

# CHROMATOGRAPHY



**KIMBLE**  **CHASE**

**Your source for  
chromatography  
glassware.**

***Chromaflex<sup>®</sup>, Flex-Column<sup>®</sup>  
and Disposaflex<sup>®</sup>  
Chromatography Columns***  
*pages 2-17*

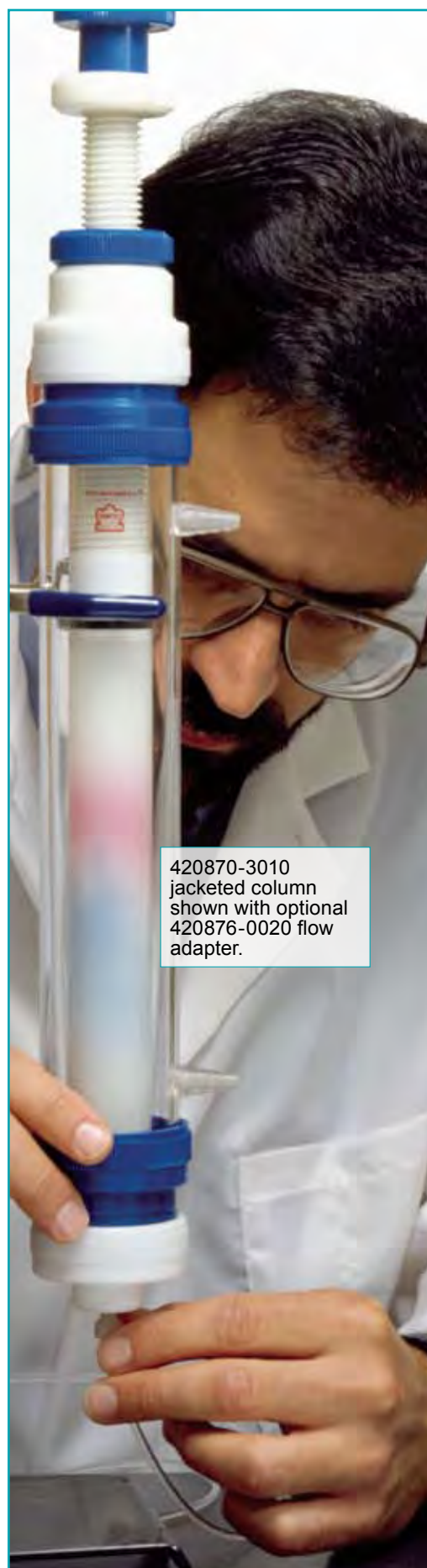
***TLC Tanks, Sprayers and  
Accessories***  
*pages 18-21*

***Ultra-Ware<sup>®</sup> HPLC Mobile  
Phase Handling Systems***  
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***Chromatography Vials and  
Accessories***  
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420870-3010  
jacketed column  
shown with optional  
420876-0020 flow  
adapter.

## CHROMAFLEX Columns

CHROMAFLEX Chromatography Columns have a unique design feature: PTFE shielded o-rings. Each end fitting has a thin PTFE layer that is curled over the o-ring to form a solvent resistant, leak free seal. CHROMAFLEX Columns can be used with all aqueous buffers without modification and with organic solvents when the optional PTFE bed supports are installed in the end fittings and flow adapters. CHROMAFLEX Columns are available in both standard and water jacketed versions.

## Standard CHROMAFLEX Columns

Standard CHROMAFLEX Columns are available in three IDs (1.0, 2.5 and 4.8 cm) in five standard lengths (15, 30, 60, 100 and 120 cm). Each column is supplied with two PTFE end fittings with 20 µm porosity polyethylene bed supports, 5 feet PTFE tubing (1/16" OD tubing with 1.0 cm, 1/8" OD tubing with 2.5 & 4.8 cm), 2 flangeless tubing nuts and 2 flangeless ferrules.

## Jacketed CHROMAFLEX Columns

Jacketed CHROMAFLEX Columns are provided with an acrylic water jacket to provide thermal control of temperature sensitive chromatographic separations. The acrylic jacket also acts as a safety shield. Jacketed columns are available in all of the standard CHROMAFLEX Column sizes and supplied with the same tubing, nuts and ferrules.

## Flow Adapters

CHROMAFLEX Flow Adapters allow easy adjustment of the column bed volume. They are ideal for concentration and pH gradients, reverse flow separations, and gravity flow separations that require a high level of resolution and reproducibility. Flow adapters are available for all three standard ID columns.

## Packing Reservoirs

The CHROMAFLEX Glass Reservoirs are ideal for packing gel slurries into columns and as buffer reservoirs for simple gravity flow chromatography. Each reservoir has been designed for easy mounting on all CHROMAFLEX Columns. The reservoir capacities are matched by column ID to take the amount of slurry required to pack the longest standard column. The reservoir end fitting has 1/4-28 threads for simple flangeless connection to a pump.

## Flangeless 1/4-28 Fittings

All tubing connections to CHROMAFLEX Columns can be made with easy-to-use 1/4-28 flangeless fittings and either 1/16" OD, 1/8" OD or 1.8 mm OD tubing. Our complete line of fittings and adapters allow simple connection to any chromatography system.

## Custom Length Columns

Certain applications may require a column length not found in our standard product offering. Please contact customer service for pricing and delivery details for custom length CHROMAFLEX Columns.

## Specifications

### Materials

|                              |                                       |
|------------------------------|---------------------------------------|
| <b>Column Barrels:</b>       | Type I, Class A Borosilicate Glass    |
| <b>End Fitting:</b>          | Polytetrafluoroethylene (PTFE)        |
| <b>Bed Support:</b>          | High Density Polyethylene (HDPE)      |
| <b>Water/Safety Jacket:</b>  | Acrylic (jacketed columns only)       |
| <b>Jacket Sealing Rings:</b> | Polypropylene (jacketed columns only) |

|                              |                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>Bed Support Porosity:</b> | 20 micron nominal (for standard bed support)                                                                     |
| <b>Maximum Pressure*:</b>    | 1.0 cm ID Columns - 100 psi (6.9 bar) 2.5 cm ID Columns<br>75 psi (5.2 bar) 4.8 cm ID Columns - 50 psi (3.4 bar) |
| <b>Temperature Range:</b>    | 0 to 50 °C                                                                                                       |
| <b>Tubing Connections:</b>   | 1/4-28 flangeless fittings                                                                                       |

|                                          |                                                                             |
|------------------------------------------|-----------------------------------------------------------------------------|
| <b>Recommended Sterilization Method:</b> | Ethylene Oxide, 2N NaOH or 100% Ethanol<br>(autoclaving is not recommended) |
|------------------------------------------|-----------------------------------------------------------------------------|

## CHROMAFLEX® Standard Threaded Columns

Columns are supplied complete with glass barrel and 2 end fittings with 20 µm porosity HDPE bed supports. Each column is also supplied with 5 feet (1.5 m) of FEP tubing (1/16" OD with 1.0 cm; 1/8" OD with 2.5 and 4.8 cm), 2 flangeless tubing nuts and 2 flangeless ferrules.

| Catalog Number | Column ID (cm) | Length (cm) | Volume (mL) | Max. Pressure* (psi/bar) | Case Qty. |
|----------------|----------------|-------------|-------------|--------------------------|-----------|
| 420830-1500    | 1.0            | 15          | 12          | 100/6.9                  | 1         |
| 420830-3000    | 1.0            | 30          | 24          | 100/6.9                  | 1         |
| 420830-6000    | 1.0            | 60          | 47          | 100/6.9                  | 1         |
| 420830-1000    | 1.0            | 100         | 79          | 100/6.9                  | 1         |
| 420830-1200    | 1.0            | 120         | 95          | 100/6.9                  | 1         |
| 420830-1510    | 2.5            | 15          | 74          | 75/5.2                   | 1         |
| 420830-3010    | 2.5            | 30          | 147         | 75/5.2                   | 1         |
| 420830-6010    | 2.5            | 60          | 295         | 75/5.2                   | 1         |
| 420830-1010    | 2.5            | 100         | 491         | 75/5.2                   | 1         |
| 420830-1210    | 2.5            | 120         | 589         | 75/5.2                   | 1         |
| 420830-1520    | 4.8            | 15          | 271         | 50/3.4                   | 1         |
| 420830-3020    | 4.8            | 30          | 543         | 50/3.4                   | 1         |
| 420830-6020    | 4.8            | 60          | 1086        | 50/3.4                   | 1         |
| 420830-1020    | 4.8            | 100         | 1810        | 50/3.4                   | 1         |
| 420830-1220    | 4.8            | 120         | 2172        | 50/3.4                   | 1         |

### Replacement Parts

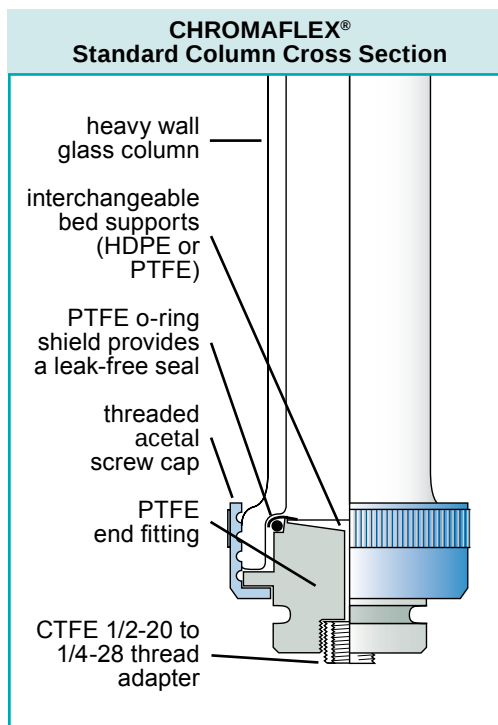
|             |                                   |    |
|-------------|-----------------------------------|----|
| 420831-1500 | Glass Barrel Only, 1.0 x 15 cm    | 1  |
| 420831-3000 | Glass Barrel Only, 1.0 x 30 cm    | 1  |
| 420831-6000 | Glass Barrel Only, 1.0 x 60 cm    | 1  |
| 420831-1000 | Glass Barrel Only, 1.0 x 100 cm   | 1  |
| 420831-1200 | Glass Barrel Only, 1.0 x 120 cm   | 1  |
| 420831-1510 | Glass Barrel Only, 2.5 x 15 cm    | 1  |
| 420831-3010 | Glass Barrel Only, 2.5 x 30 cm    | 1  |
| 420831-6010 | Glass Barrel Only, 2.5 x 60 cm    | 1  |
| 420831-1010 | Glass Barrel Only, 2.5 x 100 cm   | 1  |
| 420831-1210 | Glass Barrel Only, 2.5 x 120 cm   | 1  |
| 420831-1520 | Glass Barrel Only, 4.8 x 15 cm    | 1  |
| 420831-3020 | Glass Barrel Only, 4.8 x 30 cm    | 1  |
| 420831-6020 | Glass Barrel Only, 4.8 x 60 cm    | 1  |
| 420831-1020 | Glass Barrel Only, 4.8 x 100 cm   | 1  |
| 420831-1220 | Glass Barrel Only, 4.8 x 120 cm   | 1  |
| 420832-2100 | 1.0 cm End Fitting w/ Bed Support | 1  |
| 420832-2110 | 2.5 cm End Fitting w/ Bed Support | 1  |
| 420832-2120 | 4.8 cm End Fitting w/ Bed Support | 1  |
| 420811-2010 | Bed Support, HDPE, 1.0 cm, 20 µm  | 10 |
| 420811-2020 | Bed Support, HDPE, 2.5 cm, 20 µm  | 10 |
| 420811-2040 | Bed Support, HDPE, 4.8 cm, 20 µm  | 10 |
| 420833-0000 | Screw Cap, 1.0 cm                 | 1  |
| 420833-0010 | Screw Cap, 2.5 cm                 | 1  |
| 420833-0020 | Screw Cap, 4.8 cm                 | 1  |

### Accessories

|             |                                  |   |
|-------------|----------------------------------|---|
| 420809-0510 | Bed Support, PTFE, 1.0 cm, 5 µm  | 1 |
| 420809-0520 | Bed Support, PTFE, 2.5 cm, 5 µm  | 1 |
| 420809-0540 | Bed Support, PTFE, 4.8 cm, 5 µm  | 1 |
| 420809-1010 | Bed Support, PTFE, 1.0 cm, 10 µm | 1 |
| 420809-1020 | Bed Support, PTFE, 2.5 cm, 10 µm | 1 |
| 420809-1040 | Bed Support, PTFE, 4.8 cm, 10 µm | 1 |
| 420809-2010 | Bed Support, PTFE, 1.0 cm, 20 µm | 1 |
| 420809-2020 | Bed Support, PTFE, 2.5 cm, 20 µm | 1 |
| 420809-2040 | Bed Support, PTFE, 4.8 cm, 20 µm | 1 |

### \* CAUTION

Pressurized glassware should always be used with adequate safety shielding.



## CHROMAFLEX® Jacketed Threaded Columns

Columns are supplied complete with glass barrel, water jacket and 2 end fittings with 20 µm porosity HDPE bed supports. Each column is also supplied with 5 feet (1.5 m) of FEP tubing (1/16" OD with 1.0 cm; 1/8" OD with 2.5 and 4.8 cm), 2 flangeless tubing nuts and 2 flangeless ferrules.

| Catalog Number | Column ID (cm) | Length (cm) | Volume (mL) | Max. Pressure* (psi/bar) | Case Qty. |
|----------------|----------------|-------------|-------------|--------------------------|-----------|
| 420870-1500    | 1.0            | 15          | 12          | 100/6.9                  | 1         |
| 420870-3000    | 1.0            | 30          | 24          | 100/6.9                  | 1         |
| 420870-6000    | 1.0            | 60          | 47          | 100/6.9                  | 1         |
| 420870-1000    | 1.0            | 100         | 79          | 100/6.9                  | 1         |
| 420870-1200    | 1.0            | 120         | 95          | 100/6.9                  | 1         |
| 420870-1510    | 2.5            | 15          | 74          | 75/5.2                   | 1         |
| 420870-3010    | 2.5            | 30          | 147         | 75/5.2                   | 1         |
| 420870-6010    | 2.5            | 60          | 295         | 75/5.2                   | 1         |
| 420870-1010    | 2.5            | 100         | 491         | 75/5.2                   | 1         |
| 420870-1210    | 2.5            | 120         | 589         | 75/5.2                   | 1         |
| 420870-1520    | 4.8            | 15          | 271         | 50/3.4                   | 1         |
| 420870-3020    | 4.8            | 30          | 543         | 50/3.4                   | 1         |
| 420870-6020    | 4.8            | 60          | 1086        | 50/3.4                   | 1         |
| 420870-1020    | 4.8            | 100         | 1810        | 50/3.4                   | 1         |
| 420870-1220    | 4.8            | 120         | 2172        | 50/3.4                   | 1         |

### Replacement Parts

|             |                                   |    |
|-------------|-----------------------------------|----|
| 420831-1500 | Glass Barrel Only, 1.0 x 15 cm    | 1  |
| 420831-3000 | Glass Barrel Only, 1.0 x 30 cm    | 1  |
| 420831-6000 | Glass Barrel Only, 1.0 x 60 cm    | 1  |
| 420831-1000 | Glass Barrel Only, 1.0 x 100 cm   | 1  |
| 420831-1200 | Glass Barrel Only, 1.0 x 120 cm   | 1  |
| 420831-1510 | Glass Barrel Only, 2.5 x 15 cm    | 1  |
| 420831-3010 | Glass Barrel Only, 2.5 x 30 cm    | 1  |
| 420831-6010 | Glass Barrel Only, 2.5 x 60 cm    | 1  |
| 420831-1010 | Glass Barrel Only, 2.5 x 100 cm   | 1  |
| 420831-1210 | Glass Barrel Only, 2.5 x 120 cm   | 1  |
| 420831-1520 | Glass Barrel Only, 4.8 x 15 cm    | 1  |
| 420831-3020 | Glass Barrel Only, 4.8 x 30 cm    | 1  |
| 420831-6020 | Glass Barrel Only, 4.8 x 60 cm    | 1  |
| 420831-1020 | Glass Barrel Only, 4.8 x 100 cm   | 1  |
| 420831-1220 | Glass Barrel Only, 4.8 x 120 cm   | 1  |
| 420832-4100 | 1.0 cm End Fitting w/ Bed Support | 1  |
| 420832-4110 | 2.5 cm End Fitting w/ Bed Support | 1  |
| 420832-4120 | 4.8 cm End Fitting w/ Bed Support | 1  |
| 420811-2010 | Bed Support, HDPE, 1.0 cm, 20 µm  | 10 |
| 420811-2020 | Bed Support, HDPE, 2.5 cm, 20 µm  | 10 |
| 420811-2040 | Bed Support, HDPE, 4.8 cm, 20 µm  | 10 |
| 420833-1000 | Screw Cap, 1.0 cm                 | 1  |
| 420833-1010 | Screw Cap, 2.5 cm                 | 1  |
| 420833-1020 | Screw Cap, 4.8 cm                 | 1  |

### Accessories

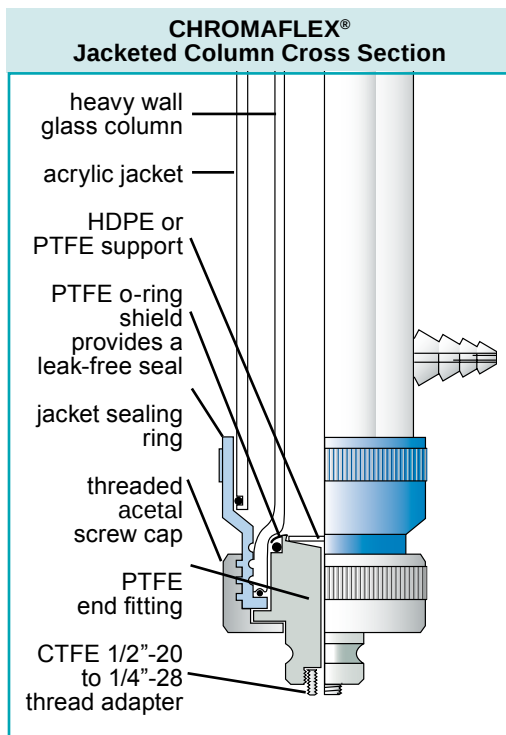
|             |                                  |   |
|-------------|----------------------------------|---|
| 420809-0510 | Bed Support, PTFE, 1.0 cm, 5 µm  | 1 |
| 420809-0520 | Bed Support, PTFE, 2.5 cm, 5 µm  | 1 |
| 420809-0540 | Bed Support, PTFE, 4.8 cm, 5 µm  | 1 |
| 420809-1010 | Bed Support, PTFE, 1.0 cm, 10 µm | 1 |
| 420809-1020 | Bed Support, PTFE, 2.5 cm, 10 µm | 1 |
| 420809-1040 | Bed Support, PTFE, 4.8 cm, 10 µm | 1 |
| 420809-2010 | Bed Support, PTFE, 1.0 cm, 20 µm | 1 |
| 420809-2020 | Bed Support, PTFE, 2.5 cm, 20 µm | 1 |
| 420809-2040 | Bed Support, PTFE, 4.8 cm, 20 µm | 1 |

### \* CAUTION

Pressurized glassware should always be used with adequate safety shielding.



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## CHROMAFLEX® Flow Adapters

Flow Adapters improve chromatogram resolution by delivering the sample and buffer directly to the top of the gel bed. This protects the gel bed from disruption during sample loading and eliminates any dead volume above the gel bed. Flow adapters are recommended when using buffer gradients, during reverse flow applications, and for high resolution gravity flow separations. Each flow adapter is supplied with a 20 µm porosity HDPE bed support, TFE / propylene o-ring, stainless steel adjusting rod, PTFE body and 5 feet (1.5 meters) of FEP tubing. Use of aggressive organic solvents requires the accessory PTFE bed supports and FFKM o-rings listed below.

### For Standard Columns

| Catalog Number | Fits Column ID (cm) | Tubing OD | Case Qty. |
|----------------|---------------------|-----------|-----------|
| 420836-0000    | 1.0                 | 1/16"     | 1         |
| 420836-1620    | 2.5                 | 1/16"     | 1         |
| 420836-0020    | 2.5                 | 1/8"      | 1         |
| 420836-0040    | 4.8                 | 1/8"      | 1         |

### For Jacketed Columns

| Catalog Number | Fits Column ID (cm) | Tubing OD | Case Qty. |
|----------------|---------------------|-----------|-----------|
| 420876-0000    | 1.0                 | 1/16"     | 1         |
| 420876-1620    | 2.5                 | 1/16"     | 1         |
| 420876-0020    | 2.5                 | 1/8"      | 1         |
| 420876-0040    | 4.8                 | 1/8"      | 1         |

### Flow Adapter Replacement Parts

| Catalog Number | Description                                 | Fits Column ID | Case Qty. |
|----------------|---------------------------------------------|----------------|-----------|
| 420811-2011    | Bed Support, HDPE, 20 µm porosity           | 1.0 cm         | 10        |
| 420811-2020    | Bed Support, HDPE, 20 µm porosity           | 2.5 cm         | 10        |
| 420811-2040    | Bed Support, HDPE, 20 µm porosity           | 4.8 cm         | 10        |
| 758260-0010    | O-ring, TFE/Propylene, Size 010             | 1.0 cm         | 1         |
| 758260-0116    | O-ring, TFE/Propylene, Size 116             | 2.5 cm         | 1         |
| 758260-0222    | O-ring, TFE/Propylene, Size 222             | 4.8 cm         | 1         |
| 420828-0116    | Ferrule, Polypropylene, for 1/16" OD tubing | 1.0 / 2.5      | 1         |
| 420828-0018    | Ferrule, ETFE, for 1/8" OD tubing           | 2.5 / 4.8      | 1         |
| 420823-0116    | Tubing, FEP, 1/16" OD x 10 feet             | 1.0 / 2.5      | 1         |
| 420823-0018    | Tubing, FEP, 1/8" OD x 10 feet              | 2.5 / 4.8      | 1         |

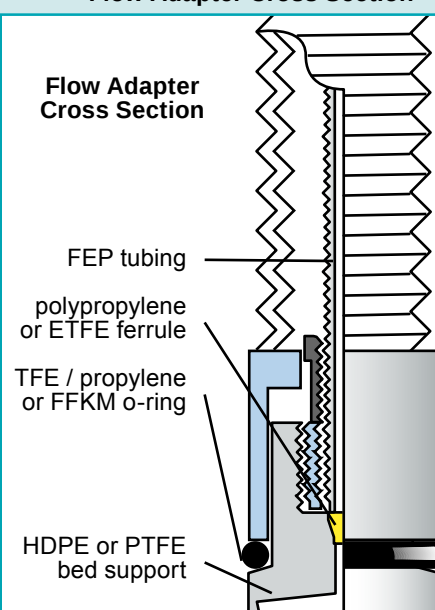
### Flow Adapter Accessory Parts

| Catalog Number | Description                       | Fits Columns ID | Case Qty. |
|----------------|-----------------------------------|-----------------|-----------|
| 420809-0510    | Bed Support, PTFE, 5 µm porosity  | 1.0 cm          | 1         |
| 420809-0520    | Bed Support, PTFE, 5 µm porosity  | 2.5 cm          | 1         |
| 420809-0540    | Bed Support, PTFE, 5 µm porosity  | 4.8 cm          | 1         |
| 420809-1011    | Bed Support, PTFE, 10 µm porosity | 1.0 cm          | 1         |
| 420809-1020    | Bed Support, PTFE, 10 µm porosity | 2.5 cm          | 1         |
| 420809-1040    | Bed Support, PTFE, 10 µm porosity | 4.8 cm          | 1         |
| 420809-2011    | Bed Support, PTFE, 20 µm porosity | 1.0 cm          | 1         |
| 420809-2020    | Bed Support, PTFE, 20 µm porosity | 2.5 cm          | 1         |
| 420809-2040    | Bed Support, PTFE, 20 µm porosity | 4.8 cm          | 1         |
| 758240-0010    | O-ring, FFKM, Size 010            | 1.0 cm          | 1         |
| 758240-0116    | O-ring, FFKM, Size 116            | 2.5 cm          | 1         |
| 758240-0222    | O-ring, FFKM, Size 222            | 4.8 cm          | 1         |



420870-3010 shown with optional 420876-0020 flow adapter.

CHROMAFLEX®  
Flow Adapter Cross Section



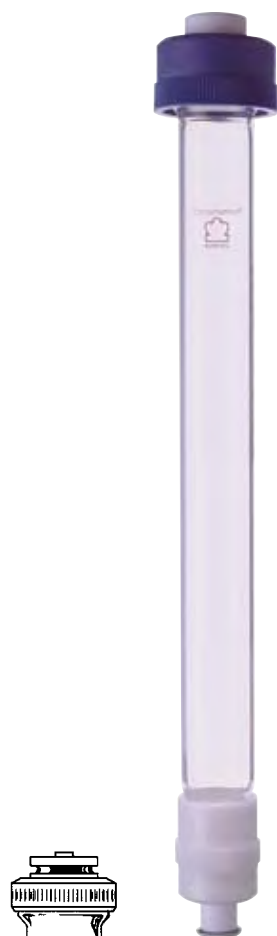
## CHROMAFLEX® Packing Reservoirs for Standard Columns

The CHROMAFLEX Packing Reservoirs are ideal for packing gel slurries into columns. Each packing reservoir is designed for easy mounting on CHROMAFLEX Standard Columns. The capacities are matched to take the amount of gel slurry required to pack the longest column. The packing reservoirs may also be used as a buffer reservoir for gravity flow chromatography.

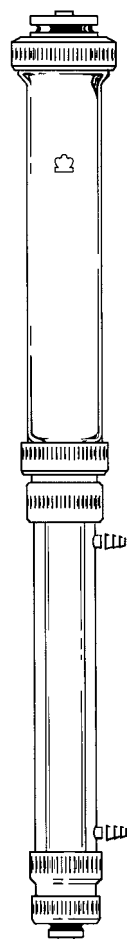
For Standard Columns Only

| Catalog Number | Fits Column ID (cm) | Nominal Volume | Case Qty. |
|----------------|---------------------|----------------|-----------|
| 420837-0000    | 1.0                 | 150 mL         | 1         |
| 420837-0020    | 2.5                 | 500 mL         | 1         |
| 420837-0040    | 4.8                 | 2000 mL        | 1         |

| CHROMAFLEX Columns - Column bed height and approximate volume data. |             |             |                  |             |                   |             |                                        |
|---------------------------------------------------------------------|-------------|-------------|------------------|-------------|-------------------|-------------|----------------------------------------|
| Without Adapters                                                    |             |             | With One Adapter |             | With Two Adapters |             | Maximum Pressure                       |
| ID (cm)                                                             | Length (cm) | Volume (mL) | Bed Height (cm)  | Volume (mL) | Bed Height (cm)   | Volume (mL) | (psi)<br>(must use with safety jacket) |
| 1                                                                   | 15          | 12          | 1-13             | 1-10        | 0-11              | 0-8         |                                        |
| 1                                                                   | 30          | 24          | 16-28            | 12-22       | 2-26              | 2-20        |                                        |
| 1                                                                   | 60          | 47          | 46-58            | 36-46       | 32-56             | 25-44       | 100                                    |
| 1                                                                   | 100         | 78          | 86-98            | 67-77       | 72-96             | 56-75       |                                        |
| 1                                                                   | 120         | 94          | 106-118          | 83-93       | 92-116            | 72-91       |                                        |
| 2.5                                                                 | 15          | 74          | 1-13             | 5-64        | 0-11              | 0-54        |                                        |
| 2.5                                                                 | 30          | 147         | 16-28            | 78-137      | 2-26              | 10-128      |                                        |
| 2.5                                                                 | 60          | 294         | 46-58            | 226-285     | 32-56             | 157-275     | 75                                     |
| 2.5                                                                 | 100         | 490         | 86-98            | 421-480     | 72-96             | 352-470     |                                        |
| 2.5                                                                 | 120         | 589         | 106-118          | 520-579     | 92-116            | 451-569     |                                        |
| 4.8                                                                 | 15          | 271         | 1-13             | 18-235      | 0-11              | 0-199       |                                        |
| 4.8                                                                 | 30          | 543         | 16-28            | 289-506     | 2-26              | 36-470      |                                        |
| 4.8                                                                 | 60          | 1085        | 46-58            | 832-1049    | 32-56             | 579-1013    | 50                                     |
| 4.8                                                                 | 100         | 1808        | 86-98            | 1555-1772   | 72-96             | 1302-1736   |                                        |
| 4.8                                                                 | 120         | 2170        | 106-118          | 1917-2134   | 92-116            | 1664-2098   |                                        |
| 10                                                                  | 15          | 1000        |                  |             |                   |             | not rated<br>(no safety jacket avail.) |
| 10                                                                  | 30          | 2000        |                  |             |                   |             |                                        |
| 10                                                                  | 60          | 5000        |                  |             |                   |             |                                        |
| 10                                                                  | 100         | 7670        |                  |             |                   |             |                                        |
| 10                                                                  | 120         | 9000        |                  |             |                   |             |                                        |



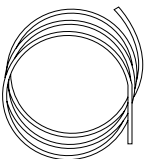
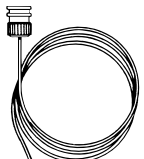
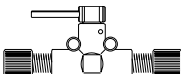
420837

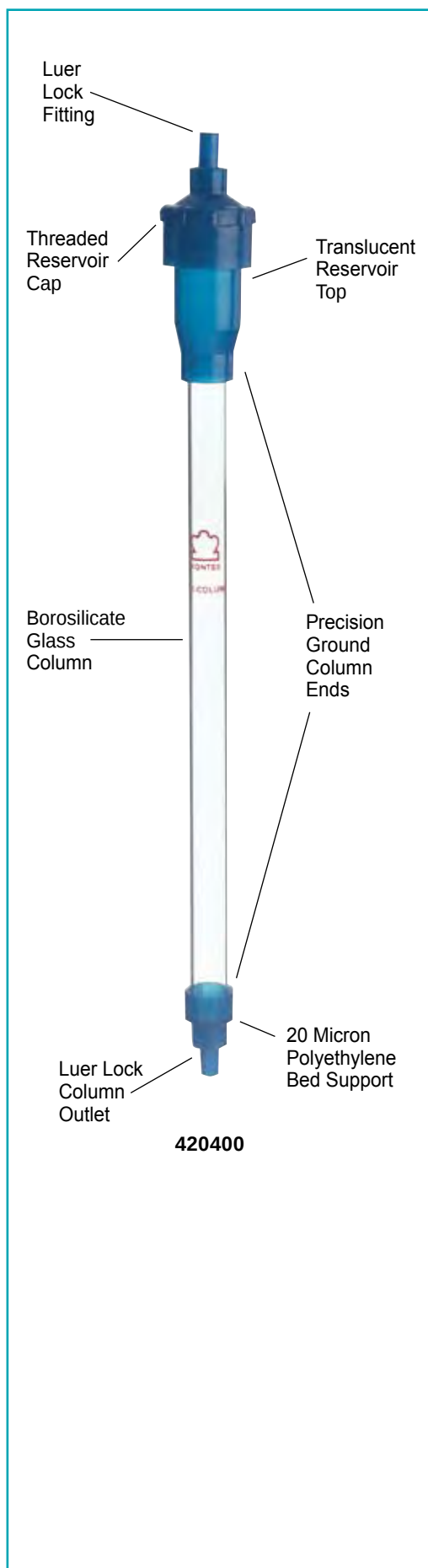


Jacketed Column with Packing Reservoir Attached

## CHROMAFLEX® FITTINGS

The following tubing nuts and ferrules are required to make the initial tubing connections to the end fittings of Chromaflex Columns.

| Catalog Number |                                                                                     | Description                                                  | Material                              | Case Qty. |
|----------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------|-----------|
| 420826-0116    |    | Tubing Nut, for 1/16" OD tubing                              | PEEK                                  | 1         |
| 420826-0018    |                                                                                     | Tubing Nut, for 1/8" OD tubing                               | PEEK                                  | 1         |
| 420827-0116    |    | Ferrule, for 1/16" OD tubing                                 | PEEK                                  | 1         |
| 420828-0116    |                                                                                     | Ferrule, for 1/16" OD tubing                                 | Polypropylene                         | 1         |
| 420827-0018    |                                                                                     | Ferrule, for 1/8" OD tubing                                  | PEEK                                  | 1         |
| 420828-0018    |                                                                                     | Ferrule, for 1/8" OD tubing                                  | Polypropylene                         | 1         |
| 953918-2306    |    | Adapter, M1/4-28 Thread to 1/16" Barb                        | ETFE                                  | 1         |
| 953918-2313    |    | Adapter, M1/4-28 Thread to 1/8" Barb                         | ETFE                                  | 1         |
| 953918-2319    |    | Adapter, M1/4-28 Thread to 3/16" Barb                        | ETFE                                  | 1         |
| 420821-0116    |    | Flangeless Nut, 1/4-28 Thread, for 1/16" tubing              | ETFE                                  | 1         |
| 420821-0018    |                                                                                     | Flangeless Nut, 1/4-28 Thread, for 1/8" and 1.8mm OD tubing  | ETFE                                  | 1         |
| 420821-6116    |    | Flangeless Nut, M6 Thread, for 1/16" tubing                  | Acetal                                | 1         |
| 420821-0618    |                                                                                     | Flangeless Nut, M6 Thread, for 1/8" and 1.8mm OD tubing      | Acetal                                | 1         |
| 420822-0116    |    | Flangeless Ferrule, for 1/16" OD tubing                      | ETFE                                  | 1         |
| 420822-2007    |                                                                                     | Flangeless Ferrule, for 1.8 mm OD tubing                     | ETFE                                  | 1         |
| 420822-0018    |                                                                                     | Flangeless Ferrule, for 1/8" OD tubing                       | ETFE                                  | 1         |
| 420823-0014    |   | Tubing, 1/4" OD x 0.030" ID x 10 feet                        | FEP                                   | 1         |
| 420823-0116    |                                                                                     | Tubing, 1/16" OD x 0.038" ID x 10 feet                       | FEP                                   | 1         |
| 420823-0018    |                                                                                     | Tubing, 1/8" OD x 0.062" ID x 10 feet                        | FEP                                   | 1         |
| H90669-0005    |  | Tubing, 1/16" OD x 5 feet, with integral F-Luer fitting      | Tubing - PTFE<br>Luer - CTFE          | 5         |
| H88800-0000    |  | Union, F1/4-28 to F1/4-28                                    | CTFE                                  | 1         |
| 420818-0000    |                                                                                     | Union, F1/4-28 to F1/4-28                                    | ETFE                                  | 1         |
| 420818-0600    |                                                                                     | Union, F1/4-28 to F-M6                                       | ETFE                                  | 1         |
| 420818-0606    |                                                                                     | Union, F-M6 to F-M6                                          | ETFE                                  | 1         |
| 953924-1300    |  | Union, M1/4-28 to M1/4-28                                    | CTFE                                  | 1         |
| 420817-2306    |  | Valve, 1-way, 1/4-28 Threads, with 1/16" Flangeless Fittings | Valve - ETFE<br>Fittings - ETFE       | 1         |
| 420817-2313    |                                                                                     | Valve, 1-way, 1/4-28 Threads, with 1/8" Flangeless Fittings  | Valve - ETFE<br>Fittings - ETFE       | 1         |
| 420817-3306    |                                                                                     | Valve, 1-way, 1/4-28 Threads, with 1/16" Flangeless Fittings | Valve - PEEK<br>Fittings - PEEK/ ETFE | 1         |
| 420817-3313    |                                                                                     | Valve, 1-way, 1/4-28 Threads, with 1/8" Flangeless Fittings  | Valve - PEEK<br>Fittings - PEEK/ ETFE | 1         |



FLEX-COLUMNS are economical, easy-to-use chromatography columns that are ideal for use with gel filtration, ion exchange, affinity and adsorption media. The columns are constructed of polypropylene reservoirs and column outlets permanently connected to a borosilicate glass barrel. The 20 µm porosity polyethylene bed supports are fixed in the column outlets. Luer lock inlets and outlets on the columns, along with a wide variety of adapters, valves and fittings provide simple and versatile tubing connections.

## Standard Columns

Standard FLEX-COLUMNS are available in 30 different sizes with standard inside diameters of 0.7, 1.0, 1.5 and 2.5 cm and lengths ranging from 4 to 120 cm. All columns are fitted with translucent polypropylene reservoir tops, and bed supports that are permanently mounted in the polypropylene column outlet. Short columns are typically used for ion exchange chromatography, sample desalting and semidisposable applications, while the long columns are ideally suited for gel filtration and adsorption chromatography.

## Flow Adapters

FLEX-COLUMN Flow Adapters allow easy adjustment of the column bed volume. They are ideal for concentration and pH gradients, reverse flow separations, and gravity flow separations that require a high level of resolution and reproducibility. Flow adapters are available for 1.0, 1.5 and 2.5 cm ID columns.

## Luer Lock Fittings

The male luer lock fittings on all FLEX-COLUMNS along with our complete line of fittings, valves and adapters allow easy connection to any low pressure chromatography system.

## Custom Length Columns

Certain applications may require a column length not found in our standard product offering. Please contact Customer Service for pricing and delivery details for custom length FLEX-COLUMNS. Call 888-546-2531.

## Specifications

### Materials:

|                                            |                                      |
|--------------------------------------------|--------------------------------------|
| <b>Column Barrels:</b>                     | Type I, Class A Borosilicate Glass   |
| <b>Cap, Reservoir &amp; Column Outlet:</b> | Polypropylene                        |
| <b>Bed Support:</b>                        | High Density Polyethylene (HDPE)     |
| <b>Bed Support Porosity:</b>               | 20 micron nominal                    |
| <b>Maximum Pressure:</b>                   | 1.0 bar (14.7 psi, 1.0 atm, 0.1 MPa) |
| <b>Temperature Range:</b>                  | 0 to 50 °C                           |
| <b>Tubing Connections:</b>                 | Male Luer Locks                      |

|                                          |                                                              |
|------------------------------------------|--------------------------------------------------------------|
| <b>Recommended Sterilization Method:</b> | 2N NaOH or 100% Ethanol<br>(Autoclaving is not recommended.) |
|------------------------------------------|--------------------------------------------------------------|

**Note:** Polypropylene end fittings are NOT replaceable on FLEX-COLUMNS.

### \* CAUTION

Pressurized glassware should always be used with adequate safety shielding.

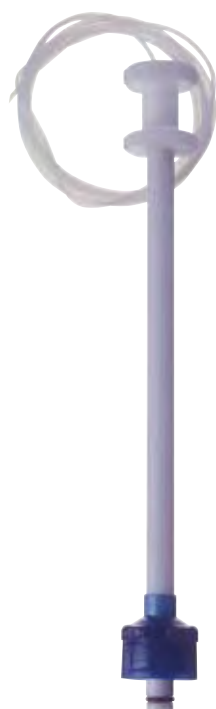
## FLEX-COLUMN® Economy Columns

| Catalog Number | ID (cm) | Length (cm) | Cross Sectional Area (cm <sup>2</sup> ) | Volume (mL) | Case Qty. | Catalog Number | ID (cm) | Length (cm) | Cross Sectional Area (cm <sup>2</sup> ) | Volume (mL) | Case Qty. |
|----------------|---------|-------------|-----------------------------------------|-------------|-----------|----------------|---------|-------------|-----------------------------------------|-------------|-----------|
| 420400-0704    | 0.7     | 4           | 0.39                                    | 2           | 10        | 420400-1505    | 1.5     | 5           | 1.77                                    | 9           | 5         |
| 420401-0704    | 0.7     | 4           | 0.39                                    | 2           | 1         | 420401-1505    | 1.5     | 5           | 1.77                                    | 9           | 1         |
| 420400-0705    | 0.7     | 5           | 0.39                                    | 2           | 10        | 420400-1510    | 1.5     | 10          | 1.77                                    | 18          | 5         |
| 420401-0705    | 0.7     | 5           | 0.39                                    | 2           | 1         | 420401-1510    | 1.5     | 10          | 1.77                                    | 18          | 1         |
| 420400-0710    | 0.7     | 10          | 0.39                                    | 4           | 10        | 420400-1515    | 1.5     | 15          | 1.77                                    | 27          | 5         |
| 420401-0710    | 0.7     | 10          | 0.39                                    | 4           | 1         | 420401-1515    | 1.5     | 15          | 1.77                                    | 27          | 1         |
| 420400-0715    | 0.7     | 15          | 0.39                                    | 6           | 10        | 420400-1520    | 1.5     | 20          | 1.77                                    | 35          | 5         |
| 420401-0715    | 0.7     | 15          | 0.39                                    | 6           | 1         | 420401-1520    | 1.5     | 20          | 1.77                                    | 35          | 1         |
| 420400-0720    | 0.7     | 20          | 0.39                                    | 8           | 10        | 420400-1530    | 1.5     | 30          | 1.77                                    | 53          | 5         |
| 420401-0720    | 0.7     | 20          | 0.39                                    | 8           | 1         | 420401-1530    | 1.5     | 30          | 1.77                                    | 53          | 1         |
| 420400-0730    | 0.7     | 30          | 0.39                                    | 12          | 10        | 420400-1550    | 1.5     | 50          | 1.77                                    | 89          | 5         |
| 420401-0730    | 0.7     | 30          | 0.39                                    | 12          | 1         | 420401-1550    | 1.5     | 50          | 1.77                                    | 89          | 1         |
| 420400-0750    | 0.7     | 50          | 0.39                                    | 20          | 10        | 420400-1575    | 1.5     | 75          | 1.77                                    | 124         | 3         |
| 420401-0750    | 0.7     | 50          | 0.39                                    | 20          | 1         | 420401-1575    | 1.5     | 75          | 1.77                                    | 124         | 1         |
| 420400-1005    | 1.0     | 5           | 0.79                                    | 4           | 10        | 420400-1511    | 1.5     | 100         | 1.77                                    | 177         | 3         |
| 420401-1005    | 1.0     | 5           | 0.79                                    | 4           | 1         | 420401-1511    | 1.5     | 100         | 1.77                                    | 177         | 1         |
| 420400-1010    | 1.0     | 10          | 0.79                                    | 8           | 10        | 420400-1512    | 1.5     | 120         | 1.77                                    | 230         | 3         |
| 420401-1010    | 1.0     | 10          | 0.79                                    | 8           | 1         | 420401-1512    | 1.5     | 120         | 1.77                                    | 230         | 1         |
| 420400-1015    | 1.0     | 15          | 0.79                                    | 12          | 10        | 420400-1517    | 1.5     | 170         | 1.77                                    | 301         | 2         |
| 420401-1015    | 1.0     | 15          | 0.79                                    | 12          | 1         | 420401-1517    | 1.5     | 170         | 1.77                                    | 301         | 1         |
| 420400-1020    | 1.0     | 20          | 0.79                                    | 16          | 10        | 420400-2505    | 2.5     | 5           | 4.91                                    | 25          | 5         |
| 420401-1020    | 1.0     | 20          | 0.79                                    | 16          | 1         | 420401-2505    | 2.5     | 5           | 4.91                                    | 25          | 1         |
| 420400-1030    | 1.0     | 30          | 0.79                                    | 24          | 10        | 420400-2510    | 2.5     | 10          | 4.91                                    | 49          | 5         |
| 420401-1030    | 1.0     | 30          | 0.79                                    | 24          | 1         | 420401-2510    | 2.5     | 10          | 4.91                                    | 49          | 1         |
| 420400-1050    | 1.0     | 50          | 0.79                                    | 40          | 10        | 420400-2515    | 2.5     | 15          | 4.91                                    | 74          | 5         |
| 420401-1050    | 1.0     | 50          | 0.79                                    | 40          | 1         | 420401-2515    | 2.5     | 15          | 4.91                                    | 74          | 1         |
| 420401-1011    | 1.0     | 100         | 0.79                                    | 79          | 1         | 420400-2520    | 2.5     | 20          | 4.91                                    | 98          | 5         |
| 420400-1012    | 1.0     | 120         | 0.79                                    | 95          | 3         | 420401-2520    | 2.5     | 20          | 4.91                                    | 98          | 1         |
| 420401-1012    | 1.0     | 120         | 0.79                                    | 95          | 1         | 420400-2530    | 2.5     | 30          | 4.91                                    | 147         | 5         |
|                |         |             |                                         |             |           | 420401-2530    | 2.5     | 30          | 4.91                                    | 147         | 1         |
|                |         |             |                                         |             |           | 420400-2550    | 2.5     | 50          | 4.91                                    | 246         | 3         |
|                |         |             |                                         |             |           | 420401-2550    | 2.5     | 50          | 4.91                                    | 246         | 1         |
|                |         |             |                                         |             |           | 420400-2575    | 2.5     | 75          | 4.91                                    | 344         | 2         |
|                |         |             |                                         |             |           | 420401-2575    | 2.5     | 75          | 4.91                                    | 344         | 1         |
|                |         |             |                                         |             |           | 420400-2511    | 2.5     | 100         | 4.91                                    | 491         | 2         |
|                |         |             |                                         |             |           | 420401-2511    | 2.5     | 100         | 4.91                                    | 491         | 1         |
|                |         |             |                                         |             |           | 420401-2512    | 2.5     | 120         | 4.91                                    | 638         | 1         |
|                |         |             |                                         |             |           | 420400-2512    | 2.5     | 120         | 4.91                                    | 638         | 2         |

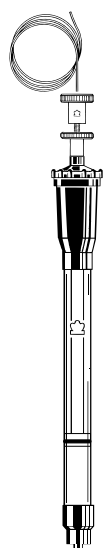
## Replacement End Caps

| Catalog Number | Case Qty. |
|----------------|-----------|
| 420169-0000    | 100       |

| Plastic Resin Codes |                                 | Temp °C (Max) | Temp °C (Min) | Autoclavable | Microwavable | Dry Heat | Gas | Gamma | Disinfectants |
|---------------------|---------------------------------|---------------|---------------|--------------|--------------|----------|-----|-------|---------------|
| Abbreviation        | Chemical Designation            |               |               |              |              |          |     |       |               |
| ABS                 | Acryl-Butadienestyrene Acetal   | 100           | 40            | NO           | YES          | NO       | YES | YES   | YES           |
| LDPE                | Low Density Polyethylene        | 100           | 80            | NO           | YES          | NO       | YES | YES   | YES           |
| HDPE                | High Density Polyethylene       | 120           | 100           | NO           | YES          | NO       | YES | YES   | YES           |
| NYL                 | Polyamide                       | 90            | 0             | NO           | YES          | NO       | YES | YES   | YES           |
| PCTFE               | Polychlorotrifluoroethylene     | 80            | 0             | NO           | YES          | NO       | YES | YES   | YES           |
| PC                  | Polycarbonate                   | 135           | 0             | YES          | YES          | NO       | YES | YES   | YES           |
| PP                  | Polypropylene                   | 135           | 0             | YES          | YES          | NO       | YES | NO    | YES           |
| PTFE                | Polytetrafluoroethylene         | 250           | 267           | YES          | YES          | YES      | YES | YES   | YES           |
| PVC                 | Polyvinyl Chloride              | 70            | 30            | NO           | YES          | NO       | YES | NO    | YES           |
| PVDF                | Kynar (polyvinylidene fluoride) | 110           | 62            | YES          | YES          | NO       | YES | NO    | YES           |
| E-CTFE              | Ethylene Chlortrifluoroethylene | 150           | 105           | YES          | YES          | YES      | YES | NO    | YES           |
| ETFE                | EthyleneTetrafluoroethylene     | 150           | 105           | YES          | YES          | YES      | YES | NO    | YES           |
| PFA                 | Perfluoroalkoxy                 | 260           | 270           | YES          | YES          | YES      | YES | NO    | YES           |
| San                 | Styrene                         | 95            | 20            | NO           | YES          | NO       | YES | YES   | YES           |
| PMP                 | Polymethylpentene (TPX)         | 175           | 70            | YES          | YES          | NO       | YES | YES   | YES           |
| PMMA                | Polymethylmethacrylate (PMMP)   | 50            | 0             | NO           | YES          | NO       | YES | YES   | YES           |
| PS                  | Polystyrene                     | 90            | 20            | NO           | YES          | NO       | YES | YES   | YES           |
| PEEK                | Polyetheretherketone            | 125           | 0             | YES          | YES          | NO       | YES | YES   | YES           |
| PVC                 | Polyvinylchloride               | 80            | 20            | YES          | YES          | NO       | YES | NO    | YES           |
| TFE                 | Tetrafluoroethylene             | 260           | -267          | YES          | YES          | YES      | YES | YES   | YES           |



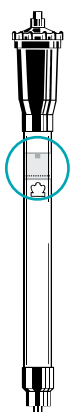
420415



Column  
with  
Flow Adapter



420404



Column  
with  
Diffusion Disc



420405

## FLEX-COLUMN® Flow Adapters

Flow adapters can significantly improve FLEX-COLUMN performance by protecting the gel bed from disruption during sample loading and by eliminating any dead volume above the gel bed. Flow adapters improve chromatogram resolution by delivering the sample and buffer directly to the top of the gel bed. Flow adapters are also recommended when using buffer gradients or when the columns are connected to a low pressure pump system. Flow adapters consist of 1/16" OD FEP tubing, a polyacetal body, an FKM o-ring seal and a 20 µm porosity HDPE bed support. One replacement bed support is supplied with each flow adapter.

| Catalog Number | Description  | Fits Column ID (cm) | Functional Length (cm) | Case Qty. |
|----------------|--------------|---------------------|------------------------|-----------|
| 420415-1000    | Flow Adapter | 1.0                 | 14                     | 1         |
| 420415-1500    | Flow Adapter | 1.5                 | 14                     | 1         |
| 420415-2500    | Flow Adapter | 2.5                 | 14                     | 1         |

### Replacement Parts

|             |                                   |         |
|-------------|-----------------------------------|---------|
| 420415-1001 | Bed Support, 1.0 cm               | 10      |
| 420415-1501 | Bed Support, 1.5 cm               | 10      |
| 420415-2501 | Bed Support, 2.5 cm               | 10      |
| 758252-0010 | O-ring, FKM, Size 010             | 10      |
| 758252-0110 | O-ring, FKM, Size 110             | 10      |
| 758252-0116 | O-ring, FKM, Size 116             | 10      |
| 420828-0116 | Ferrule, Polypropylene, 1/16" OD  | 1       |
| 420823-0116 | Tubing, FEP, 1/16" OD x 0.038" ID | 10 feet |

## FLEX-COLUMN® Sample Diffusion Discs

Sample diffusion discs protect the gel bed from being disrupted during sample application whenever a flow adapter is not used. A transparent acrylic ring is sealed to a 20 µm porosity HDPE disc which protects the top of the gel bed when the sample is manually applied. A cross bar on the top of the acrylic ring permits easy removal of the sample diffusion disc from the column.

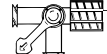
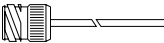
| Catalog Number | Description                   | Case Qty. |
|----------------|-------------------------------|-----------|
| 420404-1000    | Sample Diffusion Disc, 1.0 cm | 1         |
| 420404-1500    | Sample Diffusion Disc, 1.5 cm | 1         |
| 420404-2500    | Sample Diffusion Disc, 2.5 cm | 1         |

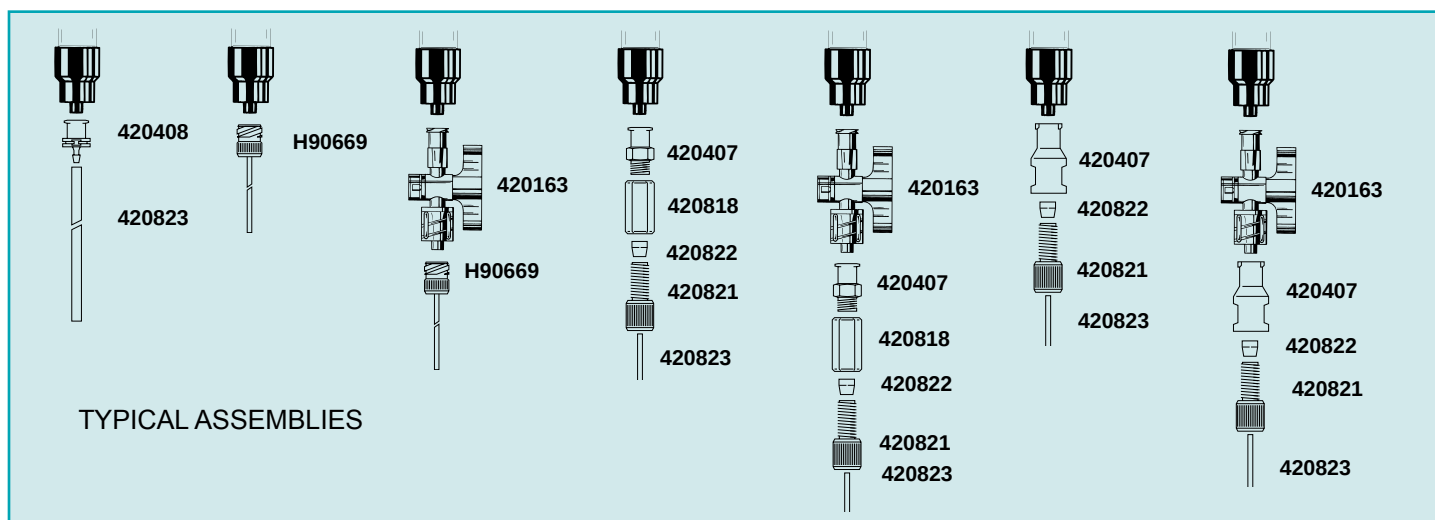
## FLEX-COLUMN® Polypropylene Packing Reservoirs

The funnels are manufactured from polypropylene and are available in two capacities: 100 mL for the 0.7, 1.0 and 1.5 cm ID columns and 700 mL for the 2.5 cm columns. The funnels are used for initial column packing and as a small buffer reservoir.

| Catalog Number | Capacity (mL) | Case Qty. |
|----------------|---------------|-----------|
| 420405-0100    | 100           | 12        |
| 420405-0700    | 700           | 5         |

**FLEX-COLUMN® Fittings**

| Catalog Number |                                                                                     | Description                                    | Material                              | Case Qty. |
|----------------|-------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------|-----------|
| 420408-0000    |    | Barb for 1/16" I.D. tubing to female luer      | polypropylene                         | 10        |
| 420412-0000    |    | Barb for 1/16" I.D. tubing to male luer        | polypropylene                         | 10        |
| 420411-0000    |    | Female luer to female luer                     | polypropylene                         | 10        |
| 420407-0000    |    | Female luer to 1/4-28 thread                   | polypropylene                         | 10        |
| 420407-2003    |    | Female luer to female 1/4-28 thread            | ETFE                                  | 1         |
| 420407-2113    |    | Male luer to male 1/4-28 thread                | ETFE                                  | 1         |
| H88800-0000    |    | Union, 1/4-28 to 1/4-28                        | CTFE                                  | 1         |
| 420818-0000    |                                                                                     | Union, 1/4-28 to 1/4-28                        | ETFE                                  | 1         |
| 420818-0600    |                                                                                     | Union, 1/4-28 to M-6                           | ETFE                                  | 1         |
| 420818-0606    |                                                                                     | Union, M-6 metric to M-6                       | ETFE                                  | 1         |
| 420818-3305    |                                                                                     | Union, 1/4-28 to 5/16-24                       | PEEK                                  | 1         |
| 420163-0001    |    | 1-way stopcock<br>female luer to male luer     | body-nylon<br>valve plug-polyethylene | 10        |
| 420163-4503    |    | 3-way stopcock<br>Two female luer to male luer | body-nylon<br>valve plug-polyethylene | 10        |
| H90669-0005    |   | 5' PTFE tubing w/ integral luer lock           | PTFE / CTFE                           | 5         |
| 420823-0116    |  | Tubing, 1/16" O.D. x 0.038" I.D. x 10'         | FEP                                   | 1         |
| 420823-0018    |                                                                                     | Tubing, 1/8" O.D. x 0.062" I.D. x 10'          | FEP                                   | 1         |
| 420823-0014    |                                                                                     | Tubing, 1/4" O.D. x 0.156" I.D. x 10'          | FEP                                   | 1         |
| 420821-0116    |  | 1/4-28 tubing nut for 1/16" O.D. tubing        | ETFE                                  | 1         |
| 420821-0018    |                                                                                     | 1/4-28 tubing nut for 1/8" O.D. tubing         | ETFE                                  | 1         |
| 420822-0116    |  | Ferrule for 1/16" O.D. tubing                  | ETFE                                  | 1         |
| 420822-0018    |                                                                                     | Ferrule for 1/8" O.D. tubing                   | ETFE                                  | 1         |
| 420822-2007    |                                                                                     | Ferrule for 1.8 mm O.D. tubing                 | ETFE                                  | 1         |





DISPOSAFLEX® Polypropylene Disposable Columns

The DISPOSAFLEX column is an inexpensive, multi-purpose column designed to satisfy a wide range of analytical separations using **aqueous** buffers. The disposable feature eliminates the possibility of cross contamination when using labeled compounds. A typical application of the Disposaflex column is the extraction of the cyclic nucleotides cAMP and cGMP from sample preparations.

The 8 mm inner diameter of the polypropylene column is uniform, assuring reproducibility. The 200 mm length of the DISPOSAFLEX column can easily be cut to a shorter length. The polypropylene reservoir has a 9 mL capacity. The lower column fitting with a luer outlet is molded polypropylene with a specially designed recess to securely hold a porous polyethylene bed support or a glass wool plug.

Supplied unassembled with a column, polypropylene reservoir and lower column fitting. Polyethylene bed supports and on-off valves are available as accessories.

Specifications

**Column I.D.:** 8mm  
**Column Length:** 200mm  
**Reservoir Capacity:** 9mL  
**Column Capacity:** 8mL  
**Overall Length:** 265mm

| Catalog Number    | Description                                    | Case Qty. |
|-------------------|------------------------------------------------|-----------|
| 420160-0000       | DISPOSAFLEX Column Set, Unassembled            | 100       |
| Replacement Parts |                                                |           |
| 420164-0000       | Reservoir Only                                 | 100       |
| 420168-0000       | Luer Fitting Only                              | 100       |
| 420168-1000       | Luer Fitting Only                              | 50        |
| Accessory Parts   |                                                |           |
| 420162-0000       | Polyethylene Bed Support, 30-50 Microns        | 100       |
| 420162-0020       | Polyethylene Bed Support, 20 Microns           | 100       |
| 420163-0000       | 1-Way On-Off Valve, Polycarbonate/Polyethylene | 50        |
| 420163-0001       | 1-Way Valve, Polycarbonate/Polyethylene        | 10        |
| 420163-4500       | 1-Way Valve, Nylon/Polyethylene                | 50        |
| 420163-4503       | 3-Way Valve, Nylon/Polyethylene                | 10        |
| 420169-0000       | Column Outlet Cap                              | 100       |



DISPOSAFLEX® Disposable Glass Columns

A multi-purpose glass column. Supplied assembled with a polypropylene reservoir, a lower column fitting with a luer outlet and a 20 micron polyethylene bed support.

Specifications

**Column I.D.:** 8mm  
**Column Length:** 150mm  
**Reservoir Capacity:** 9mL  
**Column Capacity:** 6mL  
**Overall Length:** 215mm

| Catalog Number    | Description                              | Case Qty. |
|-------------------|------------------------------------------|-----------|
| 420166-0001       | DISPOSAFLEX Column Set, Assembled        | 50        |
| 420166-1001       | DISPOSAFLEX Column Set, Assembled        | 5         |
| Replacement Parts |                                          |           |
| 420162-0020       | Polyethylene Bed Support, 20 Microns     | 100       |
| Accessory Parts   |                                          |           |
| 420162-0000       | Polyethylene Bed Support, 30-50 Microns  | 100       |
| 420163-0000       | On-Off Valve, Polycarbonate/Polyethylene | 50        |
| 420163-0001       | On-Off Valve, Polycarbonate/Polyethylene | 10        |
| 420163-4500       | On-Off Valve, Polyethylene/Nylon         | 50        |
| 420163-4503       | On-Off Valve, Polyethylene/Nylon         | 10        |
| 420169-0000       | Column Outlet Cap                        | 100       |

## Custom Column Specifications

The Custom Glass Shop has the ability to custom fabricate chromatography columns to your specifications. Columns are available with any standard taper, spherical or threaded joints. Consider the following issues when designing your columns.

**A – Column OD:** \_\_\_\_\_

Special columns will be constructed using medium wall tubing unless otherwise specified.

**B – Column Effective Length:** \_\_\_\_\_

Effective length is the length of the straight sides of the column prior to rounding off the tubing for sealing the top joint or the lower stopcock. On a fritted column, the effective length is measured to the fritted disk.

**C – Top Joint Style and Size:** \_\_\_\_\_

**D– Lower Column Configuration:** \_\_\_\_\_

Please specify round or flat bottom.

**E – Stopcock Type and Size:** \_\_\_\_\_

Please specify stopcock bore. PTFE, Glass or plain drip tip.

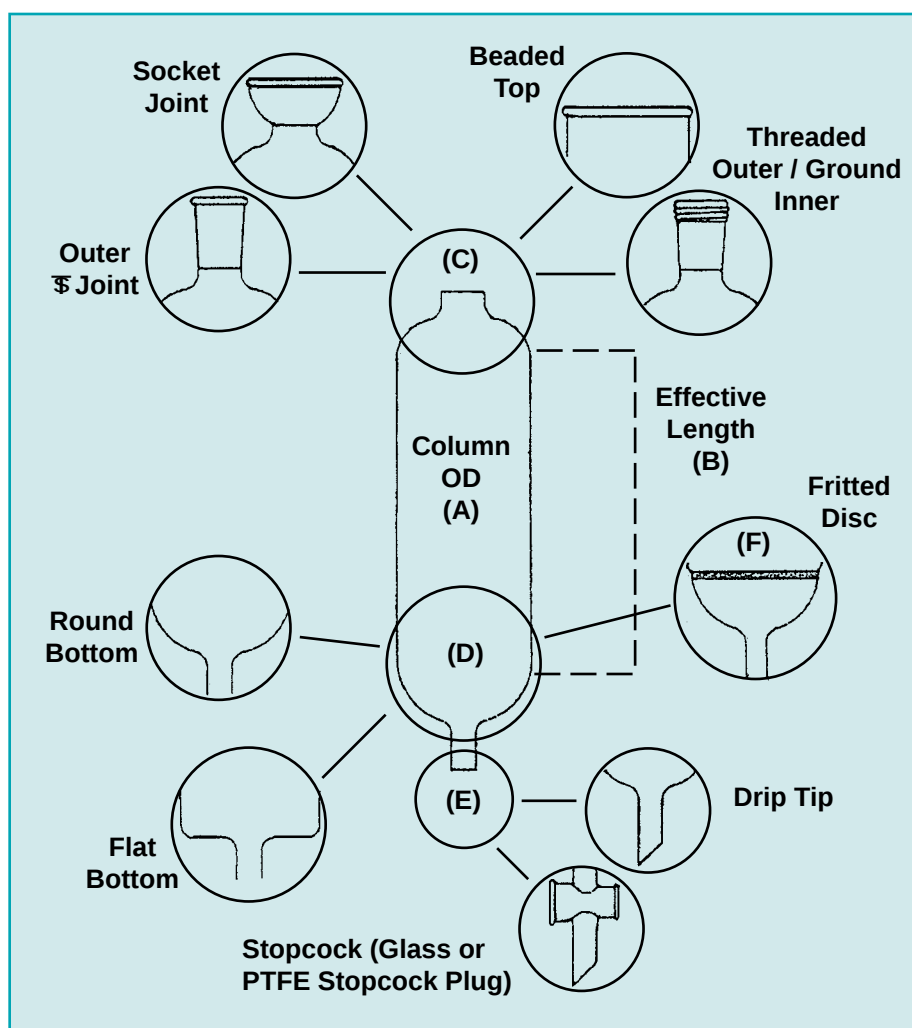
**F – Fritted Disc Required:** \_\_\_\_\_

Special columns will be constructed using a coarse porosity (40-60 micron) fritted disc unless otherwise specified.

**G – Plastic Coated Column:** \_\_\_\_\_

**H – Volume:** \_\_\_\_\_

**I – Quantity:** \_\_\_\_\_



## We can take it from here!

- Technical Support
- Product Design
- Graduating
- Calibrating
- Quartz
- Graded Seals
- Grinding
- Polishing
- and more...

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420530

Custom sizes and plastic safety coating are available upon request. See page 13 for help specifying custom column options.



420570

### Columns with PTFE Stopcock Plugs

A general purpose gravity column for analytical separations. A plug of glass wool can be used to support the column packing. PTFE stopcock plugs, 821001-0002 and 821001-0004, control the flow rate. Custom sizes and plastic safety coating are available upon request.

| Catalog Number | Column I.D. x Length (mm) | Volume (mL) | Stopcock Bore (mm) | Case Qty. |
|----------------|---------------------------|-------------|--------------------|-----------|
| 420530-0211    | 11 x 150                  | 10          | 2                  | 1         |
| 420530-0212    | 11 x 200                  | 15          | 2                  | 1         |
| 420530-0213    | 11 x 250                  | 20          | 2                  | 1         |
| 420530-0214    | 11 x 300                  | 25          | 2                  | 1         |
| 420530-0125    | 13 x 250                  | 28          | 2                  | 1         |
| 420530-0130    | 13 x 300                  | 34          | 2                  | 1         |
| 420530-0150    | 13 x 500                  | 66          | 2                  | 1         |
| 420530-0221    | 15 x 200                  | 30          | 2                  | 1         |
| 420530-0222    | 15 x 250                  | 40          | 2                  | 1         |
| 420530-0225    | 15 x 500                  | 80          | 2                  | 1         |
| 420530-0220    | 19 x 200                  | 51          | 2                  | 1         |
| 420530-0226    | 19 x 250                  | 56          | 2                  | 1         |
| 420530-0232    | 19 x 300                  | 80          | 2                  | 1         |
| 420530-0233    | 19 x 400                  | 113         | 2                  | 1         |
| 420530-0234    | 19 x 500                  | 140         | 2                  | 1         |
| 420530-0241    | 22 x 300                  | 110         | 2                  | 1         |
| 420530-0242    | 22 x 350                  | 130         | 2                  | 1         |
| 420530-0244    | 22 x 500                  | 190         | 2                  | 1         |
| 420530-0320    | 25 x 200                  | 90          | 2                  | 1         |
| 420530-0325    | 25 x 250                  | 100         | 2                  | 1         |
| 420530-0330    | 25 x 300                  | 136         | 2                  | 1         |
| 420530-0350    | 25 x 500                  | 245         | 2                  | 1         |
| 420530-0251    | 30 x 350                  | 220         | 2                  | 1         |
| 420530-0252    | 30 x 400                  | 250         | 2                  | 1         |
| 420530-0253    | 30 x 500                  | 300         | 2                  | 1         |
| 420530-0255    | 30 x 700                  | 440         | 2                  | 1         |
| 420530-0265    | 34 x 700                  | 630         | 2                  | 1         |
| 420530-0420    | 38 x 200                  | 227         | 2                  | 1         |
| 420530-0425    | 38 x 250                  | 280         | 2                  | 1         |
| 420530-0430    | 38 x 300                  | 340         | 2                  | 1         |
| 420530-0450    | 38 x 500                  | 567         | 2                  | 1         |
| 420530-0273    | 41 x 500                  | 650         | 2                  | 1         |
| 420530-0275    | 41 x 700                  | 900         | 2                  | 1         |
| 420530-0414    | 49 x 600                  | 1100        | 2                  | 1         |
| 420530-0415    | 49 x 700                  | 1300        | 2                  | 1         |
| 420530-0520    | 50 x 200                  | 360         | 2                  | 1         |
| 420530-0525    | 50 x 250                  | 470         | 2                  | 1         |
| 420530-0530    | 50 x 300                  | 589         | 2                  | 1         |
| 420530-0550    | 50 x 500                  | 981         | 2                  | 1         |
| 420530-0560    | 50 x 600                  | 1180        | 2                  | 1         |
| 420530-0620    | 64 x 200                  | 643         | 4                  | 1         |
| 420530-0625    | 64 x 250                  | 804         | 4                  | 1         |
| 420530-0630    | 64 x 300                  | 965         | 4                  | 1         |
| 420530-0650    | 64 x 500                  | 1608        | 4                  | 1         |
| 420530-0660    | 64 x 600                  | 1929        | 4                  | 1         |
| 420530-0720    | 75 x 200                  | 883         | 4                  | 1         |
| 420530-0725    | 75 x 250                  | 1004        | 4                  | 1         |
| 420530-0730    | 75 x 300                  | 1290        | 4                  | 1         |
| 420530-0750    | 75 x 500                  | 2149        | 4                  | 1         |
| 420530-0760    | 75 x 600                  | 2579        | 4                  | 1         |

#### Replacement Parts

|             |                         |   |
|-------------|-------------------------|---|
| 821001-0002 | Stopcock Plug Only, 2mm | 1 |
| 821001-0004 | Stopcock Plug Only, 4mm | 1 |

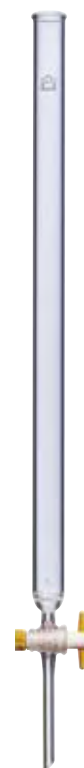
### Packing Reservoirs with Joints

These heavy duty reservoirs are designed for use with 420510 and 420550 series chromatography columns with and without fritted glass supports or in combination with 420575 series flow control adapters. Reservoirs are available in a variety of sizes and joint configurations.

| Catalog Number | Upper J. Joint | Lower J. Joint | Capacity (mL) | Case Qty. |
|----------------|----------------|----------------|---------------|-----------|
| 420570-0124    | 100            | 24/40          | 24/40         | 1         |
| 420570-0224    | 250            | 24/40          | 24/40         | 1         |
| 420570-0524    | 500            | 24/40          | 24/40         | 1         |
| 420570-1024    | 1000           | 24/40          | 24/40         | 1         |
| 420570-2024    | 2000           | 24/40          | 24/40         | 1         |
| 420570-3045    | 3000           | 45/50          | 45/50         | 1         |

## Columns with Fritted Discs and PTFE Stopcock Plugs

| Catalog Number | Column I.D. x Length (mm) | Volume (mL) | Stopcock Bore (mm) | Case Qty. |
|----------------|---------------------------|-------------|--------------------|-----------|
| 420540-0213    | 11 x 300                  | 20          | 2                  | 1         |
| 420540-0120    | 13 x 200                  | 23          | 2                  | 1         |
| 420540-0125    | 13 x 250                  | 28          | 2                  | 1         |
| 420540-0130    | 13 x 300                  | 34          | 2                  | 1         |
| 420540-0150    | 13 x 500                  | 66          | 2                  | 1         |
| 420540-0220    | 19 x 200                  | 51          | 2                  | 1         |
| 420540-0225    | 19 x 250                  | 56          | 2                  | 1         |
| 420540-0230    | 19 x 300                  | 76          | 2                  | 1         |
| 420540-0224    | 19 x 400                  | 110         | 2                  | 1         |
| 420540-0250    | 19 x 500                  | 142         | 2                  | 1         |
| 420540-0233    | 22 x 300                  | 110         | 2                  | 1         |
| 420540-0234    | 22 x 400                  | 150         | 2                  | 1         |
| 420540-0320    | 25 x 200                  | 90          | 2                  | 1         |
| 420540-0325    | 25 x 250                  | 100         | 2                  | 1         |
| 420540-0243    | 25 x 300                  | 140         | 2                  | 1         |
| 420540-0245    | 25 x 500                  | 240         | 2                  | 1         |
| 420540-0420    | 38 x 200                  | 227         | 2                  | 1         |
| 420540-0425    | 38 x 250                  | 280         | 2                  | 1         |
| 420540-0430    | 38 x 300                  | 340         | 2                  | 1         |
| 420540-0450    | 38 x 500                  | 567         | 2                  | 1         |
| 420540-0256    | 41 x 600                  | 775         | 4                  | 1         |
| 420540-2610    | 49 x 1000                 | 1875        | 4                  | 1         |
| 420540-0520    | 50 x 200                  | 360         | 2                  | 1         |
| 420540-0525    | 50 x 250                  | 470         | 2                  | 1         |
| 420540-0530    | 50 x 300                  | 589         | 2                  | 1         |
| 420540-0550    | 50 x 500                  | 981         | 2                  | 1         |
| 420540-0560    | 50 x 600                  | 1180        | 2                  | 1         |
| 420540-0620    | 64 x 200                  | 643         | 4                  | 1         |
| 420540-0625    | 64 x 250                  | 804         | 4                  | 1         |
| 420540-0630    | 64 x 300                  | 965         | 4                  | 1         |
| 420540-0650    | 64 x 500                  | 1608        | 4                  | 1         |
| 420540-0660    | 64 x 600                  | 1929        | 4                  | 1         |
| 420540-0720    | 75 x 200                  | 883         | 4                  | 1         |
| 420540-0725    | 75 x 250                  | 1004        | 4                  | 1         |
| 420540-0730    | 75 x 300                  | 1290        | 4                  | 1         |
| 420540-0750    | 75 x 500                  | 2149        | 4                  | 1         |
| 420540-0760    | 75 x 600                  | 2579        | 4                  | 1         |



420540

Gravity column manufactured from medium wall tubing with 821000 PTFE stopcock similar in design to the 420530 series. These columns have a coarse porosity glass frit (40-60 micron pore size) at the lower end to act as a support for column packing material. PTFE stopcock plugs, 821001-0002 and 821001-0004, control the flow rate.

Custom sizes and plastic safety coating are available upon request. See page 13 for help specifying custom column options.

## Columns with PTFE Stopcock Plugs and £ Joints

Gravity chromatography columns feature PTFE stopcocks and standard taper joints and are manufactured from medium wall tubing. Glass wool (not supplied) may be used as a support for column packing material. These columns may be used alone or in combination with 420570 series reservoir and 420575 series flow control adapters. PTFE stopcock plugs, 821001-0002 and 821001-0004, control the flow rate.

| Catalog Number | Column I.D. x Length (mm) | Volume (mL) | Upper £ Joint | Stopcock Bore (mm) | Case Qty. |
|----------------|---------------------------|-------------|---------------|--------------------|-----------|
| 420510-0120    | 13 x 200                  | 23          | 24/40         | 2                  | 1         |
| 420510-0125    | 13 x 250                  | 28          | 24/40         | 2                  | 1         |
| 420510-0130    | 13 x 300                  | 34          | 24/40         | 2                  | 1         |
| 420510-0150    | 13 x 500                  | 66          | 24/40         | 2                  | 1         |
| 420510-0220    | 19 x 200                  | 51          | 24/40         | 2                  | 1         |
| 420510-0225    | 19 x 250                  | 56          | 24/40         | 2                  | 1         |
| 420510-0230    | 19 x 300                  | 76          | 24/40         | 2                  | 1         |
| 420510-0250    | 19 x 500                  | 142         | 24/40         | 2                  | 1         |
| 420510-0320    | 25 x 200                  | 90          | 24/40         | 2                  | 1         |
| 420510-0325    | 25 x 250                  | 100         | 24/40         | 2                  | 1         |
| 420510-0330    | 25 x 300                  | 136         | 24/40         | 2                  | 1         |
| 420510-0350    | 25 x 500                  | 245         | 24/40         | 2                  | 1         |
| 420510-0420    | 38 x 200                  | 227         | 24/40         | 2                  | 1         |
| 420510-0425    | 38 x 250                  | 280         | 24/40         | 2                  | 1         |
| 420510-0430    | 38 x 300                  | 340         | 24/40         | 2                  | 1         |
| 420510-0450    | 38 x 500                  | 560         | 24/40         | 2                  | 1         |
| 420510-0520    | 50 x 200                  | 360         | 24/40         | 2                  | 1         |
| 420510-0525    | 50 x 250                  | 470         | 24/40         | 2                  | 1         |
| 420510-0530    | 50 x 300                  | 590         | 24/40         | 2                  | 1         |
| 420510-0550    | 50 x 500                  | 980         | 24/40         | 2                  | 1         |
| 420510-0560    | 50 x 600                  | 1180        | 24/40         | 2                  | 1         |
| 420510-0620    | 64 x 200                  | 643         | 45/50         | 4                  | 1         |
| 420510-0625    | 64 x 250                  | 804         | 45/50         | 4                  | 1         |
| 420510-0630    | 64 x 300                  | 965         | 45/50         | 4                  | 1         |
| 420510-0650    | 64 x 500                  | 1600        | 45/50         | 4                  | 1         |
| 420510-0660    | 64 x 600                  | 1920        | 45/50         | 4                  | 1         |
| 420510-0720    | 75 x 200                  | 883         | 45/50         | 4                  | 1         |
| 420510-0725    | 75 x 250                  | 1004        | 45/50         | 4                  | 1         |
| 420510-0730    | 75 x 300                  | 1290        | 45/50         | 4                  | 1         |
| 420510-0750    | 75 x 500                  | 2140        | 45/50         | 4                  | 1         |
| 420510-0760    | 75 x 600                  | 2580        | 45/50         | 4                  | 1         |



420510



420550

Custom sizes and plastic safety coating are available upon request. See page 13 for help specifying custom column options.



420575

## Columns with Fritted Discs, PTFE Stopcock Plugs and ¤ Joints

Gravity column manufactured from medium wall tubing with PTFE stopcock similar in design to the 420510 series. These columns have a coarse porosity glass frit (40-60 micron pore size) at the lower end to act as a support for column packing material. These columns may be used alone or in combination with 420570 series reservoir and 420575 series flow control adapters. **Custom sizes and plastic safety coating are available upon request.**

| Catalog Number | Column I.D. x Length (mm) | Volume (mL) | Upper ¤ Joint | Stopcock Bore (mm) | Case Qty. |
|----------------|---------------------------|-------------|---------------|--------------------|-----------|
| 420550-0213    | 11 x 300                  | 30          | 24/40         | 2                  | 1         |
| 420550-0120    | 13 x 200                  | 23          | 24/40         | 2                  | 1         |
| 420550-0125    | 13 x 250                  | 28          | 24/40         | 2                  | 1         |
| 420550-0130    | 13 x 300                  | 34          | 24/40         | 2                  | 1         |
| 420550-0150    | 13 x 500                  | 66          | 24/40         | 2                  | 1         |
| 420550-0220    | 19 x 200                  | 51          | 24/40         | 2                  | 1         |
| 420550-0225    | 19 x 250                  | 56          | 24/40         | 2                  | 1         |
| 420550-0230    | 19 x 300                  | 76          | 24/40         | 2                  | 1         |
| 420550-0224    | 19 x 400                  | 125         | 24/40         | 2                  | 1         |
| 420550-0234    | 19 x 450                  | 150         | 24/40         | 2                  | 1         |
| 420550-0250    | 19 x 500                  | 142         | 24/40         | 2                  | 1         |
| 420550-0233    | 22 x 300                  | 140         | 24/40         | 2                  | 1         |
| 420550-0243    | 22 x 350                  | 175         | 24/40         | 2                  | 1         |
| 420550-0245    | 22 x 550                  | 250         | 24/40         | 2                  | 1         |
| 420550-0320    | 25 x 200                  | 90          | 24/40         | 2                  | 1         |
| 420550-0325    | 25 x 250                  | 113         | 24/40         | 2                  | 1         |
| 420550-0330    | 25 x 300                  | 136         | 24/40         | 2                  | 1         |
| 420550-0350    | 25 x 500                  | 245         | 24/40         | 2                  | 1         |
| 420550-0420    | 38 x 200                  | 227         | 24/40         | 2                  | 1         |
| 420550-0425    | 38 x 250                  | 280         | 24/40         | 2                  | 1         |
| 420550-0430    | 38 x 300                  | 340         | 24/40         | 2                  | 1         |
| 420550-0450    | 38 x 500                  | 560         | 24/40         | 2                  | 1         |
| 420550-0256    | 41 x 600                  | 790         | 24/40         | 4                  | 1         |
| 420550-0520    | 50 x 200                  | 360         | 24/40         | 2                  | 1         |
| 420550-0525    | 50 x 250                  | 470         | 24/40         | 2                  | 1         |
| 420550-0530    | 50 x 300                  | 580         | 24/40         | 2                  | 1         |
| 420550-0550    | 50 x 500                  | 980         | 24/40         | 2                  | 1         |
| 420550-0560    | 50 x 600                  | 1175        | 24/40         | 2                  | 1         |
| 420550-2610    | 50 x 1000                 | 1875        | 24/40         | 4                  | 1         |
| 420550-0620    | 64 x 200                  | 643         | 45/50         | 4                  | 1         |
| 420550-0625    | 64 x 250                  | 804         | 45/50         | 4                  | 1         |
| 420550-0630    | 64 x 300                  | 960         | 45/50         | 4                  | 1         |
| 420550-0650    | 64 x 500                  | 1600        | 45/50         | 4                  | 1         |
| 420550-0660    | 64 x 600                  | 1920        | 45/50         | 4                  | 1         |
| 420550-0720    | 75 x 200                  | 883         | 45/50         | 4                  | 1         |
| 420550-0725    | 75 x 250                  | 1004        | 45/50         | 4                  | 1         |
| 420550-0730    | 75 x 300                  | 1280        | 45/50         | 4                  | 1         |
| 420550-0750    | 75 x 500                  | 2100        | 45/50         | 4                  | 1         |
| 420550-0760    | 75 x 600                  | 2550        | 45/50         | 4                  | 1         |

### Replacement Parts

|             |                          |   |
|-------------|--------------------------|---|
| 821001-0002 | Stopcock Plug only, 2 mm | 1 |
| 821001-0004 | Stopcock Plug only, 4 mm | 1 |

## Flow Control Adapters with ¤ Joints

The flow control adapter features Kontes HI-VAC® PTFE plug designed with a precision external thread for fine control. The accurately controlled valve seat and the extended tip on the PTFE plug allow semi-needle valve control for liquids. The FKM o-ring is shielded from direct exposure to liquids within the system by PTFE ring seals.

| Catalog Number | ¤ Joint | Valve Plug Bore Range (mm) | Case Qty. |
|----------------|---------|----------------------------|-----------|
| 420575-2440    | 24/40   | 0-4                        | 1         |
| 420575-4550    | 45/50   | 0-4                        | 1         |

### Replacement Plug

|             |                       |   |
|-------------|-----------------------|---|
| 826411-0004 | Valve Plug only, 4 mm | 1 |
|-------------|-----------------------|---|

## Columns with Reservoirs, PTFE Stopcock Plugs and 24/40 Joints

Gravity chromatography column manufactured from medium wall tubing with PTFE stopcock and in-line reservoir for containing liquid buffer. Glass wool (not supplied) may be used as a support for the packing material. These columns may be used alone or in combination with 420575-2440 flow control adapter. **Custom sizes and plastic safety coating are available upon request.**

| Catalog Number | Volume (mL) | Column ID x Length (mm) | Reservoir Cap (mL) | Stopcock Bore (mm) | Case Qty. |
|----------------|-------------|-------------------------|--------------------|--------------------|-----------|
| 420610-0120    | 23          | 13 x 200                | 250                | 2                  | 1         |
| 420610-0125    | 28          | 13 x 250                | 250                | 2                  | 1         |
| 420610-0130    | 34          | 13 x 300                | 250                | 2                  | 1         |
| 420610-0320    | 90          | 25 x 200                | 250                | 2                  | 1         |
| 420610-0325    | 100         | 25 x 250                | 250                | 2                  | 1         |
| 420610-0330    | 136         | 25 x 500                | 250                | 2                  | 1         |
| 420610-0350    | 245         | 25 x 300                | 250                | 2                  | 1         |
| 420610-0420    | 227         | 38 x 200                | 500                | 2                  | 1         |
| 420610-0430    | 340         | 38 x 300                | 500                | 2                  | 1         |
| 420610-0450    | 560         | 38 x 500                | 500                | 2                  | 1         |
| 420610-0520    | 360         | 50 x 300                | 500                | 2                  | 1         |
| 420610-0530    | 590         | 50 x 300                | 1000               | 2                  | 1         |
| 420610-0550    | 980         | 50 x 500                | 1000               | 2                  | 1         |
| 420610-0560    | 1180        | 50 x 600                | 1000               | 2                  | 1         |
| 420610-0620    | 643         | 64 x 200                | 1000               | 4                  | 1         |
| 420610-0630    | 965         | 64 x 300                | 1000               | 4                  | 1         |
| 420610-0650    | 1600        | 64 x 500                | 2000               | 4                  | 1         |
| 420610-0660    | 1920        | 64 x 600                | 2000               | 4                  | 1         |
| 420610-0720    | 883         | 75 x 200                | 2000               | 4                  | 1         |
| 420610-0730    | 1290        | 75 x 300                | 2000               | 4                  | 1         |
| 420610-0750    | 2140        | 75 x 500                | 2000               | 4                  | 1         |
| 420610-0760    | 2580        | 75 x 600                | 2000               | 4                  | 1         |

### Replacement Parts

|             |                          |   |
|-------------|--------------------------|---|
| 821001-0002 | Stopcock Plug only, 2 mm | 1 |
| 821001-0004 | Stopcock Plug only, 4 mm | 1 |

## Columns with Fritted Discs, Reservoirs and 24/40 Joints

Chromatography columns manufactured from medium wall tubing with PTFE stopcock and in-line reservoir for containing liquid buffer. These columns have a coarse porosity glass frit (40-60 micron pore size) as a support for column packing material. These columns may be used alone or in combination with 420575-2440 flow control adapter. **Custom sizes and plastic coating are available upon request.**

| Catalog Number | Column I.D. x Length (mm) | Volume (mL) | Reservoir Cap (mL) | Stopcock Bore (mm) | Case Qty. |
|----------------|---------------------------|-------------|--------------------|--------------------|-----------|
| 420620-0120    | 13 x 200                  | 23          | 250                | 2                  | 1         |
| 420620-0125    | 13 x 250                  | 28          | 250                | 2                  | 1         |
| 420620-0130    | 13 x 300                  | 34          | 250                | 2                  | 1         |
| 420620-0320    | 25 x 200                  | 90          | 250                | 2                  | 1         |
| 420620-0325    | 25 x 250                  | 100         | 250                | 2                  | 1         |
| 420620-0330    | 25 x 300                  | 136         | 250                | 2                  | 1         |
| 420620-0350    | 25 x 500                  | 245         | 250                | 2                  | 1         |
| 420620-0420    | 38 x 200                  | 227         | 500                | 2                  | 1         |
| 420620-0425    | 38 x 250                  | 280         | 500                | 2                  | 1         |
| 420620-0430    | 38 x 300                  | 340         | 500                | 2                  | 1         |
| 420620-0450    | 38 x 500                  | 560         | 500                | 2                  | 1         |
| 420620-0520    | 50 x 200                  | 360         | 500                | 2                  | 1         |
| 420620-0530    | 50 x 300                  | 590         | 1000               | 2                  | 1         |
| 420620-0550    | 50 x 500                  | 980         | 1000               | 2                  | 1         |
| 420620-0560    | 50 x 600                  | 1180        | 1000               | 2                  | 1         |
| 420620-0620    | 64 x 200                  | 643         | 1000               | 4                  | 1         |
| 420620-0630    | 64 x 300                  | 965         | 1000               | 4                  | 1         |
| 420620-0650    | 64 x 500                  | 1600        | 2000               | 4                  | 1         |
| 420620-0660    | 64 x 600                  | 1920        | 2000               | 4                  | 1         |
| 420620-0720    | 75 x 200                  | 883         | 2000               | 4                  | 1         |
| 420620-0730    | 75 x 300                  | 1290        | 2000               | 4                  | 1         |
| 420620-0750    | 75 x 500                  | 2140        | 2000               | 4                  | 1         |
| 420620-0760    | 75 x 600                  | 2580        | 2000               | 4                  | 1         |

### Replacement Parts

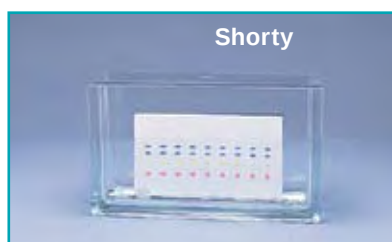
|             |                          |   |
|-------------|--------------------------|---|
| 821001-0002 | Stopcock Plug only, 2 mm | 1 |
| 821001-0004 | Stopcock Plug only, 4 mm | 1 |



420610



420620



**416180-1020**



**416180-0000**



**416185-0000**



**416190-0000**



**416190-4900**

## Rectangular TLC Developing Tanks

TLC Developing Tanks are manufactured from sturdy molded glass bricks that will withstand regular use for many years. The clear sides allow unobstructed visual inspection of TLC plates up to 20 x 20 cm in size. The top of the tanks are ground flat to match the lids and the edges are beveled to remove any sharp edges. The bottoms are ground to provide a flat, level surface. A raised ridge along the inside bottom allows the simultaneous development of two 20 x 20 cm or four 5 x 20 cm plates. Inside dimensions of the tanks are approximately 27cm W x 7cm D x 25cm H (10 5/8 x 2 7/8 x 9 3/4 inches). Weight is approximately 5.4 kg (12 pounds).

The tank lids are available in three styles: standard, nonslip and latch. Nonslip lids have a knob for easy lifting and PTFE retainers inside to prevent the lid from accidentally sliding off the tank. Latch lids are designed to hold them firmly to the developing tank, greatly improving the stability of the saturated environment for developing TLC plates. Latch lids also have a knob for easy removal and PTFE retainers. Lids in all three styles are available with holes drilled for #0 stoppers to allow addition of reagents without disturbing the equilibrium of the saturated environment.

The multiplate aluminum rack allows the simultaneous development of up to six 20 x 20 cm TLC plates. The rack is hard anodized to prevent corrosion.

## TLC Tanks with Standard Lids

"SHORTY" tank was developed for use with 10 cm x 10 cm plates but it will also accommodate 5 x 10 or 10 x 20 plates, turned long side down. Both tanks have a raised ridge to support plates during development and are supplied with lids.

| Catalog Number        | Description                                     | Use with Plate Size W x H (mm) | Case Qty. |
|-----------------------|-------------------------------------------------|--------------------------------|-----------|
| 416180-0000           | TLC Developing Tank with Standard Lid           | 20 x 20                        | 1         |
| 416180-1020           | TLC Developing Tank, "Shorty" with Standard Lid | 10 x 20                        | 1         |
| <b>Accessory Part</b> |                                                 |                                |           |
| 416181-0000           | TLC Standard Lid                                | 10 x 20 or 20 x 20             | 1         |

## TLC Tank with Nonslip Lid

| Catalog Number         | Description                          | Case Qty. |
|------------------------|--------------------------------------|-----------|
| 416185-0000            | TLC Developing Tank with Nonslip Lid | 1         |
| <b>Component Parts</b> |                                      |           |
| 416186-0000            | TLC Nonslip Lid                      | 1         |
| 416182-0000            | TLC Developing Tank Only             | 1         |

## TLC Tank with Latch Lid

| Catalog Number         | Description                        | Case Qty. |
|------------------------|------------------------------------|-----------|
| 416190-0000            | TLC Developing Tank with Latch Lid | 1         |
| <b>Component Parts</b> |                                    |           |
| 416191-0000            | TLC Latch Lid                      | 1         |
| 416192-0000            | TLC Developing Tank Only, Latch    | 1         |

## TLC Tank with Latch Lid and Aluminum Rack

| Catalog Number         | Description                                          | Case Qty. |
|------------------------|------------------------------------------------------|-----------|
| 416190-4900            | TLC Developing Tank with Latch Lid and Aluminum Rack | 1         |
| <b>Component Parts</b> |                                                      |           |
| 416191-0000            | TLC Latch Lid                                        | 1         |
| 416192-0000            | TLC Developing Tank Only, Latch                      | 1         |
| 416175-0000            | TLC Aluminum Rack, Holds Six 20x20 cm Plates         | 1         |

## Cylindrical TLC Developing Tanks with Lids

Cylindrical glass tanks for the development of 1 x 3 in. to 10 x 20 cm plates. These tanks provide maximum vapor phase saturation with a minimum amount of solvent.

| Catalog Number | For Plate Size | Lid          | Case Qty. |
|----------------|----------------|--------------|-----------|
| 416170-0510    | 5 x 10 cm      | Glass        | 1         |
| 416170-0520    | 5 x 20 cm      | Glass        | 1         |
| 416170-1020    | 10 x 20 cm     | Glass        | 1         |
| 416170-1118    | 1 x 3 in       | Polyethylene | 1         |
| 416170-1119    | 1 x 3 in       | Polyethylene | 12        |
| 416170-1120    | 5 x 10 cm      | Polyethylene | 1         |
| 416170-1121    | 5 x 10 cm      | Polyethylene | 12        |
| 416170-1122    | 5 x 20 cm      | Polyethylene | 1         |
| 416170-1123    | 5 x 20 cm      | Polyethylene | 12        |

### Component Parts

|             |                                                    |    |
|-------------|----------------------------------------------------|----|
| 416170-1124 | Polyethylene Cap For 1 x 3 in. Tanks               | 12 |
| 416170-1125 | Polyethylene Cap For 5 x 10 cm and 5 x 20 cm Tanks | 12 |
| 416171-0500 | Glass Cap for 5 cm Tanks                           | 1  |



416170





416430



416450

## TLC Plate Streaker

A simple device for uniformly streaking TLC plates. Unit consists of a stainless steel base with an adjustable holder for a glass reservoir. To operate, the streaker is placed over edge of the counter top and the plate to be streaked is positioned parallel to it. The bent capillary tip is then adjusted so that it lightly touches the plate. The reservoir is filled with the solution to be chromatographed and by moving the unit back and forth along the counter edge, a uniform streak is accomplished. Supplied complete with glass, stainless steel capillaries and instructions.

Reference: Journal of Chemical Education, Vol. 47, No. 5, May 1970, page 404, "A Simple Streaker for Preparative Layer Chromatography," L.J. Altman, James R. Trudell.

| Catalog Number | Approx. Dimensions<br>L x W x H (cm) | Case Qty. |
|----------------|--------------------------------------|-----------|
| 416430-0000    | 25 x 15 x 16                         | 1         |

### Component Parts

|             |                                             |   |
|-------------|---------------------------------------------|---|
| 416431-0000 | Base Assembly                               | 1 |
| 416432-0000 | Reservoir                                   | 1 |
| 416433-0000 | Glass Capillary Set, (2 Small, 2 Large)     | 1 |
| 416434-0000 | Stainless Capillary Set, (1 Small, 1 Large) | 1 |

## TLC Labeling Template

A transparent labeling template designed to fit over TLC plates without disturbing the absorbent layer. The apparatus features spotting guide ruler, compound and solvent travel distance markers and circles for estimation of spot sizes. Origin and 10 cm bold reference lines are provided to enable fast calculation of R<sub>f</sub>-values.

| Catalog Number | Approx. Dimensions<br>L x W x H (cm) | Case Qty. |
|----------------|--------------------------------------|-----------|
| 416450-0000    | 22 x 20 x 1                          | 1         |



764520

## TLC Spotting Capillaries, 5 Pack, Borosilicate, Microcaps®

The Microcaps "5 Pack" is ideal for use in spotting TLC plates. Each kit has 5 dispenser vials containing 100 micropipets each of 0.5, 1, 2, 5 and 10 µL sizes. Also included are a bulb assembly and spotting holder.

| Catalog Number | Case Qty. |
|----------------|-----------|
| 764520-0000    | 1         |



764500

## TLC Spotting Capillaries, Borosilicate Glass, Microcaps®

Microcaps® are ingeniously simple in concept and in use. They are precision-bore glass capillary tubes, cut to predetermined lengths, so that each capillary tube will hold a known volume of fluid when filled. Microcaps are so inexpensive that it is not impractical to dispose of each tube after use.

Filling is simple. Capillary action - not externally applied suction - draws the fluid into the tube. To dispense the fluid, simply squeeze the bulb. No unusual skills or training required. Immediate, professional results. Ideal for spotting preadsorbent TLC plates. Supplied in packages containing one bulb assembly and one dispenser vial with 100 micropipets. Volumetric tolerance is ±1%.

| Catalog Number | Capacity (µL) | Length (mm) | Relative I.D. (in.) | Relative O.D. (in.) | Case Qty. |
|----------------|---------------|-------------|---------------------|---------------------|-----------|
| 764500-0000    | 0.5           | 32          | .0056               | .022                | 100       |
| 764500-0001    | 1.0           | 32          | .0078               | .025                | 100       |
| 764500-0002    | 2.0           | 32          | .0111               | .030                | 100       |
| 764500-0005    | 5.0           | 32          | .0174               | .0355               | 100       |
| 764500-0010    | 10.0          | 41          | .0219               | .0314               | 100       |
| 764500-0020    | 20.0          | 64          | .0249               | .0355               | 100       |
| 764500-0025    | 25.0          | 65          | .0272               | .0382               | 100       |
| 764500-0050    | 50.0          | 100         | .0314               | .043                | 100       |
| 764500-0100    | 100.0         | 116         | .0410               | .0555               | 100       |

### TLC Reagent Sprayers with Screw Thread Ground Joints

The connection between the sprayer head and the flask is made with a special screw thread ground joint, connecting cap and loosening ring. If the joint ever “freezes” from reagent crystallization or residue formation, simply unscrew the connecting cap back onto the unique loosening ring and the joint will easily come apart. These sprayers will operate on as little as 1 psi (0.07 kg/cm<sup>2</sup>) air pressure with optimal results at 3-5 psi (0.21-0.35 kg/cm<sup>2</sup>). The connecting cap, loosening ring and o-ring should be removed before autoclaving.

| Catalog Number | Flask Capacity (mL) | ⌘ Joints | Approx. Height x OD (mm) | Case Qty. |
|----------------|---------------------|----------|--------------------------|-----------|
| 422530-0010    | 10                  | 19/22    | 155 x 22                 | 1         |
| 422530-0025    | 25                  | 19/22    | 147 x 40                 | 1         |
| 422530-0050    | 50                  | 19/22    | 174 x 50                 | 1         |
| 422530-0125    | 125                 | 24/40    | 204 x 65                 | 1         |
| 422530-0250    | 250                 | 24/40    | 229 x 85                 | 1         |
| 422530-0500    | 500                 | 24/40    | 273 x 105                | 1         |

#### Component Parts

|             |                                          |   |
|-------------|------------------------------------------|---|
| 422531-0010 | TLC Sprayer Head for 10 and 25 mL flasks | 1 |
| 422531-0050 | TLC Sprayer Head for 50 mL flasks        | 1 |
| 422531-0125 | TLC Sprayer Head for 125 mL flasks       | 1 |
| 422531-0250 | TLC Sprayer Head for 250 mL flasks       | 1 |
| 422531-0500 | TLC Sprayer Head for 500 mL flasks       | 1 |
| 422532-0010 | TLC Sprayer Flask, 10 mL                 | 1 |
| 422532-0025 | TLC Sprayer Flask, 25 mL                 | 1 |
| 422532-0050 | TLC Sprayer Flask, 50 mL                 | 1 |
| 422532-0125 | TLC Sprayer Flask, 125 mL                | 1 |
| 422532-0250 | TLC Sprayer Flask, 250 mL                | 1 |
| 422532-0500 | TLC Sprayer Flask, 500 mL                | 1 |
| 422533-0019 | Connecting Cap, Size 19, (1 supplied)    | 5 |
| 422534-0019 | Loosening Ring, Size 19, (1 supplied)    | 5 |



The loosening ring and joint are easily separated for cleaning.



### TLC Reagent Sprayers with Standard Ground Joints



422550



422540



422500

These units operate from 3-5 psi (0.21-0.35 kg/cm<sup>2</sup>). Their all-glass construction makes them completely steam autoclavable.

| Catalog Number | Working Capacity (mL) | ⌘ Joints | Approx. Height x OD (mm) | Case Qty. |
|----------------|-----------------------|----------|--------------------------|-----------|
| 422550-0000    | 5                     | 14/20    | 130 x 17                 | 1         |
| 422540-0000    | 25                    | 24/40    | 175 x 25                 | 1         |
| 422500-0125    | 125                   | 24/40    | 200 x 65                 | 1         |
| 422500-0250    | 250                   | 24/40    | 225 x 85                 | 1         |

#### Component Parts

|             |                                    |   |
|-------------|------------------------------------|---|
| 422551-0000 | TLC Sprayer Only for 10 mL Tube    | 1 |
| 422501-0250 | TLC Sprayer Only for 250 mL Flask  | 1 |
| 617000-0224 | Flask, 125 mL, ⌘ 24/40 outer joint | 1 |
| 617000-0424 | Flask, 250 mL, ⌘ 24/40 outer joint | 1 |



## ULTRA-WARE® HPLC Economy Cap Systems

The cap body is manufactured from PTFE and is supplied with a TFE/propylene o-ring and a polypropylene screw collar. The connecting threads on the top of the cap use standard 1/4-28 flangeless fittings. Two of the ports have 1/8" through holes, the third port has a 1/16" through hole. Assembly instructions are included.

The ULTRA-WARE Flat Bottom Reservoirs are manufactured from Type I, Class A borosilicate glass with a plastic safety coating. The plastic coating also blocks virtually all UV light up to 385 nm, preventing photodegradation of light sensitive mobile phases.

### Economy Three Hole Cap Systems are supplied with:

|               |       |                                    |             |       |                                         |
|---------------|-------|------------------------------------|-------------|-------|-----------------------------------------|
| 953913-5000   | 1 ea. | Economy Three Hole Cap             | 420822-0018 | 2 ea. | Flangeless Ferrule, ETFE, 1/8"          |
| 953902-series | 1 ea. | Ultra-Ware Flat Bottom Reservoir   | 953913-0001 | 1 ea. | Nut Plug, ETFE, 1/4-28                  |
| 953916-3002   | 1 ea. | All PEEK Inlet/Spurge Filter, 2µm  | 420823-0018 | 1 ea. | FEP Tubing, 1/8" OD x 1/16" ID x 10 ft. |
| 420821-0018   | 2 ea. | Flangeless Nut, ETFE, 1/4-28, 1/8" |             |       |                                         |

| Catalog Number | Description                                           | Case Qty. |
|----------------|-------------------------------------------------------|-----------|
| 953930-1002    | Economy Three Hole Cap System with 1 Liter Reservoir  | 1         |
| 953930-2002    | Economy Three Hole Cap System with 2 Liter Reservoir  | 1         |
| 953930-5002    | Economy Three Hole Cap System with 5 Liter Reservoir  | 1         |
| 953930-1003    | Economy Three Hole Cap System with 10 Liter Reservoir | 1         |

### Replacement Parts for Economy Three Hole Caps

|             |                                                            |   |
|-------------|------------------------------------------------------------|---|
| 953913-5000 | Replacement Economy Three Hole Cap (Body and Screw Collar) | 1 |
| 953913-5001 | Body, PTFE                                                 | 1 |

### Fittings Kit

Kit consists of 20' of 1/8" OD FEP tubing, 20 CTFE ferrules and 20 (1/4-28) ETFE nuts. Not pictured.

| Catalog Number | Case Qty. |
|----------------|-----------|
| 953882-0000    | 1         |



Bottle not included.

Port for sparging line (optional use)

Port for solvent intake line

Filter  
Catalog No.  
953916-3002

Draws solvent from bottom of solvent bottle

Filters incoming sparging gas (optional use)

## Safety System 3

*Eliminates the safety hazards of aluminum foil-wrapped solvent containers.*

- This unique Solvent Bottle Adapter is made from PBT and converts ULTRA-WARE® GL 45 mobile phase caps to standard 4L solvent bottles for direct connection to your HPLC pump.
- ULTRA-WARE® Economy Three Hole Cap is manufactured from PTFE with a TFE/propylene o-ring and a polypropylene screw collar. Three connecting threads on top of the cap use standard 1/4-28 flangeless fittings. Two ports have 1/8" through holes for connection to the inlet / spurge filter. The third port has a 1/16" through hole used as a vent port during sparging.

### Each Safety System 3 consists of the following:

|             |       |                                                                                       |
|-------------|-------|---------------------------------------------------------------------------------------|
| 953913-5000 | 1 ea. | Economy Three Hole Cap, GL 45                                                         |
| 953907-0000 | 1 ea. | Solvent Bottle Adapter, GL 45 (Systems available with or without adapter. See below.) |
| 953916-3002 | 1 ea. | Combination Inlet / Spurge Filter, 2µm, PEEK                                          |
| 420821-0018 | 2 ea. | Flangeless Nut, ETFE, 1/4-28 x 1/8" (2 Req'd.)                                        |
| 420822-0018 | 2 ea. | Flangeless Ferrule, ETFE, 1/8" (Optional - 2 Req'd.)                                  |
| 953913-0001 | 1 ea. | Vent Port Plug, ETFE, 1/4-28 (1 Req'd.)                                               |
| 420823-0018 | 1 ea. | Tubing, FEP, 1/8" O.D. x 1/16" I.D. x 10 ft.                                          |

| Catalog Number | Description                                  |
|----------------|----------------------------------------------|
| 953930-0000    | Safety System 3 with GL 45 Bottle Adapter    |
| 953930-0001    | Safety System 3 without GL 45 Bottle Adapter |

### Unique Filter Combines Functions to Increase Efficiency

Included with your Safety System 3 is the unique Bottom-of-the-Bottle™ Inlet / Spurge Filter. This component combines the functions of an inlet filter with a sparger in a single, convenient device. Sparging bubbles are prevented from entering the mobile phase stream while allowing the pump to draw all but a few milliliters of solvent from the reservoir or bottle. All PEEK construction makes it ideal for virtually all mobile phases. Supplied with 2µm porosity frits and connections for 1/8" O.D. tubing.

## Plastic-Coated ULTRA-WARE® Reservoirs

ULTRA-WARE Reservoirs have been specially designed for the preparation, storage and delivery of all liquid chromatography mobile phases. Each ULTRA-WARE Reservoir is manufactured from the most chemically inert glass available to prevent the leaching of any extractables into the mobile phase solvents. They are then externally coated with plastic containing an added ultraviolet (UV) blocking agent. In case of an accident, the plastic safety coating helps retain glass fragments and allows a reasonable amount of time for the safe disposal of the liquid contents. The plastic coating also blocks virtually all UV light up to 385 nm, preventing photodegradation of light sensitive reagents.

ULTRA-WARE Reservoirs are recommended for use under vacuum for filtration and vacuum degassing of mobile phase solvents. ULTRA-WARE Reservoirs can also be used at internal pressures up to 6 psig for helium sparging and blanketing of the mobile phase. The conical bottom reservoirs deliver virtually all of the mobile phase without dangerous reservoir tilting. All ULTRA-WARE Reservoirs are supplied with GL 45 screw thread. \*Patent No. Des. 292,824

### Conical Bottom HPLC Reservoirs without Graduations

| Catalog Number | Capacity | Height x Dia. | Case Qty. |
|----------------|----------|---------------|-----------|
| 953901-0252    | 250 mL   | 203 x 85 mm   | 1         |
| 953901-0502    | 500 mL   | 230 x 105 mm  | 1         |
| 953901-1002    | 1 liter  | 275 x 130 mm  | 1         |
| 953901-2002    | 2 liter  | 319 x 150 mm  | 1         |
| 953901-5002    | 5 liter  | 373 x 205 mm  | 1         |
| 953901-1003    | 10 liter | 433 x 255 mm  | 1         |
| 953901-2003    | 20 liter | 578 x 315 mm  | 1         |

### Conical Bottom HPLC Reservoirs with Graduations

| Catalog Number | Capacity | Height x Dia. | Case Qty. |
|----------------|----------|---------------|-----------|
| 953922-0252    | 250 mL   | 203 x 85 mm   | 1         |
| 953922-0502    | 500 mL   | 230 x 105 mm  | 1         |
| 953922-1002    | 1 liter  | 275 x 130 mm  | 1         |
| 953922-2002    | 2 liter  | 319 x 150 mm  | 1         |
| 953922-5002    | 5 liter  | 373 x 205 mm  | 1         |
| 953922-1003    | 10 liter | 433 x 255 mm  | 1         |
| 953922-2003    | 20 liter | 578 x 315 mm  | 1         |

### Conical Bottom HPLC Reservoirs with Side Necks and Graduations

Side neck allows addition of filtered solvent without removing delivery cap.

| Catalog Number | Capacity | Height x Dia. | Case Qty. |
|----------------|----------|---------------|-----------|
| 953910-2002    | 2 liter  | 319 x 150 mm  | 1         |
| 953910-5002    | 5 liter  | 373 x 205 mm  | 1         |
| 953910-1003    | 10 liter | 433 x 255 mm  | 1         |
| 953910-2003    | 20 liter | 578 x 315 mm  | 1         |

### Flat Bottom HPLC Reservoirs without Graduations

| Catalog Number | Capacity | Height x Dia. | Case Qty. |
|----------------|----------|---------------|-----------|
| 953902-0252    | 250 mL   | 133 x 73 mm   | 1         |
| 953902-0502    | 500 mL   | 165 x 89 mm   | 1         |
| 953902-1002    | 1 liter  | 205 x 111 mm  | 1         |
| 953902-2002    | 2 liter  | 250 x 138 mm  | 1         |
| 953902-5002    | 5 liter  | 320 x 186 mm  | 1         |
| 953902-1003    | 10 liter | 400 x 234 mm  | 1         |
| 953902-2003    | 20 liter | 490 x 300 mm  | 1         |

### Flat Bottom HPLC Reservoirs with Graduations

| Catalog Number | Capacity | Height x Dia. | Case Qty. |
|----------------|----------|---------------|-----------|
| 953932-0252    | 250 mL   | 203 x 85 mm   | 1         |
| 953932-0502    | 500 mL   | 230 x 105 mm  | 1         |
| 953932-1002    | 1 liter  | 275 x 130 mm  | 1         |
| 953932-2002    | 2 liter  | 319 x 150 mm  | 1         |
| 953932-5002    | 5 liter  | 373 x 205 mm  | 1         |
| 953932-1003    | 10 liter | 433 x 255 mm  | 1         |
| 953932-2003    | 20 liter | 578 x 315 mm  | 1         |



953902

#### Specifications ULTRA-WARE HPLC Reservoirs

##### Materials:

Reservoir: Type I, Class A,  
Borosilicate Glass

Plastic Coating: PVC with UV  
blocking agent

Screw Thread: GL 45

Operating Pressure: -1.0 to 0.4 bar

UV Transmittance: <1% up to 385 nm



953906

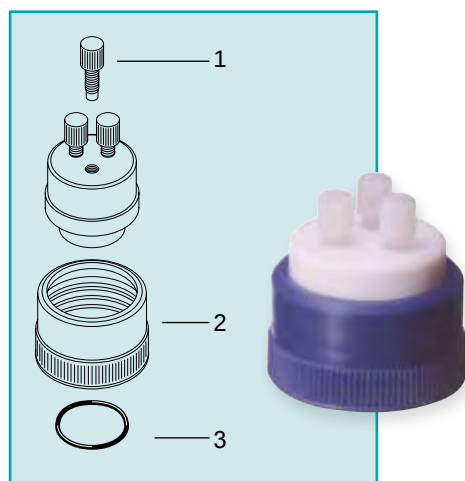
## ULTRA-WARE® Solvent Pickup Adapter

Designed to be used with the Five Valve, Four Valve and Filtration caps to provide safe, in-line filtration that replaces the traditional pour-and-wait funnel filtration method. The unique BEVEL-SEAL® makes a vacuum tight o-ring connection to the PTFE tubing. The HI-VAC® valve is easier to open under vacuum than the standard stopcock. Closing the valve provides vacuum degassing after filtration. Each unit is supplied with 3 feet (91 cm) of 1/4" O.D. FEP tubing. Valve o-ring size is 010 and sidearm o-ring size is 108.

| Catalog Number | Description                          | Case Qty. |
|----------------|--------------------------------------|-----------|
| 953906-0047    | Pickup Adapter, Standard, 47 mm      | 1         |
| 953906-6347    | Pickup Adapter, THF-Resistant, 47 mm | 1         |
| 953906-0090    | Pickup Adapter, Standard, 90 mm      | 1         |
| 953906-6390    | Pickup Adapter, THF-Resistant, 90 mm | 1         |

### Replacement Parts

|             |                                     |    |
|-------------|-------------------------------------|----|
| 953906-0001 | (1) Valve Plug Assembly, Std.       | 1  |
| 953906-0002 | (2) Glass Pickup Adapter Body, 47mm | 1  |
| 953906-0092 | (2) Glass Pickup Adapter Body, 90mm | 1  |
| 410119-1508 | (3) Cap, Nylon, 15-415, 8.5mm       | 12 |



953913-0000

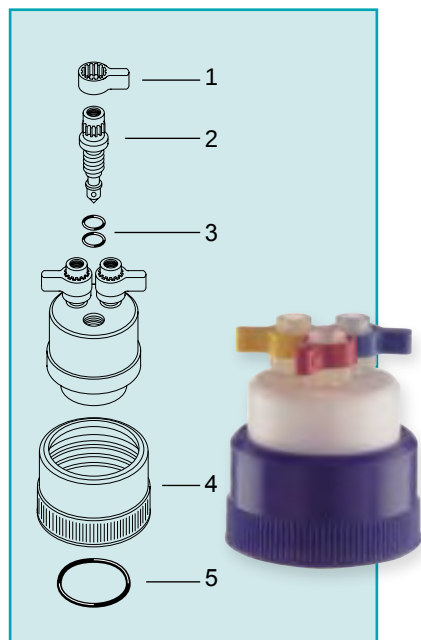
## ULTRA-WARE® Three Hole Delivery Cap

Three holes have 1/4-28 threads top and bottom with 1/8" I.D. holes through to accept 1/8" O.D. PTFE tubing. Body is PTFE. Supplied complete with three 1/4-28 CTFE plugs and a TFE / propylene o-ring.

| Catalog Number | Description    | Cap Thread | Case Qty. |
|----------------|----------------|------------|-----------|
| 953913-0000    | Three Hole Cap | GL 45      | 1         |

### Replacement Parts

|             |                                       |   |
|-------------|---------------------------------------|---|
| 953913-0001 | (1) Plug, ETFE, 1/4-28                | 1 |
| 953903-0005 | (2) Screw Cap, GL 45                  | 1 |
| 758260-0216 | (3) O-Ring, TFE / Propylene, Size 216 | 1 |



953903-0000

## ULTRA-WARE® Three Valve Delivery Cap

Three on-off CTFE valves have 1/4-28 threads top and bottom. Valve body is PTFE. Valve stem is CTFE. O-ring material for valve stem and lower seal is TFE / propylene.

| Catalog Number | Description     | Cap Thread | Case Qty. |
|----------------|-----------------|------------|-----------|
| 953903-0000    | Three Valve Cap | GL 45      | 1         |

### Replacement Parts

|             |                                                                        |   |
|-------------|------------------------------------------------------------------------|---|
| 953903-0002 | (1) Valve Handle, Blue                                                 | 1 |
| 953903-0003 | (1) Valve Handle, Red                                                  | 1 |
| 953903-0004 | (1) Valve Handle, Yellow                                               | 1 |
| 953903-0042 | (2) Valve Stem, CTFE, Short                                            | 1 |
| 758260-0008 | (3) O-Ring, TFE / Propylene, Size 008 (2 required per CTFE Valve Stem) | 1 |
| 953903-0005 | (4) Screw Cap, GL 45                                                   | 1 |
| 758260-0216 | (5) O-Ring, TFE / Propylene, Size 216                                  | 1 |

THF-resistant versions of ULTRA-WARE® caps are also available. Please call 888-546-2531 for more information.



953915-0047

**ULTRA-WARE® Filtration Cap**

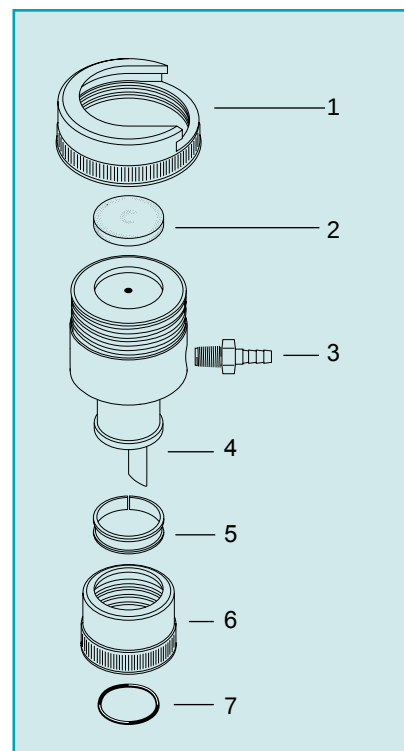
Body is constructed of glass-filled PTFE with a vacuum adapter for 1/4" I.D. tubing. Upper screw clamp holds a solvent pickup adapter or funnel. Coarse fritted glass filter support is removable. Supplied with a PTFE / propylene o-ring.

| Catalog Number | Filter Diameter | Cap Thread | Case Qty. |
|----------------|-----------------|------------|-----------|
| 953915-0047    | 47 mm           | GL 45      | 1         |

**Replacement Parts**

|             |                                               |    |
|-------------|-----------------------------------------------|----|
| 953914-0002 | (1) Upper Screw Clamp, 47 mm                  | 1  |
| 953914-0001 | (2) Coarse Porosity Glass Support Frit, 47 mm | 1  |
| 953915-0001 | (3) Hose Barb, PFA, 1/4"                      | 1  |
| 953914-0006 | (4) Drip Tip, PTFE                            | 1  |
| 953981-0004 | (5) Lower Cap Retainer Ring                   | 1  |
| 953981-0005 | (6) Lower Screw Cap, GL 45                    | 1  |
| 758292-0122 | (7) O-Ring, Ethylene Propylene, Size 122      | 10 |

Filtration cap, **953915-0047** shown with Solvent Pickup Adapter, **953906-0047**, and ULTRA-WARE, safety-coated reservoir, **953901-series**, available for purchase separately. The safety coating contains an ultraviolet (UV) blocking agent to help protect solvents from degradation.



953981-0047

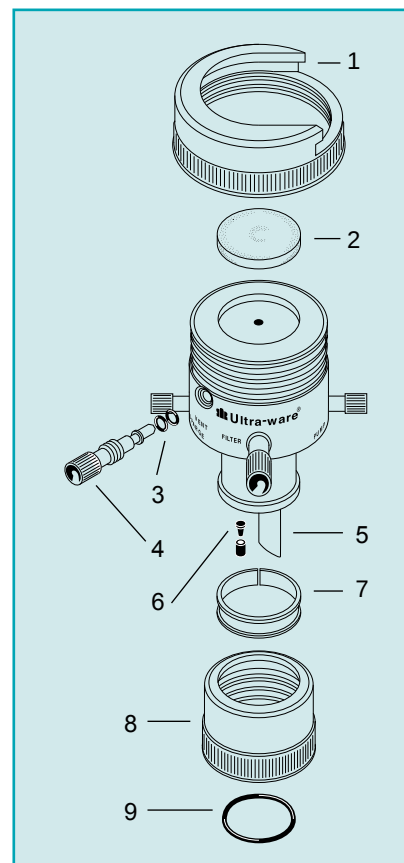
**ULTRA-WARE® Four Valve Filtration / Delivery Cap**

Cap combines the mobile phase filtration, sparging / degassing, storage and delivery functions. Tubing connections are made in the back of the cap, reducing the typical clutter of tubing at the reservoirs. An integral check valve in the sparge port prevents the mobile phase from backing up into the gas lines. A pressure release valve prevents the reservoir from being accidentally over-pressurized. The 1/4-28 fitting connections allow easy connection to any HPLC pump system. Cap body is manufactured from glass-filled PTFE. Cap will fit any reservoir or bottle with a GL 45 thread. Patent No. 5,397,467

| Catalog Number | Filter Diameter | Cap Thread | Case Qty. |
|----------------|-----------------|------------|-----------|
| 953981-0047    | 47 mm           | GL 45      | 1         |

**Replacement Parts**

|             |                                                                      |    |
|-------------|----------------------------------------------------------------------|----|
| 953914-0002 | (1) Upper Screw Clamp, 47 mm                                         | 1  |
| 953914-0001 | (2) Coarse Porosity Glass Support Frit, 47 mm                        | 1  |
| 758260-0008 | (3) O-Ring, TFE / Propylene, Size 008 (2 req'd. per CTFE Valve Stem) | 1  |
| 953981-0001 | (4) Valve Stem, CTFE, Short (for Sparge and Pump Ports)              | 1  |
| 953914-0006 | (5) Drip Tip, PTFE                                                   | 1  |
| 953981-0003 | (6) Check Valve with Retainer                                        | 1  |
| 953981-0004 | (7) Lower Cap Retainer Ring                                          | 1  |
| 953981-0005 | (8) Lower Screw Cap, GL 45                                           | 1  |
| 758292-0122 | (9) O-Ring, Ethylene Propylene, Size 122                             | 10 |



THF-resistant versions of ULTRA-WARE® caps are also available. Please call 888-546-2531 for more information.

Five valve cap, **953983-0047** shown with Solvent Pickup Adapter, **953906-0047**, and ULTRA-WARE, safety-coated reservoir, **953901-series**, available for purchase separately. The safety coating contains an ultraviolet (UV) blocking agent to help protect solvents from degradation.



## ULTRA-WARE® Five Valve Recirculation / Filtration Cap

Designed to permit the recirculation of mobile phase back into the reservoir while maintaining the helium sparged environment. Cap also performs stepwise filtration, sparging / degassing, storage and delivery to the HPLC pump. An integral check valve prevents mobile phase from backing up into the gas lines. A pressure release valve protects the reservoir from being accidentally over-pressurized. The 1/4-28 fitting connections allow easy connection to any HPLC pump system. Cap body is manufactured from glass-filled PTFE. Cap will fit any reservoir or bottle with a GL 45 thread. Patent No. 5,397,467

| Catalog Number           | Filter Diameter                                                   | Cap Thread | Case Qty. |
|--------------------------|-------------------------------------------------------------------|------------|-----------|
| 953983-0047              | 47 mm                                                             | GL 45      | 1         |
| <b>Replacement Parts</b> |                                                                   |            |           |
| 953914-0002              | (1) Upper Screw Clamp, 47 mm                                      |            | 1         |
| 953914-0001              | (2) Coarse Porosity Glass Support Frit, 47 mm                     |            | 1         |
| 758260-0008              | (3) O-Ring, TFE / Propylene, Size 008 (2 required per Valve Stem) |            | 1         |
| 953981-0001              | (4) Valve Stem, CTFE, Short (for Sparge and Pump Ports)           |            | 1         |
| 953914-0006              | (5) Drip Tip, PTFE                                                |            | 1         |
| 953981-0003              | (6) Check Valve with Retainer                                     |            | 1         |
| 953981-0004              | (7) Lower Cap Retainer Ring                                       |            | 1         |
| 953981-0005              | (8) Lower Screw Cap, GL 45                                        |            | 1         |
| 758292-0122              | (9) O-Ring, Ethylene Propylene, Size 122                          |            | 10        |

THF-resistant versions of ULTRA-WARE® caps are also available. Please call 888-546-2531 for more information.

### 1. Coarse Glass Frit



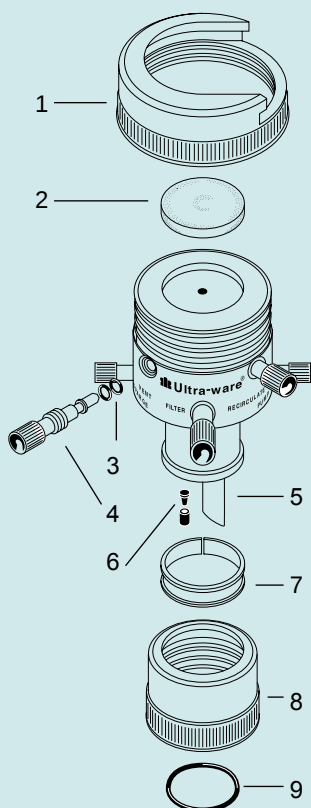
### 2. Screw Clamp

## 90 mm Conversion Base for ULTRA-WARE® Caps

Converts the Five Valve, Four Valve and Filtration caps to use 90 mm filter membranes, providing up to four times faster filtration. The conversion base is manufactured from glass-filled PTFE and is supplied with a coarse porosity glass support frit and an upper screw clamp. Requires a 90 mm Solvent Pickup Adapter, 953906-0090 or THF-resistant 953906-6390.

| Catalog Number           | Description                           | Case Qty. |
|--------------------------|---------------------------------------|-----------|
| 953984-0090              | 90 mm Conversion Base                 | 1         |
| <b>Replacement Parts</b> |                                       |           |
| 953914-0092              | (1) Upper Screw Clamp, 90 mm          | 1         |
| 953914-0091              | (2) Glass Support Frit, Coarse, 90 mm | 1         |

For a complete listing of chromatography columns and fittings, visit our website: [www.kimble-chase.com](http://www.kimble-chase.com)



**ULTRA-WARE® Fittings Kit, Standard Version**

This kit contains all of the tube fittings, adapters and solvent inlet filters required to plumb any ULTRA-WARE cap to virtually all HPLC pumps. Not recommended for use with THF or chlorinated hydrocarbons.

| Catalog Number | Description                    | Case Qty. |
|----------------|--------------------------------|-----------|
| 953882-1000    | Fittings Kit, Standard Version | 1         |

| Component Parts | Description                                               | Quantity in Kit | Case Qty. |
|-----------------|-----------------------------------------------------------|-----------------|-----------|
| 420407-2003     | Adapter, F 1/4-28 to F-Luer                               | 2               | 1         |
| 420407-2113     | Adapter, M 1/4-28 to M-Luer                               | 1               | 1         |
| 420818-3305     | Union, 5/16-24 to 1/4-28                                  | 1               | 1         |
| 420821-0018     | Tubing Nut, 1/4-28, for 1/8" O.D.                         | 10              | 1         |
| 420821-0618     | Tubing Nut, M6, for 1/8" O.D.                             | 1               | 1         |
| 420821-3519     | Tubing Nut, 5/16-24, for 3/16" O.D.                       | 1               | 1         |
| 420822-0018     | Ferrule, for 1/8" O.D.                                    | 10              | 1         |
| 420822-1019     | Ferrule, for 3/16" O.D.                                   | 1               | 1         |
| 420822-2007     | Ferrule, for 1.8 mm O.D.                                  | 2               | 1         |
| 953916-0000     | Inlet Filter, for 1/8" O.D. Tubing                        | 1               | 1         |
| 953916-1002     | Inlet Filter, Bottom-of-the-Bottle™, for 1/8" O.D. Tubing | 1               | 1         |
| 953919-0014     | Adapter, 1/4-28 to 1/4" Hose Barb                         | 1               | 1         |

**953882-1000****ULTRA-WARE® Fittings Kit, THF-Resistant**

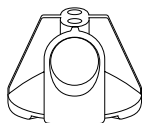
This kit contains all of the tube fittings, adapters and solvent inlet filters required to plumb any ULTRA-WARE cap to virtually all HPLC pumps. However, it is designed to be used specifically with THF or other very aggressive organic solutions.

| Catalog Number | Description               | Case Qty. |
|----------------|---------------------------|-----------|
| 953882-2000    | Fittings Kit, THF Version | 1         |

| Component Parts | Description                         | Quantity in Kit | Case Qty. |
|-----------------|-------------------------------------|-----------------|-----------|
| 420407-2003     | Adapter, F 1/4-28 to F-Luer         | 2               | 1         |
| 420407-2113     | Adapter, M 1/4-28 to M-Luer         | 1               | 1         |
| 420818-3305     | Union, 5/16-24 to 1/4-28            | 1               | 1         |
| 420821-0018     | Tubing Nut, 1/4-28, for 1/8" O.D.   | 10              | 1         |
| 420821-0618     | Tubing Nut, M6, for 1/8" O.D.       | 1               | 1         |
| 420821-3519     | Tubing Nut, 5/16-24, for 3/16" O.D. | 1               | 1         |
| 420821-6218     | Tubing Nut, 1/4-28, for 1/8" O.D.   | 2               | 1         |
| 420822-0018     | Ferrule, for 1/8" O.D.              | 10              | 1         |
| 420822-1019     | Ferrule, for 3/16" O.D.             | 1               | 1         |
| 420822-2007     | Ferrule, for 1.8 mm O.D.            | 2               | 1         |
| 953916-2002     | Inlet Filter, BOTB, for 1/16" I.D.  | 1               | 1         |
| 953916-6210     | Inlet Filter, for 1/16" I.D.        | 1               | 1         |
| 953919-0014     | Adapter, 1/4-28 to 1/4" Hose Barb   | 1               | 1         |

**953882-2000**

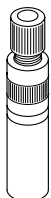


953916-3002

### Inlet / Sparge Filter

The inlet/sparge filter combines an inlet filter with a sparger in a single, convenient device. The all PEEK construction is ideal for virtually all mobile phases. The special design prevents sparging bubbles from entering the mobile phase stream while allowing the pump to draw all but a few milliliters of solvent from the reservoir. The inlet/sparge filter is supplied with 2 µm porosity frits and connections for 1/8" O.D. tubing.

| Catalog Number | O.D. x Length | Porosity | Fits Tubing Size | Case Qty. |
|----------------|---------------|----------|------------------|-----------|
| 953916-3002    | 1.1" x 0.8"   | 2 µm     | 1/8" O.D.        | 1         |



953916-1002



953916-2002

### ULTRA-WARE® Inlet Filter, Bottom-of-the-Bottle™

A specially designed inlet filter that allows solvent to be drawn to within 2 mm of the bottom of the filter. Combined with the ULTRA-WARE conical bottom reservoir, this filter will utilize all but a few milliliters of mobile phase for more efficient use of your solvent.

| Catalog Number | O.D. x Length | Fits Tubing Size | Case Qty. |
|----------------|---------------|------------------|-----------|
| 953916-1002    | 1/2" x 1 3/4" | 1/8" O.D.        | 1         |
| 953916-2002    | 1/2" x 1"     | 1/16" I.D.       | 1         |



953916-0000

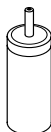
### ULTRA-WARE® Stainless Steel Solvent Inlet Filter

Two micron porosity filter with a CTFE nut for connection to 1/8" O.D. PTFE tubing. Recommended for use with the 250 mL to 5 liter size reservoir systems.

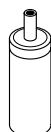
| Catalog Number | O.D. x Length | Case Qty. |
|----------------|---------------|-----------|
| 953916-0000    | 1/2" x 1"     | 1         |

#### Component Parts

|             |                |   |
|-------------|----------------|---|
| 953916-0001 | SS Filter Only | 1 |
| 953916-0002 | CTFE Nut       | 1 |



953916-6210



953916-6220

### ULTRA-WARE® Stainless Steel Solvent Inlet Filter

Ten micron porosity all stainless steel filter with a stem for slip connection to PTFE tubing. Recommended for use with THF-resistant systems.

| Catalog Number | O.D. x Length | Stem O.D. | Fits Tubing Size | Case Qty. |
|----------------|---------------|-----------|------------------|-----------|
| 953916-6210    | 1/2" x 1"     | 1/16"     | 1/8" O.D.        | 1         |
| 953916-6220    | 1/2" x 1"     | 1/8"      | 3/16" O.D.       | 1         |

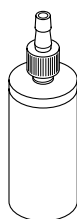
### ULTRA-WARE® Stainless Steel Solvent Inlet Filter

Ten micron porosity filter with an ETFE nut and ferrule for connection to 1/8" O.D. PTFE tubing. A CTFE hose barb adapter for connection to 1/4" O.D. (5/32" I.D.) tubing is also included. Recommended for use with 10 and 20 liter size reservoir systems.

| Catalog Number | O.D. x Length | Case Qty. |
|----------------|---------------|-----------|
| 953917-0000    | 7/8" x 1 1/2" | 1         |

#### Component Parts

|             |             |   |
|-------------|-------------|---|
| 953917-0001 | Filter Only | 1 |
|-------------|-------------|---|



953917-0000

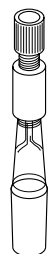
### ULTRA-WARE® Glass Solvent Inlet Filter

Five micron porosity filter with a CTFE union, 1/4-28 nut and ferrule for connection to 1/8" O.D. tubing.

| Catalog Number | O.D. x Length | Case Qty. |
|----------------|---------------|-----------|
| 953916-2700    | 1/2" x 2"     | 1         |

#### Component Parts

|             |                     |   |
|-------------|---------------------|---|
| H88800-0000 | Union, 1/4-28, CTFE | 1 |
|-------------|---------------------|---|



953916-2700

## 2mL and 4mL Autosampler Vials without Closures

- Choice of clear KG-33 or amber 203 borosilicate glass
- Available with or without marking spots
- Made in the USA

Made of the highest quality materials, Kimble Chase vials meet or exceed industry specifications and tolerances. These products are available in a variety of standard sizes and finishes. Vials are made from clear, Type 1 borosilicate, 33 expansion glass or amber, Type 1, borosilicate, 51 expansion glass for light sensitive applications. Vials are packed 100 per tray. Vials with large opening and/or marking spots are also available. Closures are not included.



12 x 32 mm Vials

### Clear Vials

| Catalog Number | Cap. (mL) | O.D. x Ht. (mm) | Finish                                     | Pack Qty. | Case Qty. |
|----------------|-----------|-----------------|--------------------------------------------|-----------|-----------|
| 331232C        | 2         | 12 x 32         | crimp                                      | 100       | 2000      |
| 331232CW       | 2         | 12 x 32         | crimp with marking spot, graduated         | 100       | 2000      |
| 331232CL       | 2         | 12 x 32         | crimp large opening                        | 100       | 2000      |
| 331232CLW      | 2         | 12 x 32         | crimp large opening w/ marking spot        | 100       | 2000      |
| 331232S        | 2         | 12 x 32         | screw thread, 8-425                        | 100       | 2000      |
| 331232SN       | 2         | 12 x 32         | screw thread, 9-425                        | 100       | 2000      |
| 331232SW       | 2         | 12 x 32         | screw thread, 9-425 w/ marking spot, grad. | 100       | 2000      |
| 331545S        | 4         | 15 x 45         | screw thread, 13-425                       | 100       | 2000      |
| 331545SW       | 4         | 15 x 45         | screw thread, 13-425 w/ marking spot       | 100       | 2000      |

### Amber Vials

| Catalog Number | Cap. (mL) | O.D. x Ht. (mm) | Finish                                     | Pack Qty. | Case Qty. |
|----------------|-----------|-----------------|--------------------------------------------|-----------|-----------|
| 511232CA       | 2         | 12 x 32         | crimp                                      | 100       | 2000      |
| 511232CAW      | 2         | 12 x 32         | crimp w/ marking spot                      | 100       | 2000      |
| 511232CLA      | 2         | 12 x 32         | crimp large opening                        | 100       | 2000      |
| 511232CLAW     | 2         | 12 x 32         | crimp large opening w/ marking spot        | 100       | 2000      |
| 511232SA       | 2         | 12 x 32         | screw thread, 8-425                        | 100       | 2000      |
| 511232DPA      | 2         | 12 x 32         | screw thread, 9-425                        | 100       | 2000      |
| 511232SAW      | 2         | 12 x 32         | screw thread, 9-425 w/ marking spot, grad. | 100       | 2000      |
| 511545SA       | 4         | 15 x 45         | screw thread, 13-425                       | 100       | 2000      |
| 511545SAW      | 4         | 15 x 45         | screw thread, 13-425 w/ marking spot       | 100       | 2000      |



15 x 45 mm Vials

## Aluminum Seals, with PTFE-Faced Silicone Rubber Liners

- Good for resealability, core resistance, multiple injections, and easy penetration

| Catalog Number | Fits GPI Aluminum Seal Finish | Color   | Thickness, Inches PTFE | Thickness, Inches Silicone Rubber | Case Qty. |
|----------------|-------------------------------|---------|------------------------|-----------------------------------|-----------|
| N73824-11      | 11                            | natural | 0.002                  | 0.040                             | 100       |



N73824 Series

## Aluminum Seals, with PTFE-Faced Red Rubber Septa

- Most popular and economical choice for general GC applications
- Moderate resealability
- Not recommended for multiple injections or long-term storage

| Catalog Number | Fits GPI Aluminum Seal Finish | Color | Thickness, Inches PTFE | Thickness, Inches Red Rubber | Case Qty. |
|----------------|-------------------------------|-------|------------------------|------------------------------|-----------|
| N73826-11      | 11                            | red   | 0.002                  | 0.040                        | 1000      |



N73826 Series

Kimble Chase caps are manufactured using the highest quality raw materials and designed for an ideal fit with our autosampler vials.



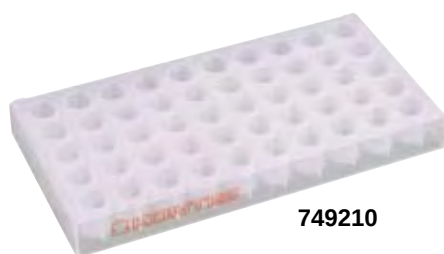
73813BK

73813WH

Pre-assembled caps and septa minimize contamination due to handling.



73814BK



749210

## Open-Top Polypropylene Screw Thread Closures with Red PTFE-Faced Silicone Septa

- Convenient assembly of caps and liners
- Available with standard or pre-slit septa

Autoclavable and used for multiple injections.

| Catalog Number | GPI Thread Finish | Septa    | Color | Shelf-Pack Qty. | Case Qty. |
|----------------|-------------------|----------|-------|-----------------|-----------|
| 73812BK-8425   | 8-425             | standard | black | 100             | 1000      |
| 73813BK-8425   | 8-425             | pre-slit | black | 100             | 1000      |
| 73812WH-8425   | 8-425             | standard | white | 100             | 1000      |
| 73813WH-8425   | 8-425             | pre-slit | white | 100             | 1000      |
| 73812BK-9425   | 9-425             | standard | black | 100             | 1000      |
| 73813BK-9425   | 9-425             | pre-slit | black | 100             | 1000      |
| 73812BL-9425   | 9-425             | standard | blue  | 100             | 1000      |
| 73813BL-9425   | 9-425             | pre-slit | blue  | 100             | 1000      |
| 73812BK-13425  | 13-425            | standard | black | 100             | 1000      |
| 73813BK-13425  | 13-425            | pre-slit | black | 100             | 1000      |
| 73812WH-13425  | 13-425            | standard | white | 100             | 1000      |
| 73813WH-13425  | 13-425            | pre-slit | white | 100             | 1000      |

## Open-Top Polypropylene Screw Thread Closures with Bonded White PTFE Liners

- Intended for single-use injection

| Catalog Number | GPI Thread Finish | Color | Case Qty. |
|----------------|-------------------|-------|-----------|
| 73814WH-8425   | 8-425             | white | 1000      |
| 73814BL-9425   | 9-425             | blue  | 1000      |
| 73814BK-13425  | 13-425            | black | 1000      |

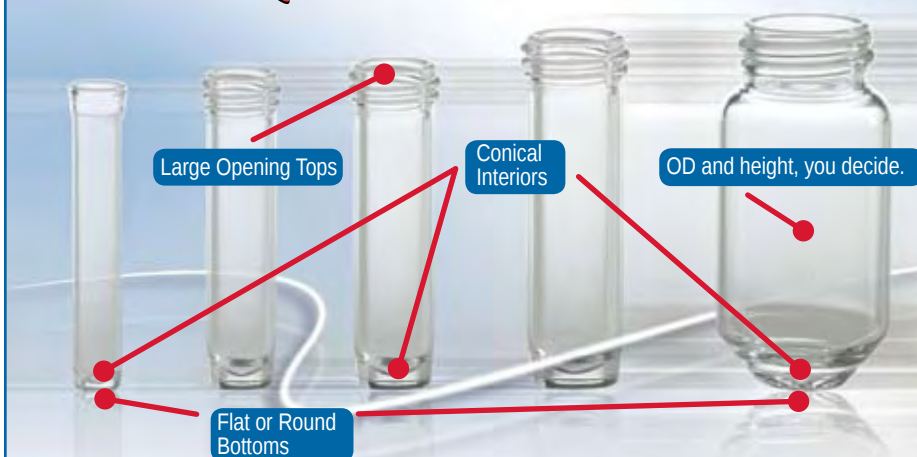
## Polypropylene Rack for 12 mm OD Vials

Disposable polypropylene vial rack is lettered and numbered for indexing individual vials. Corners interlock for convenient stacking.

| Catalog Number | Hole Diameter x Depth (mm) | Case Qty. |
|----------------|----------------------------|-----------|
| 749210-0012    | 12 x 15                    | 10        |



**High Recovery Vials Made to Your Specifications**



• Accuracy • Reliability • Quality • Affordability

### Flat Exterior Bottoms

- Ideal for bar coding
- Sized to fit any tray design
- Inherently stable

### Conical Interior Bottoms

- Maximize your sample recovery
- Minimizes the use of costly samples
- Designed based on your needle type

### Finishes

- Aluminum seal
- Screw thread
- Plug style

### Available Value Added Services

- Permanent sample ID (PSID)
- Fused on or laser etched labels
- All symbologies - 1D, 2D
- Universal readability
- Pre-labeled and pre-tared
- Pre-weighed with documentation

**We can manufacture any vial you can dream up.**

| Cat. No.    | Pg. | Cat. No.    | Pg. | Cat. No.    | Pg. | Cat. No.    | Pg. | Cat. No.    | Pg. | Cat. No.    | Pg. | Cat. No.      | Pg. | Cat. No.    | Pg. |
|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|-------------|-----|---------------|-----|-------------|-----|
| 331232C     | 29  | 420400-2511 | 9   | 420510-0625 | 15  | 420540-0520 | 15  | 420610-0660 | 17  | 420830-3010 | 3   | 422540-0000   | 21  | 953906-0047 | 24  |
| 331232CL    | 29  | 420400-2512 | 9   | 420510-0630 | 15  | 420540-0525 | 15  | 420610-0720 | 17  | 420830-3020 | 3   | 422550-0000   | 21  | 953906-0090 | 24  |
| 331232CLW   | 29  | 420400-2515 | 9   | 420510-0650 | 15  | 420540-0530 | 15  | 420610-0730 | 17  | 420830-6000 | 3   | 422551-0000   | 21  | 953906-0092 | 24  |
| 331232CW    | 29  | 420400-2520 | 9   | 420510-0660 | 15  | 420540-0550 | 15  | 420610-0750 | 17  | 420830-6010 | 3   | 511232CA      | 29  | 953906-6347 | 24  |
| 331232S     | 29  | 420400-2530 | 9   | 420510-0720 | 15  | 420540-0560 | 15  | 420610-0760 | 17  | 420830-6020 | 3   | 511232CAW     | 29  | 953906-6390 | 24  |
| 331232SN    | 29  | 420400-2550 | 9   | 420510-0725 | 15  | 420540-0620 | 15  | 420620-0120 | 17  | 420831-1000 | 3   | 511232CLA     | 29  | 953910-1003 | 23  |
| 331232SW    | 29  | 420400-2575 | 9   | 420510-0730 | 15  | 420540-0625 | 15  | 420620-0125 | 17  | 420831-1010 | 3   | 511232CLAW    | 29  | 953910-2002 | 23  |
| 331545S     | 29  | 420401-0704 | 9   | 420510-0750 | 15  | 420540-0630 | 15  | 420620-0130 | 17  | 420831-1020 | 3   | 511232DPA     | 29  | 953910-2003 | 23  |
| 331545SW    | 29  | 420401-0705 | 9   | 420510-0760 | 15  | 420540-0650 | 15  | 420620-0320 | 17  | 420831-1200 | 3   | 511232SA      | 29  | 953910-5002 | 23  |
| 410119-1508 | 24  | 420401-0710 | 9   | 420530-0125 | 14  | 420540-0660 | 15  | 420620-0325 | 17  | 420831-1210 | 3   | 511232SAW     | 29  | 953913-0000 | 24  |
| 416170-0510 | 19  | 420401-0715 | 9   | 420530-0130 | 14  | 420540-0720 | 15  | 420620-0330 | 17  | 420831-1220 | 3   | 511545SA      | 29  | 953913-0001 | 24  |
| 416170-0520 | 19  | 420401-0720 | 9   | 420530-0150 | 14  | 420540-0725 | 15  | 420620-0350 | 17  | 420831-1500 | 3   | 511545SAW     | 29  | 953913-5000 | 22  |
| 416170-1020 | 19  | 420401-0730 | 9   | 420530-0211 | 14  | 420540-0730 | 15  | 420620-0420 | 17  | 420831-1510 | 3   | 617000-0224   | 21  | 953913-5001 | 22  |
| 416170-1118 | 19  | 420401-0750 | 9   | 420530-0212 | 14  | 420540-0750 | 15  | 420620-0425 | 17  | 420831-1520 | 3   | 617000-0424   | 21  | 953914-0001 | 25  |
| 416170-1119 | 19  | 420401-1005 | 9   | 420530-0213 | 14  | 420540-0760 | 15  | 420620-0430 | 17  | 420831-3000 | 3   | 73812BK-13425 | 30  | 953914-0002 | 25  |
| 416170-1120 | 19  | 420401-1010 | 9   | 420530-0214 | 14  | 420540-2610 | 15  | 420620-0450 | 17  | 420831-3010 | 3   | 73812BK-8425  | 30  | 953914-0006 | 25  |
| 416170-1121 | 19  | 420401-1011 | 9   | 420530-0220 | 14  | 420550-0120 | 16  | 420620-0520 | 17  | 420831-3020 | 3   | 73812BK-9425  | 30  | 953914-0091 | 26  |
| 416170-1122 | 19  | 420401-1012 | 9   | 420530-0221 | 14  | 420550-0125 | 16  | 420620-0530 | 17  | 420831-6000 | 3   | 73812BL-9425  | 30  | 953914-0092 | 26  |
| 416170-1123 | 19  | 420401-1015 | 9   | 420530-0222 | 14  | 420550-0130 | 16  | 420620-0550 | 17  | 420831-6010 | 3   | 73812VH-13425 | 30  | 953915-0001 | 25  |
| 416170-1124 | 19  | 420401-1020 | 9   | 420530-0225 | 14  | 420550-0150 | 16  | 420620-0560 | 17  | 420831-6020 | 3   | 73812VH-8425  | 30  | 953915-0047 | 25  |
| 416170-1125 | 19  | 420401-1030 | 9   | 420530-0226 | 14  | 420550-0213 | 16  | 420620-0620 | 17  | 420832-2100 | 3   | 73813BK-13425 | 30  | 953916-0000 | 27  |
| 416171-0500 | 19  | 420401-1050 | 9   | 420530-0232 | 14  | 420550-0220 | 16  | 420620-0630 | 17  | 420832-2110 | 3   | 73813BK-8425  | 30  | 953916-0001 | 28  |
| 416171-3412 | 19  | 420401-1505 | 9   | 420530-0233 | 14  | 420550-0224 | 16  | 420620-0650 | 17  | 420832-2120 | 3   | 73813BK-9425  | 30  | 953916-0002 | 28  |
| 416172-0308 | 19  | 420401-1510 | 9   | 420530-0234 | 14  | 420550-0225 | 16  | 420620-0660 | 17  | 420832-4100 | 4   | 73813BL-9425  | 30  | 953916-1002 | 27  |
| 416175-0000 | 18  | 420401-1511 | 9   | 420530-0241 | 14  | 420550-0230 | 16  | 420620-0720 | 17  | 420832-4110 | 4   | 73813VH-13425 | 30  | 953916-2002 | 27  |
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| 420400-0750 | 9   | 420510-0130 | 15  | 420540-0125 | 15  | 420570-3045 | 14  | 420822-2007 | 7   | 422501-0250 | 21  | 953901-1002   | 23  | 953981-0047 | 25  |
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