Quality Control Certificate

Product: **Universal Column**

Product No.: 19511

Lot No.: 717770

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

Description: The 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 with the D-EVA 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:	0,32	pg/column
		(crit: < 0,7	pg/column)
	dl-PCB-TEQ:	0,013	pg/column
		(crit: < 0,05	pg/column)
	Sum Total PCB:	4,5	pg/column
		(crit: < 300	pg/column)

Results Recoveries:	PCDD/F	76	to	102	%	(crit:	45	to	130	%)
	PCB	84	to	107	%	(crit:	45	to	130	%)

This is to certify that the Universal Column, Lot 717770, passed the required test specifications and is released for sale.

date: 09.01.2023 sign.: T. Kehemeier

The company LCTech GmbH is certified according to ISO 9001

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Hazards:	NOT FOR HUMAN OR DRUG USE! The Carbon Column is designed and prepared for usage with the Alumina/Florisil Column and Universal/standard & Smart 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: blankvalues 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 default alumina plus or pure 209 method onto a DEXTech Pure or Plus system. There are 2 fractions, fraction 1 (all 209 PCB) and fraction 2 (PCDD/F). Both fractions are spiked with the corresponding 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
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: n= 7

Table 1: PCDD/F blank

sample amount [pg/column]		[pg/column]
	2,3,7,8-TCDF	0,15
	1,2,3,7,8-PeCDF	<0,045
	2,3,4,7,8-PeCDF	<0,081
	1,2,3,4,7,8-HxCDF	<0,027
	1,2,3,6,7,8-HxCDF	0,051
	2,3,4,6,7,8-HxCDF	0,08
	1,2,3,7,8,9-HxCDF	0,09
	1,2,3,4,6,7,8-HpCDF	<0,063
	1,2,3,4,7,8,9-HpCDF	0,041
	1,2,3,4,6,7,8,9-OCDF	0,47
	2,3,7,8-TCDD	0,14
	1,2,3,7,8-PeCDD	0,1
	1,2,3,4,7,8-HxCDD	<0,027
	1,2,3,6,7,8-HxCDD	<0,108
	1,2,3,7,8,9-HxCDD	0,034
	1,2,3,4,6,7,8-HpCDD	0,09
	1,2,3,4,6,7,8,9-OCDD	1

PCDD/F TEQ (2005)	[pg/column]
lower bound	0,32
upper bound	0,32

Table 2: PCB blank

sample amount [pg/sample]		[pg/column]
	PCB-#28	1,06
	PCB-#52	1,27
	PCB-#101	0,91
	PCB-#153	0,46
	PCB-#138	0,45
	PCB-#180	0,389
	PCB-#81	0,18
	PCB-#77	<0,18
	PCB-#126	0,1042
	PCB-#169	0,079
	PCB-#123	0,6
	PCB-#118	0,53
	PCB-#114	0,228
	PCB-#105	0,48
	PCB-#167	0,313
	PCB-#156	0,536
	PCB-#157	0,2
	PCB-#189	0,642

PCB-TEQ	[pg/column]
lower bound	0,013
upper bound	0,013
Sum DIN	4,5

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Table 3: PCDD/F recoveries

PCDD/F 13C Recoveries [%]	[%]	RSD [%]
2,3,7,8-TCDF	93	12
1,2,3,7,8-PeCDF	87	7
2,3,4,7,8-PeCDF	92	12
1,2,3,4,7,8-HxCDF	76	12
1,2,3,6,7,8-HxCDF	86	11
2,3,4,6,7,8-HxCDF	80	15
1,2,3,7,8,9-HxCDF	82	15
1,2,3,4,6,7,8-HpCDF	102	8
1,2,3,4,7,8,9-HpCDF	90	11
1,2,3,4,6,7,8,9-OCDF	95	8
2,3,7,8-TCDD	86	7
1,2,3,7,8-PeCDD	93	14
1,2,3,4,7,8-HxCDD	83	17
1,2,3,6,7,8-HxCDD	77	7
1,2,3,7,8,9-HxCDD	81	14
1,2,3,4,6,7,8-HpCDD	96	5
1,2,3,4,6,7,8,9-OCDD	82	4

Table 4: PCB recoveries

PCB 13C Recoveries [%]	[%]	RSD [%]
PCB-#28	90	4
PCB-#52	85	11
PCB-#101	97	6
PCB-#153	94	6
PCB-#138	100	5
PCB-#180	102	6
PCB-#81	93	6
PCB-#77	107	6
PCB-#126	107	7
PCB-#169	105	9
PCB-#123	92	15
PCB-#118	84	21
PCB-#114	97	8
PCB-#105	93	25
PCB-#167	89	16
PCB-#156	92	16
PCB-#157	94	25
PCB-#189	84	18

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