



Providing Complete Liquid Chromatography Solutions

AGILENT HELPS SCIENTISTS IDENTIFY AND MEASURE THE COMPONENTS IN VIRTUALLY ANY MIXTURE

Chromatography is a technique for separating mixtures into their individual components so that they can be identified and measured. In liquid chromatography, samples are carried through the system in a moving, pressurized liquid, and the components separate based on their differing affinity with a stationary support found within the instrument.

Liquid chromatography (as opposed to gas chromatography) is well suited for analyzing nonvolatile and thermally fragile molecules, including high molecular weight compounds such as proteins. LC can also be a useful tool for purifying both small molecules and macromolecules derived from chemical synthesis or natural processes.

Liquid chromatographs usually include the following key components: a pump system for solvent delivery, a sample injector, a column or columns, detectors, and a data-handling system. Different types of pumps, injectors, columns, detectors, and fraction collectors are used together in various configurations, depending on the sample and application.

The LC market includes both high-performance (HPLC) and ultra-high-performance (UHPLC) segments. In HPLC, samples are dissolved in a solvent, and then delivered through a chromatographic column to a detector under high pressure. UHPLC involves even higher pressure ranges and higher flow rates to increase the efficiency, speed, and sensitivity of the system. At the same time, smaller particles can be used as stationary support.

Both HPLC and UHPLC are frequently used in connection with mass spectrometers, forming LC/MS systems. This provides additional compound specific information to prove the identity of the analyzed species.

Agilent delivers LC and LC/MS solutions to serve the needs of customers in diverse markets and holds market-leading positions:

Pharmaceuticals: The pharmaceutical industry is a major user of Agilent LC and LC/MS systems. Liquid chromatography plays an important role in the entire life cycle of a drug, from discovery to development to manufacturing and quality control. It enables scientists to quickly screen, purify, and qualify lead compounds. LC and LC/MS are also the primary tools used to check drug compound quality and quantity with fixed methods in a regulated environment to support drug manufacturing.

Proteomics: A growing opportunity for LC and LC/MS is in the identification, isolation, and purification of proteins in cells or body fluid. The versatility of single- and two-dimensional LC makes it an ideal technique to studying proteins and other biomolecules, which can be difficult to analyze.

Environmental testing: Agilent's customers are primarily government, industrial, and independent labs that are focused on regulatory compliance and enforcement. Specific HPLC and LC/MS analyses include nonvolatile pesticides, herbicides, polynuclear aromatic hydrocarbons, and other compounds not suitable for gas chromatography.

Food safety and quality: Food safety testing includes the analysis of additives, residues, contaminants, and toxins in agricultural products and foods with a primary focus on regulatory compliance and enforcement. Examples include pesticide residues and melamine adulteration. The need for food testing is growing rapidly, driven by the liberalization of global trade, a growing regulatory environment, and increased public awareness of food safety issues. Food quality testing is focused on preservation of natural ingredients during food processing from farm to fork and during storage.

Homeland security: Agilent has a long history of working with government, military, law enforcement, and health agencies around the world in detecting, identifying, confirming, and disarming biological and chemical warfare agents, and toxic industrial compounds.

Hydrocarbon processing: Specific LC applications include additive assays, fine and specialty chemical analysis, and characterization of polymers using size exclusion chromatography, either with organic or aqueous solvents.

The company's 1220/1260/1290 lines of LC systems provide HPLC/UHPLC compatibility and can be seamlessly combined with earlier modules and systems. As a leading supplier of liquid chromatography solutions, Agilent has provided a continuous stream of technology innovations over the past 40 years. Over the past 12 years, the company has made a major advances in UHPLC technology:

- **2003:** Agilent introduces commercial columns with UHPLC technology.
- **2005:** Agilent introduces 80 Hz technology for accurate UHPLC-UV detection.
- **April 2009:** Agilent introduces high-efficiency solvent mixing with multilayer technology and active-damping for 10 times more precise solvent delivery.
- **April 2009:** Agilent introduces the noncoated optofluidic waveguides for 10 times higher UV sensitivity.
- **March 2010:** Agilent facilitates third-party software control for Agilent LC systems with the Instrument Control Framework (ICF).
- **March 2011:** Agilent introduces the 1260 Infinity hybrid SFC/UHPLC system, the first commercial instrument performing both supercritical fluid chromatography and UHPLC.
- **March 2011:** Agilent introduces its revolutionary Intelligent System Emulation Technology (ISET) to facilitate and accelerate inter-laboratory LC method transfers.
- **March 2012:** Agilent introduces the 1200 Infinity Series high dynamic range (HDR) diode array detector (DAD) for analyzing mixtures that contain widely different concentration levels.
- **April 2012:** Agilent introduces the 1290 Infinity 2D-LC solution for comprehensive and heart-cutting two-dimensional separations.
- **April 2012:** Agilent introduces the 1290 Infinity quaternary LC system the first quaternary UHPLC system to deliver the accuracy and precision of binary systems.

Agilent 1290 Infinity II LC systems set new standards for efficiency:

- **Analytical efficiency:** Agilent offers unmatched separation and detection performance to deliver data of the highest quality for all scientists.
- **Instrument efficiency:** Agilent instruments provide the highest sample capacity and fastest injection cycles, along with genuine ease of use for robust and reliable day-to-day operation.

- **Laboratory efficiency:** New Agilent solutions easily integrate into current infrastructures and accommodate smooth method transfer from legacy equipment, improving the return on invested capital for the lab.

To learn more, visit Agilent's [liquid chromatography](#) website.