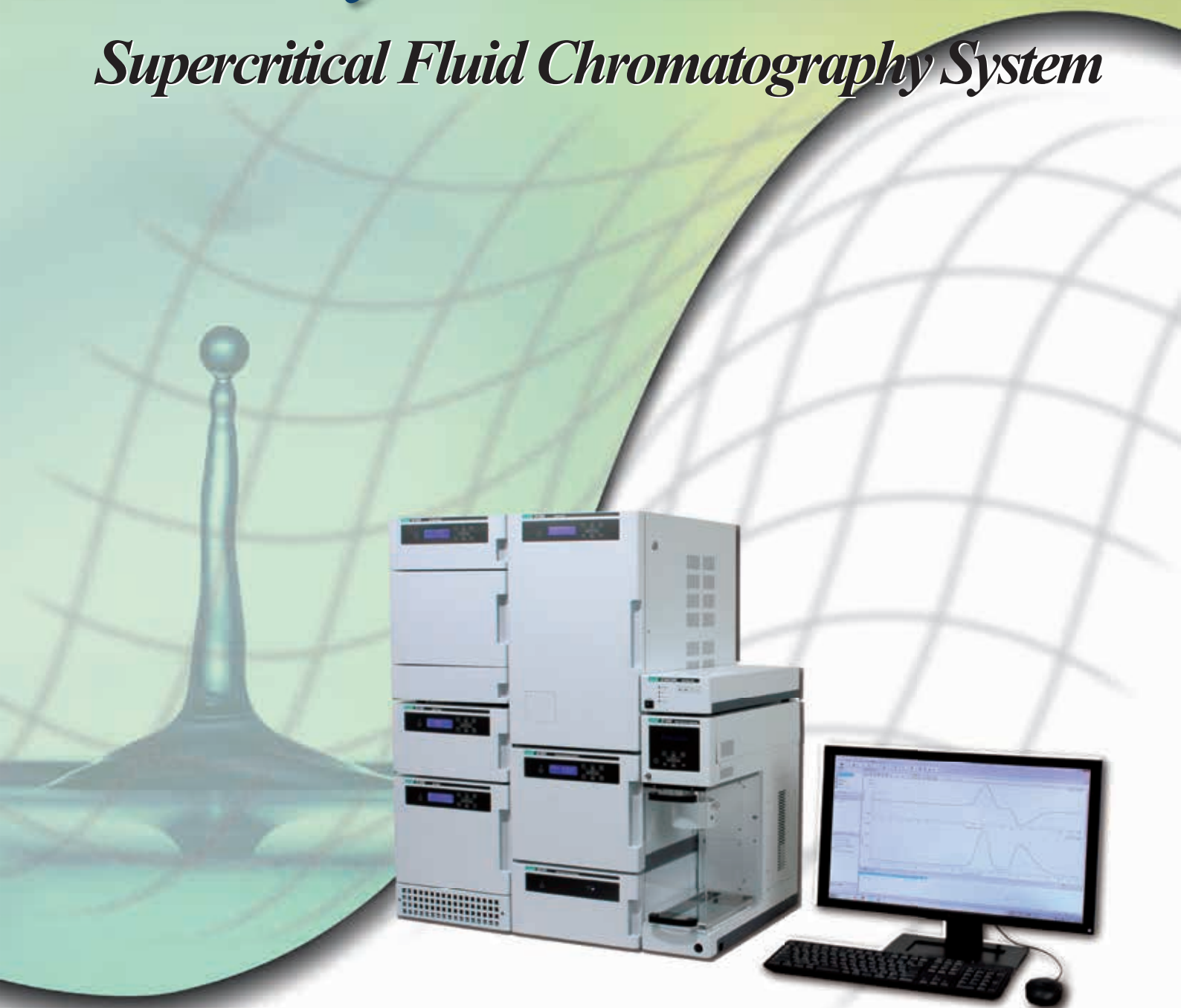


LC-4000 series

SFC system

Supercritical Fluid Chromatography System



Isco

Innovative chiral separation technology used in Supercritical Fluid

The effect of the chiral compounds is the key factor in the pharmaceutical industry, and in order to evaluate the enantiomer, the chiral separation is taken up as a main theme. As a solution, Supercritical Fluid Chromatography (SFC) is drawing attention from many researchers. Since the separation capacity of SFC is higher than the one of HPLC, the SFC is powerful tool for separating the chiral compounds which is hard to separate by using HPLC.

For Analytical System



System configuration example of Analytical SFC System

The physical characteristics exhibited by supercritical fluid include a diffusion coefficient of dissolved molecules that is a hundred times greater than it is in liquid and a viscosity that is at least one digit smaller. A SFC system, which employs such a medium as a mobile phase, can be expected to serve as a separation analysis method that can rapidly perform separation without any degradation in separation efficiency, even at fast flow rates, due to a rapid mass transfer inside the column when compared with high-speed liquid chromatography that uses liquid as the mobile phase.

<Analytical SFC>

Specification:

Flow rate: 0.5 - 7 mL/min
Column size: I.D. 2 - 4.6 mm
Injection volume: - 100 μ L

Wide range of detectors

JASCO offers a wide range of detectors with high pressure cells UV, Diode Array (realtime collection of 3D spectra and chromatogram) and the only CD detector available for SFC. Especially, JASCO original CD detector measures optical isomers with circular dichromatic absorption, and can measure both CD and UV chromatograms as well as g-factor (CD/UV) chromatograms. Since g-factor in particular has a proportional relationship with the compositional ratio of optical isomer sample, the CD detector can perform compositional measurements and high purity fractionation for non-separated peaks.

Method development by using SFC screening

Before separating and collecting the target chiral compound, finding the optimum separation condition is required (column, solvent, etc.). In order to create the measurement conditions and measure the samples automatically, JASCO can offer the SFC screening for method development, which has the benefits of labor-saving and operation improvement.

For Preparative System



System configuration example of Semi-Prep SFC System

The Semi-Prep SFC and the Prep SFC system are applied to separation and purification with high recovery. When carbon dioxide is used as the medium, gasification will occur simply by keeping the separated and fractionated sample at an atmospheric pressure, making this one of the techniques capable of highly efficient refining with few post-processing hassles, such as elimination solvents after preparative isolation. This offers a host of advantages, including cost cuts related to the expense of purchasing solvents and discarding organic solvents among other things.

<Semi-Prep SFC>

Specification:

Flow rate: 1 - 15 mL/min
Column size: I.D. 4.6 - 10 mm
No. of fractions: 6 or 56
Injection vol.: - 1 mL
Preparation vol.: some mg

<Prep SFC>

Specification:

Flow rate: - 120 mL/min
Column size: I.D. 10 - 30 mm
No. of fractions: 8
Injection vol.: - 20 mL
Preparation vol.: some g

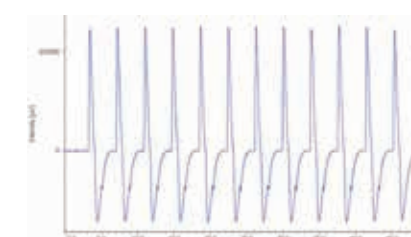
Improvement of sample throughput by stack injection

By shortening the sample injection interval to let chromatograms overlap, the separation in prep mode can be done efficiently. It means that the separation and purification of even a large amount of sample can be carried out with high recovery and high purity in short time.

Unique sample collection mechanism

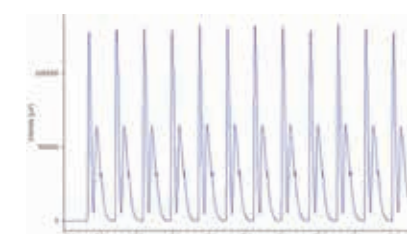
In the SFC using CO₂ as mobile phase, it is one of main problems when collecting eluted sample that the separated sample is flown apart due to volume expansion (approx. 500 times) of released CO₂. In order to improve the collection rate, JASCO has developed a Micro Cyclone Separator (MCS) for Semi-Prep SFC system, and a dedicated fraction collector for Prep SFC system.

<Separation of Flavanone by stack injection>



<CD>

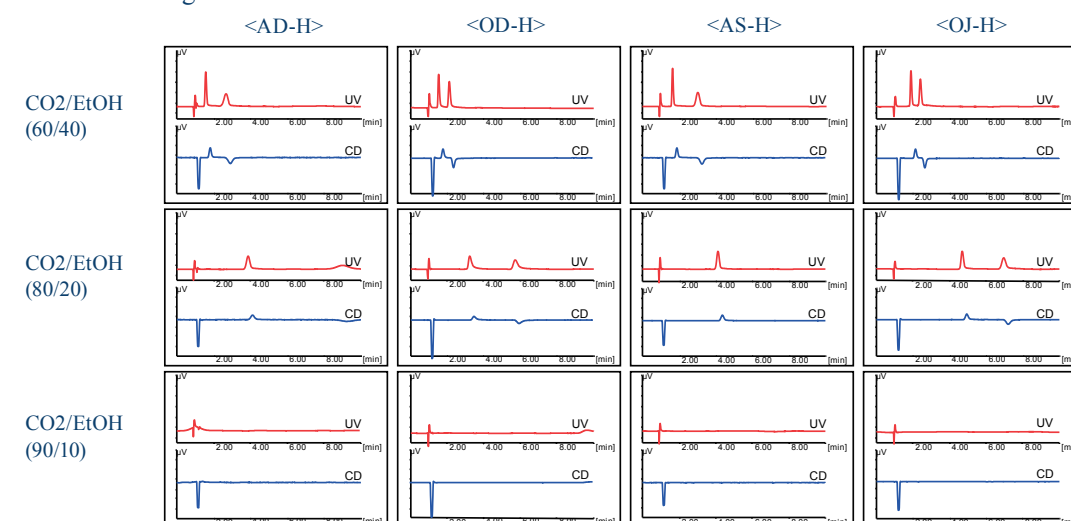
<UV>



Column: CHIRALPAK AD-H
(20 mm I.D. x 250 mm L)
CO₂ flow rate: 34 mL/min
Modifier: CH₃OH 6 mL/min

Column Temp.: 40 degree C
Pressure: 20 MPa
Detection WL: 310 nm
Sample: Flavanone 30.2 mg/mL, 1000 μ L

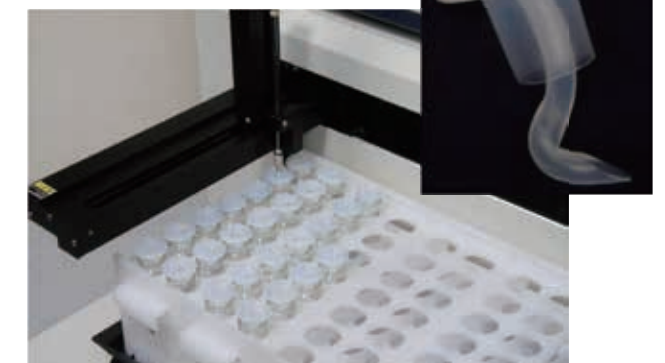
<SFC Screening for Warfarin>



Column: CHIRALPAK AD-H/AS-H, CHIRALCEL OD-H/OJ-H
(4.6 mm I.D. x 150 mm L)
Mobile phase: CO₂/EtOH
Flow rate: 2.0 mL/min

Column Temp.: 40 degree C
Pressure: 20 MPa
Detection WL: UV 230 nm, CD 230 nm
Sample: 0.02 %, 5 μ L

<Micro Cyclone Separator (MCS)>



Module for SFC

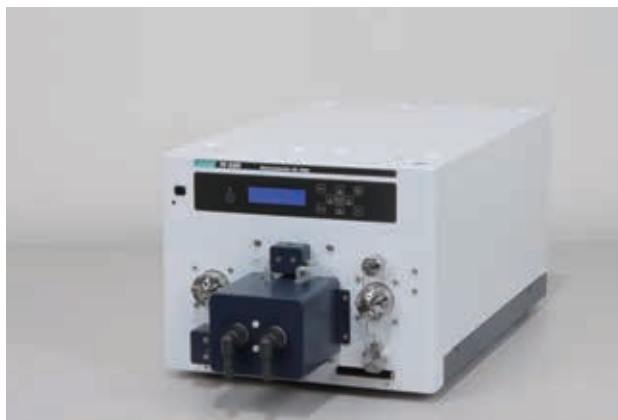
JASCO's modular SFC platforms have been optimized and refined over the last 20 years to provide reliable, worry-free performance for a wide variety of applications.

CO₂ Delivery Pump

JASCO offers the PU-4380 for analytical scale applications, the PU-4386 for applications ranging from analytical to semi-prep SFC, and the PU-4388 for high-volume prep SFC.

Specification:

Flow rate:	0.5 to 7 mL/min (PU-4380) 1 to 15 mL/min (PU-4386) 10 to 40 mL/min (PU-4387) 10 to 120 mL/min (PU-4388)
Max pressure:	50 MPa
Cooling method:	Peltier (PU-4380) Cooling jacket + Coolant circular bath (PU-4386, PU-4387 and PU-4388)



Back-Pressure Regulator

The patented JASCO back-pressure regulator employs a high-speed switching valve to ensure that a constant back pressure is maintained at all times, regardless of the gas flow rate. Most other systems use a restriction device which is flow dependent and hence is unable to provide the essential constant pressure conditions. It also presents a significant reduction in any precipitation buildup in the flow line

Specification:

Operating pressure range:	1.0 to 50.0 MPa
Flow rate:	- 120.0 mL/min
Pressure adjustment precision:	±2 % or ±0.2 MPa



* The contents of this brochure are for reference and illustrative purposes only. Information, descriptions, and specifications in this publication are subject to change without notice. JASCO assumes no responsibility and will not be liable for any errors or omissions contained herein or for incidental, consequential damages or losses in connection with the furnishing, performance or use of this material.



JASCO INTERNATIONAL CO., LTD.

11-10, Myojin-cho 1-chome, Hachioji, Tokyo 192-0046, Japan
Tel: +81-42-649-3247 Fax: +81-42-649-3518 <http://www.jasoint.co.jp/english/>
Australia, China, Hong Kong, India, Indonesia, Korea, Malaysia, New Zealand,
Pakistan, Philippines, Russia, Singapore, Taiwan, Thailand

JASCO INCORPORATED

28600 Mary's Court, Easton, MD 21601, U.S.A.
Tel: +1-800-333-5272 +1-410-822-1220 Fax: +1-410-822-7526 <http://www.jascoinc.com>
U.S.A., Canada, Costa Rica, Mexico, Puerto Rico, Argentina, Brazil, Chile, Colombia, Paraguay,
Peru, Uruguay, Guatemala, Ecuador, Bolivia

JASCO EUROPE s.r.l.

Via Luigi Cadorna 1, 23894 Cremella (Lc), Italy
Tel: +39-039-9215811 Fax: +39-039-9215835 <http://www.jasco-europe.com>
JASCO Deutschland www.jasco.de, JASCO UK www.jasco.co.uk,
JASCO France www.jascofrance.fr, JASCO Benelux www.jasco.nl,
JASCO Spain www.jasco-spain.com
Italy, Germany, U.K., France, Netherlands, Belgium, Luxembourg, Spain, Sweden, Norway, Denmark,
Austria, Finland, Greece, Hungary, Poland, Portugal, Romania, Switzerland, Algeria, Cyprus,
Egypt, Israel, Jordan, Kuwait, Lebanon, Morocco, Saudi Arabia, South Africa, Tunisia,
Turkey, U.A.E., Yemen

BSF-1506 Printed in Japan

For more information, please contact :



Products described herein are
designed and manufactured by
ISO-certified JASCO Corporation.

MADE IN TOKYO, JAPAN