POROS® Self Pack® Packing Device for High Performance Perfusion Chromatography® Columns

Applied Biosystems

Column Packing Instructions

Read Me First!

Read this document before you read the *Packing and Testing Conditions Instruction Sheet* or the *POROS® Column Operating Instructions Sheet* (included with your POROS Self Pack® media).

1 Product Description

The POROS Self Pack Packing Device for Perfusion Chromatography® columns lets you pack and repack empty PEEK or stainless steel columns with POROS Self Pack media. By packing your own Perfusion Chromatography columns, you receive the superb performance of the latest bioseparation technology along with unsurpassed affordability and economy.

You purchase empty columns and POROS Self Pack media separately from the packing device.

What These Instructions Tell You

These instructions describe how to use the packing device and related hardware. They explain:

- How to assemble the packing device
- How to adapt the packing device to different LC instruments
- How to pack your own columns
- How to test a column
- How to unpack a column
- How to reuse POROS Self Pack media

Other Necessary Information

You receive two documents with your media:

- A Packing and Testing Conditions instruction sheet provides specific slurry and packing conditions for your media. This sheet also tells you how to test a packed column.
- A column Operating Instructions sheet for your media provides information about running the packed column. These instructions also provide guidelines for using Perfusion Chromatography.

1.1 Packing Device Hardware

This section describes the following hardware:

- Packing Device Parts
- Fitting Adaptor Kit (supplied)
- Backpressure Regulator

Packing Device Parts

The Self Pack packing device is made of corrosion-resistant 316L stainless steel that can be used with salt buffers. The packing device consists of:

- Cap (center cover and lock nut)
- O-ring
- Chamber
- Stainless steel column adaptor (optional, used only with stainless steel columns; purchased separately)

A backpressure regulator comes with the packing device. Figure 1 shows the parts of the packing device and the backpressure regulator.

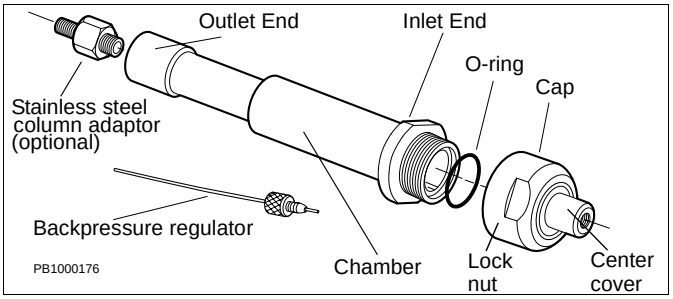

Figure 1 Packing Device Parts

Contents

Flat surfaces on the packing device chamber allow you to hold the chamber with a wrench as you insert or remove the stainless steel column adaptor piece.

The inlet end of the chamber connects to your LC instrument. It has:

- A screw-on, 2-piece cap with a 10-32 female fitting. You can adapt this fitting to M-6 metric systems (such as the Pharmacia FPLC® system) or 1/4-28 systems by using the fitting adaptor kit that is provided with the packing device.
- An O-ring seated in a depression around the rim of the inlet opening. The O-ring lets you hand-tighten the cap, even when you use the packing device with high-pressure instruments.

The outlet end is the narrow end of the chamber, where:

- You can connect an empty 4.6 mm diameter PEEK column tube without making any adaptations.
- You can use the stainless steel column adaptor to connect stainless steel columns. For information about purchasing the adaptor, see Section 8, Accessories, Spare Parts, and Ordering Information.
- A white Teflon® washer recessed in the outlet end of the packing chamber creates a proper seal when a column is screwed in place. (This washer is not visible in Figure 1.)

Fitting Adaptor Kit

The fitting adaptor kit supplied with the Self Pack packing device adapts the device to M-6 metric or 1/4-28 LC systems. (To reorder, see Table 1 on page 7.) The kit provides:

- 2 red Fingertight fittings
- 2 beige ferrules (barrel shaped)
- 2 black metric nuts
- 2 green nuts
- 2 blue ferrules (cone shaped)
- 2 pieces of orange 0.020-inch I.D. PEEK tubing

To use the fitting adaptor kit:

1. Connect one end of the orange tubing to an M-6 or 1/4-28 system.
   - ***For M-6 systems:*** Slip a black nut over the tubing followed by a blue ferrule, with the *conical end pointing toward the nut*. Connect to the LC system and finger tighten.
   - ***For 1/4-28 systems:*** Slip a green nut over the end of the tubing, followed by a blue ferrule, with the *conical end pointing away from the nut*. Connect to the LC system and finger tighten.
2. Put a red Fingertight fitting on the other end of the tubing, followed by a beige ferrule.

   The fitting is now ready to be connected to the 10-32 fitting on the cap of the packing device. Because the cap is heavy, do not attach it now. Wait until you are ready to attach the cap to the chamber (see Section 4.2, Filling the Packing Device).

Backpressure Regulator

You use the backpressure regulator only for POROS 20 micron media with a Perfusion Chromatography system (VISION™ and BioCAD® Workstations or BioCAD® SPRINT™ Systems) or a conventional HPLC system. If this is not your system setup, you can skip this section. Do not use the backpressure regulator with an FPLC system.

The backpressure regulator improves the quality of the packing by increasing the pressure drop over the column during packing. The backpressure regulator is shipped with the packing device. It consists of a length of 0.005-inch ID PEEK tubing and a Fingertight fitting. The backpressure regulator screws into the outlet end of an empty column that is installed on the outlet end of the chamber.

2 Additional Items Needed to Pack Your Column

In addition to the packing device, you need an empty PEEK or stainless steel column, POROS Self Pack media, and protein test standard (all purchased separately) to pack a column . Figure 2 shows these items.

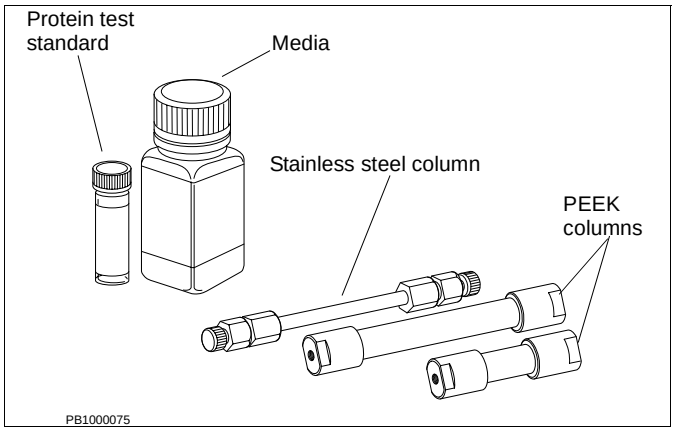

Figure 2 Additional Items Needed

You can order this equipment from Applied Biosystems. For ordering information, see Section 8, Accessories, Spare Parts, and Ordering Information.

This section describes:

- PEEK columns
- Stainless steel columns

2.1 PEEK Columns

An empty PEEK column comes with:

- A hollow tube
- Two end fittings, which screw onto threads at either end of the column tube
- Two end plugs

  As shipped, the end fittings are assembled on the tube, and the end plugs are installed.
- Four PEEK frits, provided in a separate package
- Two EZ™ Grip fittings and ferrules (used to connect the packed column to a system)
- A fitting adaptor kit (identical to the one provided with the packing device). This kit adapts the column 10-32 end fitting to M-6 metric or 1/4-28 systems.

Figure 3 shows a PEEK column without end plugs.

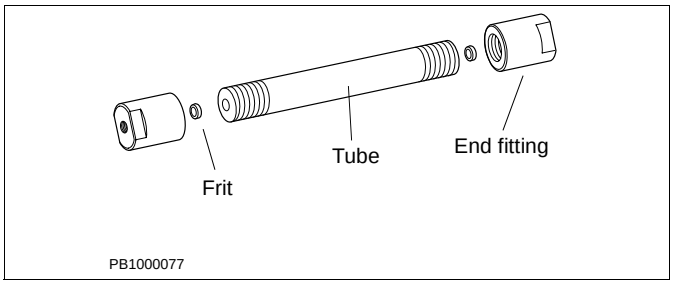

Figure 3 PEEK Column Parts

2.2 Stainless Steel Columns

An empty stainless steel column comes with:

- A hollow tube
- Two compression end fittings, consisting of an end fitting retaining nut, a ferrule, and an end fitting

  When you remove the end fitting, the end fitting retaining nut slides freely up and down the column tube. The ferrule is fixed in place.
- Two end plugs

  As shipped, the compression end fittings are assembled on the tube, and the end plugs are installed.
- Four stainless steel frits. Two are installed in the column and two are provided separately.

NOTE: *When you remove the end fitting from the column, a frit drops out. Be careful not to lose it.*

Figure 4 shows a stainless steel column without end plugs.

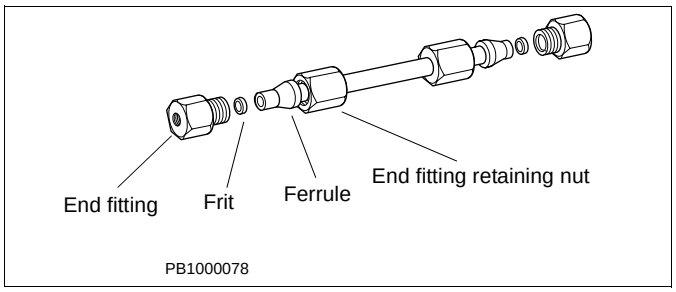

Figure 4 Stainless Steel Column Parts

3 Preparing Your Equipment for Packing

To pack a column, you must:

- Clean the column and packing device
- Prepare the slurry solvent and packing solvent
- Prepare the packing device
- Prepare your LC system
- Assemble the packing device and empty column
- Use the backpressure regulator (if appropriate)
- Position the packing device

Lab Equipment Needed

In addition to the packing device and empty column, you need:

- LC system
- Spatula
- Glass beaker of 50 ml or greater
- Squirt bottle
- Laboratory tissue
- 25-ml graduated cylinder or 20-ml pipette
- Deionized water
- Pliers
- Two 9/16-inch open-end wrenches (for stainless steel columns)
- One 11/16-inch open-end wrench (for stainless steel columns)
- One $1\frac{1}{8}$-inch open-end wrench (for stainless steel columns)

3.1 Cleaning the Column and Packing Device

NOTE: *Observe good laboratory practice. Wear safety glasses during the following procedures.*

The column and packing device are reusable. You clean them according to whether or not you have used them before.

Never Used

If the column and packing device have never been used:

Column: Unscrew the end fittings and flush the tube and end fittings with deionized water. Do not reassemble the column. Set all the pieces aside.

Packing device: Wash or sonicate the packing chamber and cap with 50% isopropanol, ethanol, or other alcohol to ensure cleanliness. Set all the pieces aside.

Previously Used

If the column or packing device has been used before, clean it before each reuse to avoid contamination with packing material left over from a previous use.

Column: Sonicate the tube, end fittings, and frits in 50% isopropanol, ethanol, or other alcohol for 10 minutes. Rinse all pieces thoroughly with deionized water. Set all the pieces aside.

Packing device: Flush the packing device cap with deionized water and thoroughly wash the threads at the outlet end of the chamber. Residual media gets trapped in the threads during normal use. Wash the O-ring. Flush with organic solvent if you see any media residue on surfaces after the water wash. Rinse again with water to remove the organic solvent. Do not reassemble the packing device. Set all the pieces aside.

NOTE: *If you previously used the packing device to pack stainless steel columns, disassemble the packing device and the stainless steel column adaptor and wash the two pieces separately.*

3.2 Preparing the Slurry Solvent and Packing Solvent

To prepare the slurry solvent and packing solvent:

1. Prepare your slurry solvent and packing solvent (see “Solvents” in the *Packing and Testing Conditions Instruction Sheet* included with your POROS Self Pack media).
2. Fill the squirt bottle with the slurry solvent.

3.3 Preparing the Packing Device

Make sure the white Teflon washer is installed in the outlet end of the chamber. The washer is required for a proper seal to pack the column.

- ***For PEEK columns:*** Go to Section 3.4, Preparing Your LC System.
- ***For stainless steel columns:*** Install the stainless steel column adaptor.

  Thread the stainless steel column adaptor into the outlet end of the chamber until finger-tight. Support the chamber with the $1\frac{1}{8}$-inch open-end wrench and tighten the stainless steel column adaptor with the 11/16-inch open-end wrench. Tighten the stainless steel column adaptor 1/3 to 1/2 turn beyond finger-tight.

NOTE: *Do not overtighten. Overtightening can damage the threads of the chamber and the stainless steel column adaptor.*

3.4 Preparing Your LC System

To prepare your LC system, you must:

- Prepare the tubing
- Set the pressure limit
- Prepare the pumps

Preparing the Tubing

Make sure that the fitting on the end of your LC system pump outlet tubing is compatible with the fitting on the packing device cap. If it is not, use the fitting adaptor kit (see "Fitting Adaptor Kit" on page 2).

Do not connect the free end of the pump outlet tubing to the cap of the packing device yet.

For example, on an FPLC system:

1. Connect one end of the orange tubing of the fitting adaptor kit to the outlet of the FPLC mixing chamber with the M-6 black nut (see "Fitting Adaptor Kit" on page 2).
2. Reserve the free end of the orange tubing for the red Fingertight fitting that will connect into the cap of the packing device.

Set the Pressure Limit

For Perfusion Chromatography or conventional HPLC systems: Set the pressure limit of your system at 3000 psi.

For medium-pressure systems: Set the pressure limit at the maximum allowable pressure for the system.

For example, on an FPLC system, set the pressure limit at 4.0 MPa (580 psi).

Preparing the Pumps

Flush the pumps and the outlet tubing with the packing solvent listed in “Solvents” in the *Packing and Testing Conditions Instruction Sheet* included with your POROS Self Pack media.

NOTE: *On an FPLC system you must flush both pumps with packing solvent because both pumps are used during packing. See “Packing Conditions” in the Packing and Testing Conditions Instruction Sheet included with your POROS Self Pack media for more information.*

3.5 Assembling the Packing Device and Empty Column

To assemble the packing device and column for packing:

1. Lay out the equipment needed for packing (see "Lab Equipment Needed" on page 3).
2. Write the name of your POROS Self Pack media on one of the blank labels provided with the media.

   These labels identify the columns and also identify the top of the column (the end connected to the packing chamber). When you use the column, you must use the top as the inlet end.
   - ***For PEEK columns:*** Attach the label to an end fitting. Reserve this fitting to be the top end fitting.
   - ***For stainless steel columns:*** Reserve the label. The column must be assembled before you can put on the label (if you put it on too early, the retaining nut jams against it).
3. Set the PEEK or stainless steel column end fittings on the countertop so that you can look down into them.
4. Drop a frit into each end fitting:
   - ***For PEEK columns:*** The frit is smaller than the inner diameter of the end fitting and must sit in the center depression that is visible inside the end fitting.
   - ***For stainless steel columns:*** The frit is the same diameter as the inner diameter of the end fitting and fits snugly inside the end fitting.
5. Pick up one end fitting containing a frit.

NOTE: *With PEEK columns, be careful to hold the end fitting level. Otherwise, the frit may slip out of the center depression as you screw in the column, and you will not get a good seal. Media will leak out of the column during packing.*

6. Screw the column tube into the end fitting until finger-tight.
7. Tighten the end fitting a little more:
   - ***For PEEK columns:*** Grip the column tube with one hand and the end fitting in the other hand and tighten securely.
   - ***For stainless steel columns:*** Grip the end fitting with one 9/16-inch open-end wrench. Use the other 9/16-inch open-end wrench to tighten the end fitting retaining nut 1/3 to 1/2 turn beyond finger-tight.
8. Screw the free end of the column tube into the outlet end of the packing chamber.
   - ***For PEEK columns:*** Tighten securely with two hands.
   - ***For stainless steel columns:*** Support the adaptor piece connected to the outlet end of the packing chamber with an 11/16-inch open-end wrench. Tighten the end fitting retaining nut with a 9/16-inch open-end wrench.
9. Set the unused end fitting aside.

3.6 Using the Backpressure Regulator

The backpressure regulator improves the quality of packing POROS 20 micron media using a Perfusion Chromatography or conventional HPLC system. The backpressure regulator increases the pressure on the column during packing.

Do not use the backpressure regulator with:

- POROS 10 micron media. The particle size of the media generates sufficient backpressure during packing.
- Medium-pressure systems. The backpressure generated is too great for the system.

Screw the backpressure regulator into the bottom of the column. Finger tighten.

3.7 Positioning the Packing Device

1. Clamp the open packing device/column assembly on the front of your LC instrument. If clamps are not available on the instrument, use a ring stand. Make sure that:
   - The packing device is positioned vertically.
   - The pump outlet tubing can reach the top of the packing device.
   - You can fit a 50-ml beaker under the end of the column.
2. Position your empty beaker below the end of the column.
3. Seat the packing chamber O-ring in the depression around the rim of the chamber opening (shown in Figure 1).

4 Packing a Column

The packing operation involves:

- Slurrying the media
- Filling the packing device
- Packing the column
- Removing and capping the packed column
- Cleaning up
- Testing the column

4.1 Slurrying the Media

Slurry the media according to the directions in “Slurrying the Media” in the *Packing and Testing Conditions Instruction Sheet* included with your POROS Self Pack media.

4.2 Filling the Packing Device

To fill the packing device:

CAUTION: *Do not proceed without setting your system pressure as described in Section 3.4, Preparing Your LC System.*

1. Determine the volume of media slurry to add to the packing device.

   See Table 1 in the *Packing and Testing Conditions Instruction Sheet* included with your POROS Self Pack media.

2. Swirl the media bottle to resuspend the slurry and use a pipette or graduated cylinder to remove the correct volume of slurry.
3. Add the media slurry into the open packing device.
4. Rinse the pipette or cylinder with a small amount of slurry solvent to ensure that all the slurry is added to the packing device.
5. Add slurry solvent to the packing device until it is completely full.

NOTE: *Do not stir up the slurry at the bottom of the packing device. Direct the slurry solvent so that it runs down the inner wall of the packing device instead of pouring directly on the slurry.*

6. Quickly screw the 2-piece cap onto the packing device: place the center cover on the chamber, thread the lock nut down over the cap and hand-tighten until snug. Keep a lab tissue on hand, since some liquid may come out through the top as you tighten the cap.

NOTE: *Do not overtighten the cap. Overtightening can damage the threads of the chamber and the cap.*

Figure 5 shows a packing device setup on a BioCAD SPRINT System.

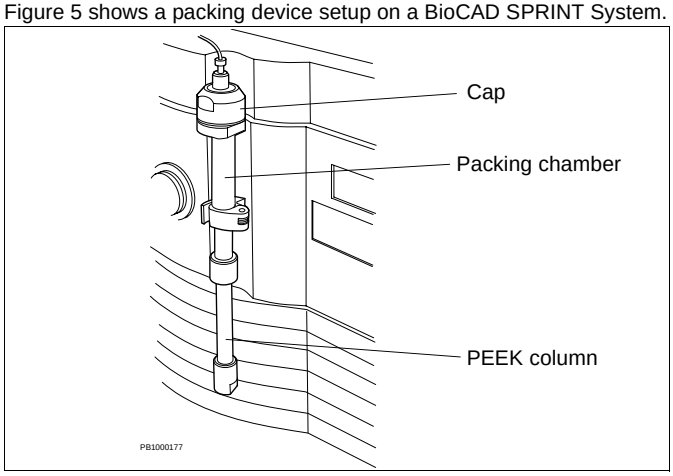

Figure 5 Typical Packing Device Setup

7. Attach the pump outlet tubing from the LC system to the cap of the packing device. Finger-tighten.

4.3 Packing the Column

This section discusses:

- Principles of Packing
- Packing a Column Using the VISION or BioCAD Workstation, BioCAD SPRINT System, INTEGRAL® 100Q System, or FPLC system
- Packing a Column Using Other Systems

Principles of Packing

As a column packs, the backpressure on the column rises.

The optimal packing flow rate is the highest flow rate possible that allows:

- Packing to proceed within the pressure limit you set earlier
- A sufficient volume of packing solvent to pass through the column to ensure an efficient and stable bed

The actual packing flow rate depends on the system used, the particle size of the media, and the length of the column.

Packing a Column Using the VISION or BioCAD Workstation, BioCAD SPRINT System, INTEGRAL 100Q System, or FPLC System

NOTE: *Monitor the highest sustained pressure that occurs during packing. Do not exceed this pressure when you run the packed column.*

To pack a column:

1. Determine the minimum volume of packing solvent required to pass through the column during packing.

   See Table 1 in the *Packing and Testing Conditions Instruction Sheet* included with your POROS Self Pack media.

2. Set the correct flow rate.

   See Table 1 in the *Packing and Testing Conditions Instruction Sheet* included with your POROS Self Pack media.

3. Turn on the flow and monitor the volume of packing solvent in the waste beaker below the column.
4. After at least the minimum volume of packing solvent passes through the column and a constant pressure is reached, stop the flow.
5. Let the column sit for 3 minutes to allow the pressure to dissipate evenly across the packed bed.

NOTE: *The packing flow rate has been determined to allow you to comfortably pack your column within the pressure limit of your system. However, variations in frit permeability or system backpressure may require you to adjust the flow rate slightly.*

6. If your system is well below the pressure limit during packing, increase the flow rate in 0.5-ml/min increments until you approach the pressure limit. Pack columns at the highest flow rate possible without exceeding the system pressure limit.
7. If you reach the pressure limit before you finish packing the column, stop the flow, restart the flow at 0.5 ml/min lower than the original setting, and continue packing. Repeat as necessary until you can pack the column within the pressure limit.

NOTE: *Occasionally a defective frit generates excessive backpressure. If so, replace the frits and start again.*

8. Record the highest sustained pressure that occurred during packing.

   Do not exceed this pressure when you run the packed column.

Packing a Column Using Other Systems

NOTE: *Monitor the highest sustained pressure that occurs as you pack the column. Do not exceed this pressure when you run the packed column.*

If you are using systems other than the VISION or BioCAD Workstation, BioCAD SPRINT System, INTEGRAL 100Q System, or FPLC, you need to experiment to find the correct flow rate. Start by setting the flow at the maximum allowable on the system.

When using other systems to pack the column:

1. Determine the minimum volume of packing solvent required to pass through the column during packing.

   See Table 1 in the *Packing and Testing Conditions Instruction Sheet* included with your POROS Self Pack media.

2. Turn on the flow and monitor the volume of packing solvent coming through the column by observing the level in the waste beaker below the column.
3. If you reach the pressure limit before the required volume of packing solvent passes through the column, stop the flow, restart the flow rate at 0.5 ml/min lower than the original setting, and continue packing.
4. If the pressure limit is again exceeded, lower the flow rate another 0.5 ml/min.
5. Continue lowering the flow rate in 0.5-ml/min increments until at least the necessary volume of packing solvent passes through the column and a constant pressure is reached.

NOTE: *Occasionally a defective frit generates excessive backpressure. If so, replace the frits and start again.*

6. Let the column sit for 3 minutes to allow the pressure to dissipate evenly across the packed bed.
7. Record the final flow rate. Use this flow rate the next time you pack a column with your system.
8. Record the highest sustained pressure that occurred during packing.

   Do not exceed this pressure when you run the packed column.

4.4 Removing and Capping the Packed Column

To remove the column:

1. Unscrew the column from the packing device.
   - ***For PEEK columns:*** Grasp the body of the column. (You may need to use pliers. Do not squeeze too tightly with the pliers or you may scratch the tube finish.) Turn the column to the left to unscrew it. Do not grasp and turn the outlet end fitting. Doing so unscrews the end fitting from the column.
   - ***For stainless steel columns:*** Grasp the adaptor piece on the outlet end of the chamber with the 11/16-inch open-end wrench. Loosen the end fitting retaining nut with the 9/16-inch open-end wrench.

   A small bubble of excess packing material covers the top end of the column tube. If the material is wet, lightly touch the bubble with a lab tissue or paper towel to draw off the moisture.
2. Draw the flat side of the spatula across the top of the column to remove the excess material and to level off the top of the packed bed.
3. With a damp tissue, carefully wipe any remaining packing material from around the rim at the top of the column tube. Do *not* touch the top of the packed bed itself.
4. Holding the unused end fitting upright (see Section 3.5, Assembling the Packing Device and Empty Column) to ensure that the frit remains seated, turn the packed column upside down and screw it into the end fitting. Keep track of the column inlet end.
5. Tighten the end fitting with both hands (for PEEK columns) or with the wrenches (for stainless steel columns).

   For stainless steel columns only: Wrap the label around the top of the column tube and overlap the free ends of the label.
6. Insert the end plugs into the column end fittings.
7. Set the column aside while you clean up from the packing procedure.

4.5 Cleaning Up

Follow this clean-up procedure:

1. Make sure an empty waste beaker is below the column packing device.
2. Pump several milliliters of packing solvent through the packing device to push out excess packing material accumulated at the outlet end of the chamber.
3. Remove the connection at the top of the packing device.

   The pressure inside the packing device is released and the entire contents flush into the beaker.
4. Remove the packing device from the clamp, take off the cap, and rinse all pieces thoroughly with water.
5. Rinse the threads at the outlet end to remove residual media.

NOTE: *The O-ring may stick to the cap of the packing device by surface tension. Use the spatula to pull it out.*

4.6 Testing the Column

There are two tests to perform on the column after packing:

- Permeability test
- Protein separation test using test standards

For specific conditions for both tests, and expected results for the protein separation test, see “Packed Column Performance” in the *Packing and Testing Conditions Instruction Sheet* included with your POROS Self Pack media.

After you perform the tests:

- Compare the results of the protein separation test to the expected results. If the data do not compare favorably, make sure that your system is functioning properly. If your system is functioning properly, unpack your column and start again (see Section 6, Unpacking a Column.)
- Keep the data generated from both the initial permeability test and the initial protein separation test as a reference standard and use it to monitor the performance of the column over time.

Periodic Testing

The packing methods for POROS Self Pack media are designed to produce columns that give you hundreds of runs. However, actual column lifetime depends on the samples you run. Contaminants may build up over time, decreasing capacity and increasing backpressure.

To check column capacity and backpressure, run a permeability test and the test protein standards after every 100 runs. Compare the results to the reference data you generated after the initial packing.

If the permeability of the column has deteriorated or the test chromatogram looks different from the original, unpack the column and pack a new one (see Section 6, Unpacking a Column).

NOTE: *Always use a freshly packed column for your most important separations to eliminate any possible contaminating proteins that may remain from a previous run.*

5 Running the Packed Column

For information about running the packed column, see the column *Operating Instructions* sheet included with your POROS Self Pack media.

6 Unpacking a Column

To unpack a column:

1. Unscrew the outlet end fitting and remove the frit.
2. Connect the inlet end of the column to the pump outlet tubing of your LC system.
3. Position a beaker under the column.
4. Start the flow rate at 5 ml/min.
5. As soon as the media is pushed out of the column into the beaker, stop the flow.
6. Remove the inlet end fittings and rinse all fittings, frits, and the column tube in water and organic solvent.

6.1 Reusing the Media

You can reuse the media to pack a new column.

NOTE: *As with any chromatographic media, repacking POROS Self Pack media may result in increased backpressure in the packed column. Backpressure is caused by particulate matter (fines) generated when you unpack and repack the column. Do not repack your column more than five times.*

You can reduce backpressure by removing all particulate matter each time you unpack the column.

Removing Particulate Matter

To remove particulate matter:

1. Suspend the unpacked media in slurry solvent.
2. Let the slurry settle for 30 to 60 minutes.
3. Draw off the supernatant, which contains particulate matter.

Reusing Media

To reuse media:

1. After removing particulate matter, add fresh media to the beaker from the slurry you mixed up in Section 3.2, Preparing the Slurry Solvent and Packing Solvent.
   - ***For 4.6 mmD/50 mmL columns:*** Add 1 ml.
   - ***For 4.6 mmD/100 mmL columns:*** Add 2 ml.
2. Add 6 ml of slurry solvent.
3. Slurry the entire mixture thoroughly and use it to repack the column.

If backpressure continues to be a problem, repeat the process 2 or 3 times to remove particulate matter.

7 Storing Packing Device and Column

7.1 Packing Device

Store the packing device with the cap on to keep the threads from knocking against other equipment. If the threads are damaged, the device may not seal properly during packing. Also, damaged threads may cause the cap to lock in place irreversibly.

Ideally, store the capped device in its original box.

7.2 Column

To store a packed column, see the column *Operating Instructions* sheet included with your POROS Self Pack media.

To store an unpacked column, collect the tube, end fittings, frits, and end plugs, and keep them together.

8 Accessories, Spare Parts, and Ordering Information

The following accessories are available for your Self Pack equipment:

Table 1 Self Pack Accessories

Description	Quantity	Part Number
Packing Device	1	1-9540-00
POROS Self Pack media	See the POROS Self Pack price list.	
Test Standards		
Anion Exchange	Package of 1	1-9002-00
Cation Exchange	Package of 1	1-9003-00
Hydrophobic Interaction	Package of 1	1-9005-00
Protein A/G	Package of 1	1-9006-00
Reversed Phase	Package of 1	1-9001-00
Empty Self Pack Columns		
4.6 mmD/50 mmL PEEK	1	1-9541-24
4.6 mmD/100 mmL PEEK	1	1-9541-28
4.6 mmD/100 mmL stainless steel	1	1-9542-28
Accessories, Packing Device		

Table 1 Self Pack Accessories (Cont'd)

Fitting Adaptor Kit	1	1-9532-00
O-Ring	1	1-9108-00
Flat Teflon washer	1	1-9109-00
Backpressure regulator	1	1-9110-13
Stainless steel column adaptor	1	1-9111-01
Accessories, column		
EZ Grip fittings	Package of 5	P5-1011-05
PEEK column frits, 4.6 mm	Package of 5	1-9125-05
Stainless steel column frits, 4.6 mm	Package of 5	1-9122-05

9 Technical Support

Applied Biosystems is dedicated to helping you use Perfusion Chromatography and POROS media to the fullest extent possible. Our biochromatographers, bioprocess engineers, and applications development laboratories are available for support ranging from telephone consultation to full method development.

Applied Biosystems offers a full line of POROS media for Perfusion Chromatography in the reversed-phase, ion-exchange, affinity, and other chromatographic modes. Please contact your Applied Biosystems representative for technical and ordering information.

Applied Biosystems publishes a continuing series of Application and Technical Notes, highlighting specific purification solutions and technical aspects of Perfusion Chromatography. Please contact Applied Biosystems directly for a publication list.

For further details or for answers to questions on POROS Self Pack, Perfusion Chromatography, or other products, please contact Applied Biosystems. Refer to the back page of this document for contact information.

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POROS products and perfusive chromatography are covered by U.S. patents 5,030,352; 5,552,041; 5,605,623; and 5,833,861; foreign patents pending. Chromatography materials of certain pore geometries, including certain wide-pore supports, can permit perfusive chromatography, that is, separations in which the rate of intraparticle convection exceeds the rate of intraparticle diffusion. Use of any such chromatography media at sufficiently high linear velocity, without license, may constitute patent infringement. A limited license to use the patented perfusive chromatography process is granted with the purchase of POROS products from Applied Biosystems. The license terminates upon expiration of the useful life of the product.

Subtractive Assay technology, enabled by the use of ImmunoDetection (ID) Sensor Cartridges and the INTEGRAL Micro-Analytical Workstation, is covered by U.S. patent 5,234,586. Other patents pending.

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