Quality Control Certificate

Product: **EVOLUTION Alox Column**

Product No.: 20087

Lot No.: 718250

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

Description: The EVOLUTION Alumina Column is part of a 3-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:	0,06	pg/column
		(crit: < 0,7	pg/column)
	dl-PCB-TEQ:	0,0306	pg/column
		(crit: < 0,05	pg/column)
	Sum Total PCB:	18,2	pg/column
		(crit: < 300	pg/column)

Results Recoveries:	PCDD/F	93	to	120	%	(crit:	70	to	120	%)
	PCB	90	to	116	%	(crit:	70	to	120	%)

This is to certify that the EVOLUTION Alox Column, Lot 718250, passed the required test specifications and is released for sale.

date: 13.04.2023 sign.: T. Kehmeier

The company LCTech GmbH is certified according to ISO 9001

LCTech GmbH
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Hazards:	NOT FOR HUMAN OR DRUG USE! The 209 Column is designed and prepared for usage with the Alumina 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	n/a

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Results:

Lockmass check: No significant disturbances, or indicators for contaminations are detected.

Blanks: n= 6

Table 1: PCDD/F blank

sample amount [pg/column]		[pg/column]
	2,3,7,8-TCDF	<dl
	1,2,3,7,8-PeCDF	<dl
	2,3,4,7,8-PeCDF	<dl
	1,2,3,4,7,8-HxCDF	<0,027
	1,2,3,6,7,8-HxCDF	<0,018
	2,3,4,6,7,8-HxCDF	<dl
	1,2,3,7,8,9-HxCDF	<0,045
	1,2,3,4,6,7,8-HpCDF	<dl
	1,2,3,4,7,8,9-HpCDF	<dl
	1,2,3,4,6,7,8,9-OCDF	<0,054
	2,3,7,8-TCDD	<dl
	1,2,3,7,8-PeCDD	<dl
	1,2,3,4,7,8-HxCDD	<dl
	1,2,3,6,7,8-HxCDD	<dl
	1,2,3,7,8,9-HxCDD	0,074
	1,2,3,4,6,7,8-HpCDD	0,16
	1,2,3,4,6,7,8,9-OCDD	0,31

Table 2: PCB blank

sample amount [pg/sample]		[pg/column]
	PCB-#28	6,87
	PCB-#52	7,38
	PCB-#101	1,93
	PCB-#153	0,66
	PCB-#138	0,8
	PCB-#180	0,537
	PCB-#81	<dl
	PCB-#77	<dl
	PCB-#126	<dl
	PCB-#169	<dl
	PCB-#123	0,27
	PCB-#118	0,68
	PCB-#114	0,211
	PCB-#105	0,32
	PCB-#167	0,106
	PCB-#156	0,125
	PCB-#157	0,1
	PCB-#189	0,29

PCDD/F TEQ (2005)	[pg/column]
lower bound	0,01
upper bound	0,06

PCB-TEQ	[pg/column]
lower bound	0,0306
upper bound	0,0306
Sum DIN	18,2

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Table 3: PCDD/F recoveries

PCDD/F 13C Recoveries [%]	[%]	RSD [%]
2,3,7,8-TCDF	105	7
1,2,3,7,8-PeCDF	93	13
2,3,4,7,8-PeCDF	115	11
1,2,3,4,7,8-HxCDF	101	8
1,2,3,6,7,8-HxCDF	109	8
2,3,4,6,7,8-HxCDF	102	11
1,2,3,7,8,9-HxCDF	96	17
1,2,3,4,6,7,8-HpCDF	120	2
1,2,3,4,7,8,9-HpCDF	101	11
1,2,3,4,6,7,8,9-OCDF	98	9
2,3,7,8-TCDD	104	9
1,2,3,7,8-PeCDD	110	14
1,2,3,4,7,8-HxCDD	112	10
1,2,3,6,7,8-HxCDD	94	8
1,2,3,7,8,9-HxCDD	106	12
1,2,3,4,6,7,8-HpCDD	113	3
1,2,3,4,6,7,8,9-OCDD	96	9

Table 4: PCB recoveries

PCB 13C Recoveries [%]	[%]	RSD [%]
PCB-#28	98	2
PCB-#52	97	2
PCB-#101	99	1
PCB-#153	94	2
PCB-#138	96	1
PCB-#180	94	1
PCB-#81	110	0
PCB-#77	111	0
PCB-#126	116	0
PCB-#169	108	0
PCB-#123	98	1
PCB-#118	96	2
PCB-#114	90	1
PCB-#105	96	1
PCB-#167	99	2
PCB-#156	96	2
PCB-#157	99	2
PCB-#189	93	3

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