

Quality Control Certificate

Product: **EVOLUTION Universal Column**
 Product No.: 20085
 Lot No.: **178139**

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 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:	0,21	pg/column
		(crit: <	0,7 pg/column)
	dl-PCB-TEQ:	0,0054	pg/column
		(crit: <	0,05 pg/column)
	Sum Total PCB:	19	pg/column
		(crit: <	300 pg/column)

Results Recoveries:	PCDD/F	71	to	108	%	(crit: 70	to	120	%)
	PCB	80	to	114	%	(crit: 70	to	120	%)

This is to certify that the EVOLUTION Universal Column, Lot 178139, passed the required test specifications and is released for sale.

date: 03.04.2023 sign.: T. Kehmeier

The company LCTech GmbH is certified according to ISO 9001



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Hazards:	<p>NOT FOR HUMAN OR DRUG USE!</p> <p>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.</p>
Quality Control:	<p>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.</p>
Quality Management:	<p>This product was produced using a Quality Management System registered to the ISO 9001:2015 (DEKRA)</p>
Documentation / Data Attached:	<p>table 1 & 2: blankvalues of PCDD/F and PCB table 3 & 4: 13C-Recoveries of PCDD/F and PCB</p>
Analytics	<p>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</p>
Remarks	<p>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.</p>

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Results:

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

Blanks: n= 11

Table 1: PCDD/F blank

	[pg/column]
2,3,7,8-TCDF	0,08
1,2,3,7,8-PeCDF	<0,045
2,3,4,7,8-PeCDF	0,13
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	<0,063
1,2,3,4,7,8,9-HpCDF	0,025
1,2,3,4,6,7,8,9-OCDF	0,19
2,3,7,8-TCDD	<0,036
1,2,3,7,8-PeCDD	0,1
1,2,3,4,7,8-HxCDD	0,062
1,2,3,6,7,8-HxCDD	<0,108
1,2,3,7,8,9-HxCDD	<0,027
1,2,3,4,6,7,8-HpCDD	0,11
1,2,3,4,6,7,8,9-OCDD	0,36

Table 2: PCB blank

	[pg/column]
PCB-#28	5,26
PCB-#52	3,78
PCB-#101	2,44
PCB-#153	3,74
PCB-#138	2,61
PCB-#180	1,173
PCB-#81	0,06
PCB-#77	<dl
PCB-#126	0,0431
PCB-#169	<0,045
PCB-#123	0,34
PCB-#118	1,36
PCB-#114	0,4
PCB-#105	0,73
PCB-#167	0,579
PCB-#156	0,523
PCB-#157	0,41
PCB-#189	0,783

PCDD/F TEQ (2005)	[pg/column]
lower bound	0,21
upper bound	0,21

PCB-TEQ	[pg/column]
lower bound	0,0054
upper bound	0,005
Sum DIN	19

Table 3: PCDD/F recoveries

	[%]	RSD [%]	
PCDD/F 13C Recoveries [%]	2,3,7,8-TCDF	92	12
	1,2,3,7,8-PeCDF	89	9
	2,3,4,7,8-PeCDF	75	35
	1,2,3,4,7,8-HxCDF	71	20
	1,2,3,6,7,8-HxCDF	81	15
	2,3,4,6,7,8-HxCDF	82	11
	1,2,3,7,8,9-HxCDF	89	18
	1,2,3,4,6,7,8-HpCDF	106	8
	1,2,3,4,7,8,9-HpCDF	108	10
	1,2,3,4,6,7,8,9-OCDF	101	9
	2,3,7,8-TCDD	92	7
	1,2,3,7,8-PeCDD	90	16
	1,2,3,4,7,8-HxCDD	77	26
	1,2,3,6,7,8-HxCDD	74	7
	1,2,3,7,8,9-HxCDD	91	14
	1,2,3,4,6,7,8-HpCDD	107	6
	1,2,3,4,6,7,8,9-OCDD	95	6

Table 4: PCB recoveries

	[%]	RSD [%]	
PCB 13C Recoveries [%]	PCB-#28	99	6
	PCB-#52	99	12
	PCB-#101	101	4
	PCB-#153	114	22
	PCB-#138	106	16
	PCB-#180	99	14
	PCB-#81	96	47
	PCB-#77	104	48
	PCB-#126	113	55
	PCB-#169	112	56
	PCB-#123	88	11
	PCB-#118	83	10
	PCB-#114	84	20
	PCB-#105	82	20
	PCB-#167	86	11
	PCB-#156	83	19
	PCB-#157	80	16
	PCB-#189	82	22