

Bio Compatibility Kit

General Information	1
Installing the Bio Compatibility Kit	2
How to Use the Bio Compatibility Kit	5
Important Safety and Solvent Compatibility Considerations	5
Setting the Minimum or Maximum Operating Pressure in ChemStation	7
Setting the Minimum or Maximum Operating Pressure in the Control Module	7
Parts and Materials	8

In this note the installation and use of the new Bio Compatibility Kit are described in detail.

WARNING

This kit is designed for the use with operating pressures of up to 200 bar. The user must always assure that the operating pressure does not exceed this limit. Mechanical stress, exposure of the used PEEK parts to some critical solvents or operation at elevated temperatures may significantly reduce the lifetime the recommendable operating pressure of the used PEEK parts. For more details, please refer to the detailed WARNING statements inside this note on pg. 6!

Features

The new Bio compatibility kit offers the following features:

- Fits for 1100 Series Isocratic (G1310A), Quaternary (G1311A) and Binary pumps (G1312A), Standard Autosamplers (G1313A or G1329A).
- Minimizes metal contacts of solvents and sample.
- Operating pressure of up to 200 bar.

General Information

When to use the Bio Compatibility Kit

For the injection of samples containing Bio-Molecules and substances that should be tested for biological activity the Bio Compatibility Kit is the option of choice, because it minimizes the exposure of samples and mobile phases to metal contacts in the flow path. Exposure of the sample substances to metal ions that could potentially lead to changes in the properties of the analytes and thus to erroneous results can be almost completely avoided.



Installing the Bio Compatibility Kit

Table 1 Requirements and preparation

	Description	Part Number
• Tools required	2.5-mm hexagonal key (shipped with every ALS)	8710-2412
	9/64" hexagonal key (shipped with every ALS)	8710-2394
	1/4 inch wrench (shipped with every 1100 series module)	8710-0510
	Flat head screw driver	N/A
	10 mm wrench or adjustable wrench	N/A
	Tubing Cutter (included in this kit)	8710-1930
• Parts required	Bio Compatibility Kit (for a detailed ship list please refer to "Parts and Materials" at the end of this note)	5065-9972
	Column (must be ordered by the user depending on the application)	
	Bio-compatible Flow Cell, e.g. 500 nl cell for Agilent 1100 Series MWD (G1365A,B,C) or DAD (G1315A,B,C)	PN G1315-68714 or Option #014 for a new instrument order
• Preparations for this procedure	Switch off the pump at the main power switch. Remove the front covers (from pump, std. ALS, thermostatted Column Compartment (if present) and detector.	

- 1 Remove the standard solvent inlet filters (glass or SST frits) from the solvent bottles' bottle head assemblies and replace them by the ones delivered with this kit (PTFE, PN 3150-0958). Remove the adapter holding the original frit by pulling it off the solvent tubing. A piece of sanding paper will help to slide the new PTFE filter into the tubing. Repeat this procedure for every solvent inlet tubing that will be used with this kit.

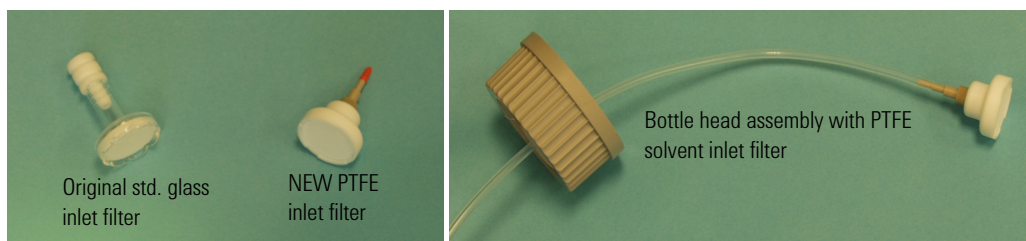


Figure 1 Replacing the std. solvent inlet filters by the PTFE one

- 2 Use the Rhe-Flex Fittings (PN 0100-1631) delivered with this kit for connections on the high pressure side of the system (between pump outlet and the head of the column), use the std. finger tight fittings (PN 5063-6591) to connect the column outlet tubing and the flow cell. Make sure to press the tubing firmly down into the seat while tightening the fitting to avoid loose tubings and potential unwanted dead volume.

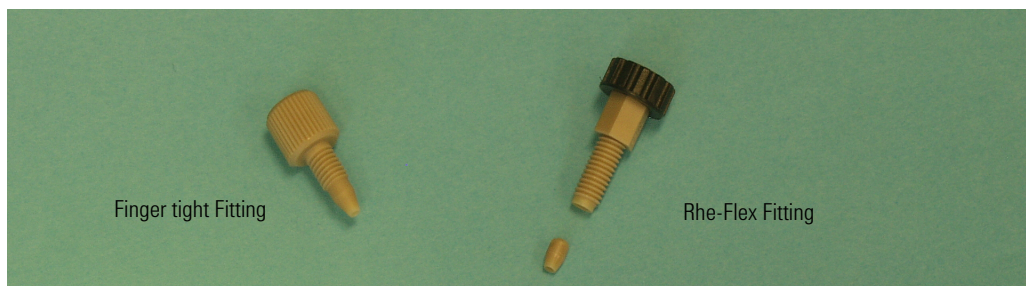
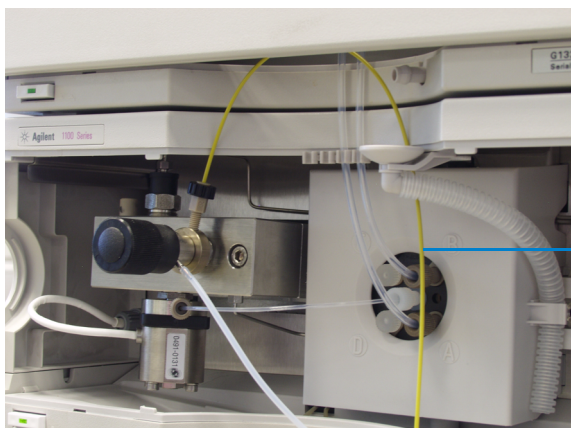


Figure 2 Finger tight and Rhe-Flex Fittings for tubing connections

- 3 Replace the std. 0.17 mm ID (green sleeve) SST capillary that connects the pump with the Autosampler by one of the PEEK tubings delivered with this kit (either 0.18 mm ID yellow or 0.25 mm ID blue PEEK tubing). The tubing must be cut to the right length, using the tubing cutter delivered with this kit. Avoid strong curves and bends in the tubing in order not to damage the tubing.

NOTE

The flex-tubing (PN 0890-0316, not shown in the figures) should be used with every pressurized PEEK tubing for minimizing potential negative effects of bursting tubing. It should be cut to a length shorter than the tubing that it will be used with (tubing length - 2 times fitting length) and slid across the tubing.



PEEK tubing Pump - ALS

Figure 3 PEEK tubing connection from pump to Autosampler (with yellow 0.18mm ID tubing)

- 4 Replace the std. Rotor seal in the Autosampler's injection valve by the PEEK rotor seal (PN 0100-2231) as described in the Autosampler Reference Manual.
- 5 Replace the std. capillary from the Autosampler's injection valve (port 2) to the bottom of the metering head by the PEEK tubing included with this kit (PN G1313-87306).
- 6 Replace the std. sample loop from Autosampler's top of the metering head to the needle by the PEEK loop included with this kit (PN G1313-87309).
- 7 Replace the std. needle assembly by the needle assembly (PN G1313-87203) for the use with the PEEK needle seat (PN G1313-87104). Strictly follow the procedure

described in the manual and use the operating Software’s maintenance step functions for removing, re-installing and aligning the needle.

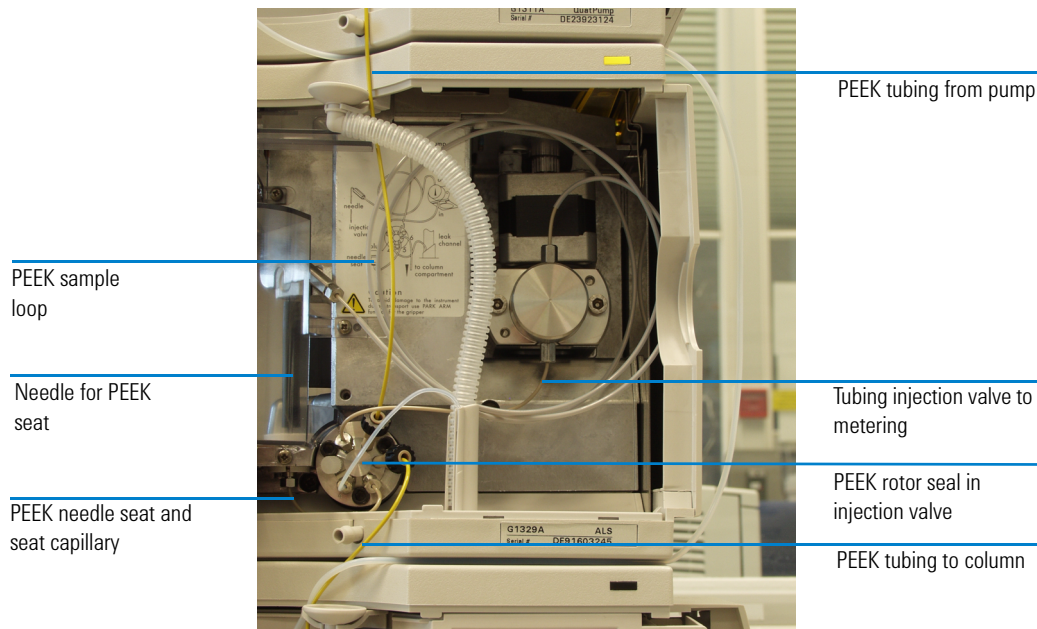


Figure 4 Replacing parts in the Autosampler

- 8** Remove the std. needle seat, following the procedure described in the Autosampler Reference Manual.
- 9** Using a 10 mm wrench or adjustable wrench and a 1/4” wrench, connect the PEEK needle seat (PN G1313-87104) to the PEEK seat capillary (PN G1313-87302). Mind the orientation of the capillary as shown on the photo.

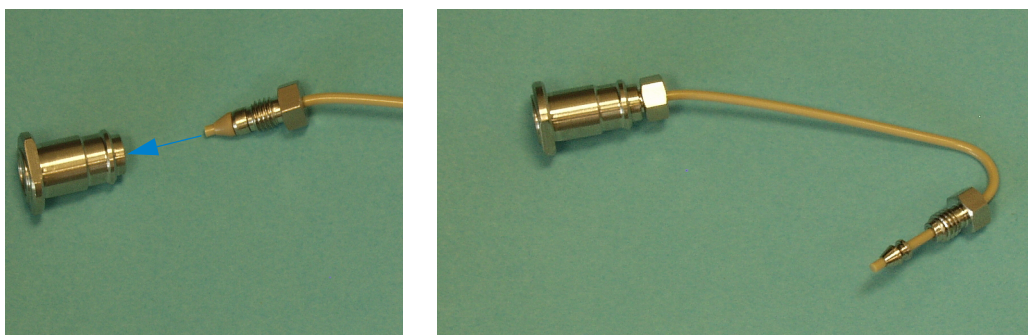


Figure 5 Connecting the PEEK needle seat to the PEEK seat capillary

- 10** Install the new PEEK needle seat and capillary assembly into it’s holder in the Autosampler. Slide the seat and capillary into the holder by feeding the tubing in from top to bottom. Be careful not to damage the seat tubing by bending it too much!

- 11 Replace the std. 0.17 mm ID (green sleeve) SST capillary that connects the Autosampler to the column with one of the PEEK tubings delivered with this kit (either 0.18 mm ID yellow or 0.25 mm ID blue PEEK tubing). The tubing must be cut to the right length, using the tubing cutter delivered with this kit. Avoid strong curves and bends in the tubing in order not to damage the tubing.

NOTE

The flex-tubing (PN 0890-0316, not shown in the figures) should be used with every pressurized PEEK tubing for minimizing potential negative effects of bursting tubing. It should be cut to a length shorter than the tubing that it will be used with (tubing length - 2 times fitting length) and slid across the tubing.

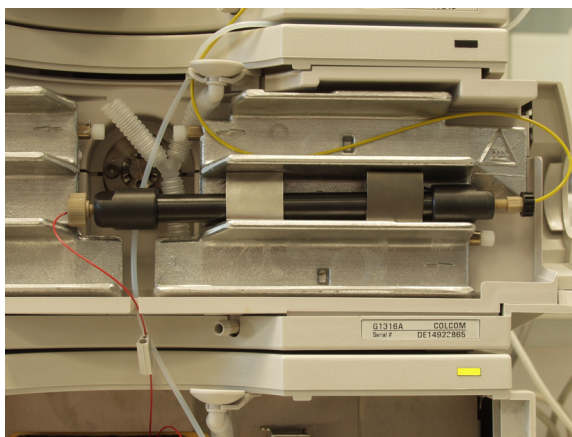


Figure 6 Tubing connections to and from the column

- 12 Replace the std. 0.17 mm ID (green sleeve) SST capillary that connects the column to the flow cell with one of the PEEK tubings delivered with this kit (either 0.18 mm ID yellow or 0.25 mm ID blue PEEK tubing). The tubing must be cut to the right length, using the tubing cutter delivered with this kit. Avoid strong curves and bends in the tubing in order not to damage it. Depending on the type of flow cell that is used in the detector, it might also be possible to directly connect the flow cell inlet tubing to the outlet of the column (as shown in the figure above).
- 13 We recommend to use this kit in combination with a bio-compatible flow cell, such as the 500 nl cell for the Agilent 1100 Series MWD (G1365A,B,C) or DAD (G1315A,B,C), PN G1315-68714 or Option #014 for a new instrument order.

How to Use the Bio Compatibility Kit

Important Safety and Solvent Compatibility Considerations

PEEK tubing can be used instead of stainless steel tubing in most applications. PEEK is inert to almost all organic solvents and is well known for its excellent bio-compatibility. Unlike metals, plastics are viscoelastic and, therefore, the yield strengths are not well defined. Therefore, we like to call your attention to the

information, provided below regarding the many factors, which affect the burst pressure of PEEK tubing. In addition, the bending of the loop during the injection cycle of the Agilent ALS (G1313A or G1329A) adds additional stress and can shorten the lifetime of the PEEK loop capillary. We recommend checking the PEEK tubing on a regular base for leaks or other damages.

WARNING

The Bio Compatibility Kit parts are designed for operating pressures lower than 200 bar, except when used with any of the critical solvents mentioned below. Never operate instruments with the Bio Compatibility kit installed at pressures higher than 200 bar. We suggest you use caution, when working with any polymer tube under pressure.

Exposing PEEK tubing to DMSO, THF and Methylene Chloride may cause the tubing to swell. Concentrated nitric and sulfuric acids will also degrade PEEK tubing. It is not recommended to use PEEK tubing with any of these solvents.

Some Chlorinated Solvents, Alcohols, Ethers, Organic and Inorganic Acids or Sulfonated Compounds may reduce the lifetime and the burst pressure of PEEK tubing, especially if they are used in combination with elevated temperatures.

For more detailed information about the solvent compatibility of PEEK tubing, please refer to the information given by some of the PEEK tubing vendors, such as:

<http://www.upchurch.com> and <http://www.rheodyne.com>

Never run the built in "Pressure Test" in the Agilent ChemStation's Diagnosis View for testing the leak tightness of a system that has the Bio Compatibility Kit installed. The test is operated at pressures of 390 bar and above, which can result in bursting capillaries.

The front doors of the HPLC modules equipped with the PEEK tubing must always be installed to avoid potential harm to the health of the user if a PEEK tubing bursts due to an overpressure or blockage. Always wear eye protection, when in close proximity to pressurized polymer tubing.

Always use the "Maximum Pressure" Feature in the pump Settings, set to a value of 200 bars or below, to generate an immediate shutdown of the system, when the pressure rises above this Setting because of a blockage, too high flow or high solvent and sample viscosity.

Extinguish all nearby flames if using flammable solvents.

Do not use PEEK tubing that has been severely stressed or kinked.

With high solvent flow rates, particularly with organic solvents, a static charge may build up on the surface of the tubing. Electrical sparking may occur. Take appropriate action to avoid any related danger. Electrically ground all modules that are part of the system.

NOTE

The "Minimum Pressure" feature in the pump Settings, might be used, set to a value of e.g. 10% below the minimum expected pressure during each run, to generate an immediate shutdown of the system, when the pressure falls below this Setting due to a leak.

Setting the Minimum or Maximum Operating Pressure in ChemStation

The setup of the “Pressure Limits” Setting is available by selecting “Set up Pump” from the context menu that pops up after clicking onto the Pump icon in the System Diagram of the Graphical User Interface in the ChemStation’s “Method and Run Control” or by selecting “Set up Pump” from the Instrument menu in the Menu bar. Enter a value of maximum 200 bar for the Max. Pressure Limit and e.g. 10% below the expected minimum pressure during each run for the Min Pressure Limit in the top right corner of the upcoming “Set up Pump” Window.

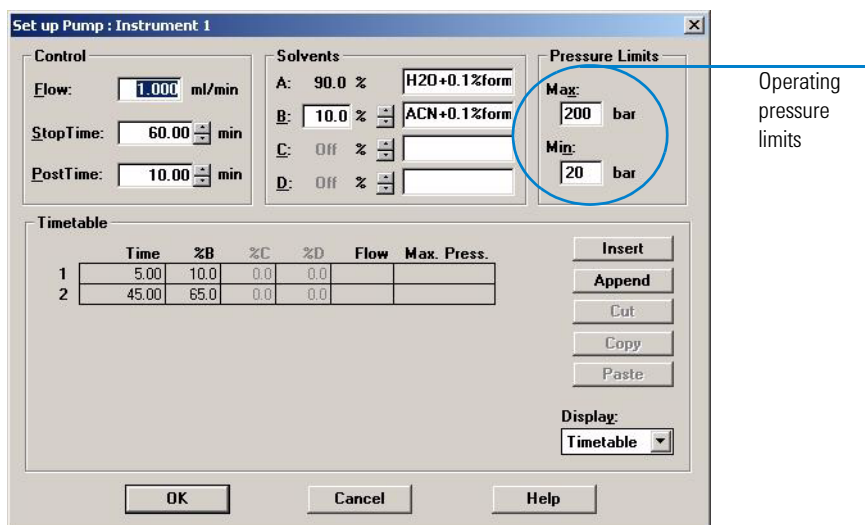


Figure 7 Pump Settings using the Maximum Pressure Setting in ChemStation

Setting the Minimum or Maximum Operating Pressure in the Control Module

The setup of the “Pressure Limits” Setting is available by pressing <F1> “Settings” from the “Analysis” View and then selecting the pump. In the upcoming Pump Settings screen, select <F3> “Pressure”. Highlight the Upper/Lower Pressure Limits using the Up/Down-Arrow keys and enter a value of maximum 200 bar for the max. pressure and e.g. 10% below the expected minimum pressure during each run for the Min Pressure Limit.

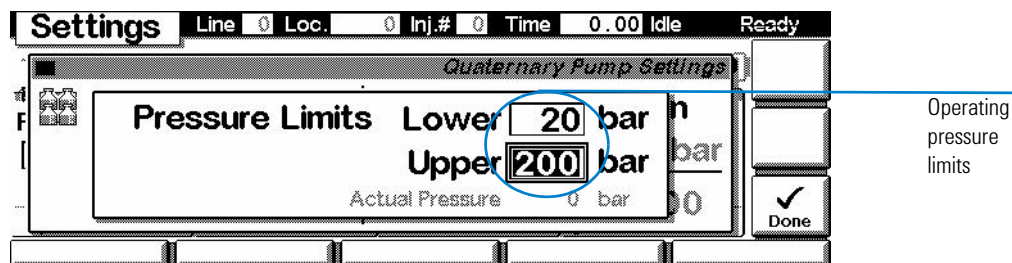


Figure 8 Pump Settings using the Maximum Pressure Setting in the Control Module

Parts and Materials

Bio Compatibility Kit Parts 5065-9972

Table 2 Bio Compatibility Kit Parts for G1310A Isocratic, G1311A, Quaternary and G1312A Binary Pumps and G1313A and G1329A 1100 Series Standard and Thermostatted Autosamplers

	Description	Part Number
1	Rotor seal, PEEK, 2-groove for 0101-0921 (for injection valve)	0100-2231
2	ZDV union, PEEK, with Fitting (for capillary to capillary connections)	0100-2441
3	Rheflex fittings, 5/PK (for connections to the tubings on the high pressure side of the system, i.e. upstream of the column)	0100-1631
4	Bio compatibility Kit Note (this note)	01100-90105
5	TUBING-FLEX.081-ID TFE .016-W (hose, for leak protection on PEEK tubings)	0890-0316
6	1/16" od 0.01" id 0.25mm, 1.5m/5 feet length, BLUE PEEK tubing (pump to sampler, sampler to column, column to detector flow cell tubing)	0890-1762
7	1/16"od 0.007" id (0.18mm), 1.5m/5 feet length, YELLOW PEEK tubing (pump to sampler, sampler to column, column to detector flow cell tubing)	0890-1763
8	4x FILTER PTFE LAST DROP 10UM TRIPOD TUBING (solvent inlet filter)	3150-0958
9	PEEK finger-tight fittings 1/16 in, 10PK (for PEEK tubing connections)	5063-6591
10	Plastic tubing cutter	8710-1930
12	Seat Assembly PEEK ALS	G1313-87104
13	Needle Assembly for use with PEEK seat	G1313-87203
14	PEEK Seat Tubing Assembly 0.17	G1313-87302
15	PEEK Valve to Metering Capillary	G1313-87306
16	PEEK Sample Loop Capillary for 100ul Sample	G1313-87309

