

Agilent PL Rapide Aqua Rapid Aqueous SEC Columns

Data Sheet

Installation

Tubing and connectors

Stainless steel tubing of 1/16 in od and 0.010 in id or 0.007 in id is recommended for column connections. Connecting tubing lengths between columns, detectors, and injection volumes should be minimized to avoid excessive dead volume which will diminish system performance. Column connections should be made using Parker compatible 1/16 in nuts and ferrules. The compatibility of column connectors is illustrated in Figure 1.

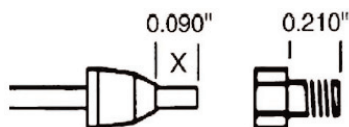


Figure 1. Compatible connectors.

The distance "x" for the standard column end fitting is 0.090 in and a minimum male nut length of 0.210 in is required. Some fittings from other manufacturers may not be compatible, for example, Waters, Valco, and Rheodyne. If unsure, please contact your local Agilent office.

Column connection

Connect the GPC column in the eluent flow direction indicated and tighten the 1/16 in nut and ferrule using wrenches on the 1/16 in nut and the actual end fitting.

It is recommended that several drops of eluent have been pumped before the column outlet is connected to another column or detector to clean out the end fitting of any particulate matter which may be present.

To avoid loosening the end fittings and causing leaks, wrenches must be used on the end fitting adjacent to the connecting nut and NOT on the column barrel or the opposite end fitting, as illustrated in Figure 2.



Figure 2. Don't use wrenches on the flats.

Eluent Selection and Flow Rate

PL Rapide Aqua columns are normally supplied in water containing 0.02% sodium azide and completely sealed with end caps which should always be in place when the column is not connected to a system. The recommendations and restrictions below must be followed.

- All eluents used should be of high purity and should be filtered and degassed before use.
- Buffered eluent systems within the pH range 2–10 of both high and low ionic strength may be used with no detrimental effect on the column.
- When transferring from one eluent to another, the compatibility and solubility of any salts/additives must be checked to prevent on-column precipitation which would irreversibly damage the column.
- The only organic solvent which is recommended for use with the PL Rapide Aqua columns is METHANOL (up to 50% by volume).
- The pressure across a column or series of columns should not exceed 2000 psi (140 bar).
- Elevating the temperature up to a maximum of 40 °C improves resolution.
- Flow rates should be changed progressively and pressure pulses limited.

The recommended flow rates are given in Table 1.

Table 1. Recommended Flow Rate

Column type	Typical flow rates (mL/min)	Recommended flow rate (mL/min)
PL Rapide Aqua 7.5 mm id	0.5–1.5	1.0
PL Rapide Aqua 10.0 mm id	2.0–5.0	2.0



Agilent Technologies

Sample Preparation and Injection

If maximum resolution and expected column lifetime are to be achieved, care must be taken in sample preparation. To avoid blockage of the column frits, sample filtration is recommended (0.5–2.0 µm filter).

Optimum sample volumes and concentrations are best determined for each type of analysis and are dependent on sample MW. Broad distribution polymers can generally be injected at higher concentrations than lower polydispersity samples. Overloading will not damage the column, but distorted peaks and hence spurious results will be obtained.

Excessive injector loop volume will contribute to band broadening and reduce system performance. Agilent's injection volume recommendations are shown in Table 2.

Table 2. Injection Volume Recommendations

Column type	Recommended concentration (%)	Recommended injection (µL) per column
PL Rapide Aqua 7.5 mm id	0.05–0.50	20
PL Rapide Aqua 10.0 mm id	0.05–0.50	20

Column Testing and Specifications

Every PL Rapide Aqua column is supplied with a test certificate indicating the column performance. Measurements of column performance are described below:

$$\text{Efficiency (1/2 ht) (Plates/m)} \quad N = 5.54 \left(\frac{t}{W_{1/2}} \right)^2 / L$$

$$\text{Efficiency (5σ) (Plates/m)} \quad N = 25 \left(\frac{t}{W_{5\sigma}} \right)^2 / L$$

Symmetry = a/b

where t is the peak elution time, $W_{1/2}$ is the peak width at half peak height, $W_{5\sigma}$ is the peak width at 4.4% of peak height, L is the column length in meters and a and b are the peak widths either side of the perpendicular measured at 10% of peak height.

Column efficiency is dependent on many experimental factors (system dead volume, eluent, flow rate, test probe, temperature, etc.) and test results may differ slightly from those quoted on the column certificate due to variability in these parameters. It is vital to ensure that the system dispersion is minimized in order to obtain the full potential of PL Rapide Aqua columns. Column specifications are listed in Table 3.

Table 3. Column Specifications

Specifications	PL Rapide Aqua H & L
Typical operating pressure psi (bar) ¹	225 (15)
Maximum operating pressure psi (bar)	2000 (140)
Maximum operating temperature °C	40
Efficiency ppm ¹	> 35,000

¹ Based on H₂O as the eluent at 20 °C, PL Rapide Aqua 150 × 7.5 mm at 1.0 mL/min, or PL Rapide Aqua 100 × 10 mm at 2 mL/min using propanetriol (glycerol) as the test probe.

Storage

On removing the column from the system, the end plugs must be replaced to prevent the column from drying out by evaporation, since subsequent shrinkage of the gel and disruption of the packing will occur. The end plugs need only be applied finger tight. For long term storage, the column should be flushed with water and stored in water containing 0.02% sodium azide.

Warranty

The columns are covered by warranty for 90 days following delivery. However, Agilent cannot accept liability if deterioration of column performance results from improper handling and use of columns used above their maximum operating temperature and pressure (Table 3) will void the warranty. For a full warranty statement, please request Agilent's General Conditions of Sale.

Maintenance

Deterioration in column performance may occur as a result of damage to the packed bed or as a result of blockage in the column frits. In the case of frit blockage, the column can be reverse flushed at 1.0 mL/min for 1 minute to remove loosely retained material. For further technical assistance, please contact your local Agilent Technologies office.

Agilent Ordering Information

For more information on our products, visit our web site at www.agilent.com/chem/gpcsec.

www.agilent.com/chem

Agilent shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Information, descriptions, and specifications in this publication are subject to change without notice.

© Agilent Technologies, Inc., 2011
Published in USA,
July, 2011



PK012



Agilent Technologies