



Automated Sample Clean-up in PCB and Dioxin Analysis

DEXTech Product Family



Experts

in the Automation of Sample Clean-up



LC Tech

Advantages of automation

- More time for more important tasks
- Reliable, reproducible results
- Faster processing per sample
- Precise, standardised processing - sources of error eliminated

- Since 20 years provider of products and technologies for automated sample preparation
- Since 2013 developer and supplier of automated sample clean-up systems for PCB and dioxin analysis
- 2018 – First fully automated sample clean-up system for PCB and dioxin analysis for sequential and unattended processing of samples
- Development and manufacturing made in Germany

Reliable and reproducible solution for different application



Feed samples



Food samples like fish, meat, fish oil, plant oils, egg



Biological matrices such as blood



Environmental samples like sludge, soil, sediments, and others



Samples, which harden at room temperature, for example vegetable fat

The DEXTech product family offers a suitable solution for everyone.

- For small laboratories with few samples but also for high volume laboratories.
- Single sample processing but also sequential processing for unattended operation around the clock.

Advantages of the DEXTech product family

- Highest possible automation - minimum manual input
- High quality, ready-to-use glass columns
- Simplest one-hand operation by „click-in“ the columns
- Pressure tight locking of columns
- Quantitative sample transfer by rinsing
- Reliable, reproducible results
- Pre-installed default methods – as well as free parametric methods
- Extensive safety features such as leakage sensors, pressure sensors, no mechanical movement when the system is open, and much more.
- Report function for documentation
- Method conformity to EPA-methods and other international regulations
- Shortest run time
- Proven no cross-contamination



Cross-contamination is reliably eliminated:

- Interchangeable columns
- Continuous rinsing of all parts that get in touch with the sample
- The sample and injection pump do not come into contact with each other
- No unrinsed dead volume in valves or tubings

DEXTech Pure

Best Set-up for High Sample Throughput



Perfect clean-up of PCB and Dioxins each in a separate fraction

- Clean-up of PCB and Dioxins in separate fractions
- Separate measurement of PCB and Dioxins in one GC run each
- 3 column set-up based on aluminium-oxide clean-up
- Fast "PCB-only" method for pure PCB-analysis. This environmentally friendly technology saves time, solvent, and therefore money!

All DEXTech systems impress with their simple operation

- 1 Place the sample vial into the sample holder.
- 2 Insert the 3 ready-to-use, high performance columns (see page 14) by the simple „click-in“ system.
- 3 Electrically seal the column pressure-tight by pressing only one button.
- 4 Select either one of the default methods already stored in the system or freely parameterise your own method.
- 5 Start the system.

Now the DEXTech system takes over your work:

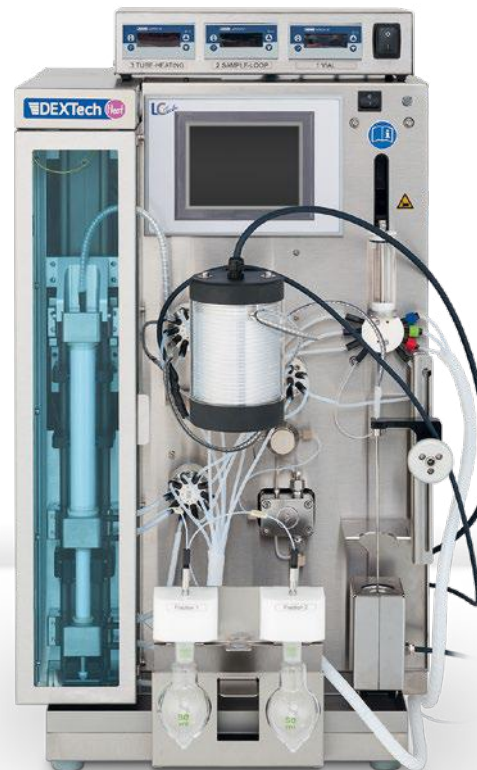
- 1 The sample will be loaded automatically.
- 2 The sample vial will be rinsed for quantitative transfer and combined in the sample loop for loading.
- 3 According to the selected method, the system cleans-up the sample and collects the analytes in small fractions for further processing.

DEXTech Heat

„Causes Every Sample to Melt“

Heated from sample introduction to the first column.

- Especially for samples, which get hard at room temperature, for example PFADs or Stearin
- Constant heating of all involved parts; from sample vial to loading onto the first column
- Homogenous distribution of quantification standards
- Assurance that the sample will be processed without clogging – „Walk away“ solution
- 3 freely selectable heating zones
 - Sample vial
 - Sample loop
 - Tubings
- Based on the DEXTech Pure Technology
- Also applicable for samples that do not harden at room temperature.
- Simultaneous to the fractionation of one sample, offline a heated sample can be stoved.



Heating from sample vial via the sample loop and tubing to the first column.

DEXTech Plus

The Most Flexible System

Selection of columns and fractionation

- Flexibility in fraction selection: 2 or 3 fractions
- Flexibility in column selection: Aluminium-oxide columns or Florisil columns

Safety comes first for all DEXTech systems

- Leakage sensor in the removable drip tray
- Pressure sensor for pressure monitoring
- Door with safety shut-off
- Transferable error report
- Overflow sensor for waste level control (optional)
- After elimination of an error, processing will be continued



“

The DEXTech Plus is running fine,
it's so easy to work with that you
almost forget about it.

CLIFF SVENMAN

Chemical Analyst at
Synlab Linköping, Sweden

Flexible

Different Fractions – Different Systems – Same Technology

Default Method 1 - „Alox Plus Method“

2 fractions

Fraction 1:
Mono-ortho-PCB
+ ndl-PCB + PBDE

Fraction 2:
Non-ortho-PCB
+ PCDD/F



Aluminium-oxide column



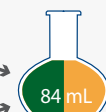
Default Method 2 - „Florisol Method“

2 or 3 fractions

Fraction 1:
Mono-ortho-PCB
+ ndl-PCB + PBDE

Fraction 2:
Non-ortho PCB

Fraction 3:
PCDD/F



Florisol column

*Fraction 1 and 2
can be collected
in one fraction*



Default Method 2 - „Alox Pure Method“

2 fractions

Fraction 1:
Mono-ortho-PCB
+ ndl-PCB + PBDE
+ non-ortho-PCB

Fraction 2:
PCDD/F



Aluminium-oxide column



Dichloromethane / n-hexane



Toluene

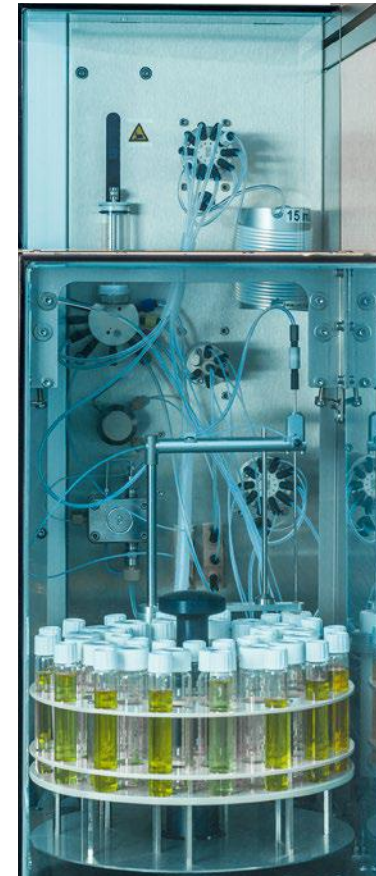


DEXTech 16

The First Fully Automated System for Sequential PCB and Dioxin Analysis

Advantages

- System for high-throughput laboratories for unattended processing of uncomplicated samples that passed the validation on DEXTech Pure.
- Serial processing of 16 samples in sequence without manual interaction.
- Unattended processing around the clock, 24/7
- Optimal capacity utilisation of the GC-MS systems due to overnight operation
- Fluidics of the DEXTech Pure as base for comparative excellent results and simple integration in the existing analysis
- Simple method transfer from DEXTech Pure to DEXTech 16
- Shorter „PCB only“ method for pure PCB analysis available.
- Automatic sampler from closed vials to closed fraction glasses to prevent any evaporation of the samples
- 3 column set-up using Aluminium-oxide columns
- Proven no cross-contamination



Autosampler

Unattended Sample Clean-up Around the Clock



Beyond Comparison

Automation Around the Clock

Preparation time for a sequence – only 30 minutes!

- 1 Load the system with the samples
- 2 Method selection and/or input
- 3 „Click-in“ the columns into the column carousel

Comprehensive safety features

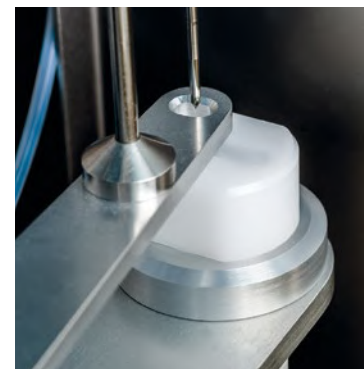
As with the other DEXTech systems, DEXTech 16 also includes many safety features to protect the user and to ensure smooth processing.



Placing samples into the autosampler



Insertion of columns - sensors check, if columns match with method input



Rinsing port for cleaning the needle inside and outside



Touchscreen for easy handling

1 System -
1 Sequence -
16 Samples

No cross-contamination

- Rinsing steps of the needle and tubing
- Disposable columns
- The sample at no point comes into contact with the injection pump
- No unrinsed dead volume of valves or tubings

Proven sample clean-up completed by clever technology

- With the help of the column carousel one column set per sample will be placed in the column tower and there automatically electrically pressure tight locked.
- The methods of DEXTech 16 are identical to DEXTech Pure. This allows a simple method transfer.
- As in DEXTech Pure, two approved standard methods, which are overwrite protected, are provided as default methods as well as 28 further freely selectable parameter driven methods.
- The columns and their composition are the same as used with DEXTech Pure.
- Sensors check whether the columns correspond with the method, which are overwrite protected, input in the system. The software indicates if the columns are not correctly clicked into the column tower.
- In addition, the volume of solvent required by the parametrised sequence will be shown on the touch screen.

Ready for further processing

- After the unattended processing of the sequence, the samples are fully fractionated for further processing, for example for parallel concentration in the D-EVA device (*see page 15*).
- With the special design of the double walled needle, no over-pressure or vacuum occurs when pipetting in the closed fraction glassware.
- Evaporation will also be reliably prevented over longer period, due to the special needle shape the septum seals again after puncturing.



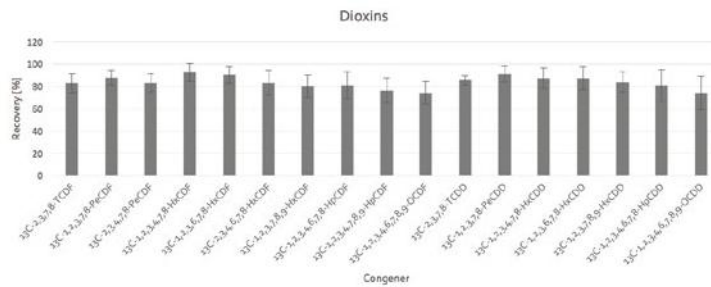
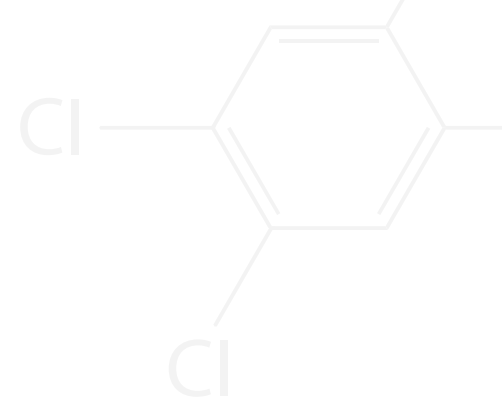
Column carousel is in the forward position for placing the column before processing.



Column carousel is in the rear position with locked columns in the column tower.

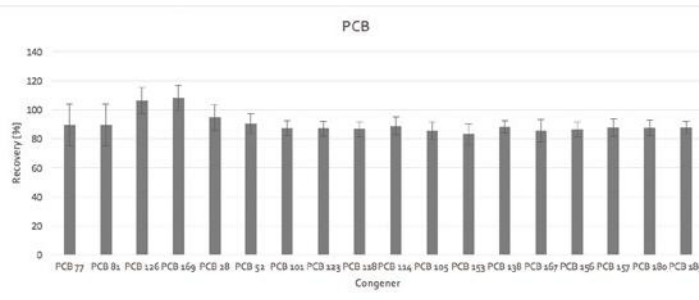
Reliable

Reproducible Results



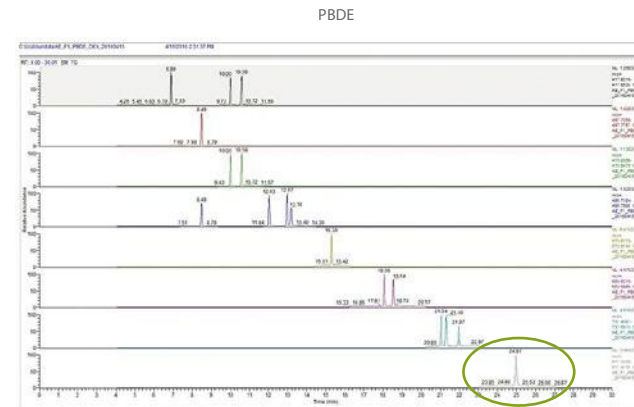
Results Dioxin

Sources: Chemical and Veterinary Investigation Office Münsterland-Emscher-Lippe (governmental laboratory); LCTech Laboratory



Results PCB

Sources: Chemical and Veterinary Investigation Office Münsterland-Emscher-Lippe (governmental laboratory); LCTech Laboratory







Clear signals, sharp separation, low background noise and excellent recoveries
Sources: Bavarian Health and Food Safety Authority (LGL-Oberschleißheim, governmental laboratory); LCTech Laboratory

Excellent recovery
BDE 2019

The Perfect System for Every User

Which DEXTech is the Best One for You?

				
Sample Loading	Single	Single	Single	Sequential
Column 2nd position	Aluminium-oxide	Aluminium-oxide	Aluminium-oxide or Florisil	Aluminium-oxide
Fractions	2	2	2 or 3	2
Fraction 1: Mono-ortho-PCB + ndl-PCB + PBDE	✓	✓	✓	✓
Fraction 2: Non-ortho-PCB + PCDD/F	✓	✓	✓	✓
Fraction 1: Mono-ortho-PCB + ndl-PCB + PBDE + Non-ortho-PCB	✓	✓	-	✓
Fraction 2: PCDD/F				
Fraction 1: Mono-ortho-PCB + ndl-PCB + PBDE				
Fraction 2: Non-ortho-PCB	-	-	✓	-
Fraction 3: PCDD/F				
Heating	-	✓	-	-
Solvents	4	4	3	4
PCB-only analysis	✓	✓	-	✓
Separation of PCBs and dioxins	✓	✓	-	✓
Compliant to US-EPA and European regulations	✓	✓	✓	✓

Columns

Approved and Ready-to-Use

As simple as that:

Take the columns out of the package and click them into the column tower with one hand operation – “just click it”! Without screwing, without any tools, or other manual working steps. Depending on your sample and the selected method, different columns can be inserted in the 3-column set-up.

Acidic silica gel column

- SMART column for samples < 1.5 g fat
- Universal column for samples up to 5 g fat; no pre-cleaning step of the extract needed!

Quick change of columns by using an adapter

Aluminium-oxide column or Florisil column

Depending on numbers and composition of fractions

Cost saving

Carbon column

- Reusable
- In “PCB only” method, this column is not needed and is replaced by a dummy column.

The acidic silica, the aluminium-oxide and the florisil columns are high quality, robust, and quality-tested columns made of glass to avoid any interactions.



Easy insertion of columns in one hand operation



LC Tech columns for PCB and dioxin analysis

D-EVA

Parallel and Fast Concentration

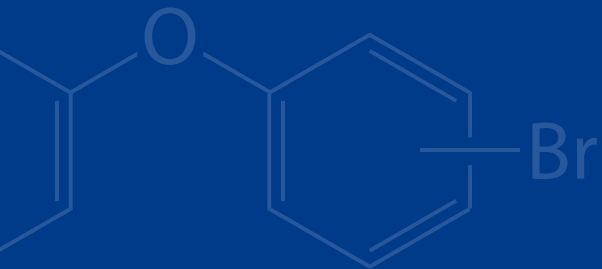
Brilliant solution for concentrating the samples before and after the clean-up step

- Rotational vacuum concentration with automatic stop
- From 1- 47 samples parallel – independent of the number of samples and their position in the rotor
- Different rotors for different containers
- Reliable evaporation to a volume from 10 to 150 μ L; enables transfer into an insert of a GC-vial - even with rinsing of sample container
- Moderate speed during centrifugation results in a centrifugal force which reliably prevents boiling retardation
- Cold trap for collection of solvents avoids vapour in the laboratory and enables easy disposal of waste
- Sensor reliably prevents evaporation to dryness
- Technology and design prevent memory effect after stopping the process
- No cleaning steps during the complete process
- Supply of energy via light
- Space saving in the laboratory due to parallel processing of larger numbers of samples using only one machine
- No cross-contamination

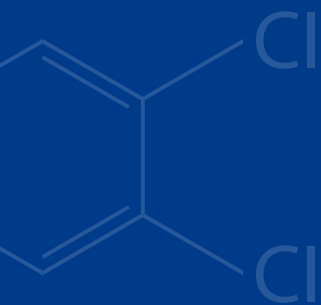
Unattended!

LCtech developed special sensor for automatic stop

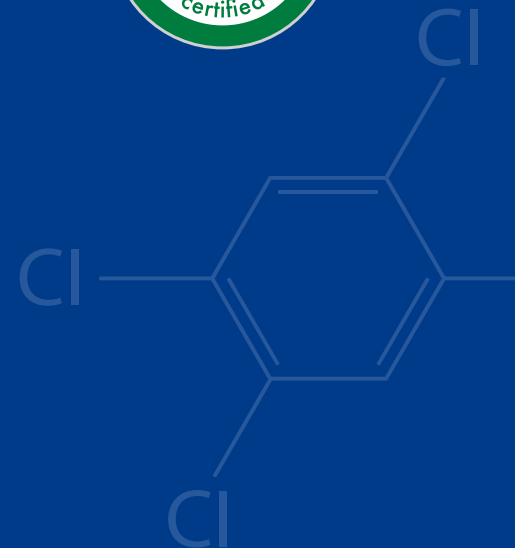




You can find detailed information regarding runtimes and volumes of all DEXTech systems at **www.LCTech.de**



Quality Management
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