



What is supercritical fluid chromatography?

A chromatographic technique in which the mobile phase is neither a gas nor a liquid, but has properties of both: formally a supercritical fluid.

At pressures and temperatures above its critical point, a gas becomes a supercritical fluid and it possesses densities and other properties that are intermediate between those of gases and liquids.

ENVANTAGE, INC.

13811 Broadway Ave
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SELERITY FULLY INTEGRATED SERIES 4000 SUPERCRITICAL FLUID CHROMATOGRAPH

Rugged, Reliable,
Reproducible, and
Easy to Use



- Fully integrated software that controls pump, oven, autosampler, and data acquisition package
- Temperature-controlled pressure transducer for better reproducibility
- 10 mL syringe pump for pulse-free pressure-controlled flow and minimal CO₂ usage
- Innovative column technology to suit all of your application requirements
- Large capacity oven suitable for any column configuration
- A secondary independent column heater to improve peak shape and decrease analysis times
- Low dead volume injections and column switching with Secure-Fit™ column connectors
- Simplified split/splitless injection for capillary columns



Applications

Petroleum

- ASTM D5186 Testing Method (aromatics and polyaromatics in diesel and jet fuels)
- ASTM D6550 Testing Method (olefins in gasoline)
- Heavy petroleum compounds and residues

Petrochemicals

- Thermally unstable compounds, e.g., isocyanates
- α -acids

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WHEN SHOULD YOU USE SUPERCRITICAL FLUID CHROMATOGRAPHY?

SFC offers distinct advantages over gas chromatography (GC) and liquid chromatography (HPLC) when:

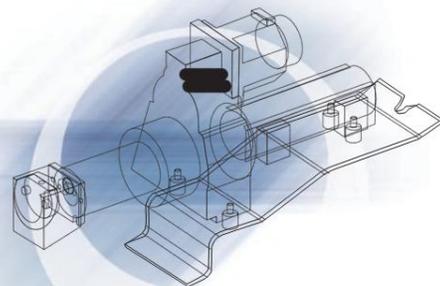
- Compounds are not volatile enough for GC without derivatization
- Compounds do not have chromophores suitable for UV detection under HPLC conditions
- Compounds are unstable at typical GC temperatures
- Universal detectors such as the flame ionization detector (FID) are desired that are not available for HPLC

HOW CAN YOU APPLY SUPERCRITICAL FLUID CHROMATOGRAPHY IN YOUR LABORATORY?

SFC finds applications essentially wherever chromatographic techniques are used. You can now complete your laboratory with the Series 4000. Just a few of the applications possible with SFC are listed in the sidebars of this document



THE SERIES 4000 SYRINGE PUMP PROVIDES ESSENTIALLY PULSE-FREE, PRESSURE-CONTROLLED FLOW



Applications

Pharmaceuticals

- Thermally unstable compounds
- Polymers such as PEG's and polyalcohols

Foods

- Fatty acids
- Natural products
- Surfactants (non-ionic)

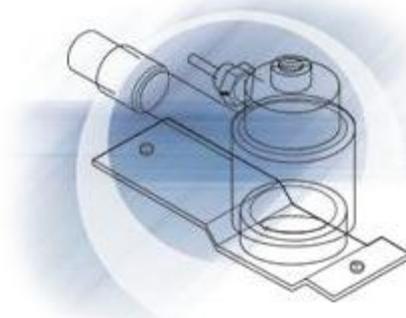
- The temperature-controlled pressure transducer is an exclusive design to Selerity Technologies. This design feature assures that the retention times are reproducible run after run, independent of changes in the laboratory temperature environment.
- Electronic cooling of the pump head assures maximum fills and accurate deliveries. Cooling the carbon dioxide also provides better pump control by decreasing compressibility of the fluid at temperatures near 0 °C.
- Small 10-mL syringe means less torque stress for longer pump life.
- Automatic refill after every run guarantees you will have a full syringe for every analysis.
- Simple pump design with few moving parts means less downtime.
- The seals used in the Series 4000 SFC have demonstrated long lifetime resulting in low maintenance.
- Automatic shutdown when sensing low carbon dioxide pressure.
- The series 4000 will automatically stop when the limit switch is reached and triggers the pump to the default fill position. Consequently, pump burnout is eliminated.
- Delivers volumes sufficient for packed (1 mm ID) and capillary column analyses.

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LARGE CAPACITY OVEN SUITABLE FOR ANY COLUMN CONFIGURATION



Applications

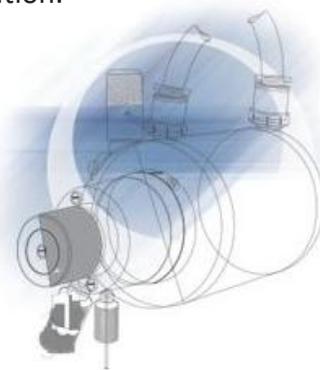
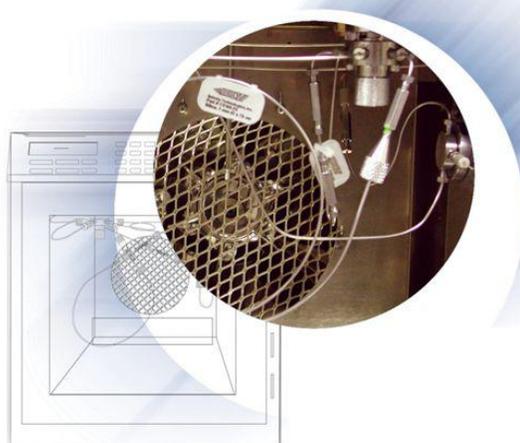
Polymers

- Light polymers (<5,000 to at most 10,000 amu)
- Polymer additives (especially where GC or HPLC require derivatization)

Electronic Industry

- Polyfluorocarbons

- Stable oven provides accurate heating zones for both packed and capillary column operation.
- Large capacity for any anticipated column type used with SFC.
- Flame ionization detector is standard on the Series 4000. This general purpose, universal detector is stable to flow from capillary through 1-mm packed columns.
- Helium actuated valves for the fastest possible switching, giving you crisp, low dead volume injections and better confidence in your data.
- Because of its lower molecular weight and viscosity, helium provides actuation speeds approximately four times faster than possible using nitrogen or electronic driven actuation.



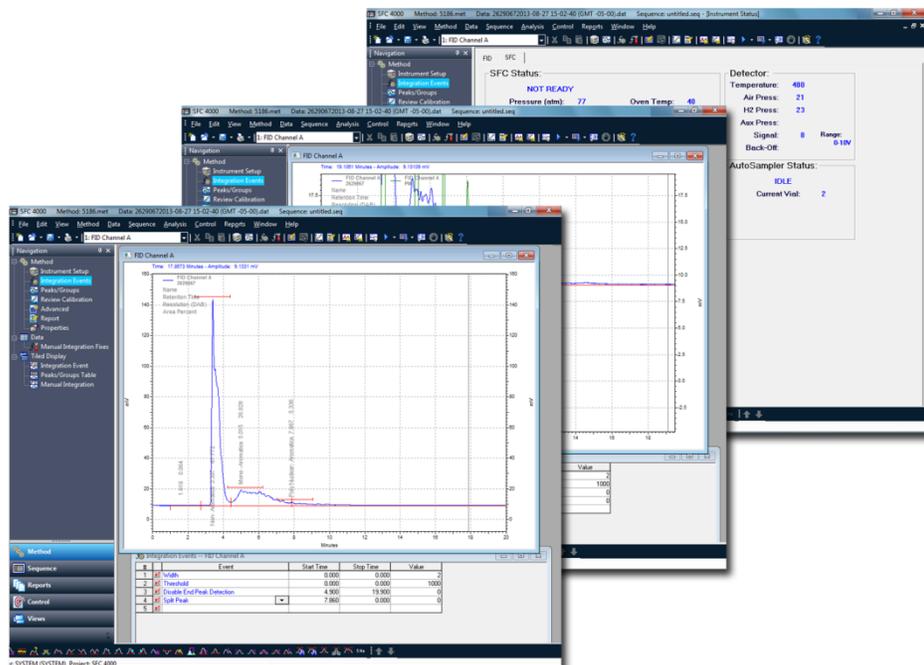
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AN EASY-TO-USE SOFTWARE PACKAGE THAT TAKES CONTROL OF YOUR ANALYSIS

- Series 4000 system offers an operating software package which provides a smooth, seamless operation between pump, oven, autosampler and data collection
- All method parameters are conveniently built into the analysis method from the computer keyboard
- A sequence containing a series of different analysis methods can be set up and run by simply building and starting the sequence run. All method parameters will change according to the method commands



Screen captures taken on Windows 7 Professional 64-bit OS running Agilent OpenLAB EZChrom CDS

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INDEPENDENT COLUMN HEATER, ESPECIALLY USEFUL WHEN TWO DIFFERENT COLUMN TEMPERATURES ARE DESIRED

- Optional secondary column heater with independent temperature control
- Custom design for column switching techniques used for petroleum analysis
- The secondary column heater conveniently mounts to the wall of the oven cavity



ASTM D6550 testing method is improved

- The oven cavity is maintained at a lower temperature to optimize the separation of saturates and aromatics, while the silver-loaded silica column can be maintained at up to 200°C to optimize the interactions between the olefinic compounds and the silver ions
- Olefin peak shape is greatly improved and the sensitivity is increased
- Tailing on the olefin peak ascribed to overly strong olefin interaction with the silver ions is significantly reduced when the silver loaded column is heated

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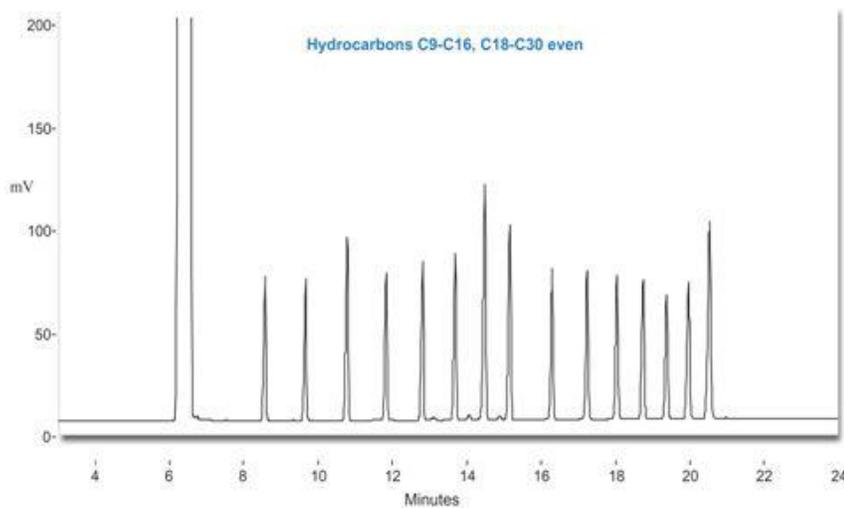
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SPLIT/SPLITLESS INJECTION TECHNIQUE FOR CAPILLARY COLUMN ANALYSIS SUPERCRITICAL FLUID CHROMATOGRAPHY IS NOW SIMPLE AND REPEATABLE

- Directly injects the sample onto the column while eliminating the effects of dead volume
- Higher loadability of analytes on capillary columns for greater sensitivity and better precision
- Decreases solvent effects of early eluting peak and improves the peak shape of all analytes in your sample
- Separates volatile analytes from the solvent.
- Increased sensitivity allows resolution of compounds with a much higher molecular weight than heretofore possible



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SELERITY TECHNOLOGIES SECRET TO GREAT CHROMATOGRAPHY IS ITS UNIQUE COLUMN TECHNOLOGY

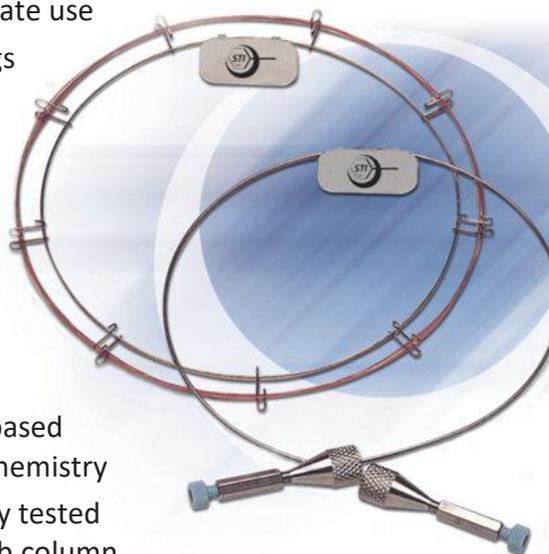
SFC Packed Columns

- Silica
- Silver-loaded silica
- Polyvinyl alcohol (PVA)
- C18
- Diol
- Fluorocarbon

SFC Superbond (SB) Capillary Columns

- SB-Methyl-100
- SB-Phenyl-5
- SB-Biphenyl-30
- SB-Cyano-25
- SB-Cyano-50
- SB-Phenyl-50
- SB-Octyl-50

- In-house column technology allows Selerity Technologies to achieve specialized and optimal SFC applications
- Manufacture high performance 1 mm packed columns for SFC that are conditioned and cleaned with supercritical carbon dioxide for immediate use
- All packed column housings are specially treated for efficient packing and allow the use of Secure-Fit™ column connectors
- Manufacture high performance 50mm capillary columns for SFC
- All capillary columns are based on polysiloxane bonding chemistry
- All columns are individually tested by SFC to guarantee superb column performance and are ready to use upon installation

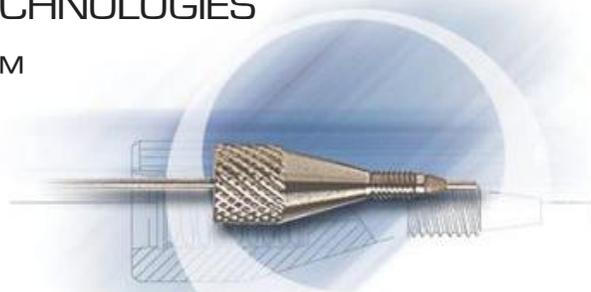


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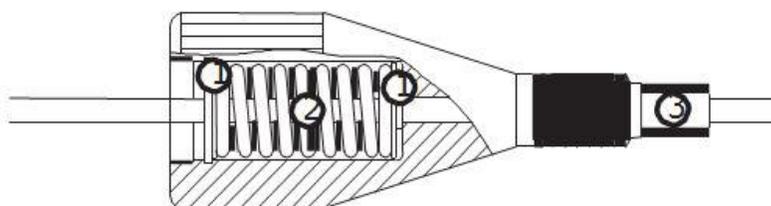
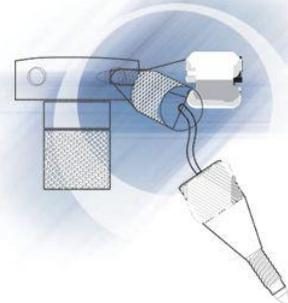
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ELIMINATE THE DEAD VOLUME CURSE WITH THE SELERITY TECHNOLOGIES PATENTED SECURE-FIT™ COLUMN CONNECTOR



- Significantly improve chromatographic performance. Zero dead-volume connections obtained by applying finger-tight tension
- Self-adjusting within any depth and any type of acceptor fitting. The spring tension automatically positions the end of the tubing against the inside fitting face
- Finger-tight tension, no wrenches needed
- Holds to pressures up to 10,000 psi
- U.S. Patent 6,193,286



1. Silver soldered stainless steel washers
2. Stainless steel spring
3. Polymeric Ferrule

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