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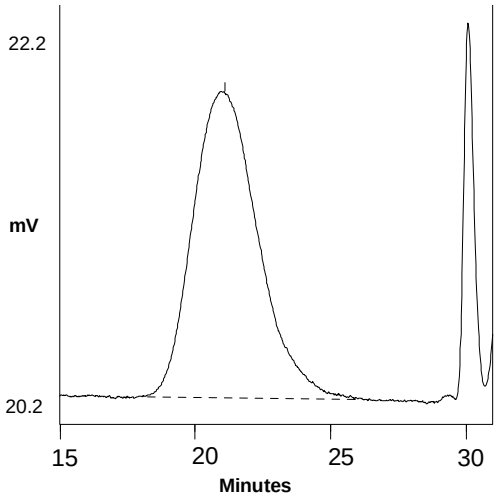
Waters Alliance® System

Performance PerSPECtives

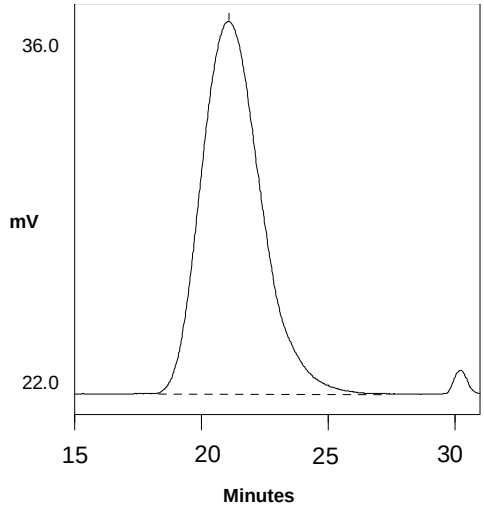
Providing Higher Sensitivity Detection for GPC

Smoothness of flow delivered by Waters Alliance Separations Module results in lower baseline noise, which increases signal to noise ratio.

Dow 1683 at 0.015% (w/v) concentration



Dow 1683 at 0.15% (w/v) concentration



Greater chromatographic sensitivity allows analysts to use more dilute solutions for injection and put less mass on the column. This advantage is beneficial in GPC (Gel Permeation Chromatography) separations, since the principles of GPC are based on infinite dilution. Polymer samples can exhibit chain entanglement at higher concentrations, resulting in less accuracy when attempting to measure molecular weight distributions. Higher sensitivity allows the polymers to be analyzed in a more dilute solution where they will be in a more random coil configuration to yield more accurate results.

Waters Alliance System consisting of:
Waters Alliance Separations Module
Waters 410 RI Detector
Columns: 2 Styragel® HR5E, and (1) HR2
Eluent: THF at 1.0 mL/min
300 uL injection
Column Temp.: 40° C

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Another advantage of decreased baseline noise in GPC is increased accuracy and precision of integration. This is of particular benefit to polymer analysts because Mn (number average) Mz and Mz+1 (Z and Z+1 average) are heavily influenced by the point where the distribution peak lifts off from, and returns to baseline. The table below shows the exceptional precision obtainable due to the smoothness of flow performance of the Waters Alliance. This performance allows for more consistent integration. The table compares the %RSD values of 9 replicate injections of Dow 1683 broad standard polystyrene in THF analyzed on a traditional system to an Alliance System.

GPC Reproducibility
Broad Standard
Polystyrene

% RSD values

System	RT	Mn	Mw	Mz
Alliance	**0.058**	**0.668**	**0.164**	**0.182**
Traditional	0.099	1.442	1.435	2.394

Greater sensitivity brings many advantages to HPLC. It can mean less sample preparation, measuring an impurity that was previously undetected, or it can result in more accurate and precise results because of improved integration. The smooth flow performance of the Waters Alliance Separations Module results in less baseline noise and higher chromatographic sensitivity.