LCTech

Automated Sample Preparation

For Dioxin and PCB Analysis

X-TRACTION

D-EVA

DEXTech 16

DEXTech Heat

DEXTech Pure

Every good analysis is the sum of perfect individual steps

LCTech

- From 1998 on provider of products and technologies for automated sample preparation
- 2013 – First automated sample clean-up system for PCB and dioxin analysis
- 2018 – First fully automated sample clean-up system for PCB, PBDEs, PCNs, PCB209, CP and dioxin analysis for sequential and unattended processing of samples
- 2021- LCTech solution with complete automated workflow

Advantages of Automation

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

MADE IN GERMANY

The entire *Dioxin Workflow* covered by powerful LCTech systems!

Sampling

Extraction with *X-TRACTION*

Evaporation with *D-EVA*
time-controlled

Clean-Up with *DEXTech Systems*

Evaporation with *D-EVA*
accurate final volume set-point

Ready for analysis

LCTech Offers Training & Support - From Expert to Expert

The Extraction System by LCTech

Quality from the Very Beginning

A good extraction is the basis for every analysis. The X-TRACTION system works with Pressurised Fluid Extraction (PFE) principle. The innovative design and procedure made by LCTech, offers many advantages in an unique way:

Advantages

- Easiest handling
- Short extraction times
- Solvent volume per cycle: 50 mL
- Solvent volume per rinsing cycle: 10 mL
- Up to 5 cycles with 5 selectable solvents each
- Quick installation with “Plug & Use”
- Extremely low maintenance
- Ready to start default methods

Flexibility for Maximum Performance

To scale up your process, the basic module can easily be adapted to your needs via a data cable with up to 5 expansion modules - retro-fittable at any time.

Flexible options to operate the modules via central touchpad:

- Individual: All units run with different methods, started any time
- Parallel: All units, started simultaneously with the same method
- Mixed-mode: Any number of units run in parallel-mode, rest individual-mode

As Simple as Ingenious: The Extraction Cell

The lids have a build-in magnet for exceptionally easy opening and closing. No threads or additional tools required.

Suitable Solutions 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 – manual handling errors minimised
- High quality ready-to-use columns, up to 5 g of fat, batch certified
- Simplest one-hand operation by “click-in” columns
- Pressure tight locking of columns
- Quantitative sample transfer by automatic rinsing of the sample vial, no sample pre-treatment needed
- Reliable, reproducible results
- Pre-programmed default methods – as well as freely adjustable parameters
- 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 US-EPA-methods and other international regulations
- Shortest run time: 31 minutes (including automated conditioning and sample transfer)

No Cross-Contamination

- Interchangeable columns
- Continuous rinsing of all parts that get in touch with the sample
- The sample does not come in touch with any pump
- No unrinsed dead volume in valves or tubings
- Highly technical, yet easy to maintain

DEXTech Pure

DEXTech Heat

UNIQUE

DEXTech 16

Best Set-up for High Sample Throughput

The Optimised Solution for “pure” Fractions

- Clean-up of PCB and dioxins in separate fractions
- 3 column set-up based on aluminium-oxide clean-up
- Further Methods: Fast “PCB-only” and “Dioxin-only” method for sole PCB or Dioxin analysis

This environmental friendly technology saves time, solvent, and therefore money!

Smart Quick Start of a Sample

- Place the sample vial into the sample holder
- Insert the 3 ready-to-use, high performance columns (see page 11) by the simple “click-in” system
- Seal the column pressure-tight automatically by pressing only one button
- Select either one of the default methods already stored in the system or freely parameterise your own method
- Start the sample

The Most Flexible 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

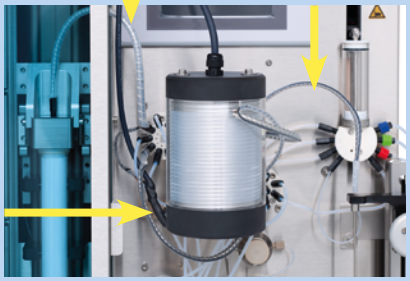
Rinsing of sample vial for quantitive transfer

“Causes Every Sample to Melt”

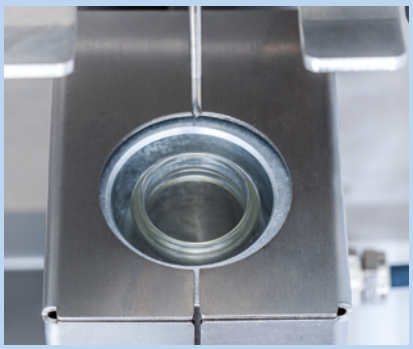
Heated from Sample Introduction to the First Column

- Especially for samples, which harden at room temperature, for example PFADs or stearin
- Constant heating from sample vial holder to the sample loop and heated tubes to the first column
- Homogenous distribution of quantification standards
- “Walk away” solution - Certainty that the sample is processed without clogging
- 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 melted stored
- Each of the heated parts can be set up individually

Heated sample loop



Heating of sample vial holder



The Fully Automated System for Sequencial PCB and Dioxin Analysis

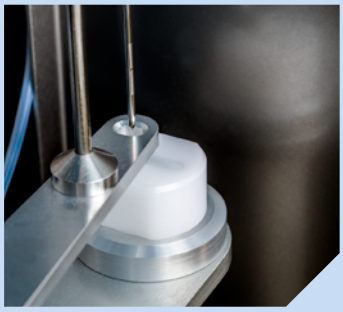
- System for ***high-throughput*** laboratories for unattended processing of uncomplicated samples that passed the validation on DEXTech Pure
- Serial processing of ***15 samples in sequence*** without manual interaction
- ***Unattended processing*** around the clock, 24/7

1 SYSTEM 1 SEQUENCE 15 SAMPLES

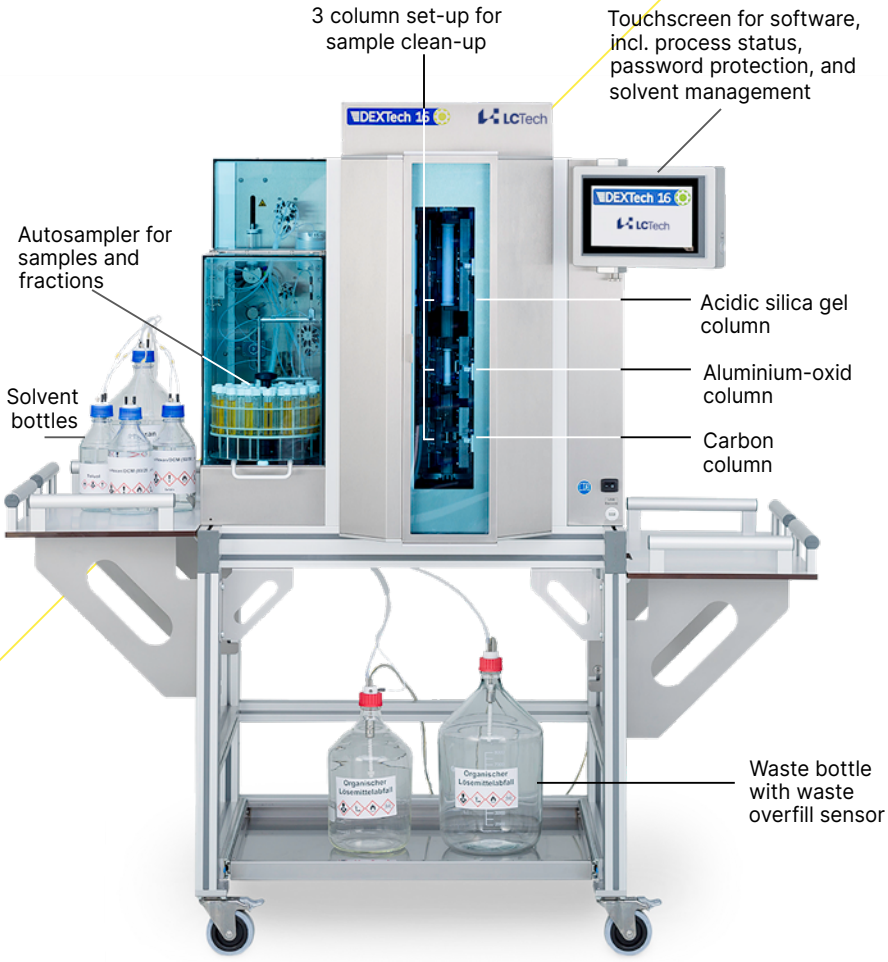
Placing samples in the autosampler

Insertion of column. A sensor checks whether the column matches with the method input

Touchscreen for easy handling



Rinsing port for cleaning the needle inside and outside



No Cross-Contamination

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

Advantages

- “Same Fluidic” as in DEXTech Pure for same excellent results and simple integration in the existing analysis
- Simple method transfer from DEXTech Pure to DEXTech 16
- Autosampler - from closed vials to closed fraction glasses to prevent any evaporation of the samples, fume tight
- 3 column set-up using aluminium oxide columns
- Default methods for the simultaneous clean-up of PCDD/Fs, PCBs, PBDEs and PCNs
- Methods: US-EPA and European directives compliant
- Proven no cross-contamination

See how the DEXTech 16 system works on YouTube

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.

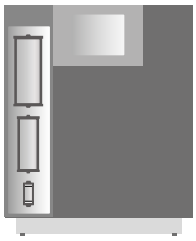
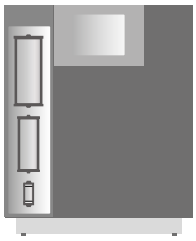
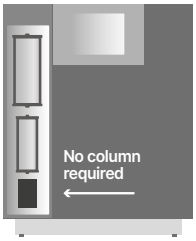
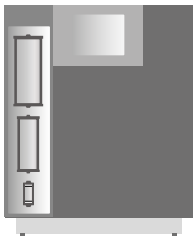
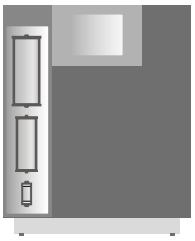
Ready for Further Processing

- 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 12)
- 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 a longer period, due to the special needle shape, the septum seals again after puncturing

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

Default Methods on all DEXTech Systems

Perfectly tailored to your requirements: Choose from pre-programmed standard methods or parameterize your own procedure. The device automatically manages the subsequent steps for you.

				NEW Additional	
Alox PLUS Method	**Alox PURE Method**	**Dioxin only Method**	**PCB only (Mono-ortho-PCB, + ndl-PCB, + non-ortho-PCB)**	**DL - PCB + PCDD/F Method**	**PCB 209 + PCDD/F Method**
3 Columns	**3 Columns**	**2 Columns**	**2 Columns**	**3 Columns**	**3 Columns**
					
Fraction 1 (24 mL*): Mono-ortho-PCB + ndl-PCB + PBDE	**Fraction 1** (24 mL*): Mono-ortho-PCB + ndl-PCB + non-ortho-PCB	**Fraction 1** (24 mL*): -	**Fraction 1** (24 mL*): PCB only (Mono-ortho-PCB, + ndl-PCB, + non-ortho-PCB)	**Fraction 1 (24 mL*): + ndl-PCB**	**Fraction 1 (24 mL**) All 209 PCB**
Fraction 2 (10 mL**): Non-ortho-PCB + PCDD/F + PCNs	**Fraction 2** (10 mL**): PCDD/F	**Fraction 2** (10 mL**): PCDD/F PCNs		**Fraction 2 (10 mL**): DL-PCB+PCDD/F**	**Fraction 2 (10 mL**) PCDD/F**
Total process time: 65 min Total process time SMART: 45 min	Total process time: 72 min Total process time SMART: 52 min	Total process time: 52 min Total process time SMART: 32 min	Total process time: 54 min Total process time SMART: 34 min	**Total process time: 65 min Total process time SMART: 45 min**	**Total process time: 50 min**
Also available as DCM Free Method!	UNIQUE FRACTIONATION: Matching best the analytical setup in many laboratories	Cost saving and DCM Free Method!			

* Dichloromethane / n-hexane

** Toluene

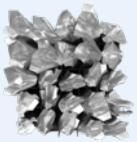
Florisil® or individual fraction required?
Just contact us via **info@LCTech.de** and we will find your solution.

Approved and Ready-to-Use

"Just click it": Outstanding results with proven chemistry for analysis of Dioxine/PCB and other POPs. Take the columns out of the package and click them into the column tower with a simple one-handed operation. No screws, no tools, or additional steps needed. Depending on your sample and chosen method, glass or plastic columns can be inserted into the 3-columns set-up with equivalent results.

Click into any DEXTech System

Carefully single wrapped in polybag packing



Top view of 25 glass columns

Top view of 100 plastic columns

Dioxin Glass Columns

- Proven glass body
- Excellent results
- Very high loading capacity

EVOLUTION Plastic Columns

- Phthalate free (Chemical inert PP)
- Unbreakable
- Very high loading capacity
- Absolutely equivalent results to glass version

Column Overview

	Name	P/N	Material	pcs	Food	Feed	Environmental	Analytes
Position 1	Universal	19511	Glass	25/box	up to 5 g fat	x	x	PCDD/F, PCBs, PBDEs, PCNs
	Universal EVOLUTION	20085	Plastic	100/box	up to 5 g fat	x	x	PCDD/F, PCBs, PCN
	Standard	19512	Glass	25/box	up to 5 g fat	x		PCDD/F, PCBs, PBDEs, PCNs
	PCB209	19871	Glass	25/box	x		x	all 209 PCBs
	PCB209 EVOLUTION	20325	Plastic	100/box	x		x	all 209 PCBs
	SMART	19513	Glass	25/box	up to 1.5 g fat	x	x	PCDD/F, PCBs, PBDEs, PCNs, CPs
Pos. 2	Alox	15433	Glass	25/box	up to 5 g fat	x	x	PCDD/F, PCBs, PBDEs, PCNs
	Alox EVOLUTION	20087	Plastic	100/box	up to 5 g fat	x	x	PCDD/F, PCBs, PBDEs, PCNs
Pos. 3	Carbon column	20777	stainless steel	25/box	up to 5 g fat	x	x	PCDD/F, PCBs, PBDEs, PCNs

Parallel and Fast Concentration

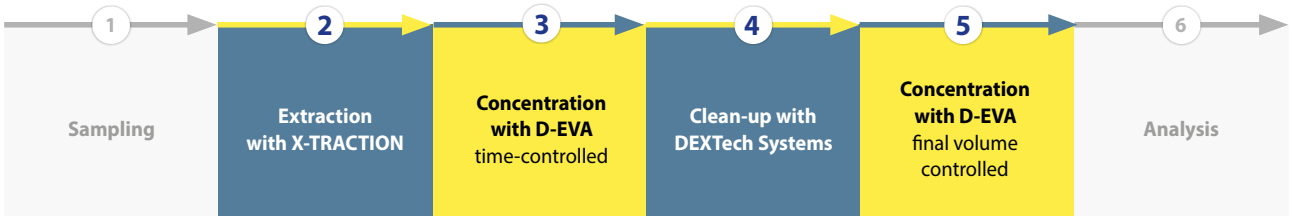
Unattended Concentration!
Due to Automatic Stop Sensor
Designed by LCTech

Brilliant Solution for Concentrating Samples

Before and after the clean-up step

- ***Concentrate*** from ***1 up to 23 samples (PCB rotor)*** or from ***1 up to 53 samples (Dioxin rotor)*** in parallel
- ***Reliably evaporate*** nearly to dryness, to a final volume of 30 to 100 µL for the PCDD/F fraction, or 300 to 500 µL for the PCB fraction
- The ***direct transfer*** into a GC-vial with insert is possible with no need for an additional rinsing of the sample vial
- The technical design reliably ***prevents boiling retardation***, cross-contamination in the head space as well as ***adsorption of the analytes*** to the glass wall
- Supply of thermal energy via infrared lamps; after switching off the lamps ***no further heating and evaporation*** will occur, respectively
- ***Space saving*** in the laboratory due to parallel processing of a larger number of samples using only one system
- ***Complete ready to use system*** comes with high quality Membrane Vacuumpump and Cryotrap
- ***No solvent vapour*** in the laboratory due to Cryotrap
- ***Different rotors*** for different sample vials

D-EVA in the Workflow of Dioxin and PCB Analysis

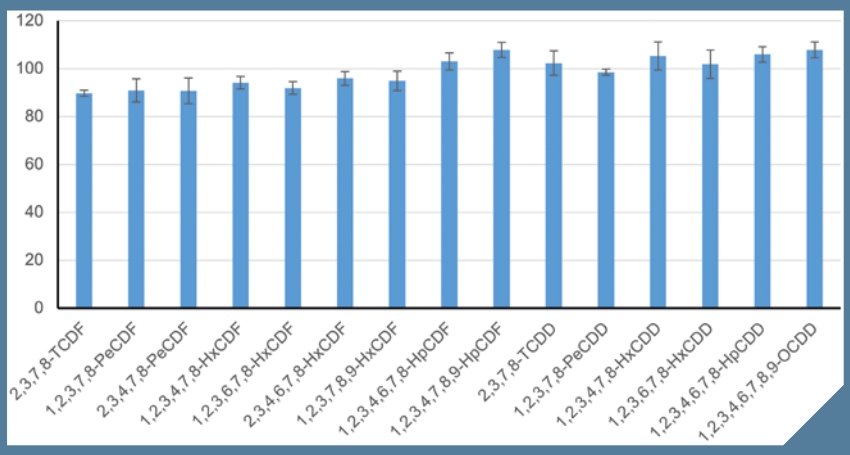


Automatic Stop for Unattended Processing

Due to a ***special LCTech sensor***, the system concentrates your samples with vacuum and energy supply via infrared light to a specified low volume and stops right in time to prevent the sample from being heated after the process has stopped.

Reproducible Results

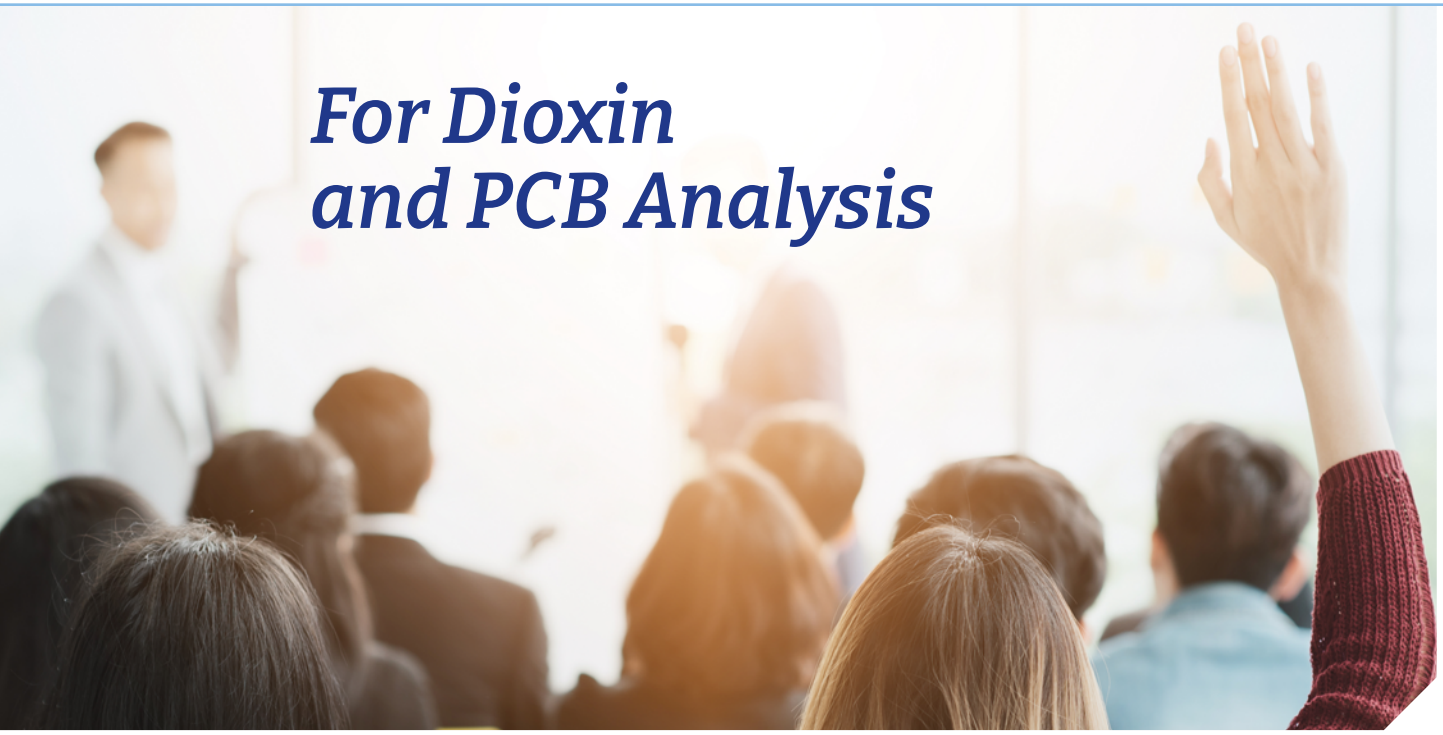
Results for vacuum concentration of dioxin samples with D-EVA, LCTech laboratory.



Recoveries 13C Dioxins D-EVA

Analytes:

PCDD/F
PCB
PBDE
PCN
PFAS
MOSH/MOAH



For Dioxin and PCB Analysis

From the Decision to Start a Dioxin Lab to the First Results with LCTech Solutions

You are Thinking about Analysing Dioxins and PCBs in your Lab?

- Learn the special lab requirements to perform the ultratrace analysis for dioxins and PCBs before planning the lab from scratch!
- Short ways, the right equipment and experience will save time and money!
- Know about the high risk of unintended permanent contamination of a lab, or about difficulties of chromatogram interpretation to avoid wrong positive results!
- Choose the optimal combination of standard solutions, GC-columns right from the beginning without extra testings!
- Shorten the time needed to establish a dioxin lab by several months with experienced experts!

Do You have these Experts in your Lab?

If not, LCTech can help you with individual training of your laboratory technicians to train experts in your own laboratory for the entire workflow from sample collection to results.

Thomas Kerkemeier

Dioxin Specialist and Trainer at LCTech

Expertise

- Over 20 years of first-hand experience as technician and analyst, there of 15 years in a commercial laboratory specialised on dioxines and PCBs.
- Skilled in method development and troubleshooting, data interpretation and optimisation of workflows
- Experienced in planning a laboratory from scratch, laboratory planning of workdays, process- and lean-management
- Establishing of LCTechs QS-laboratory for PCDD/F & PCB consumables within 2 months
- Establishing of the world's first designated dioxin laboratory under GMP requirements
- Establishing a QM system of a release laboratory with successful initial accreditation by DAkkS according to DIN EN ISO/IEC 17025
- University of Münster until 1999 study for a teaching degree in Biology and Chemistry

Operator for Various Measuring Instruments

- DFS-HRMS by Thermo Fisher Scientific
- HRMS-Autospec by Waters
- TSQ Quantiva by Thermo Fisher Scientific
- TSQ EVA 8000 by Thermo Fisher Scientific
- 7000D GC-MS/MS by Agilent

Analyst for Various Parameters

PCDD/F	2,3-MCPD
PCB	Glycidol
PBDE	MOSH/MOAH

inorganic compounds

We offer customised training and support for the complete Dioxin and PCB workflow. Please contact us for an individual offer.

Quality Management
ISO 9001
www.dekra-seal.com

DEKRA certified

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

LCTech

LCTech GmbH
Daimlerstr. 4

84419 Obertaufkirchen, Germany
Tel. +49 8082 2717-0

info@LCTech.de
www.LCTech.de