C190-E092A

Access to your success
SHIMADZU

Prominence

Gel Permeation Chromatography System

Shimadzu
High Performance
Liquid Chromatograph

Prominence Gel Permeation Chromatography System

Gel permeation chromatography (GPC) is essential in polymer chemistry for measuring the distribution of molecular weights. The fundamental requirement of each generation's GPC system remains the same – to allow anyone to easily obtain the intended data. Now, in response to users' increasing demands for a new style of GPC, one that assures the

Designed for Data Reliability

Ultimately, the Prominence GPC system was designed to assure the reliability of analytical data, with performance and features designed specifically for that purpose.

Solvent Delivery Performance Designed for Repeatability

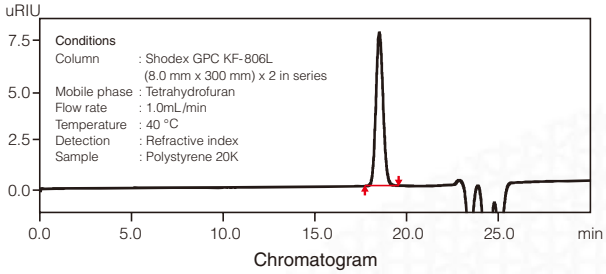
GPC systems measure molecular weight distribution by correlating the molecular weights of compounds eluted between the exclusion limit and permeation limit as an exponential function of elution times. As a result, even small elution time errors can lead to large variations in measurement results. To solve this problem, Shimadzu's Prominence GPC system utilizes high speed micro-plunger actuation and automatic pulse compensation to provide pulse-free solvent delivery and improve elution time repeatability.

Outstanding Baseline Stability

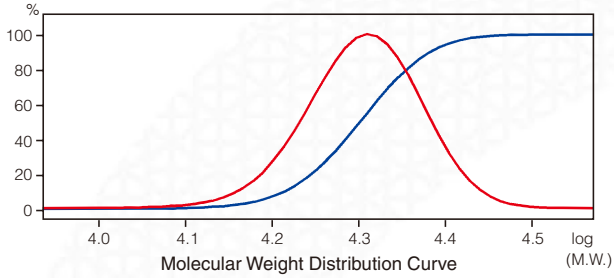
Differential refractive index detectors used in GPC can occasionally react to changes in mobile phase temperature or to the quantity of dissolved air, resulting in baseline instability. However, the Prominence GPC system's RID-10A detector suppresses baseline drift by locating the optical system inside a double temperature-controlled housing and controlling inflowing mobile phase temperature in two stages. Furthermore, the use of a high-efficiency degasser with a capacity of only 380 µL significantly reduces the time required for the system to stabilize.

Designed for Validation

To ensure the reliability of data, equipment maintenance and management are also important. This system's auto-validation feature is useful for IQ/OQ procedures during installation, and for evaluating the operating status of each unit and managing maintenance information during periodic inspections. This feature also helps reduce validation costs by allowing instrument inspection and service procedures to be performed quickly and easily. An optional column management device (CMD) allows the recognition of column name, serial number or other column information, as well as the storage of usage history information, including mobile phase flow rates and the number of sample injections. (When multiple columns are connected, the data's history can be recorded for a set of columns.)



Chromatogram



Molecular Weight Distribution Curve

	Prominence GPC	GPC Systems with Low Flow Rate Precision	
Repeatability of Elution Time	0.011% RSD	0.029% RSD	0.044% RSD
Repeatability of Weight-Average Molecular Weight	0.167% RSD	0.443% RSD	0.676% RSD
Repeatability of Number-Average Molecular Weight	0.167% RSD	0.443% RSD	0.675% RSD

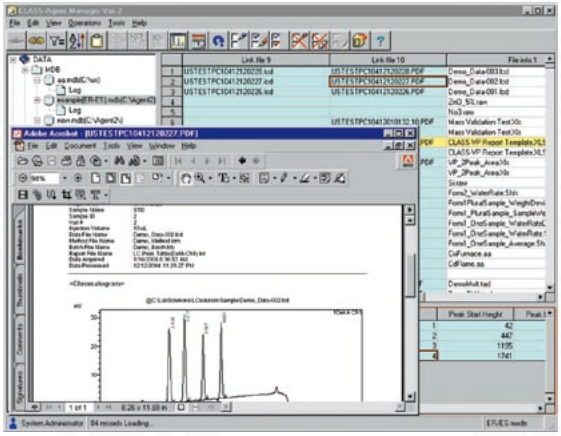
reliability of measurement results, Shimadzu has introduced the Prominence GPC system, designed specifically to provide superior data reliability and ease of use.

Designed to be Easy to Use

Shimadzu's Prominence GPC system offers a superior balance of hardware and software. An operating environment with unsurpassed user friendliness provides an operating experience never before available.

Wide Selection of Data Analysis and Report Generation Features

This system includes specialized GPC software for data analysis. GPC calibration curves are created easily from a wide variety of approximation formulae for calibration curves. Also, seamless integration with the visually oriented LCsolution Workstation software allows data analysis and report generation using the same operations as ordinary HPLC analysis.



Enhanced Data Control Features

Together with CLASS-Agent data management software, this system provides highly secure data control. Data searches can be easily set according to a variety of parameters, including operator, date and time. Data can also be automatically stored in databases as PDF files, allowing a paperless analytical laboratory.

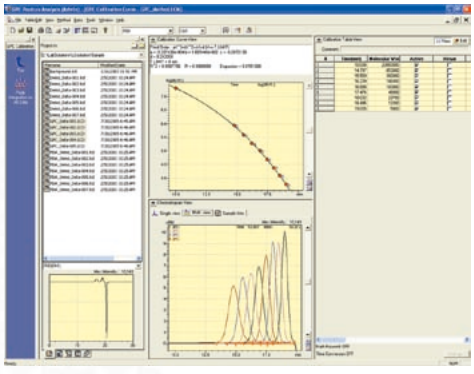
Note: Loading data as PDF files requires the Adobe® Acrobat® software.

LCsolution GPC Software

LCsolution GPC updates the GPC system and provides flexibility in measuring molecular weight distributions.

Easily Creates GPC Calibration Curves using a Visual Interface

Use a wide range of approximation formulae to create calibration curves, such as linear, 3rd-order, 3rd-order + hyperbolic curve, 5th-order, 5th-order + hyperbolic curve, 7th-order, 7th-order + hyperbolic curve, or broken line. This software provides up to 64 data points and allows entry of virtual points, so calibration curves can be checked visually for appropriateness while they are being created. Mark-Houwink calibration curve correction methods or various correction methods based on Q-factors or degree of polymerization are also available.

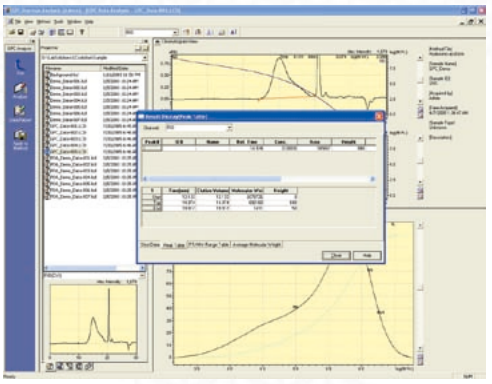


GPC Calibration Curve Creation Functions

LCsolution GPC Software

Post-Run Analysis using a Variety of GPC Data Analysis Functions Helps Determine Data Processing Methods

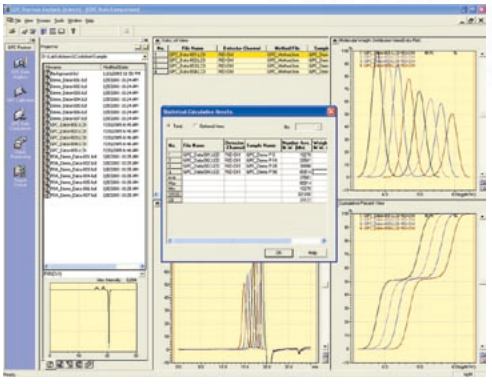
Waveforms can be manipulated by means of a graphical interface in the GPC Data Analysis window. Changing the peak integration parameters also recalculates the number-average, weight-average, Z-average, Z+1-average, and viscosity-average molecular weights, as well as intrinsic viscosity and polydispersity in real time. The derivative and integrated molecular weight distribution curves are also updated. Time correction for internal standard peaks or control samples, or sensitivity correction for detectors, is also available.



GPC Data Analysis Functions

Data Comparison Features Simplify Analysis of Multiple-Sample Data

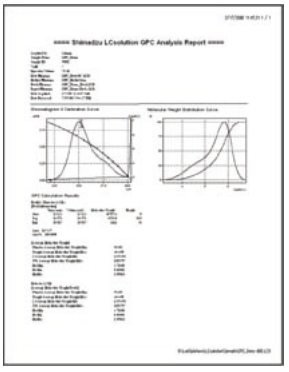
The comparison feature will display overlays of derivative and integrated molecular weight distribution curves for up to 10 analytes. It also displays statistical results such as the number-average, weight-average, Z-average, Z+1-average, and viscosity-average molecular weights, as well as intrinsic viscosity and polydispersity.
If you shift specific data parallel to the time axis, the molecular weight distribution is recalculated and the derivative and integrated molecular weight distribution curves are updated using the corrected time. These GPC data comparison features provide everything needed for multiple analyte data analysis.



GPC Data Comparison Functions

Customize the Report Layout

From individual analysis reports to summary reports, general-purpose LC and GPC calculation results can be combined in the same report format. A wide selection of report content can be used, with a high degree of freedom to create numerous report layouts. Summary reports can even include chromatograms, GPC calculation results, and statistical calculation results for multiple analytes on a single page.



Report Output Example

Prominence Gel Permeation Chromatography System

Prominence GPC System Standard Items

P/N	Part Name	Model Number	Amount
228-45012-xx	System Controller	CBM-20A	1
228-45000-xx	Solvent Delivery Unit	LC-20AD	1
228-45018-32	Online Degasser	DGU-20A3	1
228-45056-xx	Autosampler	SIL-10AF/SIL-20	1
228-45009-xx	Column Oven	CTO-20A	1
228-45095-xx	Differential Refractive Index Detector	RID-10A	1
228-45041-91	Reservoir Tray	- - -	1
- - -	LC Workstation	LCsolution Single	1
223-05655-92	Optional GPC Software	- - -	1

Note: Requires separate columns and vials. Please prepare any additional peripheral instrumentation required for your specific application.

Prominence GPC System Main Specifications

Item	Specification
System Configuration	Modular
Measurement Method	Single Flow
Mobile Phase Delivery Method	Parallel Double Plunger
Mobile Phase Flow Rate Setting Range	0.0001 mL/min - 10.0000 mL/min
Mobile Phase Flow Rate Accuracy	± 1% or ± 0.5µL/min. (whichever is greater)
Mobile Phase Flow Rate Precision	0.3 % (0.1 % RSD)
Degassing Method	Vacuum Membrane
Degassing Line Flow Rate	380µL
Sample Injection Method	Variable Loop Weighing
Sample Injection Volume Setting Range	1µL to 50µL (standard)
Number of Samples Processed	100 (1.5-mL vials) or 80 (4-mL vials)
Column Temperature Control Method	Forced Air Circulation
Column Temperature Control Range	(Amb. + 10)°C to 85°C
Detector Noise	2.5 x 10^{-9} RIU (max.)
Detector Drift	1.7 x 10^{-7} RIU/h (max.)
Detector Cell Volume	9µL
Detector Cell Temperature Control Range	30°C - 60°C
Calibration Curve Approximation Formulae	Linear, 3rd-order, 3rd-order + hyperbolic curve, 5th-order, 5th-order + hyperbolic curve, 7th-order, 7th-order + hyperbolic curve, or broken line
Calibration Curve Correction Functions	Internal Standard Correction, Q-Factor, RID Sensitivity Correction
Peak Integration	Automatic processing according to parameter settings. (Manipulation possible)
Molecular Weight Calculations	Mn, Mw, Mz, Mz1, Mv, Mw/Mn, Mv/Mn, Mz/Mw, and intrinsic viscosity
Data Output	ASCII Format
Data Control	Centralized control via database

JQA-0376

Founded in 1875, Shimadzu Corporation, a leader in the development of advanced technologies, has a distinguished history of innovation built on the foundation of contributing to society through science and technology. We maintain a global network of sales, service, technical support and applications centers on six continents, and have established long-term relationships with a host of highly trained distributors located in over 100 countries. For information about Shimadzu, and to contact your local office, please visit our Web site at **www.shimadzu.com**

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