Installation of ULTA Prime CG 2-inch capsule filters on the ÄKTApilot

Background

The lifetime and efficiency of chromatography columns is diminished by the introduction of particulates and bioburden. These can be introduced from either feedstreams or buffer solutions which have not been filtered prior to column application. Therefore, GE Healthcare strongly recommends filtering the feedstream and all chromatography buffers before application to the column. The recommended type of normal flow filter for this pre-column filtration is a bioburden reduction filter, ULTA™ Prime CG, which is a 0.2 µm nominal filter with an integral 0.6 µm pre-filter layer.

Scope

This document describes the connection of ULTA filters directly into an ÄKTApilot™ flowpath, for performing in-line filtration of the feedstream and/or buffers. The recommended size of ULTA Prime CG for use with the ÄKTApilot is a 2-inch capsule (0.05 m^2 surface area).

Materials required

The table below details the required materials:

Catalog Number	Description	Quantity Required
28-9395-67	ÄKTApilot NFF Conversion Kit	1
28-9085-17	ULTA Prime CG 2" Capsule 1.5" TC/TC	1
18-1113-17	Short column holder	2 (optional*)

*Note that the ÄKTApilot ships with four short column holders as standard accessories.

Conversion kit contents

The conversion kit (28-9395-67) contains the following parts:

Catalog Number	Description	Quantity Required
56-4109-84	1.5-in TC to 0.5-in TC polysulfone adaptor, 2/pk	1
56-4109-96	1.5-in TC silicone gasket, 4/pk	1
56-4106-68	1.5-in TC quick disconnect clamp, nylon	2
18-1169-22	5/16" female UNF to 0.5-in TC adaptor, 2/pk	1
56-4109-94	0.5-in TC silicone gasket, 4/pk	1
56-4106-66	0.5-in TC quick disconnect clamp, nylon	2
18-1169-70	Tube S6 cpl. incl. 2 nuts and 2 O-rings	1
18-1169-74	Tube S13 cpl. incl. 2 nuts and 2 O-rings	1
28-9405-24	Installation instructions	1

Filtration strategies

There are 4 possible filtration strategies:

1. Filter buffers only by placing the filter inline with the air trap.
2. Filter sample only by placing the filter inline with the sample pump.
3. Filter both product and buffers by placing the filter inline with the system pump.
4. Filter both product and buffers by placing the filter inline with the column.

These strategies are shown in Figure 1.

Option 1: In line with the air trap. This position can be used to filter buffers only.

Option 3: Downsteam of the system pump. This position can be used to filter both sample and buffer.

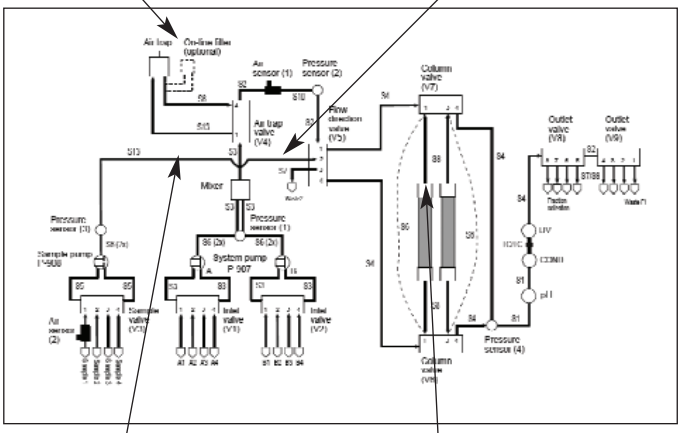

Fig 1.

Option 2: Downstream of the sample pump.This position can be used to filter sample only.

Option 4: In line with the column. This position can be used to filter both sample and buffer.

Option 3 and Option 4 achieve the same result—both sample and buffers are filtered by the same device. Option 3 allows the filter to be dedicated to the system, while Option 4 allows the filter to be dedicated to the column.

Installation instructions

Refer to Figure 1 or to the ÄKTApilot Instrument Handbook (GE Healthcare Literature Number 18-1162-95).

Filter preparation

1. Attach a 1.5-in TC to 0.5-in TC adaptor (p/n 56-4109-84) to the inlet and outlet side of the filter using a 1.5-in TC silicone gasket (p/n 56-4109-96) and a 1.5-in TC quick disconnect nylon clamp (p/n 56-4106-68).
2. Attach a 5/16" female UNF to 0.5-in TC adaptor (p/n 18-1169-22) to the inlet side of the filter using a 0.5-in TC silicone gasket (p/n 56-4109-94) and a 0.5-in TC quick disconnect nylon clamp (p/n 56-4106-66).

For Option 4 (in-line with column filtration) skip to Option 4 now.

3. Attach a 5/16" female UNF to 0.5-in TC adaptor (p/n 18-1169-22) to the outlet side of the filter using a 0.5-in TC silicone gasket (p/n 56-4109-94) and a 0.5-in TC quick disconnect nylon clamp (p/n 56-4106-66).

Option 1: Filter buffers only (see Figure 2)

1. Disconnect existing tubing S6 from the Air Trap OUT. Do not disconnect the opposite end of the tubing (connected to Valve 4, port 4).
2. Attach a new piece of tubing S6 (included in conversion kit) to the Air Trap OUT. Attach the opposite end of this tubing to the filter inlet.
3. Attach the piece of tubing disconnected in Step 1 to the filter outlet.
4. Secure filter to air trap using two 14-inch or longer cable ties.
5. Open the vent valve on the filter.
6. Direct system flow to Waste 2.
   - Airtrap_Filter=inline
   - Waste2=open
7. Flush air trap and filter with water or buffer until liquid is seen at the filter vent.
8. Close the vent valve on the filter.

Fig 2.

Option 2: Filter sample 0nly (see Figure 3)

1. Disconnect existing tubing S13 from Valve 5, port 2. Do not disconnect the opposite end of the tubing (connected to Pressure Sensor 3, port OUT-upper).
2. Attach tubing S13 (disconnected in step 1) to the filter inlet.
3. Attach a new piece of tubing S6 to the filter outlet. Attach the opposite end of this tubing to Valve 5, port 2.
4. Secure filter in place using two short column holders (p/n 18-1113-17).
5. Open the vent valve on the filter.
6. Start the sample load operation.
7. Close the vent valve on the filter when sample is seen at the filter vent.

NOTE: It may be useful to add a user prompt in Unicorn to remind the user that the vent valve should be open at the start of the load operation and closed when sample is seen at the filter vent.

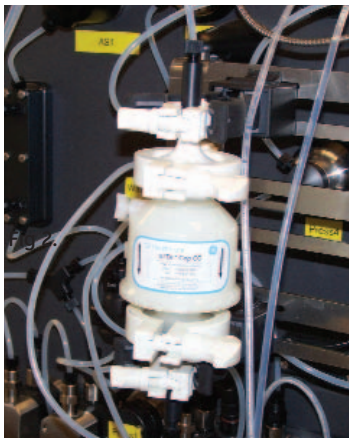

Fig 3.

Option 3A: Filter sample and buffers (upper valve V7 is upstream of first column – see Figures 4 and 5)

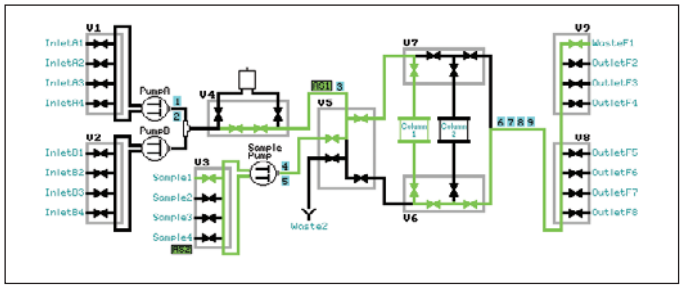

Fig 4.

1. Remove existing tubing S4 from Valve 5, port 1 and Valve 7, left port. Set aside.
2. Attach a new piece of tubing S6 to Valve 5, port 1. Attach the opposite end of this tubing to the filter inlet.
3. Attach a new piece of tubing S13 to Valve 7, left port. Attach the opposite end of this tubing to the filter outlet.
4. Secure filter in place using two short column holders (p/n 18-1113-17).
5. Open the vent valve on the filter.
6. Direct the system flow to waste.

- Col1_Col2_BypassHigh

7. Flush filter with water or buffer until liquid is seen at the filter vent.
8. Close the vent valve on the filter.

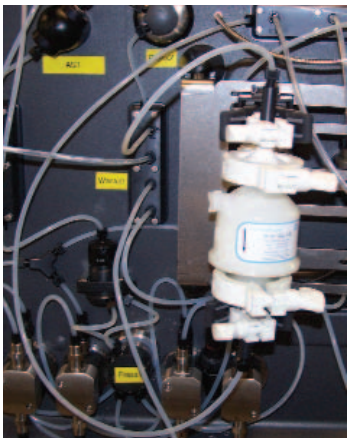

Fig 5.

Option 3B: Filter sample and buffers (lower valve V6 is upstream of first column – see Figures 6 and 7)

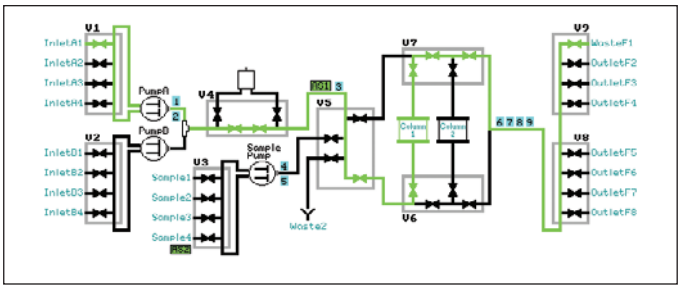

Fig 6.

1. Disconnect existing tubing S4 from Valve 5, port 4. Loosen, but do not disconnect, the same piece of tubing from Valve 6, left port.
2. Attach the free end of tubing S4 to the filter outlet.
3. Retighten tubing S4 at Valve 6, left port.
4. Attach a new piece of tubing S6 to Valve 5, port 4. Attach the opposite end of this tubing to the filter inlet.
5. Secure filter in place using two short column holders (p/n 18-1113-17).
6. Open the vent valve on the filter.
7. Direct the system flow to waste.

- Col1_Col2_BypassLow

8. Flush filter with water or buffer until liquid is seen at the filter vent.

9. Close the vent valve on the filter.

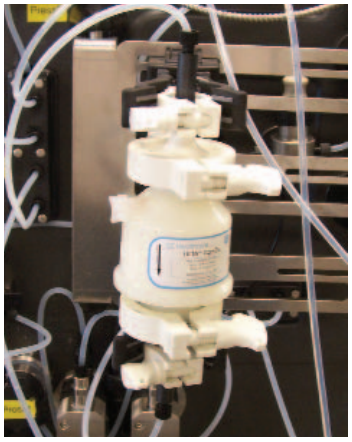

Fig 7.

Option 4: Filter sample and buffers in-line with column (see Figure 8)

1. Attach existing tubing S8 to filter inlet. (The opposite end of this tubing should be connected to Valve 6 or Valve 7 at port 1 or 3, depending on the flow orientation and number of columns in use.)

2. Attach the filter outlet to the inlet of the column using a 0.5 in TC silicone gasket (p/n 56-4109-94) and a 0.5-in TC quick disconnect nylon clamp (p/n 56-4106-66).

3. Open the vent valve on the filter.

4. Flush filter with water or buffer until liquid is seen at the filter vent.

5. Close the vent valve on the filter.

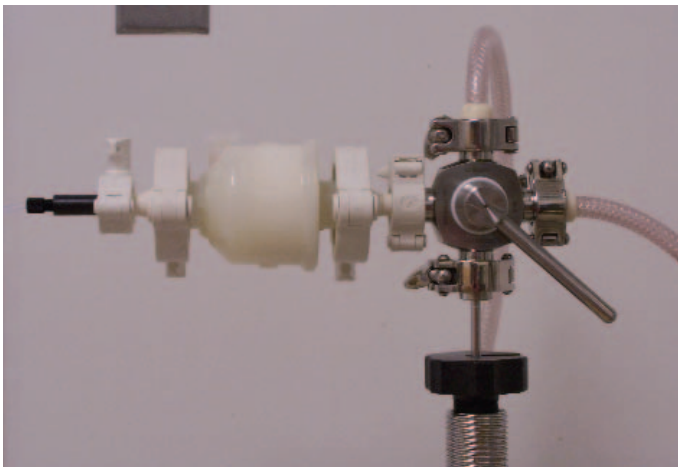

Fig 8.

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