

Errata Notice

This document contains references to PSS or Polymer Standards Service. Please note that PSS is now Agilent. This document will be republished as an Agilent document in the future.



POB 3368

Phone: +49-6131-96239-0
55023 Mainz, Germany
www.polymer.de

**POLYMER
STANDARDS
SERVICE GmbH**



**WinGPC
Newsletter
01/05**

**WinGPC
Applications**

applicable for: PSS WinGPC3 and higher

Application # 27

Higher sample throughput with overlaid injections

The separation efficiency and the resolution of a GPC system depends on the number of columns used. The more columns the better are the achieved results. On the other hand the analysis time and solvent consumption also increases with the number of columns. If the number of columns can not be reduced the overlaid injection feature of WinGPC allows to save time and eluent with every injection while keeping the resolution.

Characteristics of a GPC column

Three different separation regions can be discussed for a GPC column:

- I: complete exclusion range
- II: separation range
- III: total penetration range

A calibration curve, measured with different molar mass calibration standards, shows the different regions:

The pores in the GPC columns are responsible for the separation according to the hydrodynamic volume of the molecules (and therefore also according to the molecular weight). If the molecules are so large that they do not fit in any pores, they elute in the complete exclusion range (I). In the separation range (II), molecules with a higher hydrodynamic volume (molar mass) elute first. At the end of the analysis molecules elute that fit in every pore. Separation according to size is not possible any more.

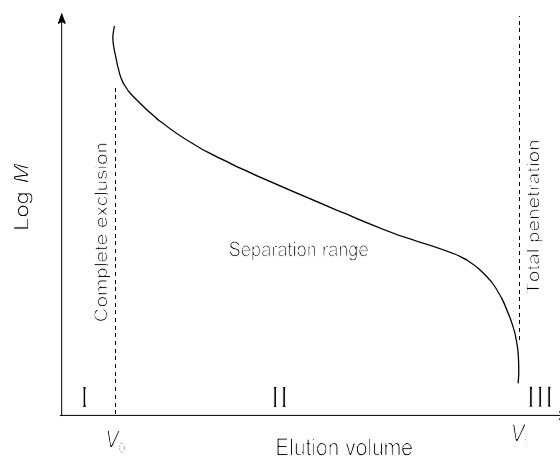


Figure 1: GPC Calibration Curve

The volume up to V_0 can now be used for overlaid injection since every column has a certain interstitial volume, where only solvent can elute while the sample is still moving through the column.

Analytical columns from PSS with a length of 30 cm and a diameter of 0,8 cm have

Polymer Standards Service GmbH; Software Dept.; Fax.: +49 - 6131-96239-11
For North American Customers: contact pssusa@polymer.de with comments or questions.

normally an interstitial volume of approximately 5 ml per column. For separations at a flow rate of 1 ml/min this means that during the first 5 minutes per column sample can not be eluted. Due to this fact it is not necessary to wait for complete elution of one sample before injecting the next sample.

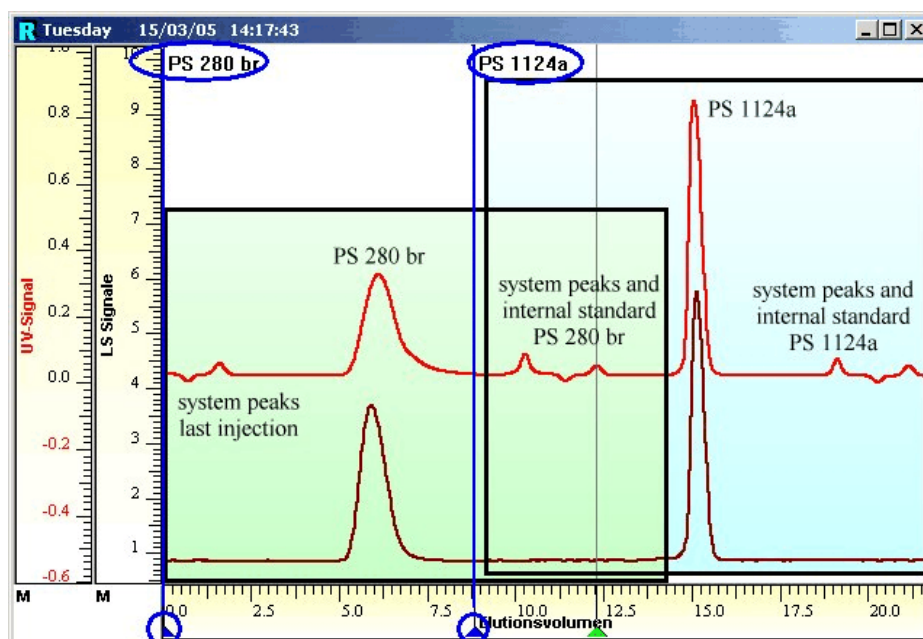


Figure 2: overlaid injection example with 45% time and eluent saved

Figure 2 shows 2 different injects in WinGPC, each inject indicated by an injection mark with a blue triangle at the bottom and the sample name at the top right. Before the system peaks and the internal standard (light green triangle) of "PS 280 br" are eluted, the next sample "PS 1124 a" is already injected at 8.5 ml. The analysis and data evaluation of sample "PS 280 br" is not affected by that; baseline and integration limits can be set as required by national and international GPC standards, e.g. ISO 13885.

Tip: WinGPC automatically shows the elution volume (time) axis corresponding to the active sample. The active sample is always displayed in the status bar and can be changed using the injection list or the arrow keys of the keyboard. Just select "PS 1124 a" as active sample to evaluate it with its corresponding elution volume (time) axis.