm x 20 mm (ID x OD) |
| Total Length: | 175 mm |
| Capacity: | 4 ml |

Ordering Information: TransferTube®

| | Part No. | Description | Size | Qty/Pkg |
|--|----------|-------------------------------|---------------|---------|
| Cell Culture Accessories & Consumables | 190195P | TransferTube Sampling Pipette | Standard Pack | 250 |
| | 190195 | | Economy Pack | 1000 |

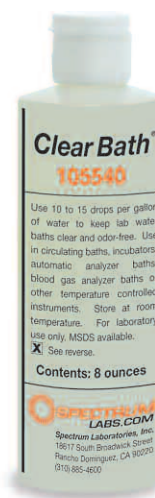


Clear Bath® Water Treatment Solution

Keep water baths clean with Spectrum's Clear Bath. Only 12 drops per gallon (3 drops per liter) are necessary to keep water clean. One 2 oz (60 ml) bottle is sufficient for the treatment of 1500 to 1900 liters of water. One 8 oz (230 ml) bottles treats 6,000 to 10,000 liters of water. (Not recommended for use with soap or anionic wetting agents.)

For use with:

- Circulating water baths
- Incubators
- Temperature controlled instruments
- Humidifiers
- Automatic analyzer baths
- Blood/gas analyzers



Bessman Tissue Pulverizer

The stainless steel Bessman Tissue Pulverizer consists of a 2 component mortar with handles and a pestle, specifically designed for pulverizing 10 – 1000 mg of tissue. After chilling the Pulverizer in liquid nitrogen, the included 28 cm lead hammer is used on the mortar to completely homogenize the inserted sample. The sample can then easily be transferred without touching or thawing by removing the mortar and inverting the pestle assembly over a test tube. The small and medium Pulverizers each include 10 test tubes and the large Pulverizer includes one culture jar.



| Specifications: | Small | Medium | Large |
|------------------|----------|-----------|-------------|
| Sample Capacity: | 10-50 mg | 25-250 mg | 100-1000 mg |
| Mortar Diameter: | 6.6 mm | 12.7 mm | 25.6 mm |
| Mortar Height: | 26.8 mm | 47.3 mm | 47.6 mm |

Ordering Information: Clear Bath® & Tissue Pulverizer

| | | Part No. | Description | Size | Qty/Pkg |
|--|--|----------|----------------------------|-----------------------|---------|
| Cell Culture Accessories & Consumables | | 105535 | Clear Bath Water Treatment | Small (2 oz / 60 ml) | 1 |
| | | 105540 | | Large (8 oz / 237 ml) | |
| | | 189476 | Bessman Tissue Pulverizer | Large | |
| | | 189475 | | Medium | |
| | | 189470 | | Small | |



NEW! mPES Hollow Fiber Filter Modules

Single-Use Filter Modules for Tangential Flow Filtration

Spectrum Labs introduces new modified polyethersulfone hollow fiber filters, a major advancement in filtration.

Benefits:

- High flux rates for **faster** processing times
- Low protein binding for higher product yields
- Available in a wide range of pore sizes
- **Scalable** from R&D to Production
- **Priced for Single-Use**



scan to go to website



KrosFlo®

| | |
|--|-----|
| LABORATORY ORGANIZERS | .62 |
| Drawer/Ganizer® Portable Organizer Trays | .62 |
| Drawer/Ganizer® Drawer Spacer Trays | .62 |
| Refrig/Arranger® Storage Products | .64 |
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| COMING SOON: Fleaker® Glass Containers | .65 |
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| Gas Safety Stand for Large Cylinders | .68 |



NEW! Drawer/Ganizer® Portable Organizer Trays

Spectrum introduces new Drawer/Ganizer Portable Trays molded from thicker 1/8 inch heavy duty polystyrene with easy-gripping folded edges for transporting assorted lab items and mobilizing experimental activities. The deeper compartments are better suited than most other lab trays for holding larger quantities as well as serving as secondary containment for spills. Like the original Drawer/Ganizer Spacers, these Portable Organizer Trays are designed for standard lab drawers, refrigerators and bench tops to organize and protect supplies, conserve valuable space and promote lab safety. Spectrum offers 6 configurations in two sizes (1 tray/pkg).



Pipette / Column Tray

Two sizes for sorting 4 or 6 types of pipettes, chromatography columns or long instruments in a protected parallel position.



Stopper / Fittings Tray

Great for separating large quantities of different types of small items. 2 sizes available with 12 or 16 equal compartments.



Parts / Chromatography Tray

Various size compartments for easy to find storage of lab & chromatography supplies like utensils, valves, connectors, etc.



Micropipettor Tray

2 sizes designed for storing up to 7 micropipettors, pipettes and/or glass syringes as well as 2 types of pipette tips.



Clamp / Instrument Tray

Two spacer sizes available, each with 3 compartment sizes for storing clamps, hardware, instruments and other odd-shaped items.



Utility / Equipment Tray

Ideal for the separation of bulky and/or fragile items that can otherwise be damaged. 2 sizes available, each with 4 spaces.



Drawer/Ganizer® Drawer Spacers

Spectrum's original Drawer/Ganizer Spacers are designed specifically to fit in standard lab drawers to organize lab supplies and save space. The custom compartments also help to maintain visual inventory and protect stored items. The 3 most popular configurations displayed below. Go to www.spectrumlabs.com/labware/DrawerGanizers to view the 8 other Drawer Spacer configurations available.

Grid / Vial Spacer

Secures upright vials or fragile items in 1" deep spaces. Large spacer has 9 rows of 11 spaces and small size has 7 rows of 10.



Beaker / Fleaker Spacer

Round depressions with spout cut-outs for secure storage of 50 – 600 ml beakers. Great protection for drying glassware.



Tools Spacer

2 sizes available to help maintain a visual inventory of tools like hammers, screwdrivers, wrenches, pliers, tape measure, etc.



Drawer/Ganizer® Benefits

- Designed for Portability or Storage
- Stronger & More Durable
- Organize & Protect Lab Supplies
- Maintain Laboratory Inventory
- Maximize Working Space
- Increase Lab Safety
- Provides Secondary Containment



Related Products:

Refrig/Arranger® Storage Trays

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Ordering Information: Organizer Trays & Drawer Spacers

| | | Part No. | Description | Size | Dimensions (cm) | No. of Comp. | Compartment Dimensions (cm) | Qty | |
|-------------------------|--------------------------|--------------------------|-----------------------------|-------------|-----------------|---------------------------|-----------------------------|-------|-------|
| Drawer/Ganizer® | Portable Organizer Trays | 155510 | Pipette / Colum Tray | Large | 49 x 44 x 5 | 6 | 42 x 7 | 1/pkg | |
| | | 155585 | | Small | 34 x 44 x 5 | 4 | | | |
| | | 155495 | Stopper / Fittings Tray | Large | 49 x 44 x 7 | 16 | 11 x 10 | | |
| | | 155570 | | Small | 34 x 44 x 7 | 12 | 10 x 10 | | |
| | | 155450 | Parts / Chromatography Tray | Large | 49 x 44 x 7 | 15 | various | | |
| | | 155645 | | Small | 34 x 44 x 7 | 7 | | | |
| | | 155430 | Micropipettor Tray | Large | 49 x 44 x 7 | 7, 2 | 27 x 6, 23 x 23 | | |
| | | 155675 | | Small | 34 x 44 x 7 | 5, 2 | 27 x 6, 16 x 14 | | |
| | 155525 | Clamp / Instrument Tray | Large | 49 x 44 x 7 | 7 | various | | | |
| | 155600 | | Small | 34 x 44 x 7 | 5 | | | | |
| | 155465 | Utility / Equipment Tray | Large | 49 x 44 x 7 | 4 | 23 x 20 | | | |
| | 155630 | | Small | 34 x 44 x 7 | 4 | 20 x 15 | | | |
| | Drawer Spacers | Grid / Vial Spacer | 144420 | Large | 49 x 44 x 6 | 99 | 3.2 x 3.2 | | 2/pkg |
| | | | 144665 | Small | 34 x 44 x 6 | 70 | | | |
| Beaker / Fleaker Spacer | | 144480 | Large | 49 x 44 x 5 | 27 | 5.7, 7.6 & 9.5 (diameter) | | | |
| | | 144555 | Small | 34 x 44 x 5 | 20 | | | | |
| Tools Spacer | | 144435 | Large | 49 x 44 x 5 | 15 | "suitcase spaces" | | | |
| | | 144660 | Small | 34 x 44 x 5 | 15 | | | | |

(More Drawers Spacer configurations available at www.spectrumlabs.com/labware/DrawerGanizers)

Refrig/Arranger® Storage Trays

Refrig/Arranger Storage Trays are the ideal way to conserve valuable space in laboratory refrigerators and freezers and can also be used on laboratory bench tops and in cabinets. Made of lightweight, high-impact polystyrene, these sturdy trays are perfect for the safe transportation and refrigerated storage of glass vials and small bottles. The trays are also well-suited for storage of solutions, samples and tissues in freezers as low as -90°C.



Refrig/Arranger Storage Trays are available in either channel or grid configurations. Select from among 3 different channel widths (1.9 cm, 3.2 cm and 4.8 cm) or 2 grid sizes (1.9 x 1.9 cm and 3.2 x 3.2 cm). The Channel Trays feature a raised front edge that prevents breaks and permits labeling.



Refrig/Arranger® Benefits

- Convenient & Organized Storage System
- Channel or Grid Configurations
- Efficient Use of Valuable Space
- Protects Glass & Plastic Containers
- Transport from Bench-top to Fridge
- Secondary Containment for Spills
- Freezer Storage as low as to -90°C

Ordering Information: Storage Trays

| | | Part No. | Description | Size | Dimensions (cm) | No. of Compartments | Compartment Dimensions (cm) | Qty |
|------------------|---------------|----------|----------------------|--------|-----------------|---------------------|-----------------------------|-------|
| Refrig/Arranger® | Storage Trays | 183552 | | Large | 34.3 x 40 | 7 | 4.8 (wide) | 1/pkg |
| | | 183550 | Channel Storage Tray | Medium | | 10 | 3.2 (wide) | |
| | | 183547 | | Small | | 13 | 1.3 (wide) | |
| | | 183554 | | Large | | 60 | 3.2 x 3.2 | |
| | | 183556 | Grid Storage Tray | Small | | 104 | 1.9 x 1.9 | |

Related Products:

Drawer/Ganizer® Organizer Trays & Drawer Spacers pg 62

Excellent for organizing or secondary containment in refrigerators and freezers

Coming Soon!

Fleaker® Glass Containers

Due to popular demand the Original Fleaker® will be re-introduced in 2012

- Combines the best of an Erlenmeyer flask and a Griffin beaker.
- Narrow recessed neck prevents splashing during vigorous stirring
- Makes handling, transporting and pouring easy
- Constructed of borosilicate glass
- Graduated for accurate measurements
- 3 volume sizes: 250 ml, 500 ml & 1000 ml

Contact customerservice@spectrumlabs.com to be notified when the new Fleaker® is available.

For more information go to www.spectrumlabs.com/labware/Fleaker.html



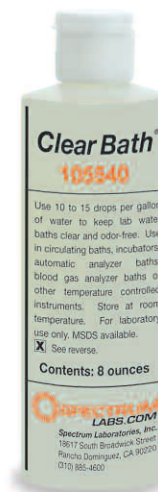
Disposables & Consumables

Clear Bath® Water Treatment Solution

Keep water baths clean with Spectrum's Clear Bath. Only 12 drops per gallon (3 drops per liter) are necessary to keep water clean. One 2 oz (60 ml) bottle is sufficient for the treatment of 1500 to 1900 liters of water. One 8 oz. (230 ml) bottles treats 6,000 to 10,000 liters of water. (Not recommended for use with soap or anionic wetting agents.)

For use with:

- Circulating water baths
- Incubators
- Temperature controlled instruments
- Humidifiers
- Automatic analyzer baths
- Blood/gas analyzers



Ordering Information: Clear Bath

| | Part No. | Description | Size | Qty |
|-------------|----------|----------------------------|-----------------------|-------|
| Clear Bath® | 105535 | Clear Bath Water Treatment | Small (2 oz / 60 ml) | 1/pkg |
| | 105540 | | Large (8 oz / 237 ml) | |



TransferTube® Sampling Pipette

The disposable TransferTube is an innovative device for transferring liquid and coring solid samples with one hand. The large aperture is particularly useful for working with powders, suspensions, gels, creams, pastes and viscous fluids. Disposable transferring reduces the risk of cross contamination associated with re-used pipettes and cutting instruments.

Applications

- Life Science: suspensions, mixtures & viscous solutions
- Microbiology: colony transfers
- Ecology/Environment: soil, mud, sludge & slurry coring
- Cosmetics: creams, gels, waxes & powders
- Food & Beverages: batters, pastes & sauces

Specifications

| | |
|------------------|-------------------------------|
| Material: | Polypropylene |
| Shaft & Plunger: | 153 mm length x 6 mm diameter |
| Finger Ring: | 16.5 mm x 20 mm (ID x OD) |
| Total Length: | 175 mm |
| Capacity: | 4 ml |



Disposable Desiccant Plates

Spectrum's Disposable Desiccant Plates efficiently bind atmospheric water to prevent the exposure of dry-dependent samples to moisture. Covered with a porous material, the silica gel slowly changes from blue to pale pink as it absorbs water. The clear polystyrene base allows for visual inspection for checking gel saturation. Silica gel is inert, non-corrosive and non-toxic. Two plate sizes are available for holding 20 ml and 50 ml grams of silica gel.

Ordering Information: TransferTube & Disposable Desiccant Plates

| | | Part No. | Description | Size | Qty/Pkg |
|---------------------|---------------------------|-----------------------------|-------------------------------|---------------|---------|
| Laboratory Supplies | Disposables & Consumables | 190195P | TransferTube Sampling Pipette | Standard Pack | 250 |
| | | 190195 | | Economy Pack | 1000 |
| | 183578 | Disposable Desiccant Plates | Large (50 g) | 6 | |
| | 183579 | | Small (20 g) | | |

Equipment & Instruments

NEW! KrosFlo® Research I Peristaltic Pump with Integrated Lab Stand



Spectrum's KrosFlo Research I (KRI) System combines a digital peristaltic pump and a multi-purpose lab stand to provide ultimate convenience and efficiency for experiments involving fluid circulation and transfers. The easy-to-operate digital KRI Pump drives the fluid stream through flexible tubing (sold separately) while the incorporated stand and included holders secure the tubing, filters, reservoirs and other components in place. Traditional stands often tip over, need more space and can move due to vibration. Since our stand is anchored to the pump, the KRI prevents spills, sucking air and broken connections. The Trilobite holders are designed to secure flexible tubing and cylindrical items. Standard lab clamps can also be used on the KRI stand. The molded handle on the pump makes transporting easy.

The reversible KRI pump (100 or 600 RPM) features a digital keypad that provides easy and accurate speed control. A second pump-head can be stack-mounted for increased flow or operating two parallel flow streams. Optimal flow rates can be achieved by selecting the preferred tubing size.

Features & Benefits

- Pump-mounted stand for ultimate stability
- Portable compact set-up saves space
- Easy-to-use & low maintenance
- Locking digital keypad & display
- Accurate & reliable speed control
- (Soft) Start/Stop & reversible flow
- Remote operation by external controller
- ETL, cETL, CE, RoHS & IP33 Safety Ratings

Components

- Digital Pump Drive
- Rotating Pump-head
- Stand Bracket
- Stand Pole (46 cm)
- 2 Trilobite Holders
- 1 Reservoir Holder

Dimensions

Pump, pump-head & stand (L x W x H): 14.50" (37cm) x 10.16" (26cm) x 19.65" (50cm)

Specifications

| 2 Drive Types: | 1-100 RPM | 6-600 RPM | Tubing Size: | 13 | 14 | 16 | 25 | 17 | 18 |
|-------------------|-----------------|------------------|---------------------------|------------------------------------|------------------------------------|----------------------------------|------------------------------------|----------------------------------|------------------------------------|
| Flow Rates: | 0.06-380 ml/min | 0.36-2300 ml/min | OD x ID (inch): | $\frac{5}{32} \times \frac{1}{32}$ | $\frac{3}{16} \times \frac{1}{16}$ | $\frac{1}{4} \times \frac{1}{8}$ | $\frac{5}{16} \times \frac{3}{16}$ | $\frac{3}{8} \times \frac{1}{4}$ | $\frac{7}{16} \times \frac{5}{16}$ |
| Speed Resolution: | 0.1 RPM | 1 RPM | OD x ID (mm): | 4 x 0.8 | 4.8 x 1.6 | 6.3 x 3 | 8 x 4.8 | 9.5 x 6.4 | 11 x 8 |
| Speed Accuracy: | +/- 0.25% | +/- 0.25% | Flow Rate (ml/min) | | | | | | |
| Motor Power: | 75W | 75W | 100 RPM Drive: | 0.06-6 | 0.21-21 | 0.8-80 | 1.7-170 | 2.8-280 | 3.8-380 |
| Main Power: | 90-260V 60/50Hz | 90-260V 60/50Hz | 600 RPM Drive: | 0.36-36 | 1.3-130 | 4.8-480 | 10-1000 | 17-1700 | 23-2300 |

KrosFlo® Digital Pressure Monitor



Designed to monitor pressures in fluid processing, the Digital Pressure Monitor also serves as an excellent multi-purpose lab pressure monitor. The monitor measures & displays 3 pressures with warning and shut-off alarms. Great for protecting valuable and delicate samples, the triggered monitor can generate an output signal to stop any compatible lab equipment. (Does not interface with KRI Pump) The Monitor also communicates with a PC to record all process data into the provided Excel® based KF Comm Data Collection Software.

Features & Benefits

- Measures 3 pressures
- Calculates transmembrane pressure
- 5 high/low alarms & 2 auto stop set-points
- Data collection & recording
- CE & UL compliant

Components

- Digital Monitor
- 3 Pressure Transducers & Cables
- Monitor/Pump Cable
- RS-232 Monitor/PC Cable
- KF Comm Data Collection Software

Ordering Information: Peristaltic Pump & Digital Pressure Monitor

| | | Part No. | Description | Power | Qty/Pkg |
|---|--------------|---|-------------------|-------------------|---------|
| Laboratory Supplies & Equipment & Instruments | ACR1-U1S-01N | | | 100 RPM, 90-260 V | 1 |
| | ACR1-U2S-01N | KrosFlo Research I Peristaltic Pump with Integrated Stand | 600 RPM, 90-260 V | | |
| | ACR2-H3S-01N | KrosFlo Research Pump-Head with 3 SS rollers | - | | |
| | ACPM-201-01N | | 110 V | 3 | |
| | ACPM-202-01N | KrosFlo Digital Pressure Monitor | 220 V | | |
| | ACPM-499-03N | Disposable Pressure Transducers | - | | |



Bessman Tissue Pulverizer

The stainless steel Bessman Tissue Pulverizer consists of a 2 component mortar with handles and a pestle, specifically designed for pulverizing 10 – 1000 mg of tissue. After chilling the Pulverizer in liquid nitrogen, the included 28 cm lead hammer is used on the mortar to completely homogenize the inserted sample. The sample can then easily be transferred without touching or thawing by removing the mortar and inverting the pestle assembly over a test tube. The small and medium Pulverizer includes 10 test tubes and the large Pulverizer includes one culture jar.

| Specifications: | Small | Medium | Large |
|------------------|----------|-----------|-------------|
| Sample Capacity: | 10-50 mg | 25-250 mg | 100-1000 mg |
| Mortar Diameter: | 6.6 mm | 12.7 mm | 25.6 mm |
| Mortar Height: | 26.8 mm | 47.3 mm | 47.6 mm |



Vacu/Trol® Vacuum Water Aspirator

The Vacu/Trol Water Aspirator efficiently generates full vacuum with standard laboratory faucets (10 liters of air to < 60 mm Hg in < 6 minutes at 25 psi/1.7 bar water pressure). Constructed of stainless steel and brass with a heavy chrome finish to avoid corrosion, the aspirator has a long discharge tube to minimize splashing and can be connected to flexible tubing for directing flow, a 3/8" male NPT inlet for connecting to 3/8" female NPT faucets, and a tapered vacuum side-arm for connecting to 1/4" ID x 1/2" OD tubing. A faucet adaptor to change the inlet connector from 3/8" male thread to 3/4" female thread is sold separately.

Specifications

Length: 24.15 cm (9.51 in.)
Weight: 315 g



Gas Safety Stand for Large Cylinders

The Gas Safety Stand provides a solid base that allows large gas cylinders to be located where desired and secured in an upright position without the risk of falling. The Gas Safety Stand is suitable for gas cylinders from 18 to 25 cm in diameter.

Specifications

Dimensions: 46 cm (L) x 46 cm (W) x 30 cm (H)
Weight: 15.7 kg

Ordering Information: Tissue Pulverizer, Vacu/Trol Water Aspirator & Gas Safety Stand

| | | Part No. | Description | Qty/Pkg | |
|---------------------|-------------------------|----------|---------------------------|---------|---|
| Laboratory Supplies | Equipment & Instruments | 189476 | Large | 1 | |
| | | 189475 | Bessman Tissue Pulverizer | | |
| | | 189470 | Small | | |
| | | 146300 | Vacu/Trol Water Aspirator | | - |
| | | 146301 | Vacu/Trol Faucet Adapter | | - |
| | | 148702 | Gas Cylinder Safety Stand | | - |

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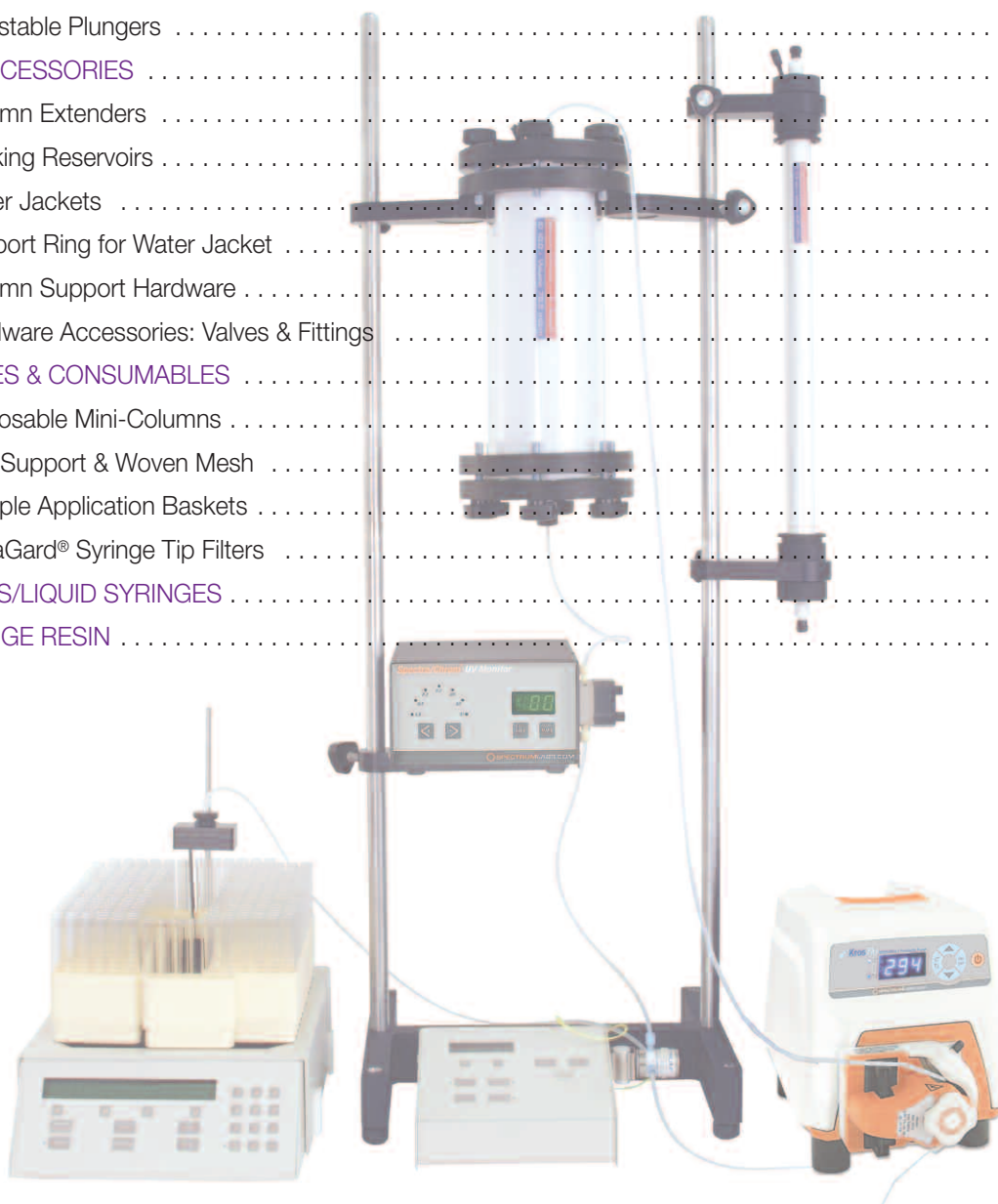
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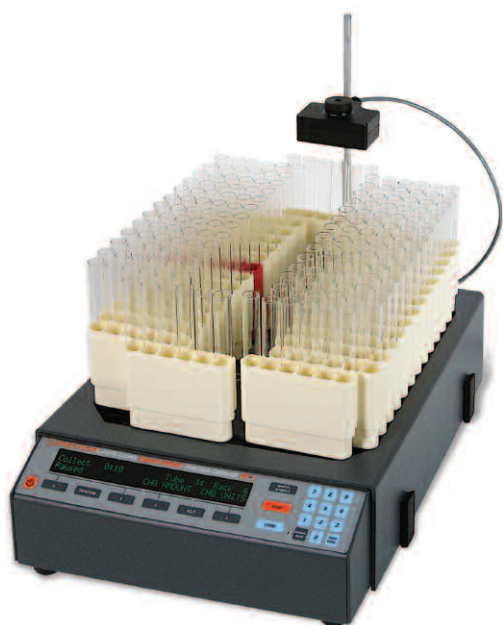
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CF-2 Fraction Collector

Sold complete and ready-to-use, the CF-2 is the perfect collector for both large volume open column chromatography and preparative HPLC. The CF-2 Fraction Collector includes a drop counter and a set of racks for up to 174 tubes (12 to 13 mm OD). Cold-room compatible, the CF-2 uses less than 10 watts of power and presents a minimal load to the cooling system while keeping its interior free of condensation. The sturdy aluminum and stainless steel construction assures you of many years of reliable operation. When connected to the Spectra/Chrom® Model 280 UV Monitor the CF-2's powerful peak separator allows you to set different fraction sizes for the peak and non-peak materials. When using the optional diverter valve, you can opt to collect only the peak fractions to maximize the utility of each tube and reduce your post-collection work. Locating the tube for each peak is easy when the Spectra/Chrom® Model 280 UV Monitor is used with the CF-2 Fraction Collector, a tick mark placed on the recorder trace marks each tube change. Optional tube rack sets are available for a variety of different tube sizes.

Features & Benefits

- Fractions sized by time, drop count or volume count
- Interfaces with most detectors
- Includes tube racks for 174 fractions
- CE marked & complies with RoHS

Product Specifications

| | |
|-----------------|---|
| Dimensions: | 28 x 12 x 38 cm |
| Weight: | 5 kg (10 lb) |
| Fraction Size: | 1-9999 drops in 1 drop increments or 6 sec – 999 min; 59 sec in 1 sec increments |
| Change Rate: | 0.35 sec max within 12/13 mm tube rack |
| Operating Temp: | 0–40°C (cold-room compatible) |
| Power: | 115 VAC or 230 VAC, 50/60 Hz |



IS-95 Interval Sampler

Ideal for QC sampling & reactor testing, the IS-95 Interval Sampler collects periodic samples of liquids. Simply provide the interval for sampling & the sample size and it does the rest. It has the capability to control either a valve for sampling from a low pressure line or elevated tank, or a pump when the sample has to be lifted to be collected. The IS-95 Interval Sampler includes a drop counter & drop former that allows you to size your samples based on either the number of drops or on the duration of collection. If large samples are required, you can have a single collection span several tubes. The IS-95 Interval Sampler also includes remote control capability that allows you to start & stop the sampler, as well as follow its collection progress from an external controller. The IS-95 can collect up to 173 samples in 12 or 13 mm OD tubes in a single set of racks. The rack set is not included & must be purchased separately. See ordering information for the range of available rack sizes.

Features & Benefits

- Programmable volume or time sampling
- Up to 173 samples in 12 to 13 mm tubes
- Tube sizes from 10 to 28 mm OD
- Remote operation by external controller
- CE marked & complies with RoHS

Product Specifications

| | |
|------------------|---|
| Dimensions: | 28 x 12 x 40 cm |
| Weight: | 5 kg (10 lb) |
| Sample Size: | 1-9999 drops in 1 drop increments or 6 sec–999 min; 59 sec in 1 sec increments |
| Sample Interval: | 6 sec–999 min; 50 sec in 1 sec increments |
| Operating Temp: | 0–40°C (cold-room compatible) |
| Power: | 115 VAC or 230 VAC, 50/60 Hz |

Ordering Information: Chromatography Instruments (Fraction Collector & Interval Sampler)

| | | Part No. | Description | Voltage | Includes: | |
|-----------------------------------|------------------------|----------|--|-----------------------------|--|------|
| Fraction Collector | 124845 | | CF-2 Fraction Collector | 115 V, 50/60 Hz | rack set (124853) & drop counter | |
| | 124846 | | | 230 V, 50/60 Hz (CE & RoHS) | | |
| Interval Sampler | 141200 | | IS-95 Interval Sampler | 115 V, 50/60 Hz | drop counter requires rack set for operation | |
| | 141202 | | | 230 V, 50/60 Hz (CE & RoHS) | | |
| | | Part No. | Description | Qty | For Use With: | |
| Chromatography Instruments | Accessory Parts | 124838 | High Flow Diverter Valve: Diverts flow from CF-2 to waste between fraction collections and at end of run. Allows for unattended fraction collection. PTFE wet-contact materials. Flow rates up to 100 ml/min. | 1/pkg | CF-2 & IS-95 | |
| | | 124848 | 2-Way Shut-off Valve: Ideal for use with radioactive or toxic materials, stops flow to CF-2 during tube change and at end of the run to avoid missing drops. Not recommended for use with pumped system without auto-stop control. (Caution should be taken, not guaranteed to prevent all errant drops.) | | | |
| | | 124849 | 3-Way Diverter Valve: Diverts flow from CF-2 to waste between fraction collections and at end of run. Allows for unattended fraction collection. PTFE wet-contact materials. Flow rates up to 20 ml/min. | | | |
| | | 124853 | Racks for 12 & 13 mm Tubes: up to 174 fractions for CF-2 or 173 samples for IS-95 Standard 13 mm diameter x 100 mm tall tubes can hold up to 10 ml | 30 racks/set | | |
| | | 124854 | Racks for 10 to 16 mm Tubes: up to 116 fractions for CF-2 or 115 samples for IS-95 Standard 16 mm diameter x 150 mm tall tubes can hold up to 23 ml | | | |
| | | 124855 | Racks for 17 & 18 mm Tubes: up to 116 fractions for CF-2 or 115 samples for IS-95 Standard 18 mm diameter x 150 mm tall tubes can hold up to 27 ml | | | |
| | | 124856 | Racks for 28 mm Scintillation Vials: up to 42 fractions for CF-2 or 41 samples for IS-95 | 15 racks/set | | |
| | | 124858 | Dust Cover for Fraction Collector: Reduces risk of airborne contamination; removable without disturbing electrical and fluid connections; clear acrylic | 1/pkg | | |
| | | 124874 | Mast Package for Fraction Collector: Adds two 50 cm long masts to rear of CF-2 or IS-95 for additional small column or instrument support and conserving bench space. These masts can be used to save bench space by supporting small columns or instruments without the use of a separate ring stand. | 1/pkg | | CF-2 |
| | | 124876 | 4-Column Adaptor (requires mast package): Allows the collection of 4 separate fractions simultaneously from 4 different columns (29 fractions/column). Includes special 4 place tube racks and quadruple drop head. (Mast Package required to support quadruple drop head). | | | |



Spectra/Chrom® Model 280 UV Monitor

The Spectra/Chrom Model 280 UV Monitor is a fixed-wavelength flow-through spectrophotometer, ideal for chromatographic detection in both HPLC and low pressure systems. The Model 280 features a direct reading digital output and a dual-beam optical system that can automatically subtract even a rapidly changing solvent background. This detector works with the CF-2 Fraction Collector to separate the peak and non-peak material or, if preferred, to collect only the peaks. The Spectra/Chrom® Model 280 UV Monitor also provides analog outputs for both the Spectra/Chrom® Chart Recorder and an integrator. Sold complete & ready-to-use, the Model 280 UV Monitor includes a 5 mm path-length flow-cell, filters for 254 & 280 nm operation, a set of tubing fittings and recorder cable.

Features & Benefits

Dual-beam optics for
baseline subtraction
254 & 280 nm operation
(<10 sec change)
 3×10^{-4} AU detection limit
CE marked & complies with RoHS

Product Specifications

Dimensions / Weight: 24 x 12 x 20 cm / 4.1 kg (9 lb)
Stability after 30 min: 0.0005 AU/hr maximum drift
Noise after 30 min: <0.0003 AU at 254 nm
with dry flow-path
Absorbance Range: 0.01–1.0 AU full-scale
Operating Temp: 0–40°C (cold-room compatible)

Spectra/Chrom® Chart Recorder

The ideal complement to the Model-280 UV Monitor, the Spectra/Chrom Chart Recorder is an all-purpose laboratory strip-chart recorder used to record chromatograms and other time-varying signals. The Chart Recorder holds 15 meters of paper for extended recording times and to reduce the frequency of paper changes. Can be set to calibrated or variable scales. The zero point can be positioned anywhere using the zero offset.

Features & Benefits

12 chart speeds from
1 cm/hr to 30 cm/min
Zero Offset for chart repositioning
Compatible with
Model-280 UV Monitor
CE marked & complies with RoHS

Product Specifications

Full Scale Span: 1, 2, 5, 10, 20, 50 mV, .1, .2, .5,
1, 2 and 5 V
Full-Scale response: <0.5 sec
Pen Type: Disposable fiber tip
Chart Speeds: 1, 2, 5, 10, 20, 30 cm/hr & cm/min
Paper Dimensions: 15 m long x 20 cm wide



S-3 Solvent Saver System

The microprocessor controlled S-3 is a solvent recycler specifically designed to reduce isocratic solvent consumption by up to 90% for both LC and HPLC, providing a significant savings in both solvent acquisition and disposal costs. It uses a sensitive level sensor to shunt the eluant to waste when the detector indicates something is coming off of the column. After the contaminant (typically a sample component) passes and the output from the system detector drops below the threshold you set then the uncontaminated solvent is routed back to the solvent reservoir for re-use. The S-3 works equally well with UV, RI and other detectors with chart recorder outputs, handles up to a 50% over-range and continuously displays its status and signal level. The recycle valve can also be set manually or remotely to remain in either the recycle or waste position which is indicated by the Q.A. validation signal. The S-3 Solvent Saver comes complete with control console, valve, signal cable and tubing fittings.

Features & Benefits

Works with both UV and RI detectors
Q.A. validation signal
Both manual & automatic operation
CE marked & complies with RoHS

Product Specifications

Dimensions: 6.7 x 4 x 8.3 cm
Weight: 1 kg (0.5 lb)
Input: 1 V or 10 mV full-scale (user selectable)
Set Point: 0-0.5 V in 0.01 V steps or 0-5 mV in
0.1 mV steps
Remote Inputs: Contact closure or TTL low inputs
for forced waste, forced recycle & auto-zero
Remote Output: Open collector output to verify valve operation
Hysteresis: 0-9.9% full-scale in 0.1% steps
Operating Temp: 0-40°C (cold-room compatible)



Ordering Information: Chromatography Instruments (UV Monitor, Chart Recorder & Solvent Saver System)

| | | Part No. | Description | Voltage | Includes: | | |
|----------------------------|----------------------------|-----------------|-----------------------------------|--|-------------------------------|----------------------|-------------------------|
| Chromatography Instruments | UV Monitor | 142600 | UV Monitor, Model 280 | 115 V, 50/60 Hz | 5mm path-length flow-cell | | |
| | | 142602 | | 230 V, 50/60 Hz (CE & RoHS) | | | |
| | Chart Recorder | 124700 | Chart Recorder, Single Pen | 115 V, 50/60 Hz | 1 pen & 1 roll of paper | | |
| | | 124701 | | 230 V, 50/60 Hz (CE & RoHS) | | | |
| | | 124705 | Chart Recorder, Dual Pen | 115 V, 50/60 Hz | Set of pens & 1 roll of paper | | |
| | Solvent Saver | 124706 | S-3 Solvent Saver System | 230 V, 50/60 Hz (CE & RoHS) | Signal cable & valve | | |
| | | 142100 | | 115 V, 50/60 Hz | | | |
| | | 142102 | | 230 V, 50/60 Hz (CE & RoHS) | | | |
| | | | Part No. | Description | Qty | For Use With: | |
| | Chromatography Instruments | Accessory Parts | 142610 | Mast Bracket for Model 280 | 1/pkg | UV Monitor Model 280 | |
| | | | 142615 | Model 280 to CF-2 Cable, for event marking | | | |
| | | | 142625 | Model 280 Universal Remote Cable | | | |
| 142630 | | | Model 280 Cable for event marking | | | | |
| 142640 | | | 10 mm Path-length PEEK Flow-cell | | | | |
| 142642 | | | 5 mm Path-length PEEK Flow-cell | | | | |
| 142644 | | | 2 mm Path-length PEEK Flow-cell | | | | |
| 124710 | | | Trace Paper | 15 m/roll | | | Chart Recorder |
| 124711 | | | Red pen for pen 1 (short) | 1/pkg | | | Dual Pen Chart Recorder |
| 124712 | | | Blue pen for pen 2 (long) | | | | |
| | | 124714 | Black Pen | 1/pkg | Single Pen Chart Recorder | | |

NEW! KrosFlo® Research I Peristaltic Pump

The new digital KrosFlo Research I (KRI) Pump is ideal for low-pressure liquid chromatography, providing sufficient flow and pressure limits equivalent to open glass columns (35 psi, 2.4 bar). Available in 100 and 600 RPM models, both pumps include a pump-head with rotating rollers that compress against flexible tubing to efficiently drive fluid forward. The 100 RPM pump generates lower flow rates for smaller columns (≤ 2.5 cm diameter), while the 600 RPM pump generates higher flow rates for larger columns or other general fluid transfers. The simple digital keypad and display provides easy and accurate control of pump speed and flow direction. Combined with the suitable tubing size, optimal flow rates can be achieved for all lab chromatography applications. The KRI Pump can be controlled by the CF-2 Fraction Collector to stop the pump at the end of a run to save solvent and reduce waste.



Features & Benefits

- Easy-to-use & low maintenance
- Portable small foot-print design
- Includes easy loading pump head
- Splash-resistant digital keypad & display
- Accurate & reliable digital speed control
- (Soft) Start/Stop & Reversible
- Remote operation by external controller
- Universal voltage for world-wide operation
- ETL, cETL, CE, RoHS & IP33 Safety Ratings

Pump Drive Specifications

| 2 Drive Types: | 1-100 RPM | 6-600 RPM |
|-------------------|-----------------|------------------|
| Flow Rates: | 0.06-380 ml/min | 0.36-2300 ml/min |
| Speed Resolution: | 0.1 RPM | 1 RPM |
| Speed Accuracy: | +/- 0.25% | +/- 0.25% |
| Motor Power: | 75W | 75W |
| Mains Power: | 90-260V 60/50Hz | 90-260V 60/50Hz |
| Dimensions: | 28 x 21 x 22 cm | 28 x 21 x 22 cm |

Pump Head Specifications

| Tubing Size: | 13 | 14 | 16 | 25 | 17 | 18 |
|-----------------|------------------------------------|------------------------------------|----------------------------------|------------------------------------|----------------------------------|------------------------------------|
| OD x ID (inch): | $\frac{5}{32} \times \frac{1}{32}$ | $\frac{3}{16} \times \frac{1}{16}$ | $\frac{1}{4} \times \frac{1}{8}$ | $\frac{5}{16} \times \frac{3}{16}$ | $\frac{3}{8} \times \frac{1}{4}$ | $\frac{7}{16} \times \frac{5}{16}$ |
| OD x ID (mm): | 4 x 0.8 | 4.8 x 1.6 | 6.3 x 3 | 8 x 4.8 | 9.5 x 6.4 | 11 x 8 |

Flow Rate (ml/min)

| | | | | | | |
|----------------|---------|---------|---------|---------|---------|---------|
| 100 RPM Drive: | 0.06-6 | 0.21-21 | 0.8-80 | 1.7-170 | 2.8-280 | 3.8-380 |
| 600 RPM Drive: | 0.36-36 | 1.3-130 | 4.8-480 | 10-1000 | 17-1700 | 23-2300 |

NEW! KrosFlo® Research Pump-Head

An additional KrosFlo Research Pump-head can be purchased and stack-mounted on the existing pump-head to run 2 columns simultaneously. The quick and easy-to-load pump-head can be used with any flexible tubing with an outer diameter up to 7/16 inch (11.1 mm) and a wall thickness of 1/16 inch (1.6 mm).

Ordering Information: Peristaltic Pumps

| | Part No. | Description | Model | Voltage |
|-------------------|--------------|--|---------|-----------------|
| Peristaltic Pumps | 124868 | KrosFlo Research I Peristaltic Pump (includes pump-head) | 100 RPM | 90-260V 50/60Hz |
| | 146821 | | 600 RPM | |
| | ACR2-H3S-01N | KrosFlo Research Pump-Head | | |



Spectra/Chrom® Flexible Tubing

Spectra manufactures flexible peristaltic pump tubing from 3 different materials, low pressure silicone (LPS), low pressure vinyl (LPV) and low pressure fluoroelastomer (LPF). The 15 and 30 meter lengths of tubing come in easy dispensing shelf boxes that include a Spectra/Chrom Tubing Cutter. Polyethylene and PTFE tubing is also available for general laboratory use (not recommended for use with peristaltic pump).

| Peristaltic Tubing | Best For | Pumping Life |
|--------------------|------------------|-------------------|
| LPS | most solvents | 500 hrs @ 100 RPM |
| LPV | aqueous solvents | 200 hrs @ 100 RPM |
| LPF | organic solvents | 100 hrs @ 100 RPM |

Ordering Information: Chromatography Flexible Tubing

| | Tubing Dimension (inches) | | | Vinyl (LPV) | Silicone (LPS) | LPF | Polyethylene | PTFE | | | | | |
|-----------------|---------------------------|------|------------|-------------|----------------|--------|--------------|--------|--------|--------|--------|--------|--------|
| | Size | OD | ID | | | | | | Wall | | | | |
| Flexible Tubing | - | 1/16 | 0.010 | 0.025 | - | - | - | - | - | 123798 | 123800 | | |
| | | | 0.021 | 0.020 | - | - | - | - | - | 123802 | 123804 | | |
| | | | 1/32 | 1/64 | - | - | - | - | - | 123806 | 123808 | | |
| | | | 0.038 | 0.012 | - | - | - | - | - | 123810 | 123812 | | |
| | - | 0.85 | 0.020 | 1/32 | 123700 | 123702 | 123704 | 123706 | 123708 | 123710 | 123712 | - | - |
| | - | 1/8 | 1/32 | 3/64 | - | - | - | - | - | - | - | 123814 | 123816 |
| | | | 1/16 | 1/32 | 123714 | 123716 | 123718 | 123720 | 123722 | 123724 | 123726 | 123818 | 123820 |
| | | | 0.085 | 0.020 | - | - | - | - | - | - | - | 123822 | 123824 |
| | | | 0.106 | 0.010 | - | - | - | - | - | - | - | 123826 | 123828 |
| | 13 | 5/32 | 1/32 | 1/16 | 123728 | 123730 | 123732 | 123734 | 123736 | 123738 | 123740 | - | - |
| | 14 | 3/16 | 1/16 | 1/16 | 123742 | 123744 | 123746 | 123748 | 123750 | 123752 | 123754 | - | - |
| | 16 | 1/4 | 1/8 | 1/16 | 123756 | 123758 | 123760 | 123762 | 123764 | 123766 | 123768 | 123830 | 123832 |
| | - | 1/4 | 3/16 | 1/32 | 123770 | 123772 | 123774 | 123776 | 123778 | 123780 | 123782 | 123834 | 123836 |
| | 15 | 3/8 | 3/16 | 3/32 | 123838 | 123840 | 123842 | 123844 | 123846 | 123848 | 123850 | - | - |
| | 17 | 3/8 | 1/4 | 1/16 | 123852 | 123854 | 123856 | 123858 | 123860 | 123862 | 123864 | - | - |
| | 18 | 7/16 | 5/16 | 1/16 | 123784 | 123786 | 123788 | 123790 | 123792 | 123794 | 123796 | - | - |
| | - | 1/2 | 5/16 | 3/32 | - | - | 123888 | 123890 | - | - | - | - | - |
| | - | 1/2 | 3/8 | 1/16 | - | - | 123892 | 123894 | - | - | - | - | - |
| | | | Qty | 3m | 30m | 3m | 15m | 3m | 3m | 30m | 3m | 30m | |



Spectra/Chrom® Tubing Cutter

The Spectra/Chrom® Tubing Cutter easily cuts most plastic tubing with 1/2" (13 mm) OD or smaller. The special "V" shape of the tubing holder keeps the tubing perpendicular to the blade to provide a flat, even cut surface. Replacement blades are also available (5/pkg)

| Part No. | Description | Qty |
|----------|--------------------------------------|-------|
| 123367 | Spectra/Chrom Tubing Cutter | 1/pkg |
| 123368 | Replacement Blades for Tubing Cutter | 5/pkg |



Spectra/Chrom® Chromatography Columns

Spectra/Chrom® Columns are versatile, state of the art columns intended for high-quality, classical chromatographic separations using gravity or moderate pressure. There are 2 series of columns to select from depending on the elution chemistry.

1. Aqueous Columns

For use with standard buffers

2. Organic Columns

For use with organic solvents

Column Features

- Use with aqueous and organic solvents
- Wide range of standard sizes
- Non-clogging, high resolution bed supports
- Ascending or descending flow
- Injection/Vent port in upper end-plate

Column End-plates

Made of polypropylene for aqueous columns and PTFE for organic columns, both upper and lower end-plates accept a variety of tubing connectors, special purpose connectors or valves. A set of Multifit Tubing Connectors is included with each column. The upper end-plate also has a multi-purpose vent port that can be used as an air bleed, a sample port or a means to connect optional fittings for introduction of a second fluid stream.

Column Bodies

Made of borosilicate glass and resistant to almost any chromatographic solvent, the column bodies are available in a wide range of diameters, 6–150 mm (¼– 6 in.), and standard lengths, 10– 200 cm (4 –80 in.). Longer columns with a continuous inner bore can be created by using the column extenders to join multiple lengths.

Column Bed Support

All columns & optional adjustable plungers are constructed with non-clogging bed supports made from a thin 10 µm membrane layered over a coarse 50 µm woven grid. This 2 layer membrane reduces the likelihood of clogging, especially when compared to a porous packing support. The coarse grid supports the membrane and minimizes the loss of resolution that can occur when a band passes from the large column bore to the small bore of the outlet tubing.

Column Selection Guide

| Size Feature | Purpose | Benefit |
|-------------------|--|---|
| Long Columns: | fractionation | high resolution |
| Large Diameters: | preparative chromatography | large volume capacity |
| Small Columns: | ion exchange & affinity chromatography | resolution & capacity controlled by elution media |
| Elution Chemistry | Column Materials | Benefit |
| Aqueous Column: | glass, nitrile rubber & polypropylene | economic |
| Organic Column: | glass & inert PTFE | resistant to organic solvents |

Adjustable Plungers

Used in place of one or both end-plates, Spectrum's Adjustable Plungers are bed supports that allow you to adjust the bed height for your particular needs. They are especially useful for reverse (ascending) flow, in-stream injection, conserving gel packing and important bed height exactness. The plunger's 2-layer bed support is the same as the column's, consisting of a 10 µm mesh supported by a 50 µm woven grid to provide a non-clogging support that minimizes eluant band spreading. There are 2 plunger designs based on size, both free of mixing cavities and dead-space.

Small column ID (0.6 – 2.5 cm): Standard capillary passage from the plunger face to an external fitting

Large column ID (5.0 - 15 cm): Tubing through shaft from fitting on back of plunger face to an external fitting

Aqueous and Organic Plungers: available to match the column series & elution chemistry

| Elution Chemistry | Small Column Seal | Large Column Seal |
|-------------------|-----------------------------|--|
| Aqueous Plunger: | non-expanding Viton® O-ring | expanding Viton® O-ring |
| Organic Plunger: | non-expanding Viton® O-ring | expanding Viton® O-ring w/ PTFE shield |



Ordering Information: Chromatography Columns & Adjustable Plungers

| | Length (cm) | Column Diameter (cm) | | | | | | | | |
|-------------------------------|----------------|----------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| | | 0.6 | 0.9 | 1.5 | 2.5 | 5 | 7.5 | 10 | 15 | |
| Chromatography Columns | Aqueous | 10 | 123903 | 123950 | 123952 | 123956 | 123972 | - | - | - |
| | | 15 | 123900 | 124000 | 123954 | 123955 | 124035 | - | - | - |
| | | 20 | 123905 | 124001 | 124008 | 124021 | 123974 | - | - | - |
| | | 30 | 123910 | 124002 | 124010 | 124022 | 124036 | 124046 | 124052 | 124058 |
| | | 40 | 123915 | 124003 | 124012 | 124024 | - | - | 124053 | - |
| | | 45 | - | - | - | 124026 | - | 123975 | - | 124059 |
| | | 50 | 123920 | 124004 | 124013 | 124027 | 124037 | - | 123963 | - |
| | | 60 | 123925 | 124005 | 124014 | 124028 | 124038 | 124047 | 124054 | 124060 |
| | | 70 | 123930 | 123960 | 124016 | 124030 | - | - | 124055 | - |
| | | 75 | - | - | - | - | - | - | - | 124061 |
| | | 80 | 123935 | 123961 | 124017 | 124031 | - | - | 123964 | - |
| | | 90 | 123940 | 123962 | 124018 | 124032 | 124040 | 124048 | 123965 | 123970 |
| | | 100 | 123945 | 124006 | 124020 | 124034 | 124042 | 124049 | 123966 | - |
| | | 120 | - | - | - | 123958 | 124043 | 124050 | 124056 | 124062 |
| | 150 | - | - | - | - | 124044 | 124051 | 123967 | 124064 | |
| | 200 | - | - | - | - | - | - | - | 124066 | |
| | Organic | 10 | - | 125000 | 124970 | 125024 | 125036 | - | - | - |
| | | 15 | 124900 | 125001 | 124971 | - | - | - | - | - |
| | | 20 | 124905 | 125002 | 125009 | 125022 | 124983 | - | - | - |
| | | 30 | 124910 | 125003 | 125011 | 125023 | 125037 | 125047 | 125053 | 125059 |
| | | 40 | 124915 | 125004 | 125013 | 125025 | - | - | 125054 | - |
| | | 45 | - | - | - | 125027 | - | - | - | 125060 |
| | | 50 | 124920 | 124950 | 125014 | 125028 | - | - | 124953 | - |
| | | 60 | 124925 | 125005 | 125015 | 125029 | 125039 | 125048 | 125055 | 125061 |
| | | 70 | 124930 | 125006 | 125017 | 125031 | - | - | 125056 | - |
| | | 75 | - | - | - | - | - | - | - | 125062 |
| 80 | | 124935 | 124951 | 125018 | 125030 | - | - | 124954 | - | |
| 90 | | 124940 | 124952 | 125019 | 125033 | 125041 | 125049 | 124955 | 124959 | |
| 100 | | 124945 | 125007 | 125021 | 125035 | 125043 | 125050 | 124956 | - | |
| 120 | | - | - | - | - | 125044 | 125051 | 125057 | 125063 | |
| 150 | - | - | - | - | 125045 | 125052 | 125058 | 125065 | | |
| 200 | - | - | - | - | - | - | - | 125067 | | |

| | Part No. | Column ID (cm) | Adjustable Length (cm) | |
|----------------------------|----------------|----------------|------------------------|----|
| Adjustable Plungers | Aqueous | 124101 | 0.6 | 10 |
| | | 124100 | 0.9 | |
| | | 124108 | 1.5 | |
| | | 124122 | 2.5 | |
| | | 124136 | 5.0 | 32 |
| | | 124142 | 7.5 | |
| | | 124146 | 10 | |
| | 124152 | 15 | | |
| | Organic | 125100 | 0.6 | 10 |
| | | 125101 | 0.9 | |
| | | 125109 | 1.5 | |
| | | 125123 | 2.5 | 16 |
| | | 125139 | 5.0 | 32 |
| | | 125141 | 7.5 | |
| 125147 | | 10 | | |
| 125149 | 15 | | | |

Related Products:

- Column Extenders* pg 78
- Packing Reservoirs* pg 78
- Water Jackets* pg 78
- Support Hardware* pg 80
- Valves & Fittings* pg 80
- Column Bed Supports* pg 82



Column Extenders

Column Extenders are frequently used to facilitate packing chromatography columns with soft media. They securely connect two columns with the same ID end-to-end to accommodate a large volume of dilute gel slurry. As the buffer drains, the extended column minimizes convection currents that commonly occur with funnels, allowing the gel to settle evenly and providing a uniform packing. To pack gels that require pressure, attach an upper end-plate to the upper column and drive packing buffer through the column with an MP-1 Peristaltic Pump. After the gel is sufficiently packed, the upper column and Column Extender are removed and the lower packed column is ready for use.

Spectrum offers two types for different elution chemistries:

- Polypropylene Extenders for Aqueous Columns
- PTFE Extenders for Organic Columns



Packing Reservoirs

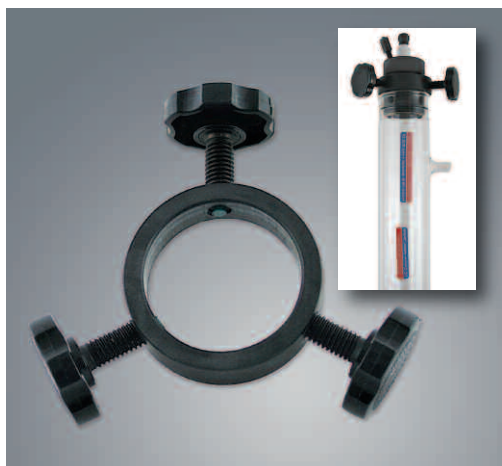
As an alternative to using a second column for slurry packing, a Packing Reservoir can be attached to the top of a column with a Column Extender to smoothly extend the inner bore of the column and minimize disruption of the packed bed. The spherical body of the packing reservoir reduces the height requirements (as compared to using a second column) while the neck of the reservoir matches the column size to minimize eddy currents.

The Packing Reservoir can also be used as a solvent reservoir for a gravity driven separation. Simply attach an upper end-plate to the reservoir and then connect the end-plate to a column with a length of flexible tubing. The spherical shape of the reservoir reduces the rate of changing head pressure as the solvent passes through the column.



Water Jackets

Spectrum offers removable glass Water Jackets for controlling the temperature of the column packing. Available for columns with dimensions ranging from 0.6 cm ID x 15 cm L to 5.0 cm ID x 150 cm L, the jacket easily slips over the column and is secured by clamping to a stand. Water is circulated through the jacket via two 1/4" hose barbs. The tooled ends assure a tight fit while the nitrile O-Rings prevent water leakage. Depending on the column diameter, a Support Ring (sold separately) may be recommended to secure the chromatography column.



Support Ring for Water Jacket

For column diameters of 2.5 cm or larger, a support ring should be attached to the upper column collar to prevent the column from slipping through the Water Jacket. The Support Ring is not necessary for column diameters of 1.5 cm or less since the end plate design is sufficient to support the column.

Related Products:

- [Spectra/Chrom® Chromatography Columns](#)
- [Adjustable Plungers](#)
- [Column Support Hardware](#)

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Ordering Information: Column Accessories (Column Extenders, Packing Reservoirs, Water Jackets & Support Rings)

| Column Accessories | Column Extenders | Part No. | Column ID | Type | Qty | |
|--------------------|------------------|----------------------------|-----------|-----------------|--------|--------|
| | | 124339 | 0.6 cm | Aqueous Columns | 1/pkg | |
| | | 124340 | 0.9 cm | | | |
| | | 124342 | 1.5 cm | | | |
| | | 124344 | 2.5 cm | | | |
| | | 124346 | 5.0 cm | | | |
| | | 124347 | 7.5 cm | | | |
| | | 124348 | 10 cm | | | |
| | | 125352 | 0.6 cm | Organic Columns | 1/pkg | |
| | | 125353 | 0.9 cm | | | |
| 125355 | 1.5 cm | | | | | |
| 125357 | 2.5 cm | | | | | |
| 125359 | 5.0 cm | | | | | |
| 125360 | 7.5 cm | | | | | |
| 125361 | 10 cm | | | | | |
| Part No. | Column ID | Volume | Qty | | | |
| Packing Reservoirs | 124352 | 0.6 cm | 125 ml | 1/pkg | | |
| | 124354 | 0.9 cm | 300 ml | | | |
| | 124356 | 1.5 cm | 300 ml | | | |
| | 124358 | 2.5 cm | 1000 ml | | | |
| | 124360 | 5.0 cm | 3000 ml | | | |
| | 124361 | 7.5 cm | 5000 ml | | | |
| | 124362 | 10 cm | 5000 ml | | | |
| | Length (cm) | Column Inner Diameter (cm) | | | | |
| | 0.6 | 0.9 | 1.5 | 2.5 | 5.0 | |
| Water Jackets | 15 | 123200 | 124280 | - | - | - |
| | 20 | 123201 | 124281 | 124288 | 124301 | 124317 |
| | 30 | 123202 | 124282 | 124290 | 124302 | 124316 |
| | 40 | 123203 | 124283 | 124292 | 124304 | - |
| | 50 | 123204 | 123212 | 124293 | 124307 | - |
| | 60 | 123205 | 124284 | 124294 | 124308 | 124318 |
| | 70 | 123206 | 124285 | 124296 | 124310 | - |
| | 80 | 123207 | 123213 | 124297 | 124311 | - |
| | 90 | 123208 | 123214 | 124298 | 124312 | 124320 |
| | 100 | 123209 | 124286 | 124300 | 124314 | 124322 |
| | 120 | - | - | - | 124315 | 124323 |
| | 150 | - | - | - | - | 124324 |
| Part No. | Column ID | Qty | | | | |
| Support Rings | 124326 | 1.5 cm | 1/pkg | | | |
| | 124328 | 2.5 cm | | | | |
| | 124330 | 5.0 cm | | | | |



Column Support Hardware

Spectrum offers a broad selection of accessories for supporting chromatography columns with a wide range of diameters and lengths; including lab stands, support rods, bases, rings and other weight-bearing equipment.

Selection Guide for Support Hardware Based on Column Size

| Column Diameters | Column Length | Support Stand System (longer rods sold separately) | Column Support Rings | Mounting Insert Kit |
|-----------------------|---------------|---|--------------------------|--|
| 0.6 cm 0.9 cm | < 30 cm | Bench Top Mini-stand (incl. one 50 cm Support Rod) | Two 2.5 cm Support Rings | Kit for appropriate column diameter (Kit not required for 2.5 cm dia. column) |
| 1.5 cm & 2.5 cm | 30 - 90 cm | Bench Top Work Station (incl. two 100 cm Support Rods) | | |
| | > 90 cm | "H" Base & Set of Support Rods, 150 cm | | |
| | < 90 cm | Bench Top Work Station (incl. two 100 cm Support Rods) | Two 5.0 cm Support Rings | None required |
| 5.0 cm | 90 - 120 cm | "H" Base & Set of Support Rods, 150 cm | | |
| | > 120 cm | Floor Model Work Station & 200 cm instrument rod | | |
| 7.5 cm 10 cm | < 60 cm | Bench Top Work Station (incl. two 100 cm Support Rods) | Two 2.5 cm Support Rings | Mounting Insert Kit for 7.5 - 15 cm dia. |
| & 15 cm | > 60 cm | Floor Model Work Station & Set of Telescoping Rods of appropriate length | None required | None required |

Note: Support rods should always be at least 20 cm longer than the column. Telescoping rods should match the column length exactly.



Hardware Accessories: Valves & Fittings

Spectrum offers an assortment of Valves & Fittings for chromatography columns to make tubing connection, flow control and sample injection easier. Valve & fitting sizes should match tubing OD to ensure tight seals.

Multifit Connectors

Spectrum offers two types of Multifit Connectors for connecting flexible tubing to the column end-plates: Aqueous Series with an O-ring for gripping the tubing and Organic Series with a PTFE ferrule. Neither connector type is designed for use above 50 psi.

Multifit Valves

This valve with its own Multifit connector serves to replace the standard tubing fitting by connecting to the flexible tubing and screwing directly into the column end-plate.

Metering Valves

Instead of altering reservoir heights which can be cumbersome, in-line Metering Valves provide a simple and convenient means to control the flow rate for gravity-fed chromatography.

Sample Injection Fittings

The simplest method to introduce a sample for chromatographic separation is using a syringe and needle to pierce the septum of a Sample Injection Fitting. Two types are available depending on the preferred location for injection. The first type has 1/8" inlet / outlet compression fittings and is placed "In-Line" with the tubing. The second type screws directly into the column upper end-plate to replace the Multifit Connector with 2 sizes for connecting to either 1/8" or 3/16" OD tubing.

Ordering Information: Column Accessories (Column Support Hardware, Valves & Fittings)

| | | Part No. | Description | Rod Length (cm) | Qty | | |
|----------------------|---|-------------------------|------------------------------------|---|--------------------------------------|----------|------------|
| | | Column Support Hardware | Bench Top Stand | 123321 | Bench Top Mini-stand with single rod | 50 | 1 |
| 123320 | Bench Top Work Station with 2 rods | | | 100 | | | |
| 123322 | H-Base Stand, holds up to 4 rods, rods not included | | | - | | | |
| 123324 | Rods for use with H-Base Stand | | | 15 | set of 2 | | |
| 123326 | | | | 30 | | | |
| 123328 | | | | 50 | | | |
| 123330 | | | | 100 | | | |
| 123331 | | | 150 | | | | |
| | | | Part No. | Description | Column ID (cm) | Qty | |
| | | | 123334 | Column support ring (2 required) | 2.5 | 1 | |
| | | | 123353 | Insert kit for 123334, 1 insert kit and 2 rings required per column | 0.6 | 1 kit | |
| | | | 123354 | | 0.9 | | |
| | | | 123355 | | 1.5 | | |
| | | | 123317 | | 7.5 to 15 | | |
| | | 123339 | Column support ring (2 required) | 5 | 1 | | |
| | | Part No. | Description | Column Length (cm) | Qty | | |
| | Floor Stand | 123300 | Floor Model Work Station | | 1 | | |
| | | | 123302 | Set of Telescoping rods for use with the Floor Model Work Station, Length of column must match rod length. Only 1 set of rods required per column. Only for 7.5 cm diameter and larger columns. | 30 | set of 2 | |
| | | | 123303 | | 40 | | |
| | | | 123305 | | 50 | | |
| | | | 123304 | | 60 | | |
| | | | 123307 | | 70 | | |
| | | | 123309 | | 80 | | |
| | | | 123306 | | 90 | | |
| | | | 123308 | | 100 | | |
| | | | 123310 | | 120 | | |
| | | | 123312 | | 150 | | |
| | | | 123314 | 200 | | | |
| | | | 123318 | Replacement mounting pin set for Floor Model Work Station | - | 4/pkg | |
| | | Part No. | Description | Column Length (cm) | Qty | | |
| Hardware Accessories | Connectors | 124380 | Column Multifit Connector, Aqueous | 1/16 | 1/pkg | | |
| | | 124384 | | 1/8 | | | |
| | | 124391 | | 3/16 | | | |
| | | 124390 | | 1/4 | | | |
| | | 124487 | | 1/8 | | | |
| | | 124489 | | 3/16 | | | |
| | | 124488 | | 1/4 | | | |
| | | 124491 | | 1/2 | | | |
| | | | Part No. | Description | Column Length (cm) | Qty | |
| | | Valves | 124414 | Column Multifit Shut-off Valve | 1/16 | 1/pkg | |
| | | | | | 124420 | | 1/8 |
| | | | | | 124426 | | 1/4 |
| | | | | | 124432 | | 1/8 |
| | | | | | 124508 | | 1/8 to 1/8 |
| | | | 124514 | 1/8 to 1/4 | | | |
| | | | Part No. | Description | Column Length (cm) | Qty | |
| | | Fittings | 124474 | In-line Injection Fitting | 1/8 to 1/8 | 1/pkg | |
| | | | | 124376 | Column Injection Fitting | | 1/8 |
| | | | 124378 | Column Injection Fitting | 3/16 | | |
| | | | 124576 | Replacement Silicone Septa | | | |
| | | | 124579 | Replacement PTFE lined Silicone Septa | | | |



Disposable Mini-Columns

Spectrum's Disposable Mini-Columns are ideal for economic chromatographic separations that require speed and simplicity such as sample preparation, desalting and concentration. Designed with a wide-brimmed reservoir to make packing quick and easy, the Mini-Columns are available in 2 column body materials; clear polystyrene for visibility and translucent polypropylene for solvent resistance. 3 bed support porosities are available to accommodate a variety of media.

Product Specifications

| | |
|--------------|--|
| 2 Materials: | Ultra-pure polystyrene Ultra-pure polypropylene |
| Bed Support: | Polyethylene (15, 45 & 90 μ m) |
| Packaging: | 20/pkg |

| Dimensions: | Column | Reservoir |
|-------------|-----------|------------|
| Volume: | 3 ml | 4.5 ml |
| Length: | 6 cm | 3.5 cm |
| ID x OD: | 8 x 10 mm | 13 x 15 mm |



Bed Support & Woven Mesh

The 2 layer bed supports used in our Aqueous and Organic series chromatography columns are field replaceable. The 10 micron inner mesh is held in place with a plastic ring, simply take a new piece of mesh, snap it in place with the ring, and trim the excess with a sharp blade. Make sure the piece you start with is at least a little bigger than the column diameter.

The 50 μ m coarse woven mesh is pre-cut for each column size. This is layered beneath the 10 μ m bed support and used to maintain the column resolution.

Product Specifications

| | |
|--------------------|---|
| 3 Material Types: | Nylon, PTFE & polypropylene |
| 2 Mesh Openings: | 10 μ m & 50 μ m |
| 3 Pkg. Dimensions: | 4 x 4 in. square, 6 x 6 in. square, 1 sq. yd. |



Sample Application Baskets

The Sample Application Basket is specifically designed for laying a sample on the column bed. The basket consists of a clear acrylic shell with an open top and a replaceable 10 μ m nylon mesh base. Use a wire hook to submerge and maneuver the basket beneath a layer of buffer onto the gel bed. (Baskets are not for use with organic solvents.)

Product Specifications

| | |
|----------------------|--|
| 8 Column Dia. Sizes: | 0.6, 0.9, 1.5, 2.5, 5.0, 7.5, 10 & 15 cm |
| Basket: | Acrylic |
| Base: | 10 μ m nylon mesh |

Ordering Information: Disposables & Consumables (Mini-Columns, Woven Mesh & Sample Baskets)

| Chromatography Disposables & Consumables | | | | | | Disposable Mini-Columns | | | | | | | |
|--|--|---|-----------|--|--|--|-------------------------|-------------|--------------|--|--|--------|---------------------------|
| | | | | | | Part No. | Description | Material | Pore Size | Qty | | | |
| Chromatography Disposables & Consumables | | | | | | 104700 | Disposable Mini-Columns | Polystyrene | 90 µm | 20/pkg | | | |
| | | | | | | 104701 | | | 45 µm | | | | |
| 104702 | 15 µm | | | | | | | | | | | | |
| 104703 | Polypropylene | 90 µm | 20/pkg | | | | | | | | | | |
| 104704 | | 45 µm | | | | | | | | | | | |
| 104705 | | 15 µm | | | | | | | | | | | |
| Chromatography Disposables & Consumables | | | | | | Part No. | Description | Material | Mesh Opening | Size | | | |
| | | | | | | Chromatography Disposables & Consumables | | | | | | 124080 | Bed Support Cloth |
| 124082 | 6 x 6 in. | | | | | | | | | | | | |
| 124084 | 1 sq.yd. | | | | | | | | | | | | |
| 124086 | PTFE | 10 µm | 4 x 4 in. | | | | | | | | | | |
| 124088 | | 6 x 6 in. | | | | | | | | | | | |
| 124090 | | 1 sq.yd. | | | | | | | | | | | |
| Chromatography Disposables & Consumables | | | | | | 524006 | Flow Dispersing Grid | PTFE | 50 µm | For 0.6 cm diameter aqueous or organic series column | | | |
| | | | | | | 524009 | | | | For 0.9 cm diameter aqueous or organic series column | | | |
| 524015 | For 1.5 cm diameter aqueous or organic series column | | | | | | | | | | | | |
| 524025 | For 2.5 cm diameter organic series column | | | | | | | | | | | | |
| 524050 | For 5 cm diameter organic series column | | | | | | | | | | | | |
| 524075 | For 7.5 cm diameter organic series column | | | | | | | | | | | | |
| 524110 | For 10 cm diameter organic series column | | | | | | | | | | | | |
| 524115 | For 15 cm diameter organic series column | | | | | | | | | | | | |
| 124025 | Polypropylene | For 2.5 cm diameter aqueous series column | | | | | | | | | | | |
| 124500 | | For 5 cm diameter aqueous series column | | | | | | | | | | | |
| 124075 | | For 7.5 cm diameter aqueous series column | | | | | | | | | | | |
| 124110 | | For 10 cm diameter aqueous series column | | | | | | | | | | | |
| 124115 | | For 15 cm diameter aqueous series column | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Chromatography Disposables & Consumables | | | | | | Part No. | Description | Column ID | Qty | | | | |
| | | | | | | Chromatography Disposables & Consumables | | | | | | 124261 | Sample Application Basket |
| 124262 | 0.9 cm | | | | | | | | | | | | |
| 124264 | 1.5 cm | | | | | | | | | | | | |
| 124266 | 2.5 cm | | | | | | | | | | | | |
| 124268 | 5.0 cm | | | | | | | | | | | | |
| 124269 | 7.5 cm | | | | | | | | | | | | |
| 124270 | 10 cm | | | | | | | | | | | | |
| 124272 | 15 cm | | | | | | | | | | | | |



DynaGard® Syringe Tip Filters

Ideal for HPLC and chromatography, DynaGard's looped hollow fiber membrane maximizes surface area while reducing membrane plugging. The narrow housing device minimizes hold-up volume and easily withdraws & dispenses from ampules & test tubes. Available with either 0.2 μm hydrophilic mixed cellulose ester (ME) fibers for use with aqueous solutions or 0.2 μm hydrophobic polypropylene (PP) fibers for use with organic solvents and alcohols.

| | ME DynaGard® | | | PP DynaGard® | |
|------------------------|--|---------------------|---------------------|--------------------------------|---------------------|
| Housing: | Polycarbonate (blue) | | | Polypropylene (white) | |
| HF Membrane: | Hydrophilic Mixed Cellulose Ester (ME) | | | Hydrophobic Polypropylene (PP) | |
| Potting: | Epoxy | | | Epoxy | |
| Specifications: | 3 Sizes | | | 2 Sizes | |
| Membrane SA: | 2.5 cm ² | 3.4 cm ² | 5.5 cm ² | 0.8 cm ² | 3.9 cm ² |
| Filtration Volume: | < 5 ml | 1 – 10 ml | 5 – 20 ml | < 5 ml | 5 – 20 ml |
| Hold-up Volume: | < 18 μl | < 23 μl | < 35 μl | < 8 μl | < 30 μl |
| Pore Rating: | 0.2 μm | 0.2 μm | 0.2 μm | 0.2 μm | 0.2 μm |
| Housing Length: | 3.0 cm | 4.3 cm | 5.4 cm | 3.0 cm | 5.4 cm |
| Housing Diameter: | 0.5 cm | 0.6 cm | 0.6 cm | 0.6 cm | 0.6 cm |
| Top/Bottom End: | FLL/ML Slip | FLL/MLL | FLL/ML Slip | FLL/ML Slip | FLL/ML Slip |
| Available Irradiated: | YES | YES | YES | NO | NO |

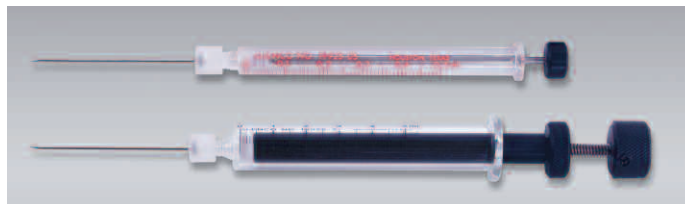
Ordering Information: DynaGard® Syringe Tip Filters

| | Part No. | Description | Pore Rating | SA | Irradiated | Qty | |
|---|-------------------------------|--------------|---------------------------|-------------------|---------------------|-----|---------------------|
| Chromatography Disposables & Consumables | DynaGard® Syringe Tip Filters | DG2M-110-50S | ME for Aqueous filtration | 0.2 μm | 2.5 cm ² | YES | 50/pkg |
| | | DG2M-110-200 | | | | NO | 200/pkg |
| | | DG2M-23L-50S | | | 3.4 cm ² | YES | 50/pkg |
| | | DG2M-23L-100 | | | | NO | 100/pkg |
| | | DG2M-330-50S | | | 5.5 cm ² | YES | 50/pkg |
| | | DG2M-330-100 | | | | NO | 100/pkg |
| | | DG2P-110-200 | PP for Organic Filtration | 0.2 μm | 0.8 cm ² | NO | 200/pkg |
| | | DG2P-320-100 | | | | | 3.9 cm ² |

Glenco Gas/Liquid Syringes

Constructed with glass, PTFE and stainless steel for sample contact, Glenco Gas/Liquid Syringes are ideally suited for handling almost any gas or liquid. The flat plunger face found on both the fixed tension and adjustable tension plungers maximizes sample displacement. The syringes are available with replaceable needles as well as with fixed (cemented in place) needles. The removable needle syringes have a threaded tip (1/4" x 28 threads/in) for use with a variety of accessories.

The interchangeable plungers make replacing broken glass barrels economical. The adjustable tension plungers are ideal for storing samples in syringes. The tension can be tightened to hold the plunger in place for storage or transport and then loosened to add or remove sample. Adjustable tension plungers are available with either a fixed (cemented) needle or a removable needle (1/4" x28 thread/in tip).



Ordering Information: Glenco Gas/Liquid Syringes

| | Syringe Type & Description | Part No. | Syringe | | Needle Dimensions (in) | | | Qty | | |
|---|----------------------------|---|---------|--------|------------------------|--------------|---------------|--------------|---------------|---------------|
| | | | Vol. | Grad. | Length | Size | OD x ID | | | |
| Glenco Gas / Liquid Syringes | Conventional | 185190 | 50 µl | 1 µl | 2 | 22 G | 0.028 x 0.006 | 1/pkg | | |
| | | 185549 | | | 3 | | | | | |
| | | 185191 | 100 µl | 2 µl | 2 | | | | | |
| | | 185551 | | | 3 | | | | | |
| | | 185192 | 250 µl | 5 µl | 2 | | | | | |
| | | 185553 | | | 3 | | | | | |
| | | 185193 | 500 µl | 10 µl | 2 | 22 G | 0.028 x 0.016 | | | |
| | | 185554 | | | 3 | | | | | |
| | | 185194 | 1.0 ml | 10 µl | 2 | | | | | |
| | | 185556 | | | 3 | | | | | |
| | | 185195 | 2.5 ml | 50 µl | 2 | | | | 22 G | 0.028 x 0.016 |
| | | 185390 | 5.0 ml | 0.1 ml | | | | | | |
| | | 185391 | 10 ml | 0.5 ml | | | | | | |
| | | 185392 | 20 ml | 0.5 ml | | | | | | |
| | | 185393 | 50 ml | 1.0 ml | | | | | | |
| | | 185394 | 100 ml | 1.0 ml | | | | | | |
| | | Gas/Liquid syringe with constant tension plunger and removable blunt (flat-ended) needle. | 185558 | 2.5 ml | 50 µl | 2 | 22 G | | 0.028 x 0.016 | |
| | | Gas/Liquid syringe with constant tension plunger and fixed (cemented in place) needle | 185200 | 50 µl | 1 µl | 2 | 22 G | | 0.028 x 0.006 | |
| 185201 | 100 µl | | 2 µl | | | | | | | |
| 185202 | 250 µl | | 5 µl | | | | | | | |
| 185203 | 500 µl | | 10 µl | | | | | | | |
| 185204 | 1 ml | | 10 µl | | | | | | | |
| 185205 | 2.5 ml | | 50 µl | | | | | | | |
| 185420 | 5 ml | | 0.1 ml | 22 G | 0.028 x 0.016 | | | | | |
| 185421 | 10 ml | | 0.1 ml | | | | | | | |
| 185422 | 20 ml | | 0.5 ml | | | | | | | |
| 185423 | 50 ml | | 1.0 ml | | | | | | | |
| 185424 | 100 ml | 1.0 ml | | | | | | | | |
| Gas/Liquid syringe with adjustable tension plunger and removable screw hub needle. | 185210 | 5 ml | 0.1 ml | 2 | 22 G | 0.28 x 0.016 | | | | |
| | 185211 | 10 ml | 0.1 ml | | | | | | | |
| | 185212 | 20 ml | 0.5 ml | | | | | | | |
| | 185213 | 50 ml | 1.0 ml | | | | | | | |
| | 185214 | 100 ml | 1.0 ml | | | | | | | |
| | 185219 | 5 ml | 0.1 ml | | | | 22 G | 0.28 x 0.016 | | |
| | 185220 | 10 ml | 0.1 ml | | | | | | | |
| | 185221 | 20 ml | 0.5 ml | | | | | | | |
| | 185222 | 50 ml | 1.0 ml | | | | | | | |
| | 185223 | 100 ml | 1.0 ml | | | | | | | |
| Gas/Liquid syringe with adjustable tension plunger and fixed (cemented in place) needle | 185219 | 5 ml | 0.1 ml | 2 | 22 G | 0.28 x 0.016 | | | | |
| | 185220 | 10 ml | 0.1 ml | | | | | | | |
| | 185221 | 20 ml | 0.5 ml | | | | | | | |
| | 185222 | 50 ml | 1.0 ml | | | | | | | |
| | 185223 | 100 ml | 1.0 ml | | | | | | | |



Spectra/Gel® Ion Exchange Resin

Spectrum offers a complete range of Ion Exchange Resins for preparative scale chromatography, ideal for protein purification, antibody isolation, peptide fractionation as well as traditional inorganic ion exchange. Spectra/Gel® Resins are durable, insoluble and compatible with most aqueous and organic solvents. Select from the 3 cross-link ratios, 3 bead sizes and 2 ionic resin forms.

3 Cross-link Ratios Available

The structural polymeric backbone of the resin is styrene cross-linked with divinylbenzene. Higher levels of cross-linkage provide higher resin capacities and smaller molecular pore sizes. While they have little impact in inorganic ion exchange, pore sizes possess significant exclusion limits for globular proteins. Spectrum offers 3 cross-linkage types with corresponding capacities and pore sizes.

| Cross-Linkage | Resin Capacity | Pore Size |
|---------------|----------------|-----------|
| 2% | 0.6 meq/ml | 3,000 D |
| 4% | 1.0 meq/ml | 1,500 D |
| 8% | 1.2 meq/ml | 1,000 D |

3 Bead Sizes Available

Spectrum offers 3 resin bead sizes, each providing a unique advantage for different chromatography applications:

| Bead Size | Diameter | Application Type | Advantage |
|-----------|------------|---|--|
| Small | 40–75 µm | Pump Flow | Reduces plate height providing a more rapid equilibration at higher flow rates |
| Medium | 75–150 µm | Pump Flow Gravity Flow Batch (non-flow) | One universal size for all types of applications |
| Large | 150–300 µm | Gravity Flow Batch (non-Flow) | Ready-flow & easy separation from a bulk liquid |

2 Ionic Resin Forms Available

The type of ion exchange performed depends on the charge of the functional groups covalently linked to the polymeric resin. Spectrum offers 2 ionic forms: negatively charged for cation affinity and positively charged for anion affinity.

| Specifications: | Cation Affinity Exchange Resin | Anion Affinity Exchange Resin |
|-------------------|---|--|
| Type: | Type 50 strong acid cation exchanger | Type 1 strong base anion exchanger |
| Active Group: | Sulfonic Acid | Trimethylbenzylammonium |
| Ionic Form: | H ⁺ | Cl ⁻ |
| Selectivity: | Ba ⁺⁺ > Rb ⁺⁺ > Ca ⁺⁺ > Mg ⁺⁺ > Be ⁺⁺ > Ag ⁺ > Cs ⁺ > Rb ⁺ > K ⁺ > NH ₄ ⁺ > Na ⁺ > H ⁺ > Li ⁺ | I ⁻ > NO ₃ ⁻ > Br ⁻ > Cl ⁻ > OH ⁻ > F ⁻ |
| Moisture Content: | 51–54% | 43–48% |

Ordering Information: Spectra/Gel® Ion Exchange Resin

| | | Part No. | Description | Capacity (meq/ml) | Cross Linkage | Bead Size (µm) | Mesh Size | Qty |
|--------------------|------------------------------|----------|--------------------------------|-------------------|---------------|----------------|-----------|---------------|
| Ion Exchange Resin | Cation | 122000 | Cation Exchange Resin, IE 50X2 | 0.6 | 2% | 40-75 | 200-400 | 0.5 kg (1 lb) |
| | | 122005 | | | | 75-150 | 100-200 | |
| | | 122010 | | | | 150-300 | 50-100 | |
| | | 122025 | Cation Exchange Resin, IE 50X4 | 1.2 | 4% | 150-300 | 50-100 | |
| | | 122030 | Cation Exchange Resin, IE 50X8 | 1.7 | 8% | 40-75 | 200-400 | |
| | | 122040 | | | | 150-300 | 50-100 | |
| | Anion | 122045 | Anion Exchange Resin, IE 1X2 | 0.6 | 2% | 40-75 | 200-400 | 0.5 kg (1 lb) |
| | | 122050 | | | | 75-150 | 100-200 | |
| | | 122055 | | | | 150-300 | 50-100 | |
| | | 122060 | Anion Exchange Resin, IE 1X4 | 1.0 | 4% | 40-75 | 200-400 | |
| 122070 | | 150-300 | | | | 50-100 | | |
| 122075 | Anion Exchange Resin, IE 1X8 | 1.2 | 8% | 40-75 | 200-400 | | | |
| 122080 | | | | 75-150 | 100-200 | | | |
| 122085 | | | | 150-300 | 50-100 | | | |

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

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

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