Purification Product Guide
FINALLY, SOMEONE CLEANED UP PURIFICATION

Sample prep. Purity. Recovery. Time to result.
To effectively turn your everyday challenges into competitive advantages, accept no substitutions for Waters Purification. Because only Waters workflow solutions are powerful enough to streamline the entire process. Find the system that’s right for your lab. Visit waters.com/prep.
Preparative-scale HPLC chromatography plays a critical role in applications where compounds must be synthesized, identified, isolated, purified, characterized, screened, and tested. The Waters® suite of HPLC purification solutions offer scalable configurations, from semi-automated modular systems to fully automated MS-directed systems, whether you want the specificity of mass-directed purification or inclusiveness of a UV system.

**Key Applications**
- Compound isolation and purification
- Biopharmaceutical
- Pharmaceutical
- Natural products and traditional medicine
- Open Access purification
Modular HPLC Purification Systems

Waters’ complete line of modular purification solutions are perfectly suited for purifying a limited number of samples that do not need the advanced features or automation of a full preparative system. Satisfying analytical to preparative scale workloads, these systems offer various detection, injection methods, and solvent delivery managers to achieve the functionality and capacity your application requires.

Key Technologies

- With either manual or automated injection capability, system configurations can vary by throughput and scale requirements.
- Flexible solvent delivery capabilities with flow rates up to 300 mL/min.
- Flexible collection formats designed for use in both small-scale and large-scale work environments.
- User-friendly console and software features help you manage solvents and samples, whether you do manual or automated injections.
Prep 150 LC System

Waters’ Prep 150 LC System has been designed as a dedicated purification system, enabling quick compound isolation with performance you can rely on. Versatile systems satisfy low throughput requirements of only a handful of samples to higher throughput needs with unattended operation. Tailored systems controlled by intuitive easy-to-navigate software suit your purification scale requirements of milligrams to grams.

Key Technologies

- **ChromScope™ Software** provides simplistic system control with robust functionality designed with helpful tools to increase efficiency.
- Flexible solvent delivery systems provide gradient mixing, large sample volume loading, and flow rates up to 150 mL/min.
- Manual or automated injectors satisfy workflow and throughput requirements.
- Analytical to preparative scalability are available to accommodate your laboratory purification needs.

Prep 150 LC System featuring 2545 Binary Gradient Manager, 2998 PDA Detector, Prep Injector Module, and WFC III.
AutoPurification HPLC System

Waters’ advanced AutoPurification™ HPLC System offers robust, scalable solutions for every purification requirement. The flexible, expandable platform grows with your lab’s needs – from UV-based fraction collection of a few dozen samples to mass-directed purification when your workflow demands high-throughput, parallel runs for selective fraction collection of hundreds of samples.

Key Technologies

- Automatically process hundreds of samples, or just a few, with configurable UV/Vis or MS-directed detection options.
- FractionLynx™ Application Manager automates purification processes, tracks samples/fractions, and presents results in an easy-to-view format.
- User-friendly software features help you manage solvents and samples, whether you do manual or automated injections.
- Proprietary Optimum Bed Density (OBD™) Column design offers the highest sample loading and unmatched column stability.
- ACQUITY QDa™ Detector enables the selectivity required to maximize throughput and efficiency.

Learn more at www.waters.com/prep
Waters Fraction Manager – Analytical

Learning as much information as possible about molecules is better attained with pure compounds. Purification instrumentation has been limited to HPLC conditions rather than UPLC – until now. The Waters Fraction Manager – Analytical (WFM-A) is a new analytical fraction collector for UPLC and HPLC Systems that minimizes fraction loss and carryover to better manage low volume peaks and allows for efficient collection of small amounts of material for further assays. Because UPLC Technology allows the collection of smaller, purer peaks, especially from complex mixtures, the ideal solution is a purposefully built analytical scale fraction collector.

- Low internal divert valve volume for minimal dispersion and enhanced collection of narrow UPLC peaks.
- Innovative bio-compatible needle with tapered tip allows for optimized collection of minute fractions.
- Advanced fluidic design enables exceptional recovery and high purity.
- Precisely controlled sample compartment from 4 to 40°C accommodates thermally labile samples.

ACQUITY UPLC® H-Class System with WFM-A.
SFC Technologies

SFC

Widely accepted as a “green” purification technology, supercritical fluid chromatography (SFC) provides an attractive alternative to LC-based purification techniques with added environmental and economical benefits. Generally considered a normal-phase chromatographic technique, SFC shares many principles with LC. The main difference lies in the mobile phase – SFC uses environmentally friendly liquid carbon dioxide (CO₂) as the main mobile phase component. Due to the high diffusivity and low viscosity of CO₂, SFC often offers high efficiency separation with high speed and fast dry-down post-purification; hence, high purification productivity. The use of CO₂ also reduces organic solvent consumption and associated waste disposal, and is welcomed by many industries pursuing lean operations and environmental sustainability.

Key Applications

- Enantiomeric and diastereomeric resolution
- Target compound isolation from crude synthetic mixtures
- Impurity isolation
- Bioactive compound isolation from natural products
Investigator SFC System

The Investigator SFC System, capable of performing both analytical scale method development and semi-preparative purification, offers a flexible SFC platform for a wide variety of applications, allowing for fast method development in an automated fashion. Once the optimal chromatographic parameters, including mobile phase, stationary phase, temperature, and pressure, are determined from analytical screening, the method can be easily scaled up for purification on the same system.

Key Technologies

- Optional mass detection for information-rich sample analysis and characterization.
- Fluid Delivery Module (FDM) supports flow rates up to 15 mL/min for both the CO₂ and co-solvent.
- Column oven, with unique pull-out drawer design for easy access, supports up to 10 columns of 4.6 mm or 10 mm I.D.
- Enhanced, easy-to-use ChromScope Software allows maximum flexibility for instrument control, method programming, stacked injection capability, and full spectra acquisition/data analysis.
- Fraction Collection Module accommodates up to 12 collection vessels.
Prep 15 SFC System

The Prep 15 SFC System is a versatile automated and high throughput purification platform capable of performing a complete purification process, including analytical method development/optimization, semi-preparative purification, and post-purification fraction analysis. Enabled by its patented gas-liquid separator (GLS), the system adopts an open-bed collection format that's familiar to many LC purification users and can be seamlessly incorporated into their existing purification workflow. The optional ACQUITY QDa Detector allows for fraction collections with high specificity, improving overall purification productivity.

Key Technologies

■ Fluid Delivery Module (FDM) supports flow rates up to 15 mL/min for both the CO₂ and co-solvent, suitable for both analytical and semi-preparative applications.
■ Column oven, with unique pull-out drawer design for easy access, houses up to 10 analytical and columns of 4.6 mm or 10 mm I.D.
■ Automated sample handling and column switching.
■ Patent-pending gas/liquid separator for open-bed collection.
■ Fully automated MS- or UV-directed fraction collection.
■ MassLynx® Software and FractionLynx™ Application Manager streamlines the purification process, from analytical to preparative.
■ ACQUITY QDa Detector offers information-rich detection and efficient mass triggering.
Prep 100q SFC System

Bringing increased efficiencies and productivity to purification laboratories, the Prep 100q SFC System is perfectly suited to those high-throughput laboratories seeking to adopt a greener approach to purification. With flow rates up to 100 mL/min, the system is ideally suited for high-throughput library compound purification, isolation of low level impurities, and target compound isolation in complex sample matrices. With the addition of the ACQUITY QDa Detector, the benefits of mass-directed SFC purification have just become more attainable. While retaining the high specificity and sensitivity essential to MS directed purification, its intuitive user interface and small footprint make the ACQUITY QDa Detector a natural fit for the Prep 100q SFC System.

Key Technologies

- 2545 QGM Pump provides accurate solvent delivery for applications that require low co-solvent percentage and improved gradient chromatography.
- Column oven, with unique pull-out drawer design for easy access, supports up to six, 2 to 3 cm preparative columns.
- ACQUITY QDa Detector offers information-rich detection and efficient mass triggering.
- Gas-liquid separator enables open bed collection with uncompromised recovery.
- Optional stacked injection improves isocratic purification productivity.
- MassLynx Software with FractionLynx Application Manager can manage and automate sample purification process.
Prep 80q/200q SFC Systems

With their leading performance in chiral compound purification and cost benefits, the Waters’ suite of bulk purification SFC systems, including the Prep 80q and 200q SFC Systems, have led the way in pushing the boundaries of prep SFC applications beyond traditional isocratic chromatography. Featuring best-in-class pump technology, the systems provide superior accuracy in mobile phase delivery at low co-solvent percentage and low flow rates to maintain chromatographic fidelity, and enable purification of many historically challenging, low retentive compounds as well as improved gradient chromatography for complex samples. These bulk purification SFC systems are suitable for isolation and purification of up to six target compounds from milligram to 100’s grams scale.

Key Technologies
- 2645 QGM Pump provides accurate solvent delivery for applications that require low co-solvent percentage and improved gradient chromatography.
- Patented modifier stream injection improves sample loading without peak distortion caused by strong solvent effects.
- Stacked injection improves isocratic purification productivity.
- Low pressure collection assembly offers easy operation and easy clean up to minimize carryover, ideally suited for small to medium size purification campaigns.
- Enhanced, easy-to-use ChromScope Software allows maximum flexibility for instrument control, method programming, stacked injection capability, and data analysis.

Prep 80q/200q SFC Systems

<table>
<thead>
<tr>
<th></th>
<th>Prep 80q SFC</th>
<th>Prep 200q SFC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal column I.D.</td>
<td>19 mm</td>
<td>30 mm</td>
</tr>
<tr>
<td>Recommended total flow rate</td>
<td>80 g/min</td>
<td>150 g/min</td>
</tr>
<tr>
<td>Typical throughput</td>
<td>Up to 15 g/day</td>
<td>Up to 40 g/day</td>
</tr>
<tr>
<td>Fractions</td>
<td>6 + 1 waste</td>
<td>5 + 1 waste</td>
</tr>
</tbody>
</table>

Prep 80q SFC System.
Prep 350 SFC System

One of the largest lab-scale SFC purification systems on the market, Waters Prep 350 System is slated for 100's gram to kilogram scale compound purification. Ruggedness, simplicity, and productivity are the key principles reflected throughout the instrument design. Classic cyclonic collection is easy-to-use and durable, ideally suited for large compound campaigns. It also allows an easy integration with Waters CO₂ recycler for improved cost-effectiveness, an important consideration for large scale purification. Modified stream injection and stacked injection capability are also featured in the Prep 350 System for high productivity.

**Key Technologies**
- Modifier stream injection improves sample loading without peak distortion caused by strong solvent effects.
- Stacked injection improves isocratic purification productivity.
- Cyclonic collection is easy-to-use and can be integrated with Waters CO₂ recycler for improved cost-effectiveness.
- CO₂ bulk delivery system (BDS) enables cost savings and improves energy efficiency.
- Enhanced, easy-to-use ChromScope Software allows maximum flexibility for instrument control, method programming, stacked injection capability, and data analysis.

<table>
<thead>
<tr>
<th>Prep 350 SFC</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal column I.D.</td>
<td>50 mm</td>
</tr>
<tr>
<td>Recommended total flow rate</td>
<td>300 g/min</td>
</tr>
<tr>
<td>Typical throughput</td>
<td>Up to 100 g/day</td>
</tr>
<tr>
<td>Fractions</td>
<td>5 + 1 waste</td>
</tr>
</tbody>
</table>

Learn more at [www.waters.com/prep](http://www.waters.com/prep)
Supercritical fluid extraction (SFE) is a highly selective extraction technique, often used as a pre-purification sample preparation method, capable of extracting compounds from solid matrices to isolate compounds of interest. Utilizing supercritical CO₂ as its primary extraction solvent, in place of an organic solvent, the advantage of SFE is an extract with little or no residual solvent, superior purity and yield, and lower operating cost compared to traditional hydrocarbon-based solvent extraction systems.

**Key Applications**
- Decaffeination of coffee and tea
- Extraction and fractionation of edible fats and oils
- Production of flavors, spice extracts, herbs, and dietary supplements from natural resources
- Separation of tocopherols and other antioxidants
- Fractionation of polymeric materials
- Natural products
- Photo-resist cleaning
- Precision parts cleaning
MV-10 ASFE System

Waters MV-10 ASFE™ System is a semi-automated, multi-vessel supercritical fluid extraction (SFE) system enabling faster, greener, and more selective analyte extractions, using supercritical carbon dioxide (CO₂), from a wide variety of sample matrices.

Key Technologies

■ ChromScope™ Software: Workflow-based architecture and intuitive user-friendly interface make sample extraction easy.
■ Uses environmentally friendly CO₂ instead of toxic, organic solvents.
■ Supports up to 10 vessels for automated, sequential extraction.
■ Automated Back Pressure Regulator (ABPR) provides precise pressure control and monitoring of supercritical fluids.
SFE 100 – 5000, SFE 2x5 LF

Waters’ line of SFE systems extract chemical compounds using supercritical CO₂ instead of an organic solvent. Configurable for the amount of sample you want to extract, the SFE systems manipulate temperature and pressure of the fluid to solubilize the material of interest and selectively extract it. The sample is placed in an extraction vessel (from 100 to 5000 mL) and pressurized with CO₂ to extract the compound of interest and transfer the desired material to the fraction collector.

Key Technologies

- High-pressure “finger-tight” extraction vessels designed for simple opening, loading, and closing.
- Novel cyclonic-style collection uses high velocity, centrifugal forces to separate liquids from gases.
- Automated Back Pressure Regulator (ABPR) provides precise pressure control and monitoring of supercritical fluids and allows for controlled depressurization of the compounds of interest and the CO₂.
- High-pressure, pulse-free CO₂ pump.
## Purification System Components

### Solvent Managers

Waters’ reliable and robust solvent managers provide a wide range of capabilities for purification.

<table>
<thead>
<tr>
<th>Typical column I.D. (mm)</th>
<th>Max flow rate (mL/min)</th>
<th>Solvent manager</th>
<th>Sample load</th>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0 to 19.0</td>
<td>22.5</td>
<td>1525 EF</td>
<td>µg to tens of mg</td>
<td>MassLynx or Empower®</td>
</tr>
<tr>
<td>4.6 to 30.0</td>
<td>50.0</td>
<td>2535 Quaternary Gradient Module</td>
<td>mg to g</td>
<td>MassLynx, Empower, or stand-alone console software</td>
</tr>
<tr>
<td>4.6 to 50.0</td>
<td>150.0</td>
<td>2545 Quaternary Gradient Module</td>
<td>mg to g</td>
<td>MassLynx, Empower, or ChromScope stand-alone console software</td>
</tr>
<tr>
<td>4.6 to 50.0</td>
<td>150.0</td>
<td>2545 Binary Gradient Module</td>
<td>mg to g</td>
<td>MassLynx with FractionLynx Application Manager or ChromScope</td>
</tr>
<tr>
<td>7.8 to 75.0</td>
<td>300.0</td>
<td>2555 Quaternary Gradient Module</td>
<td>mg to tens of g</td>
<td>MassLynx, Empower, or stand-alone console software</td>
</tr>
</tbody>
</table>

- **1525 EF**: The 1525, with EF (Extended Flow) heads, is an integrated, high-pressure, binary HPLC pump that features on-board pulse dampening and efficient mixing. Pulse-free solvent flow at semi-preparative flow rates makes it ideal for smaller scale purifications.

- **2535 Quaternary Gradient Module (QGM)**: The 2535 QGM is a four-solvent, low pressure mixing gradient pump with a flow rate maximum up to 50 mL/min (up to 6000 psi) for columns up to 30 mm I.D. Two fluidic pathways (small-scale and large-scale) accommodate column selection while maintaining chromatographic efficiency.

- **2545 Quaternary Gradient Module (QGM)**: The 2545 QGM is a four-solvent, low pressure mixing gradient pump that features up to 150 mL/min capability (6000 psi up to 100 mL/min with a roll off to 5000 psi at 150 mL/min) for columns up to 50 mm I.D. for purification of material ranging from milligrams to grams.

- **2545 Binary Gradient Module (BGM)**: The 2545 BGM is a high-pressure mixing binary gradient pump that serves as the primary solvent delivery device for the Waters AutoPurification System, enabling subsequent isolation and purification of targeted compounds. It provides excellent performance at analytical and preparative flow rate scales (0.50 to 150.00 mL/min) with a maximum operating pressure of 6000 psi.

- **2555 Quaternary Gradient Module (QGM)**: The 2555 QGM is a four-solvent, low pressure mixing gradient pump with a maximum flow rate of 300 mL/min (3000 psi at 200 mL/min with a roll off to 2500 psi at 300 mL/min) used with columns up to 75 mm I.D. for grams of material.

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Learn more at [www.waters.com/prep](http://www.waters.com/prep)
Purification System Components

Sample Managers/Collectors

Waters offers an array of easy-to-use advanced sample managers and collectors to accommodate automated purification systems.

- **2707 Autosampler:** The 2707 Autosampler is a versatile, compact sample management system that makes highly precise and reproducible injections. It is ideally suited for laboratories where reduced carryover, maximized repeatability, high accuracy, and application flexibility are of concern.
  - Compact design yet easily serviceable.
  - High-resolution syringe control for high-precision injections.
  - Interchangeable fixed-volume sample loops.
  - Variable-volume partial-loop injection capability.
  - Optional sample cooling for sample stability.
  - Pressure-assisted sample aspiration injection capability.
  - Use of plates or vials, alone or in combination, for varied sampling formats.

- **2767 Sample Manager:** The 2767 Sample Manager is a high-capacity sample processing system that easily and automatically manages sample aspiration and injection, collection, and fraction analysis on a single platform. Designed for use with Waters Purification systems, the 2767 Sample Manager has separate sampling and fraction dispensing probes ensuring sample integrity and purity.
  - Configured with analytical and preparative injectors, as standard, allows accurate isolation and purification without hardware changes.
  - High capacity platform allows for variable sample formats: microtiter plates (up to 15), test tubes (up to 480), scintillation vials or conventional autosampler vials (up to 2160).
  - Collection of sample fractions sequentially or with one-to-one mapping of sample and fraction.
  - Self-venting probes that perform accurate sample injections from tightly covered containers.

- **2767 Autosampler:** The 2767 Autosampler is a versatile, compact sample management system that makes highly precise and reproducible injections. It is ideally suited for laboratories where reduced carryover, maximized repeatability, high accuracy, and application flexibility are of concern.
  - Compact design yet easily serviceable.
  - High-resolution syringe control for high-precision injections.
  - Interchangeable fixed-volume sample loops.
  - Variable-volume partial-loop injection capability.
  - Optional sample cooling for sample stability.
  - Pressure-assisted sample aspiration injection capability.
  - Use of plates or vials, alone or in combination, for varied sampling formats.

- **High velocity wash pump (>30 mL/min flow) to rapidly and efficiently flush the sampling needle and tubing while maintaining high sample throughput.**

- **Optional fume hood for ventilation of hazardous vapors.**

- **Fraction Collector III (WFC III):** The WFC III is a reliable easy-to-use collector for highly precise sample collection. Use it alone or as part of a Waters Purification system for even greater sample collection capacity.
  - Flexible collection racks and vessel options accommodating a variety of fraction sizes whether you are transferring or collecting to microtiter plates or multiple containers.
  - Able to accommodate flow rates as high as 300 mL per minute.
  - Multiple collection modes — from simple time/threshold based to more advanced collection such as pooling of repeated runs — allow for maximum control and usability.

Learn more at [www.waters.com/prep](http://www.waters.com/prep)
Purification System Components

Detectors

Waters low-dispersion optical detectors enable you to analyze a wide variety of compounds. When paired with their accessories, such as flow cells or nebulizers, you can obtain more information per run, fulfilling multiple detection strategy requirements.

- **2489 UV/Visible Detector**: A high sensitivity universal detector for routine UV-based applications to low-level impurity identification and quantitative analysis.
  - Offering both single and dual wavelength capability.
  - Low noise performance (<5 μAU).
  - Flexible sampling rate (1 to 80 Hz) for both normal and fast separations.
  - Patented TaperSlit™ flow cell technology channels light through the cell for better energy throughput, resulting in minimal RI effects and enhanced sensitivity.
  - Independent optimization of high-speed data rates and filter time constants allows for the accurate integration of narrow, sharp peaks.

- **2998 Photodiode Array (PDA) Detector**: A highly sensitive detector designed for trace impurity identification and quantitative analysis, compound identification, and method development applications.
  - Low noise performance (<10 µAU).
  - Flexible sampling rates for normal and fast separations (1 to 80 Hz).
  - Patented TaperSlit flow cell technology ensures high sensitivity while maintaining optimal spectral performance.

- **2424 Evaporative Light Scattering (ELS) Detector**: A low dispersion detector, featuring a temperature controlled nebulizer, produces analysis results that you can have confidence in for compounds that lack UV/Vis chromophores including triglycerides, sugars, and natural products.
  - High sensitivity and low noise performance.
  - Full control and time programming of all control parameters including events, temperature, photomultiplier tube, and gas pressure.

- **SQ Detector 2 Mass Detector**: Using the SQ Detector 2 as part of a Waters Purification system for HPLC and SFC – provides users with the most accurate way to collect the purest fractions possible.
  - Engineered Simplicity™ – our design philosophy ensures every analyst can consistently generate the highest quality data with minimal training.
  - IntelliStart™ automates routine tasks, such as resolution and calibration checks, allowing you to focus on isolating and collecting the purist fractions possible.
  - Universal Ion Source Architecture offers the most extensive range of interface capabilities able to service the broadest range of applications.
  - Mass range of 3000 m/z.

- **ACQUITY QDa Detector**: The ACQUITY QDa Detector provides the specificity of mass directed purification affordably and with the simplicity of an optical detector.
  - Power on the ACQUITY QDa Detector and quickly begin purifying your samples. The self-optimizing detector does not require user calibration or adjustments, allowing you to focus on isolating your fraction and maximizing your throughput.
  - Seamlessly integrate the compact mass detector into your LC or SFC purification system with confidence.
  - Mass range of 1250 m/z.
Purification System Components

Software

Laboratory informatics solutions convert the scientific data generated in the lab into valuable information throughout your organization – compile, analyze, find, and share your purification data for faster and more effective decision-making.

- **Empower**: From acquisition to real-time monitoring and total results management, you’ll never be more than a few clicks away from the purification answers you are looking for.
  - Controls the Waters Fraction Collector III (WFC III), enabling the user to configure collection vessels and program collection routines. Real-time feedback from the fraction collector indicates the state of the collection process and the location of the collected fractions.

- Perform these different collection techniques:
  - Collection of everything with time slicing.
  - Time-based collection of specific segments of the run.
  - Collection of eluent between triggered fractions.
  - Detector-triggered collection based on:
    - Threshold
    - Slope
    - Slope and threshold

- **MassLynx with FractionLynx**: FractionLynx Application Manager manages and automates your sample purification process. FractionLynx controls fraction collection and tracks your samples, their fractions, and associated data, all accessible through the FractionLynx browser.
  - FractionLynx offers you flexible compound detection, fraction triggering and collection capabilities.
  - Fraction triggering options using time-based criteria or signal intensity threshold and slope.
  - Fraction collection options include sequential (continuous in one tube after another), one-for-one (collects fractions into a single location), and reserved tubes (allocates a specified number of tubes for a single sample analysis).
  - The dedicated FractionLynx browser presents sample and fraction information and data in one interactive location. You may review chromatograms, fraction spectra and fraction information. Further, the browser allows you to manually modify sample and fraction status if necessary.

- **FractionLynx’s AutoPurify™ features** automated sample analysis, purification, and fraction assessment. By automating the transition between these processes, AutoPurify provides you with an integrated solution to the overall purification and analysis process.

- **ChromScope**: Waters ChromScope Software, for use on Waters supercritical fluid chromatography (SFC) and extraction (SFE) systems, enables fully automated instrument control and facilitates the process of developing SFC methods and SFE extractions.
  - Its simple work-flow-based architecture and intuitive user-friendly interface makes routine chromatographic analysis, reporting, and fraction collection easy. Simple wizards guide users through a stepwise process of creating new sequences, including method screening, purification, and calibration curve building.

- When there is a large amount of sample to be purified, ChromScope includes a stacked injection wizard. Stacked injections allow the system to optimize the collection of the same samples over multiple injections. In all cases, fractions can be collected based on a number of criteria, and there is a graphical interface to aid in the determination of optimal settings.
Purification System Components

Optional Components

- **FlexInject**: The FlexInject is a manual dual-injector module that can be mounted on the side of any of the fluid delivery systems (2545 BGM, 1525EF Binary HPLC Pump, 2535 QGM, 2545 QGM, and 2555 QGM).

- **System Fluidic Organizer**: The System Fluidic Organizer (SFO) is an integrated valve and instrument communications module, which also houses the leak detection system. The Ethernet-controlled valves provide:
  - Switching mechanisms for up to two preparative and three analytical columns.
  - Flow path changes for sample flow coming from either the analytical or preparative columns to the UV and MS detectors.
  - The on-board pump control module can integrate with up to three additional 515 pumps providing unique capabilities such as At-Column Dilution, solvent modifier addition, and a MS makeup flow for mass-directed purification. The ethernet hub provides the communications hub for the various detectors and solvent delivery systems.

- **Preparative Chromatography Rack**: The Preparative Chromatography Rack (PCR) is a free-standing dual manual injector module with embedded leak detection and multiple column holders. It consists of one analytical and one preparative injector and supports flow rates up to 300 mL/min. The PCR is typically configured with the higher flow prep pumps for high flow applications, and the integrated manual collection valve can be used to manually direct fractions for high flow applications, when an automated collection device is not available.

- **CO₂ Recycler**: The CO₂ Recycler is a lab-based automated recycling system designed to draw liquid CO₂ from bulk tanks or dewars to compress and deliver the CO₂ to a usable pressure for SFC systems. It can provide up to a 5X increase in the amount of work to be performed from a single tank of gas. Recycling CO₂ is a viable option for labs restricted by the size of tanks that they can use.

- **CO₂ Bulk Delivery System (BDS)**: The BDS is a completely automated system designed to draw liquid CO₂ from bulk tanks or dewars to compress and deliver the CO₂ to multiple systems with total demand of 500 g/min.
Purification System Components

Chemistry

- **OBD Preparative Columns for SFC Purification**
  - **Viridis® SFC Columns**: Manufactured with our patented OBD Preparative technology, Viridis SFC Columns bring a new level of reproducibility to the world of laboratory scale purification.
  - **Viridis Hybrid SFC Columns**: Based on patented Ethylene-Bridged Hybrid (BEH) particle technology and Charged Surface Hybrid (CSH™) technology, Viridis Hybrid particles are designed to better control the silanols on the particle surface. Under SFC conditions, scientists can achieve excellent peak shapes without the use of mobile phase additives and elute longer retaining basic compounds and wide range selectivity.
    - Viridis BEH 2-EP (2-Ethylpyridine) Columns
    - Viridis BEH Columns
    - Viridis CSH Fluoro-Phenyl Columns
    - Viridis Silica 2-EP Columns
    - Viridis Silica Columns

- **OBD Preparative Columns for HPLC Purification**
  - **OBD Prep Columns**: Since 2003, chemists have come to rely on the high purity and recovery obtained with Waters OBD Prep Columns. Extended column lifetimes and high mass loading capacity have led to increased productivity. Scientists continue to select OBD columns for speed, robustness, predictable performance, and ease-of-scaling from analytical to prep.
    - SunFire™ OBD Preparative Columns
    - XBridge® OBD Preparative Columns
    - XSelect® CSH OBD Preparative Columns
    - Peptide Separation Technology (PST) OBD Preparative Columns
    - Atlantis® T3 OBD Preparative Columns
    - XBridge Amide/Atlantis HILIC/XBridge HILIC OBD Preparative Columns