Quality Control Certificate

Product:	**EVOLUTION Universal Column**
Product No.:	**20085**
Lot No.:	**716866**

Storage Recommendations: **Store the column at room temperature below 25°C**

Description: The EVOLUTION universal column is part of a 3- or 4-column setup used for the sample preparation of environmental-, food- / feed- and similar matrices with DEXTech systems from LCTech for the analysis of polychlorinated dibenzo-p-dioxins (PCDD), polychlorinated dibenzofurans (PCDF) and polychlorinated biphenyl (PCB) congeners.

Quality Control Release Inspection and Test Specification

Test Procedure: A solvent blank, spiked with quantification standard has been cleaned on a DEXTech Plus system, spiked with recovery standard, evaporated via DEva and has been quantified with a HRGC/HRMS DFS from Thermo Fisher Scientific at a resolution of R > 10000.

Results Blank Value:	PCDD/F-TEQ:	0,63	pg/column
		(crit: < 0,7	pg/column)
	dl-PCB-TEQ:	0,041	pg/column
		(crit: < 0,05	pg/column)
	Sum Indikator PCB:	8	pg/column
		(crit: < 100	pg/column)

Results Recoveries:	PCDD/F	81	to	112	%	(crit: 70	to	120)
	PCB	87	to	110	%	(crit: 70	to	120)

This is to certify that the EVOLUTION universal column, Lot 716866, passed the required test specifications and is released for sale.

date: 12.05.2022 sign.: T. Kehemeier

The company LCTech GmbH is certified according to ISO 9001:2015

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Hazards:

NOT FOR HUMAN OR DRUG USE!

The universal column is designed and prepared for usage with the alumina/florisil column and carbon column from LCTech and for laboratory use only. This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion, all procedures should be carried out with suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed according to national and regional regulations.

Quality Control:

All ingredients are traceable to certified lots of our supplier. In addition, any ingredient with a new lot will be checked on contamination and efficiency before releasing for production. Monitoring the ongoing production, several columns are chosen at random day for analysis to check on contamination and efficiency.

Quality Management:

This product was produced using a Quality Management System registered to the ISO 9001:2015 (DEKRA)

Documentation / Data Attached:

Table 1 & 2:	Blank values of PCDD/F and PCB
Table 3 & 4:	13C-Recoveries of PCDD/F and PCB

Analytics:

All the columns (n>5) have to perform a clean-up of a solvent blank (10 mL n-hexane), spiked with a 13C - labelled quantifier-standard solution with a single column method onto a DEXTech Plus system. The fractions 1 (PCB) and 2 (PCDD/F) are spiked with 13C - labelled recovery- standard solutions and evaporated with the D-EVA vacuum centrifuge. The extracts are measured with a HRMS-DFS from Thermo Fisher Scientific with a resolution of R > 10000. The HRGCs are equipped with 60 m DB5 MS columns. For PCDD/F 5µL are injected via PTV, for PCB 2µL via SSL.

Remarks:

Our suppliers maintain the highest standard of quality, however due to the high temperature necessary for several steps in the production, some small charred particles may be visible within a batch of silica or filters without any effect on the clean-up.

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Results:

Lockmass check:

No significant disturbances, or indicators for contaminations are detected.

Blanks:

Table 1: PCDD/F blank (n=6)

Congeneres:	[pg/column]:
2,3,7,8-TCDF	<0,036
1,2,3,7,8-PeCDF	<0,045
2,3,4,7,8-PeCDF	0,14
1,2,3,4,7,8-HxCDF	0,158
1,2,3,6,7,8-HxCDF	0,056
2,3,4,6,7,8-HxCDF	0,4
1,2,3,7,8,9-HxCDF	0,53
1,2,3,4,6,7,8-HpCDF	0,27
1,2,3,4,7,8,9-HpCDF	0,546
OCDF	0,53
2,3,7,8-TCDD	0,07
1,2,3,7,8-PeCDD	0,24
1,2,3,4,7,8-HxCDD	0,56
1,2,3,6,7,8-HxCDD	0,46
1,2,3,7,8,9-HxCDD	0,48
1,2,3,4,6,7,8-HpCDD	0,47
OCDD	1,3

TEQ (WHO 2005)	
lower bound	0,63
upper bound	0,63

Table 2: PCB blank (n=6)

Congeneres:	[pg/column]:
PCB 28	2,54
PCB 52	2,07
PCB 77	0,29
PCB 81	0,108
PCB 101	1,01
PCB 123	0,1874
PCB 118	0,91
PCB 114	0,2201
PCB 105	0,46
PCB 126	0,3729
PCB 153	0,94
PCB 138	0,98
PCB 167	0,154
PCB 156	0,22
PCB 157	0,146
PCB 169	0,112
PCB 180	0,3
PCB 189	0,241

TEQ (WHO 2005)	
lower bound	0,0408
upper bound	0,0408

Sum DIN PCB	8

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Results:

13C-Recoveries

Table 3: PCDD/F 13C-recoveries (n=6)

Congeneres:	13C rec [%]
2,3,7,8-TCDF	94
1,2,3,7,8-PeCDF	95
2,3,4,7,8-PeCDF	94
1,2,3,4,7,8-HxCDF	86
1,2,3,6,7,8-HxCDF	95
2,3,4,6,7,8-HxCDF	96
1,2,3,7,8,9-HxCDF	92
1,2,3,4,6,7,8-HpCDF	111
1,2,3,4,7,8,9-HpCDF	112
OCDF	110
2,3,7,8-TCDD	95
1,2,3,7,8-PeCDD	92
1,2,3,4,7,8-HxCDD	86
1,2,3,6,7,8-HxCDD	81
1,2,3,7,8,9-HxCDD	100
1,2,3,4,6,7,8-HpCDD	110
OCDD	110

Table 4: PCB 13C-recoveries (n=6)

Congeneres:	13C rec [%]
PCB 28	94
PCB 52	95
PCB 77	96
PCB 81	100
PCB 101	98
PCB 123	97
PCB 118	94
PCB 114	97
PCB 105	91
PCB 126	101
PCB 153	97
PCB 138	102
PCB 167	97
PCB 156	110
PCB 157	87
PCB 169	95
PCB 180	99
PCB 189	92

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