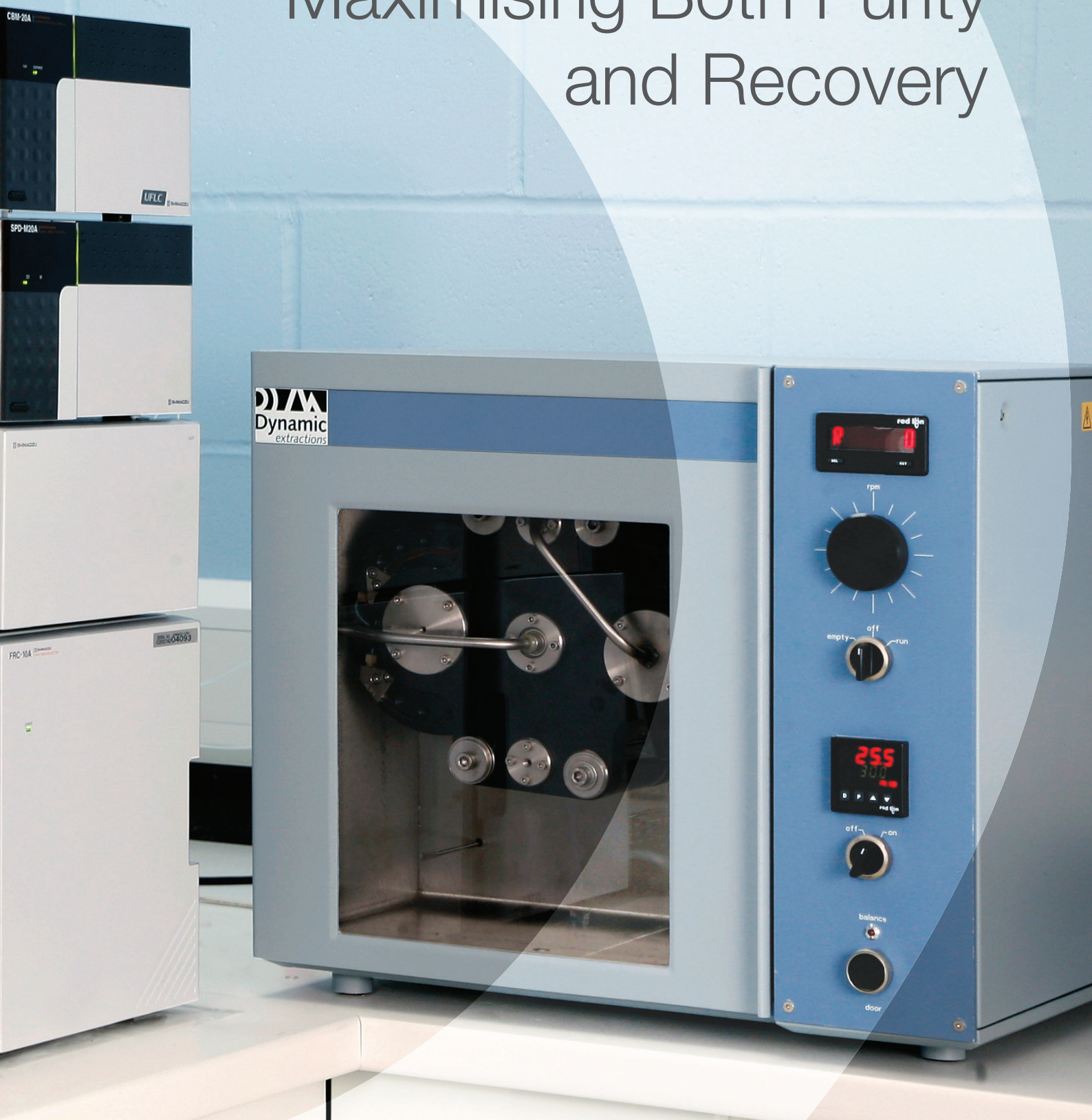
Dynamic extractions

High Performance Countercurrent Chromatography Instruments

Maximising Both Purity and Recovery



Orthogonal Preparative Liquid Chromotography

HPCCC instruments allow you to add an orthogonal and complementary liquid chromatographic technique to your laboratory without major changes to your current workflows. In contrast to solid phase techniques, such as reverse or normal phase liquid chromatography or SFC, the HPCCC stationary phase is a liquid rather than a solid. High resolution separations are possible due only to differences in the liquid-liquid partitioning behavior of sample solutes. Separations are dependent on improving selectivity, a powerful alternative to increasing efficiency when tackling difficult chromatographic separation problems.

Why is it required?

Today's samples for purification at a preparative scale, whether milligrams, grams or kilograms are challenging the existing techniques of HPLC and SFC. Typical problems are:

- Lack of resolution
- Throughput constraints due to poor sample solubility
- Low recovery: sometimes 70% or less
- Post-purification work-up causes compound degradation and loss

Liquid-liquid chromatography because of its nature offers solutions to any and all of these problems.

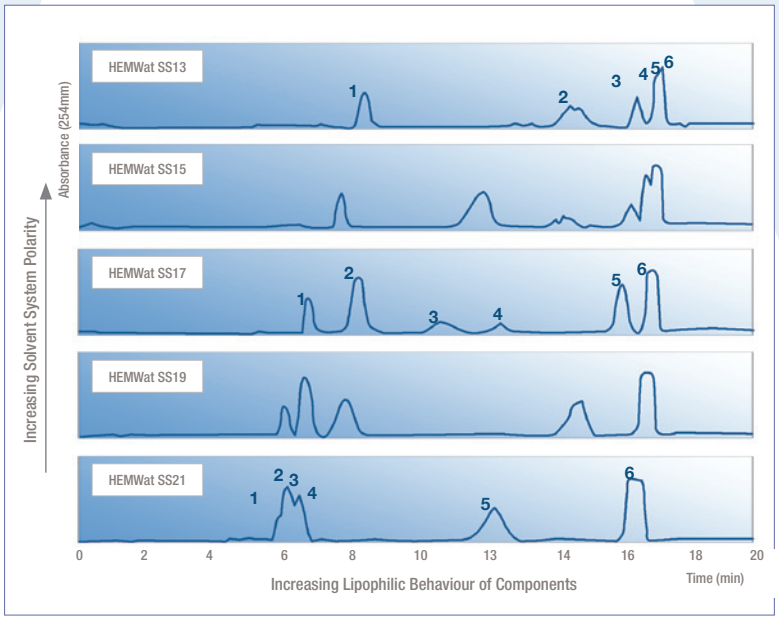
Benefits of Technology

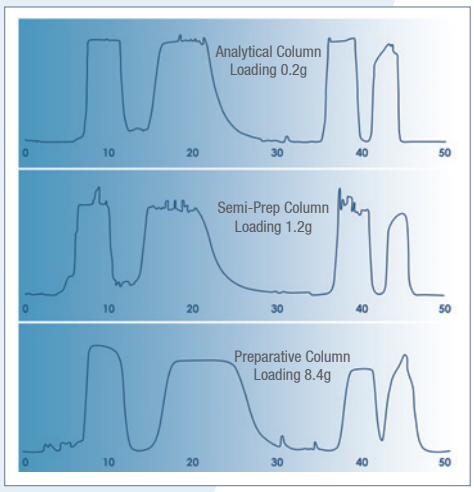
- Significantly higher mass throughput
- Simple and reliable scale-up
- Total sample recovery
- Greener chromatography
- Reduced solvent usage
- Quick post-purification work up

Selectivity and Rapid Purification Method Development

The method development shown highlights the resolution that selectivity control can offer. In the example shown, a test mixture comprising of Dipyridamole, 4-Bromobenzamide, Methyl 4-amino-3-methylbenzoate, Warfarin, Methyl 2-acetamido-5-bromobenzoate and Biphenyl (in elution order) was examined by screening five sets of different column conditions which demonstrated that HEMWat SS17 was able to produce excellent resolution of all 6 components.

Automated, "on-demand" solvent mixing allows rapid screening of a range of purification conditions. HPCCC instruments can be easily connected to almost any low or high pressure quaternary pump, enabling rapid, "on demand" solvent system screening, i.e. method development: in the example all 5 chromatograms were produced in a total of less than 2 hours. Such time scales enable HPCCC to replace HPLC or SFC in current workflows.





Simple and Reliable Scale-up

Using HPCCC instruments you can achieve true linear scale up and produce 'identical', i.e. superimposable, chromatograms at all scales. The example shows the linear scale-up of the method developed in the screening runs above using four of the six original components, Methyl 2-acetamido-5-bromobenzoate, Warfarin, 4-Bromobenzamide and Dipyridamole. The separation is shown at analytical, semi preparative and preparative scales.

Total Sample Recovery

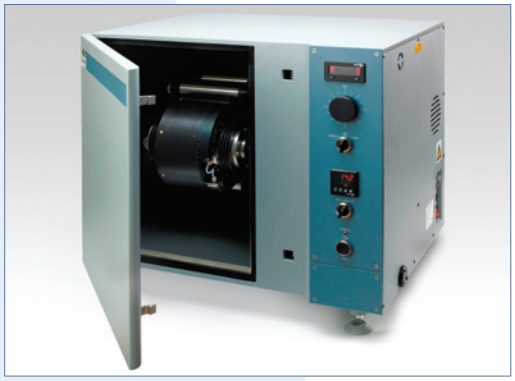
Because there is no solid phase used in liquid-liquid chromatography there is no possibility of irreversible binding of the solutes in the sample taking place. This means that all injected sample is eluted from the column so typical recoveries in excess of 85% to 90% are achieved.

Greener Chromatography

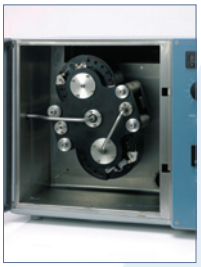
Since HPCCC instruments operate with such high percentages of stationary phase, solvent consumption is low compared to high efficiency preparative techniques such as RP-HPLC. Typical solvent usage will be 1/5th to 1/10th for a given sample mass.

A Full Range of Semi-Prep to Preparative HPCCC Instruments

The HPCCC range of liquid chromatography instruments offered by Dynamic Extractions is suitable for applications from analytical scale to large scale preparative chromatography. It is this range of application scale that allows chemists and chromatographers involved in liquid chromatography to develop separations at the milligram scale and then easily scale to whatever amount meets their purified compound needs.



The Spectrum and Midi HPCCC instruments come fitted with two columns in their standard configuration. This allows users to quickly screen samples and develop methods with milligrams of compound before scaling up to inject grams of material.



		MINI	SPECTRUM	MIDI
Column Volume	Analytical	20ml	22ml	22ml
	Preparative	-	136ml	940ml
Injected Sample Loading	Analytical	1 - 300mg	1 - 300mg	1 - 300mg
	Preparative	-	1 - 3g	7 - 25g
Mobile Phase Flow Rate	Analytical	1 - 2 ml/min	1 - 2 ml/min	1 - 2 ml/min
	Preparative	-	6 - 12ml/min	40 - 80ml/min
Column Material	Analytical	FEP	FEP	SS
	Preparative	-	PFA	PFA
Height		46cm/18”	47cm/19”	60cm/24”
Width		41cm/16”	54cm/21”	65cm/26”
Depth		41cm/16”	48cm/19”	55cm/22”
Weight		42kg	70kg	140kg
Electricity Supply		230V/120V/50-60Hz	230V/120V/50-60Hz	230V/120V/50-60Hz

Preparative Scale Purification Systems

A HPCCC instrument can simply be considered an alternative to the solid phase column used in an existing liquid chromatography system. Dynamic Extractions is able to offer a range of solutions to meet your preparative scale chromatographic needs. There are two generic system types that Dynamic Extractions can offer and these relate to the solvent pumping options offered. The first option is based on the use of one or two isocratic pumps for use with pre-mixed stationary and mobile phases. The second option is based on a quaternary pump which allows on-demand, automated mixing of both stationary and mobile phases. Dynamic Extractions is also able to fit its HPCCC instruments into existing liquid chromatographic systems with these pump configurations.

HPCCC systems are configurable with one or more typical liquid chromatography detectors including UV, ELSD and MS enabling detection and potential identification of the widest possible range of compounds. Options regarding autosampling and fraction collection are also offered. With these options, Dynamic Extractions can provide systems to suit a wide range of applications and fit all budgetary scales.

Applications

Dynamic Extractions offers solutions to the challenges facing preparative chromatography by providing liquid-liquid instruments of high sample mass capacity, tuneable selectivity, and ease of scale-up. The HPCCC instrument range covers milligram to kilo-scale and therefore can be used in all process industries. The technology has been applied successfully in the following industries: Pharmaceutical (Drug discovery and development, Contract Research, Traditional Chinese Medicines, BioPharma), Environmental (sample analysis), Agriculture (soil analysis, trace metals, agricultural fertiliser) Forensics and Drug testing (Toxicology), Specialty Chemicals (AgriChemical, Flavours and Fragrances and Petrochemicals Analysis).

Demonstrating the HPCCC advantage

Dynamic Extractions has fully functional applications laboratories at both our UK headquarters in Slough, Berkshire and our USA headquarters in Monmouth Junction, NJ. At both of these facilities we are pleased to receive customer samples to perform feasibility studies, instrument demonstrations and outsourced contract separations.

Typical separation work performed:

- Purifications of milligram, gram and kilogram quantities of reference compounds, intermediates, drug candidates, analytical standards, metabolites, API's
- HPCCC method development using normal and reverse phase, elution-extrusion and pH zone refining conditions
- Isolation of minor components of interest from complex mixtures

Interested customers should contact a member of the team using the contact details below or submit a sample form on-line at www.dynamicextractions.com

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Instruments are sold internationally from our UK and USA facilities or through our network of local distributors. For a full list of our distributors visit www.dynamicextractions.com/contact-us

Distributor Information