Quality Control Certificate

Product:	**EVOLUTION Universal Column**
Product No.:	20085
Lot No.:	**718191**

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:	0,06	pg/column
		(crit: < 0,7	pg/column)
	dl-PCB-TEQ:	0,003	pg/column
		(crit: < 0,05	pg/column)
	Sum Total PCB:	6,9	pg/column
		(crit: < 300	pg/column)

Results Recoveries:	PCDD/F	70	to	105	%	(crit:	70	to	120	%)
	PCB	72	to	97	%	(crit:	70	to	120	%)

This is to certify that the EVOLUTION Universal Column, Lot 718191, passed the required test specifications and is released for sale.

date: 23.05.2023 sign.: T. Kehmeier

The company LCTech GmbH is certified according to ISO 9001

LCTech GmbH
Daimlerstrasse 4, 84419 Obertaufkirchen
Germany

QC-Certificate - 20085 - 718191

Hazards:	NOT FOR HUMAN OR DRUG USE! The EVOLUTION 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: blankvalues of PCDD/F and PCB table 3 & 4: 13C-Recoveries of PCDD/F and PCB
Analytics	This is to certify that the EVOLUTION Universal Column, Lot , passed the required test specifications and is released for sale.
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.

LCTech GmbH
Daimlerstrasse 4, 84419 Obertaufkirchen, Germany,
Tel +49 8082 2717 - 0, info@lctech.de, www.lctech.de

QC-Certificate - 20085 - 718191

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	<0,036
	1,2,3,7,8-PeCDF	<dl
	2,3,4,7,8-PeCDF	<dl
	1,2,3,4,7,8-HxCDF	<dl
	1,2,3,6,7,8-HxCDF	<dl
	2,3,4,6,7,8-HxCDF	<dl
	1,2,3,7,8,9-HxCDF	<dl
	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	<dl
	2,3,7,8-TCDD	<dl
	1,2,3,7,8-PeCDD	<0,054
	1,2,3,4,7,8-HxCDD	<dl
	1,2,3,6,7,8-HxCDD	<dl
	1,2,3,7,8,9-HxCDD	<dl
	1,2,3,4,6,7,8-HpCDD	<dl
	1,2,3,4,6,7,8,9-OCDD	<dl

Table 2: PCB blank

sample amount [pg/sample]		[pg/column]
	PCB-#28	2,44
	PCB-#52	1,87
	PCB-#101	0,62
	PCB-#153	1,04
	PCB-#138	0,44
	PCB-#180	0,473
	PCB-#81	<dl
	PCB-#77	<0,045
	PCB-#126	0
	PCB-#169	<0,027
	PCB-#123	<0,18
	PCB-#118	0,32
	PCB-#114	0,084
	PCB-#105	0,14
	PCB-#167	0,072
	PCB-#156	0,058
	PCB-#157	0,08
	PCB-#189	0,106

PCDD/F TEQ (2005)	[pg/column]
lower bound	0,03
upper bound	0,06

PCB-TEQ	[pg/column]
lower bound	0,003
upper bound	0,003
Sum DIN	6,9

LCTech GmbH
Daimlerstrasse 4, 84419 Obertaufkirchen, Germany,
Tel +49 8082 2717 - 0, info@lctech.de, www.lctech.de

QC-Certificate - 20085 - 718191

Table 3: PCDD/F recoveries

PCDD/F 13C Recoveries [%]	[%]	RSD [%]
2,3,7,8-TCDF	94	7
1,2,3,7,8-PeCDF	70	6
2,3,4,7,8-PeCDF	76	9
1,2,3,4,7,8-HxCDF	93	13
1,2,3,6,7,8-HxCDF	104	12
2,3,4,6,7,8-HxCDF	105	11
1,2,3,7,8,9-HxCDF	102	10
1,2,3,4,6,7,8-HpCDF	104	8
1,2,3,4,7,8,9-HpCDF	96	7
1,2,3,4,6,7,8,9-OCDF	90	7
2,3,7,8-TCDD	72	9
1,2,3,7,8-PeCDD	72	9
1,2,3,4,7,8-HxCDD	103	9
1,2,3,6,7,8-HxCDD	89	11
1,2,3,7,8,9-HxCDD	103	9
1,2,3,4,6,7,8-HpCDD	97	7
1,2,3,4,6,7,8,9-OCDD	86	7

Table 4: PCB recoveries

PCB 13C Recoveries [%]	[%]	RSD [%]
PCB-#28	89	5
PCB-#52	79	6
PCB-#101	86	14
PCB-#153	85	23
PCB-#138	97	4
PCB-#180	91	11
PCB-#81	76	6
PCB-#77	78	6
PCB-#126	72	14
PCB-#169	75	10
PCB-#123	86	4
PCB-#118	83	4
PCB-#114	89	6
PCB-#105	85	4
PCB-#167	83	6
PCB-#156	89	5
PCB-#157	89	4
PCB-#189	87	4

LCTech GmbH
Daimlerstrasse 4, 84419 Obertaufkirchen, Germany,
Tel +49 8082 2717 - 0, info@lctech.de, www.lctech.de