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Thermo Scientific Vanquish UHPLC Systems for Online 2D-LC

The world leader in serving science

Agenda

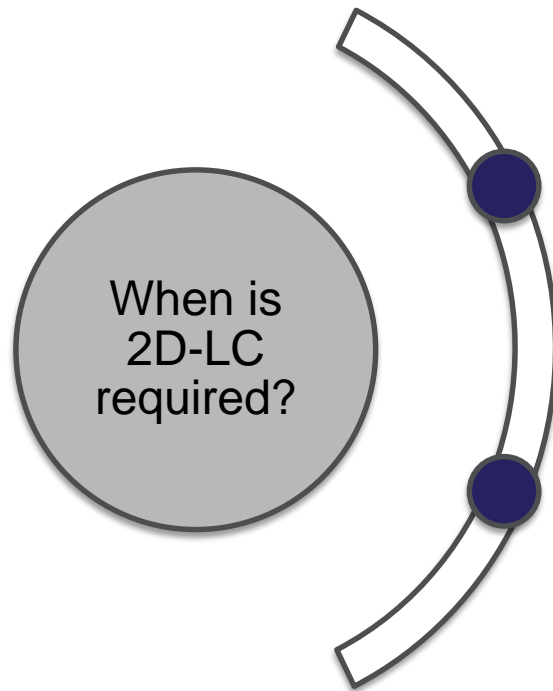
- What is 2D-LC?
- Who uses 2D-LC?
- The Solution

What is 2D-LC?

Two-Dimensional Liquid Chromatography (2D-LC)

Definition of 2D-LC

One compound or one fraction is analyzed by two different separation modes (two columns)



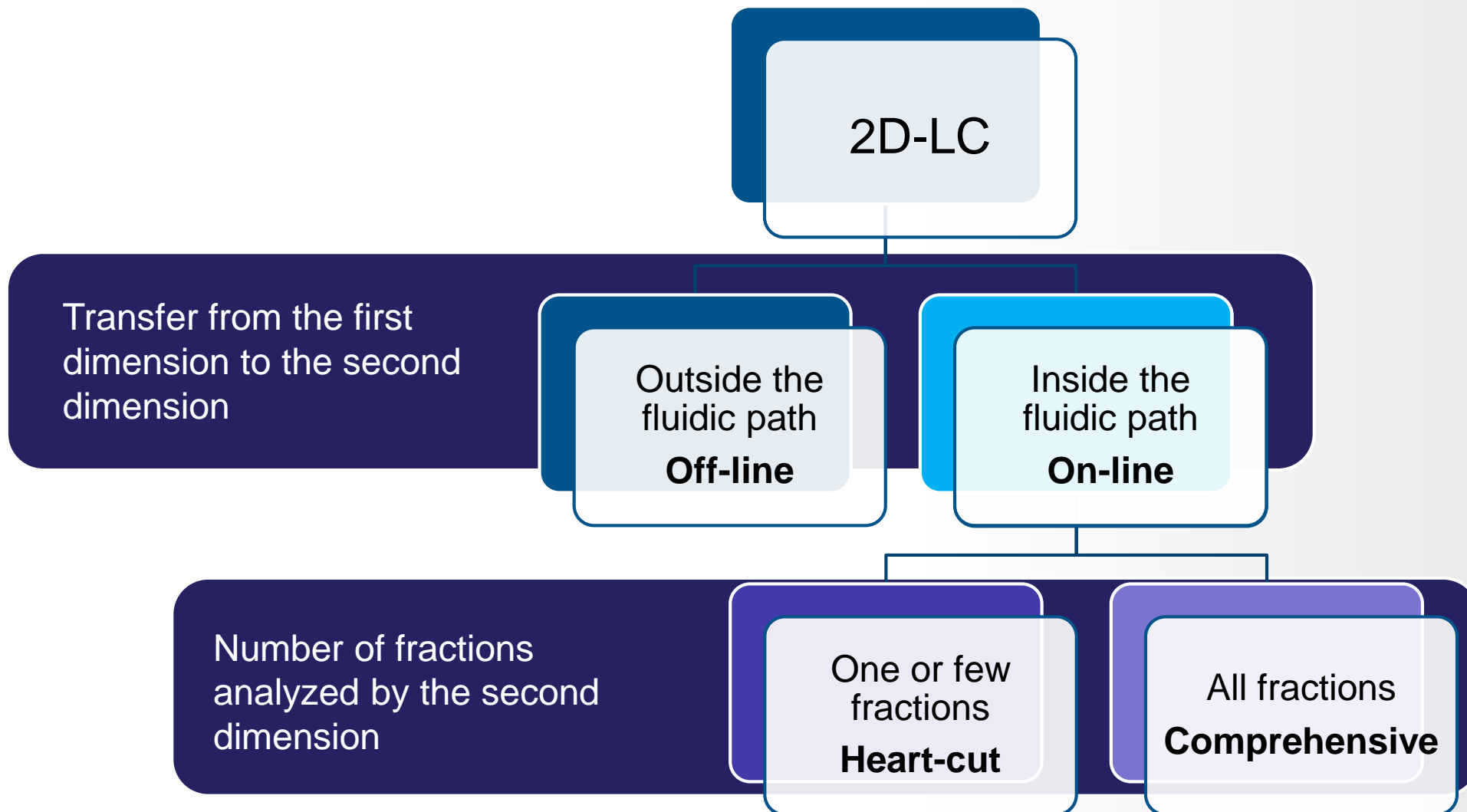
Sample is too complex

Mixtures of thousands of metabolites and thus outstrip the ability of 1D-LC to entirely separate the mixture into distinct components (i.e., singlet peaks)

Compounds are difficult to resolve

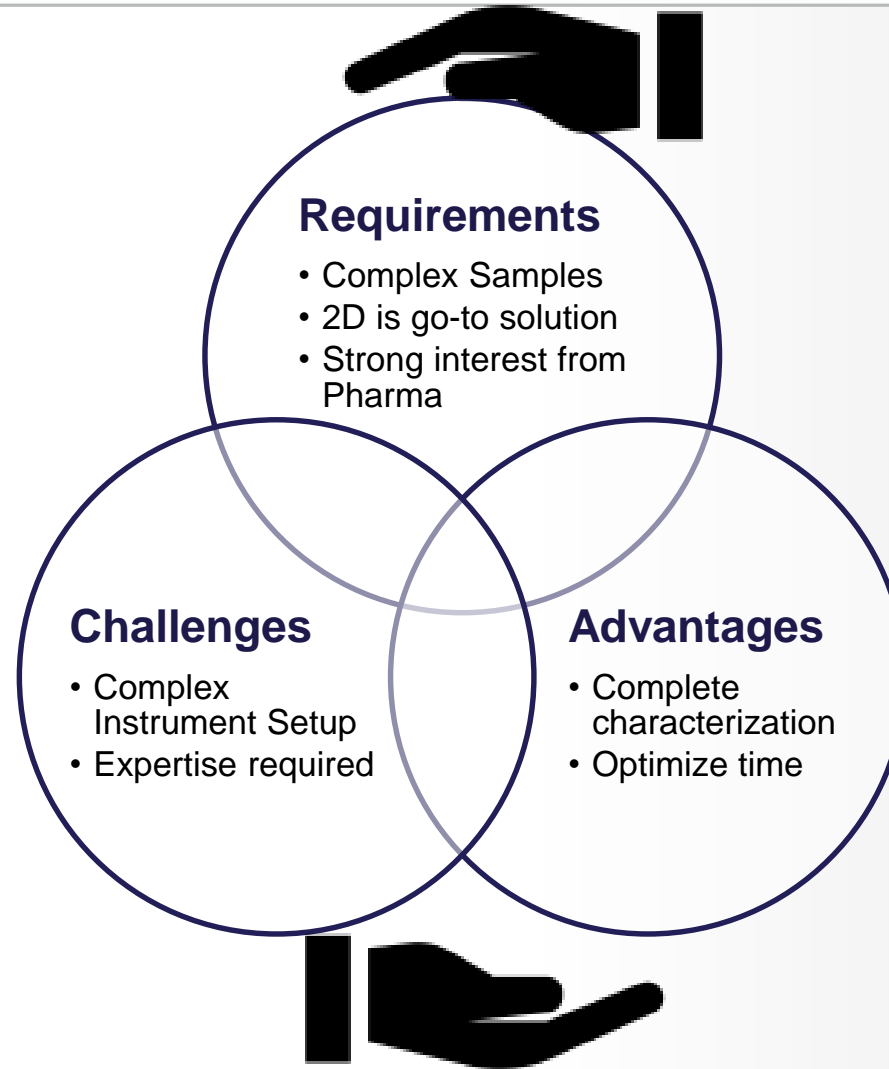
Mixtures that are not necessarily complex per se but contain several species of interest that are very difficult to resolve (e.g., enantiomers, structural isomers)

Two-Dimensional Liquid Chromatography (2D-LC)

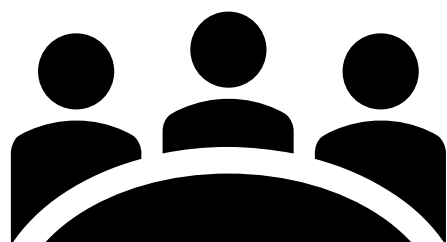


Who Uses 2D-LC?

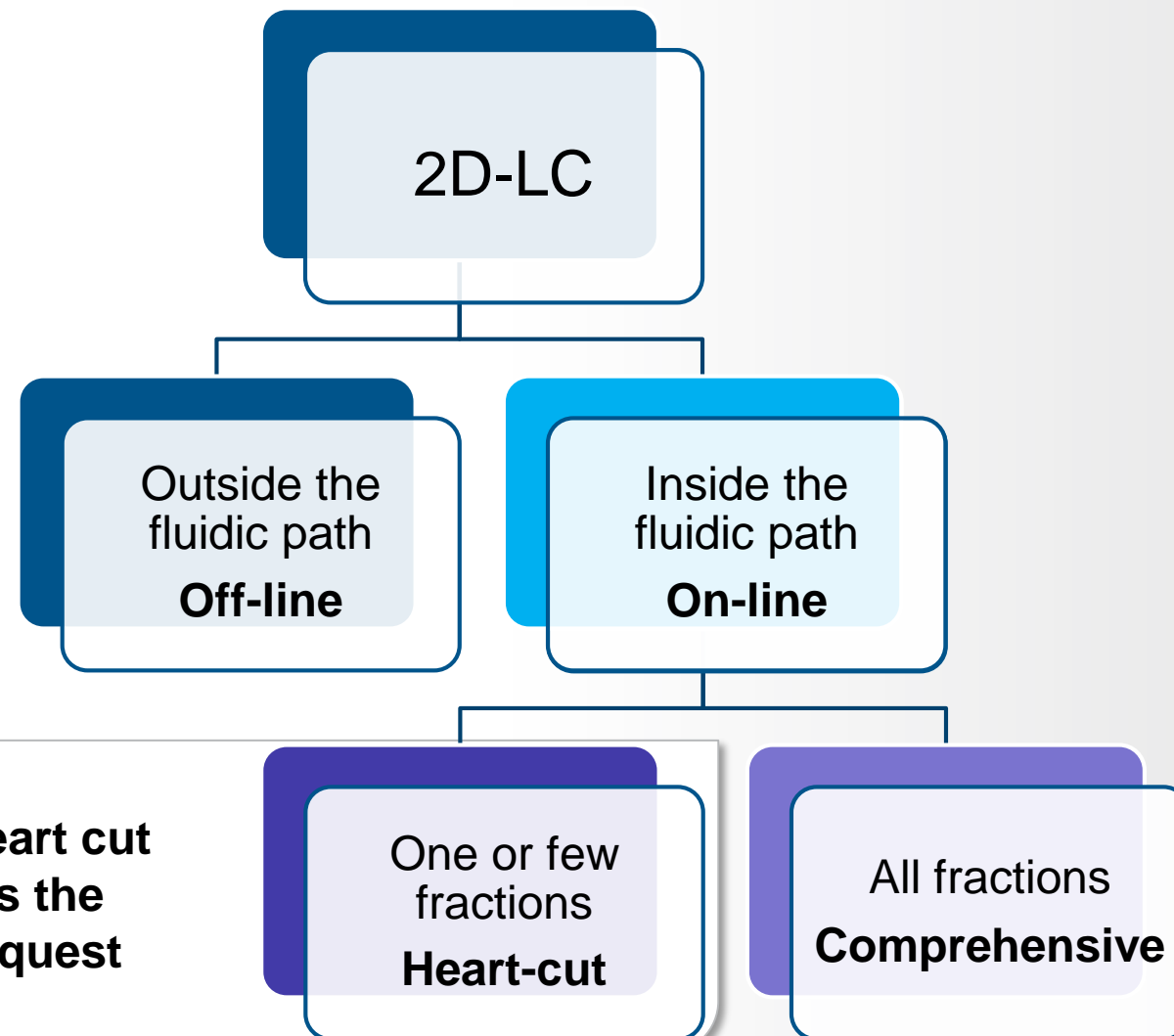
Listening to Customers – Our Take on 2D-LC



Thermo Scientific Vanquish UHPLC System for 2D-LC



On-line Single and Multi-heart cut for LC-UV-MS peak purity is the most frequent customer request



Thermo Scientific Vanquish UHPLC System for 2D-LC

The User

Mary, Scientist in Pharma development/characterization labs



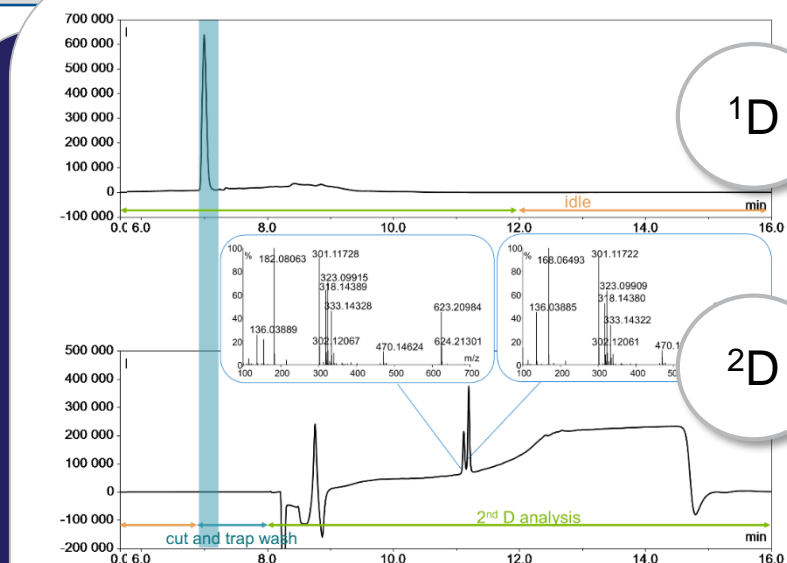
Their Application and Challenge

I have an impurity in my LC-UV method in QC. I need to control the peak purity by LC-MS. The **LC-UV method uses not MS compatible solvents**, I need to transfer the LC-UV method to MS compatible conditions and repeat the analysis

Solving the problem

The Thermo Scientific™ Vanquish™ UHPLC system for 2D-LC analyzes the sample by LC-UV, trapping on a column, washing it to remove the not MS compatible solvents, and analysis by LC-MS.

- Method from QC without need to adjust it for MS
- Less paperwork to justify differences in the LC-UV and LC-MS chromatograms



1D – Mobile phase not MS compatible

2D – MS analysis without changing the 1D method

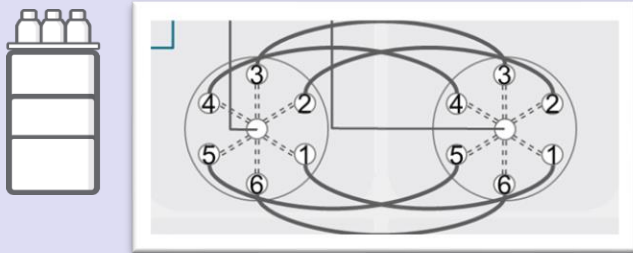
The Solution

Thermo Scientific Vanquish UHPLC System for 2D-LC Solutions

1

Multi heart-cut with loops

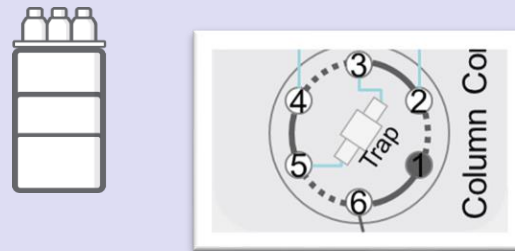
One system for 1D and 2D



2

Single heart-cut with trap column
– *basic setup* –

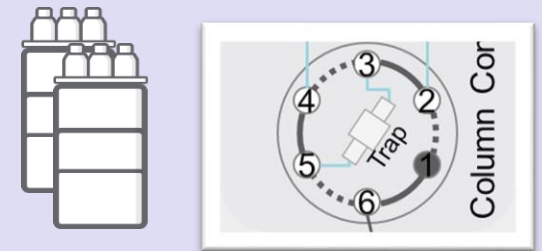
One system for 1D and 2D



3

Single heart-cut with trap column
– *advanced setup* –

One system for 2× 1D or 2D

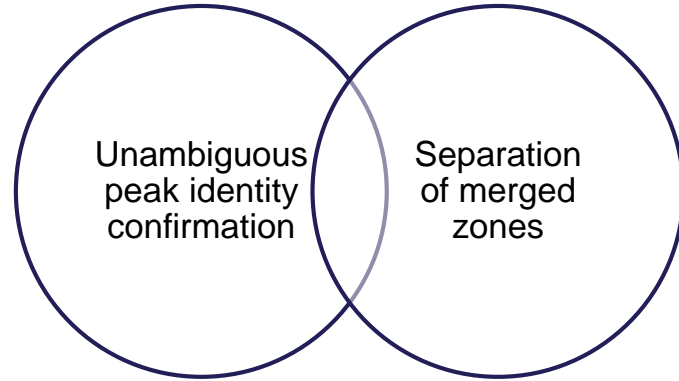


Three solutions for 2D-LC

Thermo Scientific Vanquish UHPLC System for 2D-LC Solutions



Challenge



Features

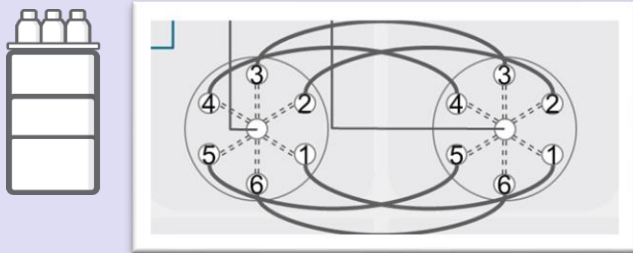
- Save bench space – 1D and 2D in one system
- Highest application flexibility - customizable fraction collection and different temperature zones
- Workflow with unique, patented features of 2D-LC handling
- Easy and save capillary connection with Thermo Scientific™ Viper™ fingertight fitting installation kit
- Easy and customizable instrument and switching valve control

Thermo Scientific Vanquish UHPLC System for 2D-LC Solutions

1

Multi heart-cut with loops

One system for 1D and 2D



2

Single heart-cut with trap column
– *basic setup* –

One system for 1D and 2D



3

Single heart-cut with trap column
– *advanced setup* –

One system for 2× 1D or 2D



Three solutions for 2D-LC

Sample

Antioxidants in Tea and Olive Oil

High degree of polarity

Method

Fraction transfer from loops, without elution strength reduction

First dimension

Column: Thermo Scientific™ Accucore™ Polar Premium, 2.6 μm, 2.1 × 100 mm
 System: Thermo Scientific™ Vanquish™ Duo UHPLC system
 Eluents : A–0.1% formic acid in water
 B–0.1% formic acid in methanol
 Gradient:

min	% A	% B
0	97	3
2.5	97	3
8.83	40	60
10	0	100
11	0	100
11.1	97	3
14.1	97	3

 Flow rate: 400 μL/min
 Pressure: 460 bar (max.)
 Col. Temp.: 40 °C
 Inj. Vol.: 1 μL
 Detection: Thermo Scientific™ Vanquish™ Diode Array Detector FG, semi-micro flow cell, 260 nm, 280 nm, 20 Hz, 0.2 s resp. time

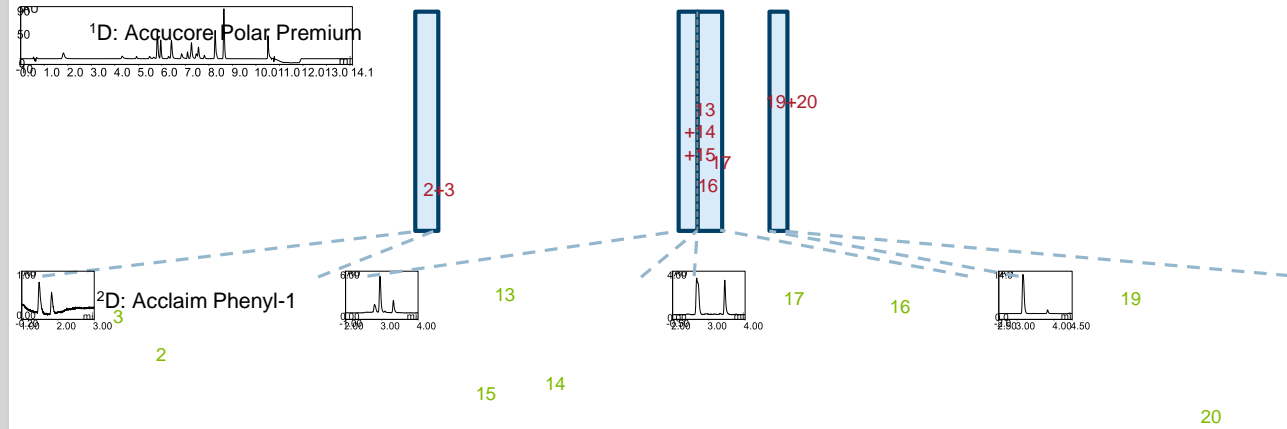
Second dimension

Column: Thermo Scientific™ Acclaim™ Phenyl-1, 3 μm, 3 × 100 mm
 System: Vanquish Duo UHPLC system
 Eluents: A–0.1% formic acid in water
 B–0.1% formic acid in methanol
 Gradient:

min	% A	% B
0	95	5
3.5	40	5
3.9	0	100
4.3	0	100
4.35	95	5
5.85	95	5

 Flow rate: 1.3 mL/min
 Pressure: 660 bar (max.)
 Col. Temp.: 50 °C
 Inj. Vol.: up to 150 μL
 Detection: Vanquish Diode Array Detector FG, semi-micro flow cell, 260 nm, 280 nm, 20 Hz, 0.2 s resp. time

Results



Benefits

Separation of coeluting peaks

Online collection of multiple fractions

User-defined fraction collections

How to configure it

thermo scientific
TECHNICAL NOTE No. 73184

Complementary Dual LC as a convenient alternative to multiple heart-cut 2D-LC for samples of medium complexity

Authors: Maria Grübner, Frank Steiner, Thermo Fisher Scientific, Germering, Germany

Keywords: Polyphenols, Dual LC, parallel LC, two-dimensional liquid chromatography, 2D-LC, 2D-HPLC, multi-heart-cut 2D-LC, Vanquish Duo UHPLC System for Dual LC, Vanquish Dual Split Sampler, Chromleon CDS



Benefits

- Complementary Dual LC provides a convenient alternative to 2D-LC workflows and has great potential for quantitative analysis of samples containing around 15–30 compounds.

Goal

To illustrate the benefit of the Vanquish Duo UHPLC System for Dual LC to resolve semi-complex samples for quantitative analysis in direct comparison to multi-heart-cut 2D-LC approaches.

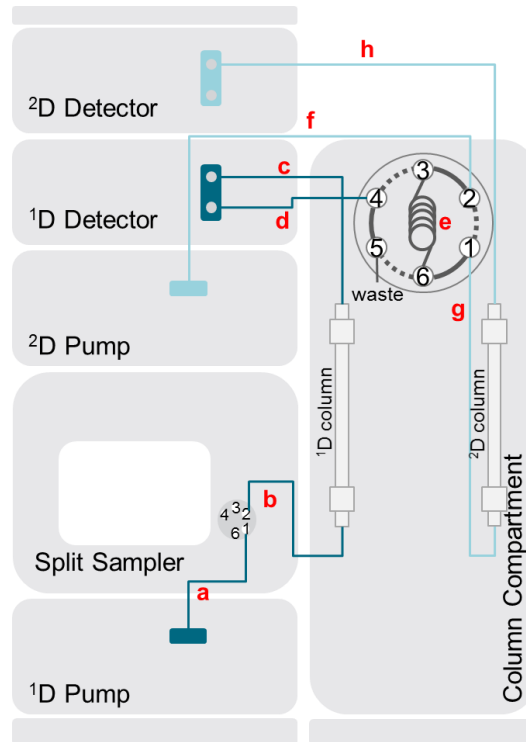
Introduction

In general, the application of liquid chromatography (LC) aims for the unambiguous identification and quantification of several compounds in a certain sample. However, despite tremendous improvements in both liquid chromatography instrumentation and column technology, the analytical task sometimes just exceeds the capabilities of conventional one-dimensional LC (1D-LC). In particular, samples of increasing complexity (such as structurally similar compounds and samples with a large number of analytes) present an analytical challenge in terms of resolution power, efficiency, and selectivity. Thus, several more sophisticated techniques such as parallel LC*, serial column coupling†, column switching‡, or

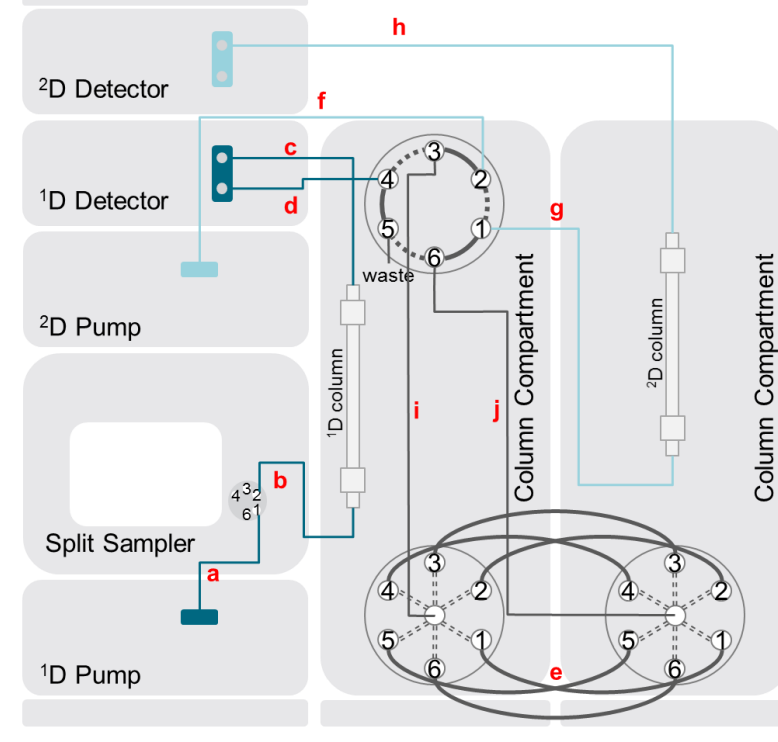
ThermoFisher SCIENTIFIC

Technical note TN73184 –

Complementary Dual LC as a convenient alternative to multiple heart-cut 2D-LC for samples of medium complexity.



single heart-cut setup

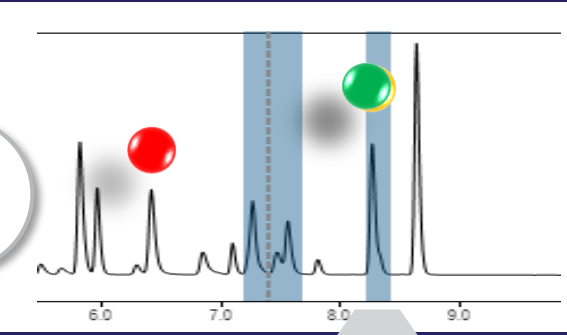


multiple heart-cut setup

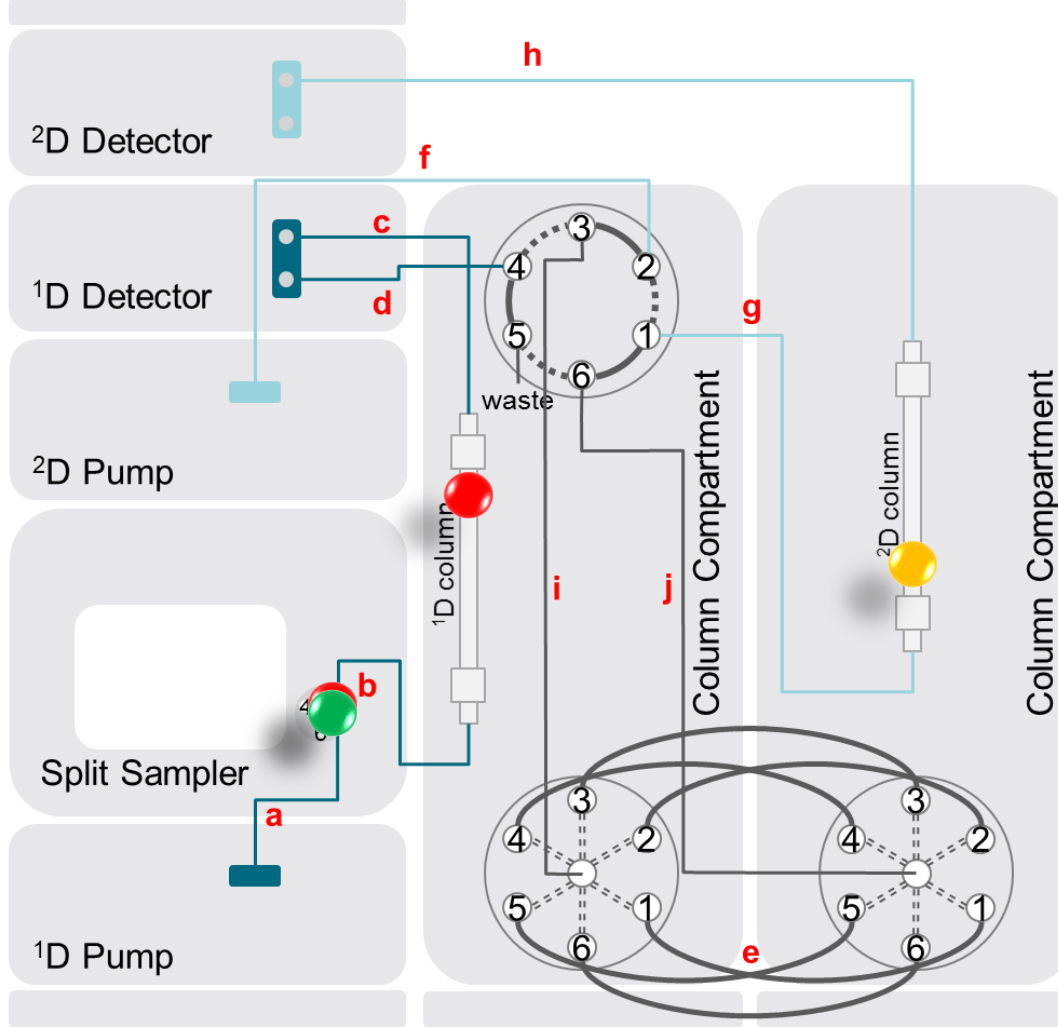
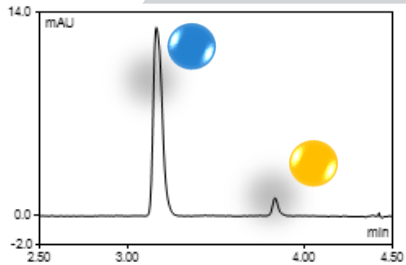
#	Connection	Part Number	#	capillary	Part Number
a	Viper Capillary, ID × L 0.10 × 350 mm, MP35N	6042.2340	f	Viper Capillary, ID × L 0.1 × 450 mm, MP35N	6042.2350
b	Active Pre-heater, ID × L 0.1 × 380 mm, MP35N	6732.0110	g	Active Pre-heater, ID × L 0.1 × 610 mm, MP35N	6732.0150
c	Post-column Cooler 1 µL, ID × L 0.10 × 590 mm, MP35N	6732.0520	h	Post-column Cooler 1 µL, ID × L 0.10 × 590 mm, MP35N	6732.0520
d	Viper Capillary, ID × L 0.10 × 350 mm, MP35N	6042.2340	i	Viper Capillary, ID × L 0.1 × 650 mm, MP35N	6042.2370
e	loops; size depends on the application; i.e.: Sample loop 200 µL, Viper Sample loop 20 µL, Viper Waste fluidic, VH-D1	6830.2418 (200 µL) 6826.2420 (20 µL) 6038.2425	j	Viper Capillary, ID × L 0.1 × 650 mm, MP35N	6042.2370

How it works

1D



2D



multiple heart-cut setup

More info

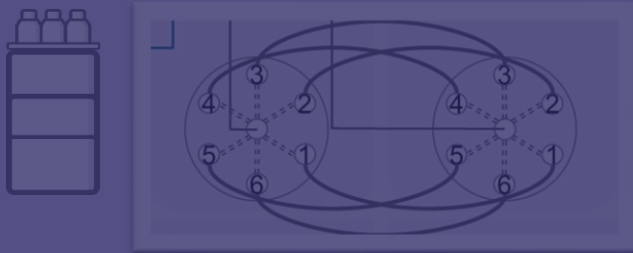
Grübner, M., Steiner, F.:
Complementary Dual LC as a
convenient alternative to multiple
heart-cut 2D-LC for samples of
medium complexity, Thermo Fisher
Scientific Technical Note 73184,
2019,
<https://assets.thermofisher.com/TF-S-Assets/CMD/Technical-Notes/tn-73184-lc-multiheart-cut-alternative-tn73184-en.pdf>

Thermo Scientific Vanquish UHPLC System for 2D-LC Solutions

1

Multi heart-cut with loops

One system for 1D and 2D



2

Single heart-cut with trap column
– basic setup –

One system for 1D and 2D



3

Single heart-cut with trap column
– advanced setup –

One system for 2× 1D or 2D



Three solutions for 2D-LC

Sample

Desmedipham and Phenmedipham, two herbicides

Isomeric compounds

Method

Fraction transfer with solvent modulation

First dimension

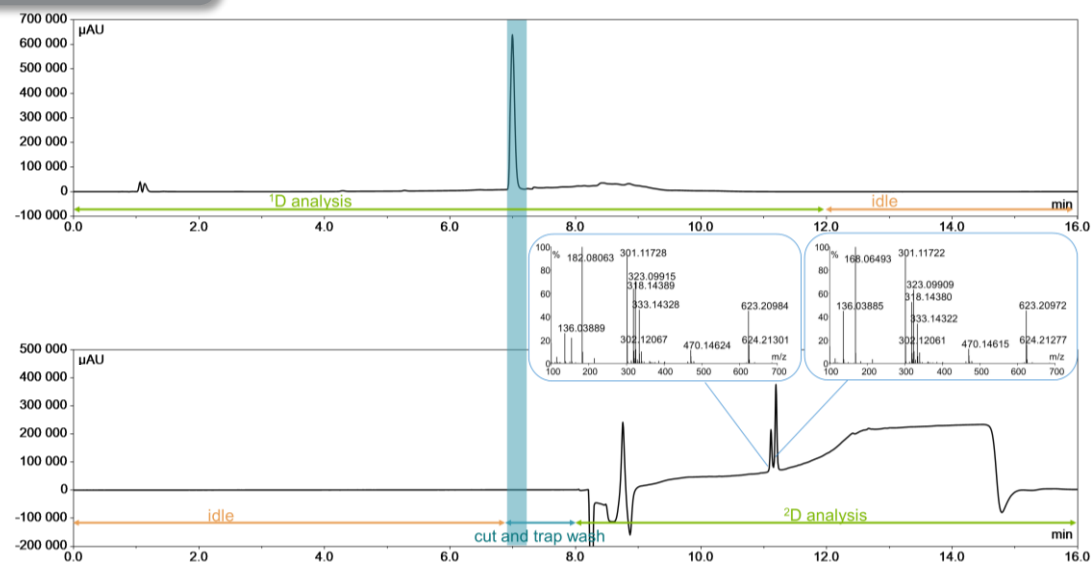
Column	Thermo Scientific™ Hypersil™ Gold , 2.1x100 mm, 1.9 μm, 175 Å (P/N 25002-102130)		
Mobile Phase	A: 0.1% phosphoric acid in water B: acetonitrile		
Gradient 1	Time (min)	A	B
	0.0	90	10
	3.0	10	90
	4.0	10	90
	4.1	90	10
Gradient 2	Time (min)	A	B
	0.0	90	10
	5.0	10	90
	5.9	10	90
	6	90	10
Flow Rate	0.6 mL/min (Gradient 1); 0.3 mL/min (Gradient 2)		
Column Temperature	40 °C		
Autosampler Temperature	4 °C		
Injection Volume	5 μL		
Detector Settings	210 nm; 10 Hz; 0.5 s response time		

Second dimension

Column	Thermo Scientific™ Accucore™ PFP , 2.1x50 mm, 2.6 μm, 80 Å (P/N 17426-052130)		
Trap column	Thermo Scientific™ Hypersil™ Javelin BDS C18 Javelin guard column , 3x20 mm, 3 μm (P/N 28103-023006)		
Mobile Phase	A: 0.1% formic acid in water B: 0.1% formic acid in methanol		
Gradient	Time* (min)	A	B
	0.0	70	30
	3.5	30	70
	4.0	10	90
	6.0	10	90
	6.1	70	30
	8.0	70	30
*absolute gradient times may change if used as 2 nd dimension			
Flow Rate	0.6 mL/min		
Column Temperature	40 °C		
Autosampler Temperature	4 °C		
Injection Volume	5 μL		
Detector Settings	210 nm; 10 Hz; 0.5 s response time		

LC-UV (Phosphate buffer gradient) LC-UV-MS (Formic acid gradient)

Results



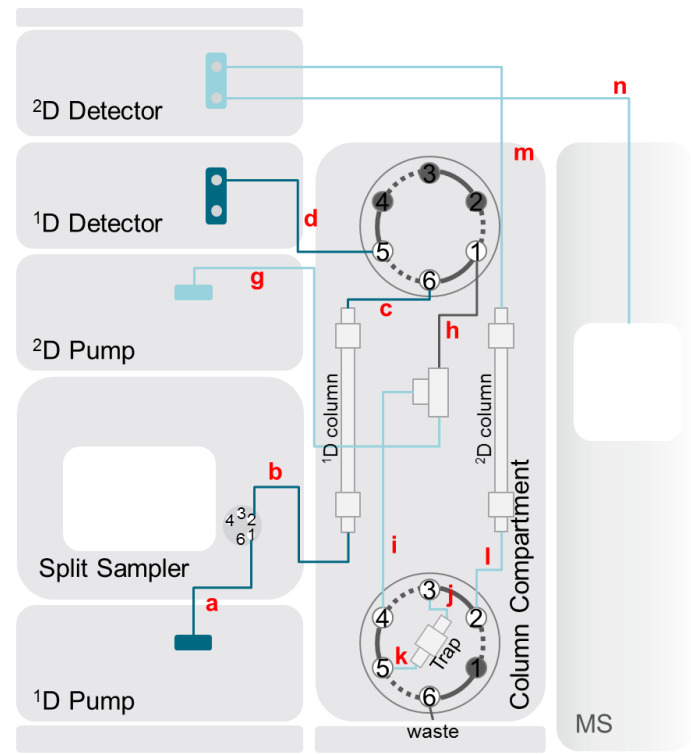
Features

Separation of coeluting peaks

Elution strength reduction before the 2D separation
Better peak shape and increased resolution

Automatic transfer to MS without changing the UV method solvents

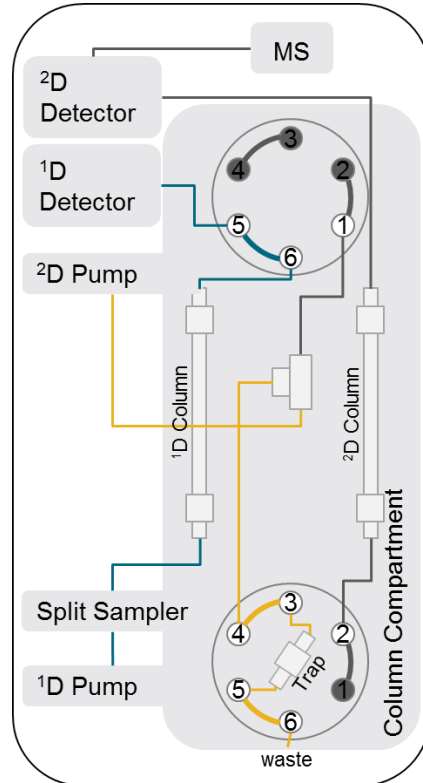
How to configure it



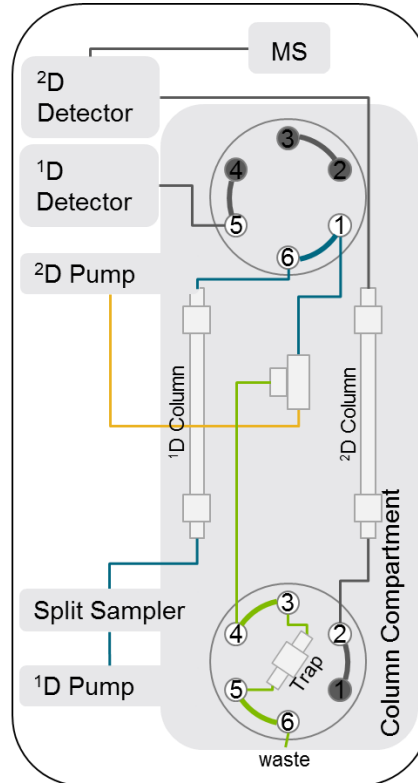
#	Connection	Part Number	#	Connection	Part Number
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b	Active Pre-heater, 0.1 × 380 mm, MP35N	6732.0110	i	Viper Capillary, ID × L 0.18 × 450 mm, MP35N	6042.2365
c	Viper Capillary, ID × L 0.10 × 250 mm, MP35N	6042.2330	j	Viper Capillary, ID × L 0.10 × 150 mm, MP35N	6042.2320
d	Viper Capillary, ID × L 0.10 × 350 mm, MP35N	6042.2340	k	Viper Capillary, ID × L 0.10 × 250 mm, MP35N	6042.2330
e	Viper Capillary, ID × L 0.10 × 450 mm, MP35N	6042.2350	l	Active Pre-heater, 0.1 × 380 mm, MP35N	6732.0110
f	Viper Capillary, ID × L 0.10 × 350 mm, MP35N	6042.2340	m	Viper Capillary, ID × L 0.10 × 650 mm, MP35N	6042.2370
g	Viper Capillary, ID × L 0.10 × 550 mm, MP35N	6042.2360	n	Viper Capillary, ID × L 0.10 × 750 mm, MP35N	6042.2390
	Waste fluidic, VH-D1	6038.2425		Tee Piece ID 0.020" for 1/16" capillary	6263.0035
	6x Viper Blind plug	6040.2303			

TN73298 - Flexible HPLC instrument setups for double usage as one heart-cut-2D-LC system or two independent 1D-LC systems – to be published

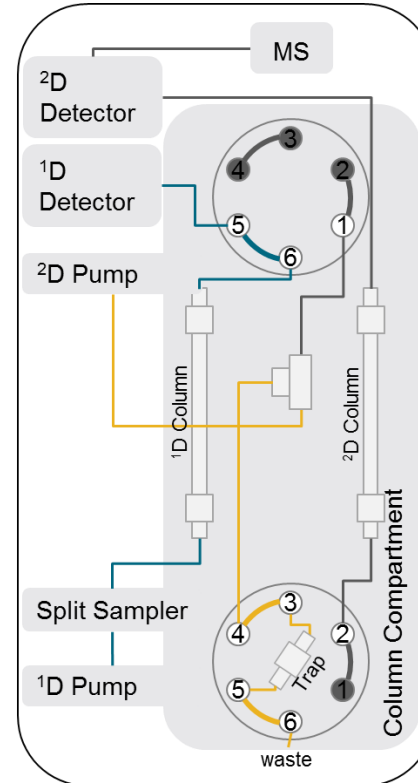
How it works



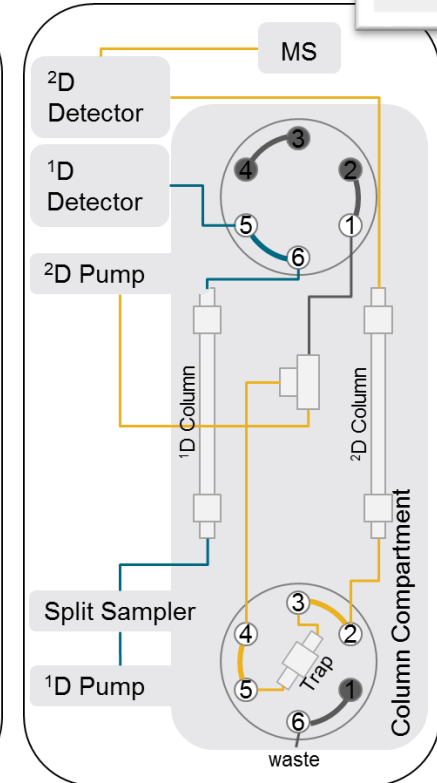
1D analysis / 2D idle



heart-cut w/ elution strength reduction and trapping



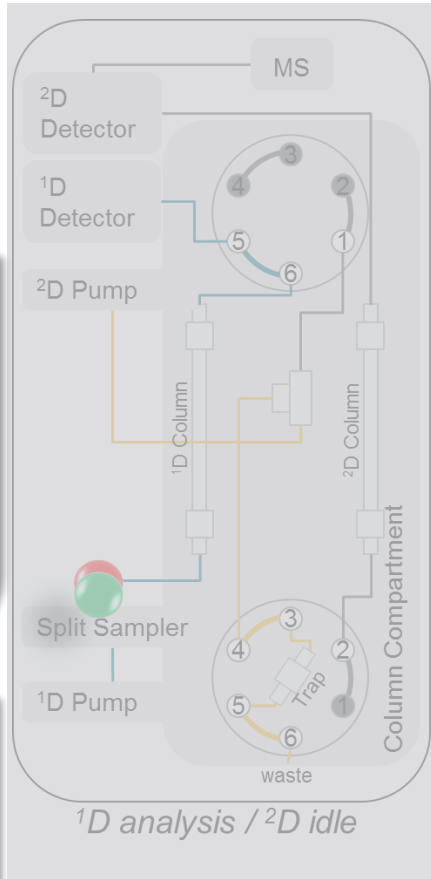
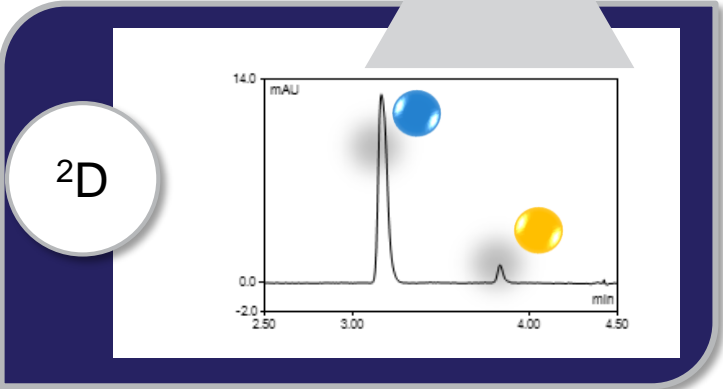
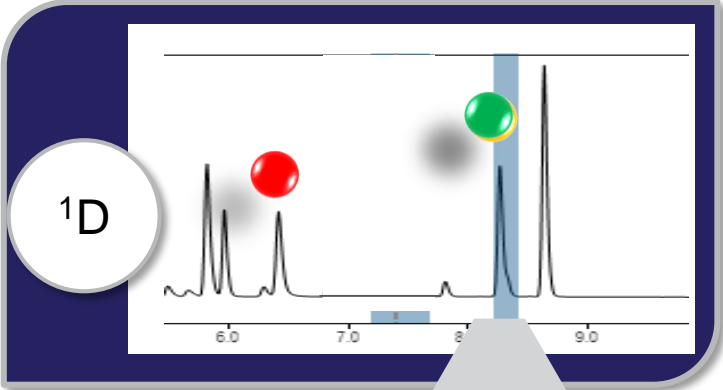
trap washing (optional)



1D and 2D analysis

action	lower valve	upper valve
1D analysis – 2D idle	1_2	1_2
heart-cut + trapping	1_2	6_1
1D analysis + trap washing	1_2	1_2
1D and 2D analysis	6_1	1_2
AVOID	6_1	6_1

How it works



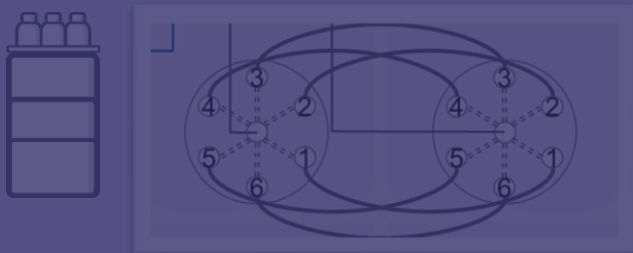
action	lower valve	upper valve
<i>1D analysis – 2D idle</i>	1_2	1_2

Thermo Scientific Vanquish UHPLC System for 2D-LC Solutions

1

Multi heart-cut with loops

One system for 1D and 2D



2

Single heart-cut with trap column
– basic setup –

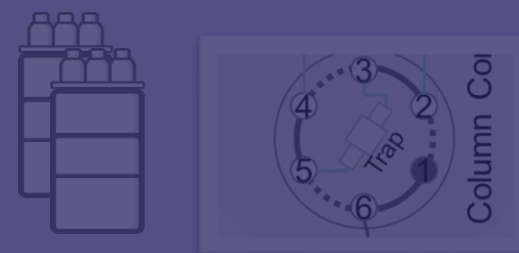
One system for 1D and 2D



3

Single heart-cut with trap column
– advanced setup –

One system for 2× 1D or 2D

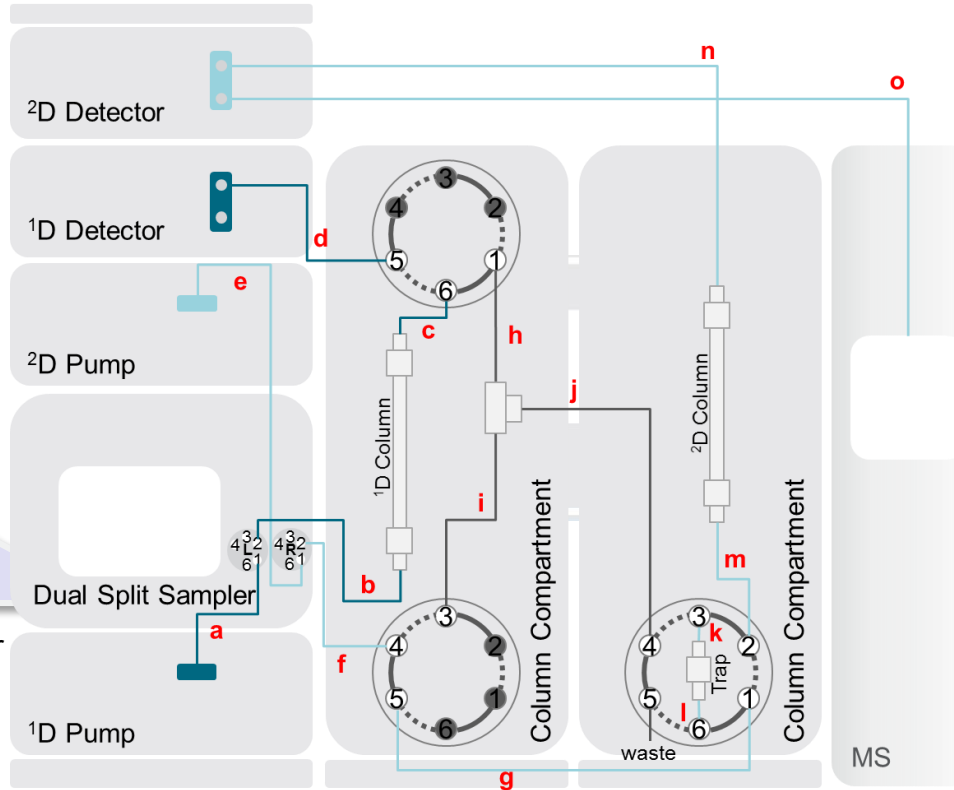


Three solutions for 2D-LC

How to configure it



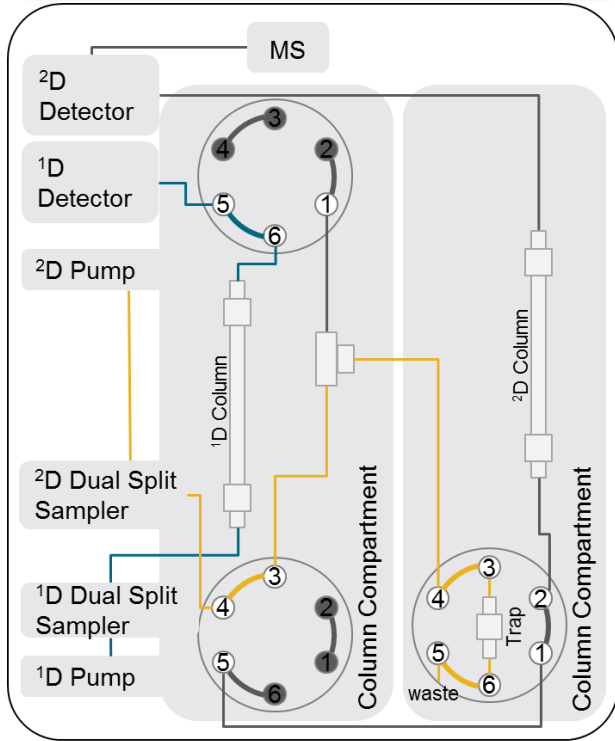
Thermo Scientific™ Vanquish™ Dual Split Sampler



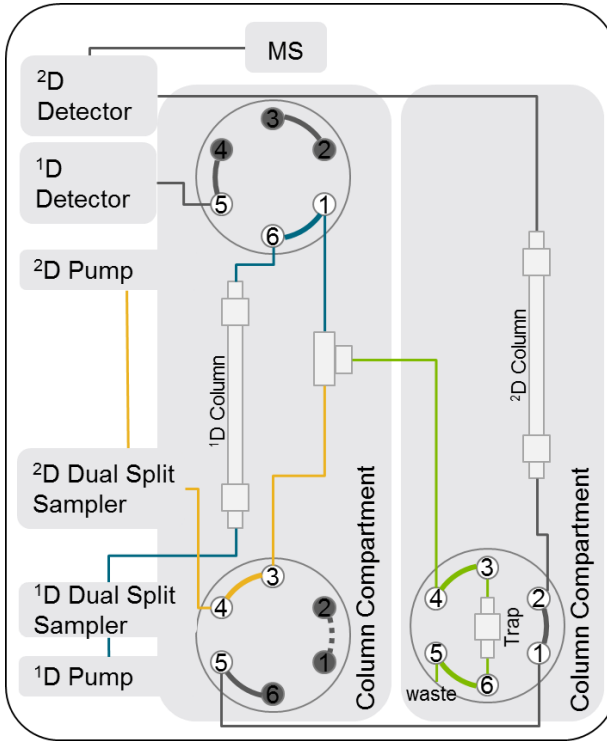
#	Connection	Part Number	#	Connection	Part Number
a	Viper Capillary, ID × L 0.10 × 350 mm, MP35N	6042.2340	h	Viper Capillary, ID × L 0.10 × 250 mm, MP35N	6042.2330
b	Active Pre-heater, 0.1 × 380 mm, MP35N	6732.0110	i	Viper Capillary, ID × L 0.10 × 350 mm, MP35N	6042.2340
c	Viper Capillary, ID × L 0.10 × 250 mm, MP35N	6042.2330	j	Viper Capillary, ID × L 0.18 × 450 mm, MP35N	6042.2365
d	Viper Capillary, ID × L 0.10 × 350 mm, MP35N	6042.2340	k	Viper Capillary, ID × L 0.10 × 150 mm, MP35N	6042.2320
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g	Viper Capillary, ID × L 0.10 × 250 mm, MP35N	6042.2330	n	Viper Capillary, ID × L 0.10 × 650 mm, MP35N	6042.2370
	Waste fluidic, VH-D1	6038.2425	o	Viper Capillary, ID × L 0.10 × 750 mm, MP35N	6042.2390
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	6x Viper Blind plug	6040.2303			

TN73298 - Flexible HPLC instrument setups for double usage as one heart-cut-2D-LC system or two independent 1D-LC systems – to be published

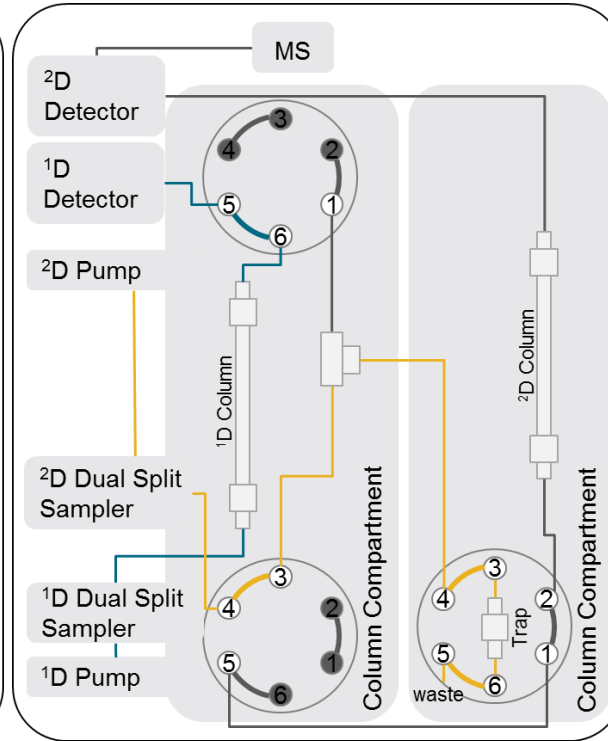
How it works



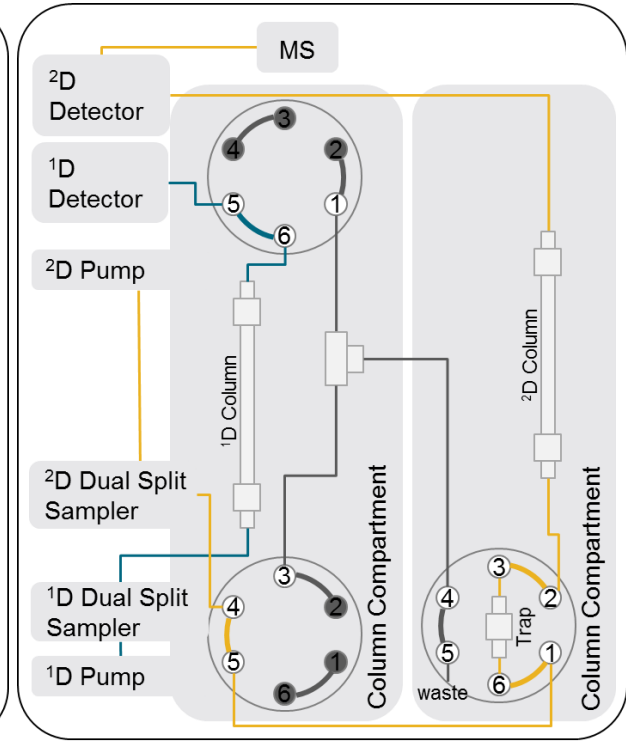
1D analysis / 2D idle



heart-cut w/ elution strength reduction and trapping

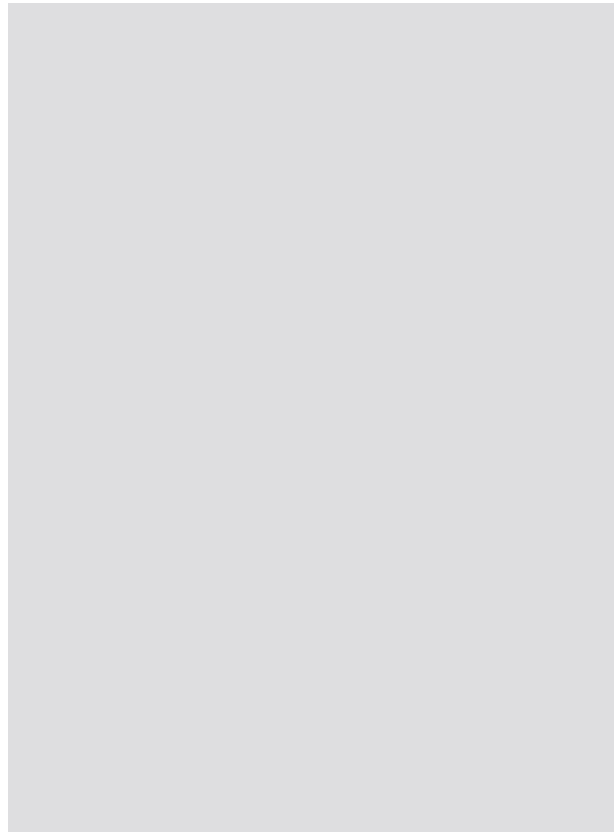
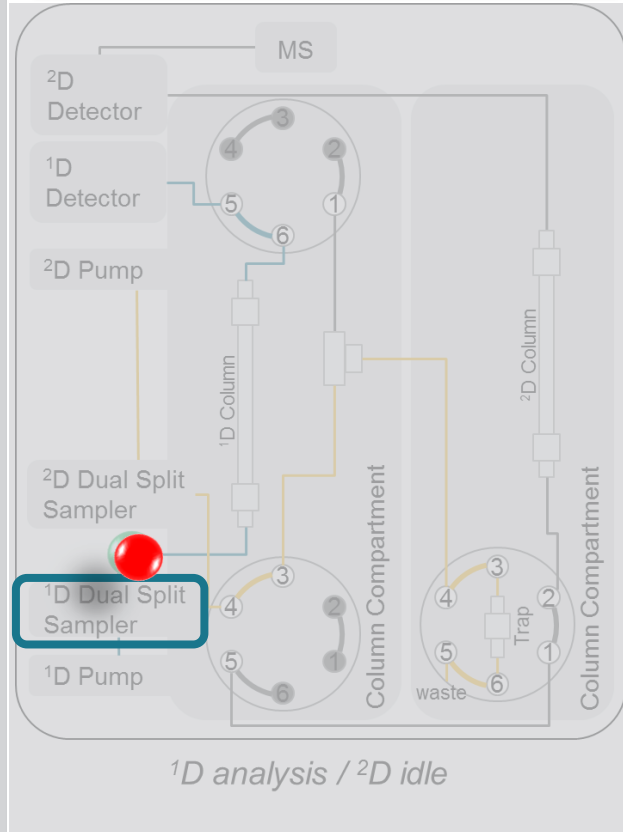


trap washing (optional)



1D and 2D analysis

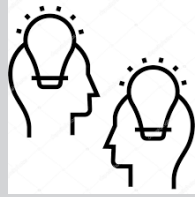
How it works



action	upper valve L	lower valve L	lower valve R
1D analysis – 2D idle	1_2	1_2	1_2
heart-cut + trapping	6_1	1_2	1_2
1D analysis + trap washing	1_2	1_2	1_2
1D and 2D analysis	1_2	6_1	6_1

Thermo Scientific Vanquish UHPLC System for 2D-LC – Single Heart-Cut with Trap Column

– Advanced Setup –

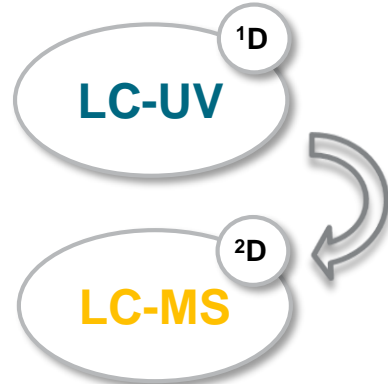
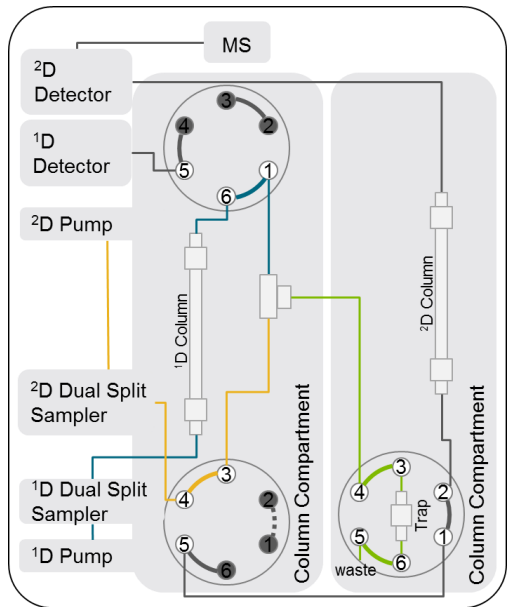


Unique solution

2 patents pending

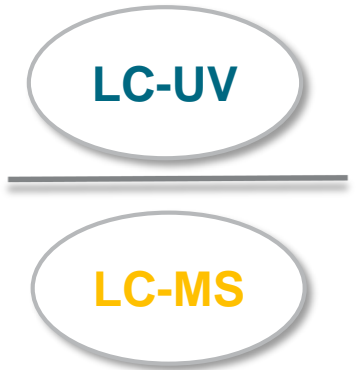
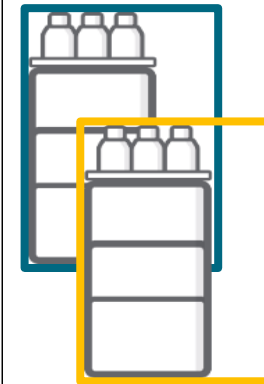
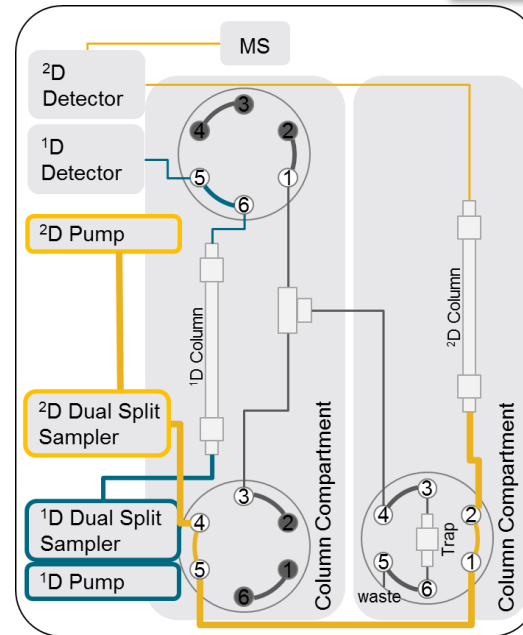
3

Single heart-cut



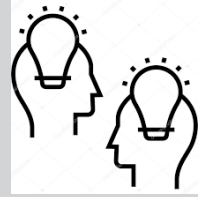
action	upper valve L	lower valve L	lower valve R
heart-cut + trapping	6_1	1_2	1_2

Independent LC-UV and LC-MS



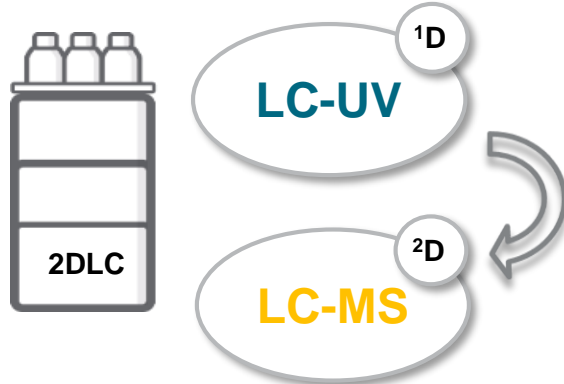
action	upper valve L	lower valve L	lower valve R
direct injection 1D and 2D	1_2	6_1	1_2

Two independent flow paths for 2D-LC or two HPLCs without manual replumbing



Unique solution

Single heart-cut

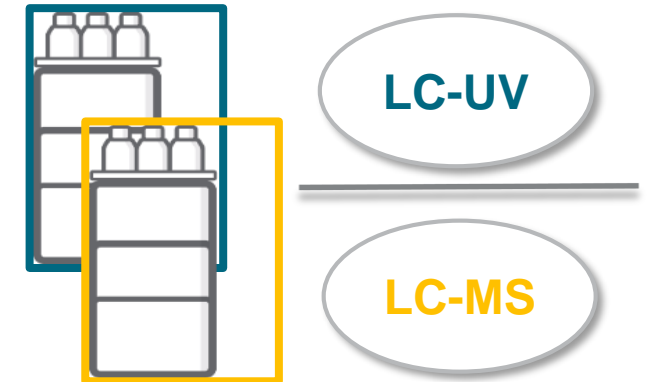


2 patents pending

2D Heart-Cut with sample dilution using only two pumps

2D Setup for simultaneous operation of two 1D methods or one 2D method

Independent LC-UV and LC-MS



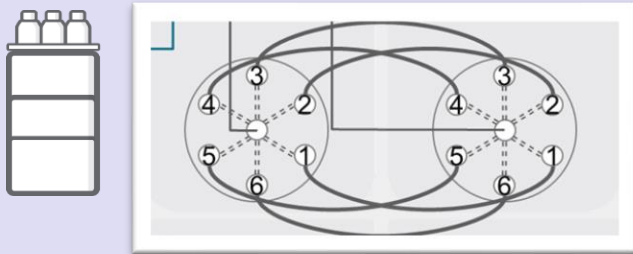
Two independent flow paths for 2D-LC or two HPLCs without manual replumbing

Thermo Scientific Vanquish UHPLC System for 2D-LC Solutions

1

Multi heart-cut with loops

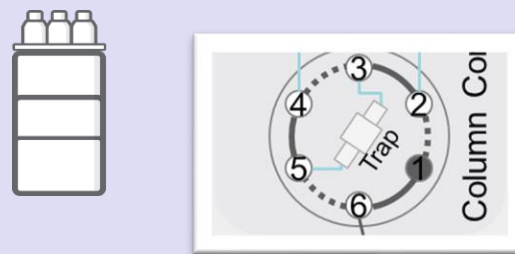
Investigate multiple fractions



2

Single heart-cut with trap column
– basic setup –

Get peak to shape in 2D



3

Single heart-cut with trap column
– advanced setup –

Maximize system usage:
One 2D-LC or two 1D-LCs



Three solutions for 2D-LC

Thermo Scientific Vanquish UHPLC System for 2D-LC Solutions – Overview

1

Multi heart-cut with loops

2

Single heart-cut with trap column
– *basic setup* –

3

Single heart-cut with trap column
– *advanced setup* –

	1	2	3
Multi heart-cut	✓		
Single heart-cut		✓	✓
Price competitive		✓	
Unique solution			✓
Better peak shape in ² D		✓	✓
¹ D and ² D at different temperature	✓		✓

Three solutions for 2D-LC

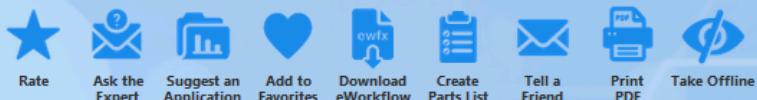
Control Your Thermo Scientific Vanquish UHPLC System for 2D-LC



Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) and Thermo Scientific Vanquish UHPLC System for 2D-LC

- Control of Vanquish Dual Split Sampler
- Support of Vanquish Duo for Dual LC workflow
- Heart-cut 2D-LC in a single method
- Heart-cut 2D-LC in separate methods
- Custom columns/custom variables
- Hard-coded heart-cut 2D-LC
- Smart-coded heart-cut 2D-LC
- Intelligent Run Control (IRC)

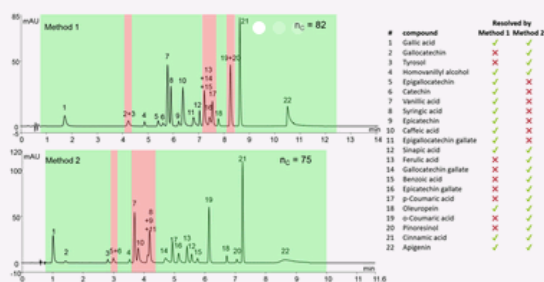
Download Method from Thermo Scientific AppsLab Library of Analytical Applications



Find methods for your needs

Complementary Dual LC as a convenient alternative to multiple heart-cut 2D-LC for samples of medium complexity

Be the first to rate this application



Dual LC

Description

The Technical Note illustrates the benefit of the Vanquish Duo UHPLC System for Dual LC to resolve semi-complex samples for quantitative analysis in direct comparison to multi-heart-cut 2D-LC approaches.

Market: Other

Keywords: Polyphenols, Chromeleon CDS, Dual LC, Vanquish Duo UHPLC system for Dual LC, 2D-HPLC, 2D-LC, multi-heart-cut 2D-LC, parallel LC, two-dimensional liquid chromatography, Vanquish Dual Split Sampler

Author: Maria Grübner, Frank Steiner

Affiliation: Thermo Fisher Scientific, Germering, Germany

Status: Proof of Concept

Uploaded on 10/21/2019.



<https://appslab.thermofisher.com/>

Compounds | Method | System | Downloads | Comments

tn-73184-dual-lc-vs-multiheart-cut-2d-lc-tn73184-en.pdf
Technical Note

1.3 MB Download
 Preview

Dual LC vs multi-heart-cut 2D-LC.cmbx
exemplary sample sequences for Dual LC and multi-heart-cut 2D-LC

3.5 MB Download

multi-heart-cut-2DLC.ewfx
This eWorkflow creates a sequence for online multi-heart-cut 2D-LC of polyphenolic compounds on a Vanquish UHPLC system including storage loop selection by a custom variable. It can also be used as a template for the creation of own multi-heart-cut 2D-LC methods. It was created using Chromeleon 7.2.9. It works with Chromeleon 7.2 SR3 or higher. It is not compatible with earlier versions of Chromeleon.

453.5 KB Download

Example: Smart-Coded Method for 2D-LC

- Download method and example sequence from Thermo Scientific™ AppsLab Library of Analytical Applications
- No extra tool needed
- High flexibility with custom variables
- Start your 2D-LC analysis

More information:

Technical note TN73298 - Flexible HPLC instrument setups for double usage as one heart-cut-2D-LC system or two independent 1D-LC systems
– to be published soon

Time	Command	Value
74	Start Run	
75	DAD.DAD_1.AcqOn	
76	PumpModule_1.Pump_1.Pump_Pressure_1AcqOn	
77	UV.UV_VIS_1.AcqOn	
78	PumpModule2.Pump2.Pump2_PressureAcqOn	
79	Trigger	"FlowUp", System.Retention>=System.Injection.CustomVariables.CutStart-0.5, Limit=1
80	PumpModule2.Pump2.Flow.Nominal	2.00 [ml/min]
*	Click here to append a new command	
81	End Trigger	
82	Trigger	"CutStart", System.Retention>=System.Injection.CustomVariables.CutStart, Limit=1
83	ColumnComp.UpperValve.CurrentPosition	6_1
*	Click here to append a new command	
84	End Trigger	
85	Trigger	"CutEnd", System.Retention>=System.Injection.CustomVariables.CutEnd, Limit=1
86	ColumnComp.UpperValve.CurrentPosition	1_2
*	Click here to append a new command	
87	End Trigger	
88	Trigger	"FlowDown", System.Retention>=System.Injection.CustomVariables.CutEnd+0.4, Limit=1
89	PumpModule2.Pump2.Flow.Nominal	0.600 [ml/min]
*	Click here to append a new command	
90	End Trigger	
*	Click here to append a new command	
91	Run	Duration = 5.500 [min]

triggers for heart-cut

triggers for trap flow

Software Capabilities in Heart-cut 2D-LC with the Thermo Scientific Vanquish UHPLC System



All the heart-cut LC-MS applications presented in this presentation were acquired with SII for Xcalibur

	Chromeleon CDS	Thermo Scientific™ Xcalibur™ Software	Waters™ Empower™
With Thermo Scientific™ Standard Instrument Integration (SII) plugin	not needed	SII for Xcalibur Software	SII for Empower Software
support of Vanquish Dual Split Sampler	✓	✓	✓
support of Dual LC	✓	✗	✓
heart-cut 2D-LC in one method	✓	✓	✓
heart-cut 2D-LC in separated methods	✓	✓	✓
custom columns/custom variables	✓	✗	✗
hard-coded heart-cut 2D-LC	✓	✓	✓
smart-coded heart-cut 2D-LC	✓	✗	✗
Intelligent Run Control (IRC)	✓	✗	✗

Note: Waters and Empower are registered trademarks of Waters Corp.

Learn More About

Thermo Scientific Vanquish UHPLC systems for 2D-LC

Thermo Scientific Vanquish UHPLC System for 2D-LC Solutions

thermo scientific

TECHNICAL NOTE No. 73184

Complementary Dual LC as a convenient alternative to multiple heart-cut 2D-LC for samples of medium complexity

Authors: Maria Grübner, Frank Steiner, Thermo Fisher Scientific, Germering, Germany

Keywords: Polyphenols, Dual LC, parallel LC, two-dimensional liquid chromatography, 2D-LC, 2D-HPLC, multi-heart-cut 2D-LC, Vanquish Duo UHPLC System for Dual LC, Vanquish Dual Split Sampler, Chromeleon CDS



Goal
To illustrate the benefit of the Vanquish Duo UHPLC System for Dual LC to resolve semi-complex samples for quantitative analysis in direct comparison to multi-heart-cut 2D-LC approaches.

Introduction
In general, the application of liquid chromatography (LC) aims for the unambiguous identification and quantification of several compounds in a certain sample. However, despite tremendous improvements in both liquid chromatography instrumentation and column technology, the analytical task sometimes just exceeds the capabilities of conventional one-dimensional LC (1D-LC). In particular, samples of increasing complexity (such as structurally similar compounds and samples with a large number of analytes) present an analytical challenge in terms of resolution power, efficiency, and selectivity. Thus, several more sophisticated techniques such as parallel LC*, serial column coupling*, column switching*, or

Benefits

- Complementary Dual LC provides a convenient alternative to 2D-LC workflows and has great potential for quantitative analysis of samples containing around 15–30 compounds.
- The Thermo Scientific™ Vanquish™ Duo UHPLC System for Dual LC facilitates the accomplishment of two parallel LC analyses in the same time as one analysis by a single channel UHPLC instrument.
- In terms of quantification precision, LOQ, throughput, solvent consumption, and ease-of-use, the Vanquish Duo UHPLC System for Dual LC clearly outperforms multi-heart-cut 2D-LC.

ThermoFisher SCIENTIFIC

Technical note TN73184 – Complementary Dual LC as a convenient alternative to multiple heart-cut 2D-LC for samples of medium complexity.


thermoscientific

TECHNICAL NOTE No. 73298

Flexible HPLC instrument setups for double usage as one heart-cut-2D-LC system or two independent 1D-LC systems

Authors: Maria Grübner and Giorgia Greco, Thermo Fisher Scientific, Germering, Germany

Keywords: Two-dimensional liquid chromatography, 2D-LC, 2D-HPLC, heart-cut-2D-LC, Vanquish Duo UHPLC System, Vanquish Dual Split Sampler, Chromeleon, SII for Xcalibur, SII for Empower



Goal
Showcase several heart-cut 2D-LC setups with elution strength reduction implemented with the Thermo Scientific™ Vanquish™ UHPLC platform and highlight the benefit of the Thermo Scientific™ Vanquish™ Dual Split Sampler to build a flexible system, which can be used either as one heart-cut 2D-LC system or as two independent 1D-LC systems.

Benefits

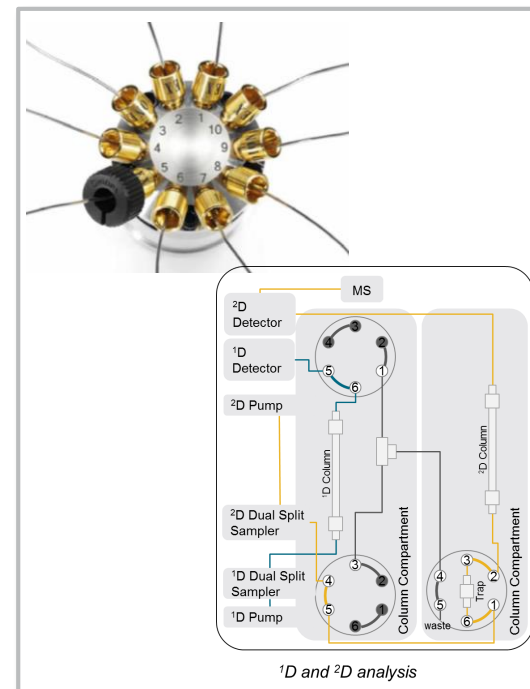
- Heart-cut 2D-LC with analyte trapping during fraction transfer enables straightforward peak identity and purity confirmation by MS detection despite MS incompatible mobile phases in the first-dimension separation.
- The Vanquish Dual Split Sampler in a 2D-LC setup greatly improves the instrument usability and value.

Introduction
Conventional liquid chromatography (LC) separations are referred as one-dimensional (1D) as the sample is subjected to one single separation process. However,


Flexible, software-aided switching between the application options as a heart-cut 2D-LC system or as two independent 1D-LC systems enables more efficient instrument operation and increases the return on investment of the LC instrument as well as of associated MS detectors.

ThermoFisher SCIENTIFIC

Technical note TN73298 - Flexible HPLC instrument setups for double usage as one heart-cut-2D-LC system or two independent 1D-LC systems – to be published soon



Thermo Scientific Viper Workflow kit for Vanquish online 2D-LC and Installation Guide - Coming soon



<https://appslab.thermofisher.com/>

Thermo Scientific AppsLab Library of Analytical Applications Searchable online analytical method repository: <https://appslab.thermofisher.com/>