



CERTIFICATE OF ANALYSIS

Work Order	: PR24B1931	Issue Date	: 18-Oct-2024
Customer	: ALS Laboratory Services doo	Laboratory	: ALS Czech Republic, s.r.o.
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Project	: Dioxin emission analyses	Page	: 1 of 3
Order number	: ----	Date Samples	: 16-Sep-2024
		Received	
		Quote number	: PR2023ALSLA-RS0001 (CZ-251-23-0421)
Site	: Serbia	Date of test	: 17-Sep-2024 - 17-Oct-2024
Sampled by	: customer	QC Level	: ALS CR Standard Quality Control Schedule

General Comments

This report shall not be reproduced except in full, without prior written approval from the laboratory. The laboratory is not responsible for the sample data supplied by the customer and their impact on the validity of the result.

The laboratory declares that the test results relate only to the listed samples. If "ALS" is not included in the test report in the "Sampled by" section, then the results refer to the sample as received.

samples PR24B1931/001,002 - A-DFHMS02, A-PCBHMS03 - the results are recalculated and expressed in ng/Nm3 based on data provided by the client

Responsible for accuracy

Testing Laboratory No. 1163
Accredited by CAI according to
CSN EN ISO/IEC 17025:2018

Signatories

Lubomír Pokorný

Position

Country Manager



The company is certified according to ČSN EN ISO 14001 (Environmental management systems) and ČSN ISO 45001 (Occupational health and safety management systems)



Analytical Results

Sub-Matrix: AIR

				Client sample ID		7 (21.5. - 1.7.2024)		8 (1.7. - 1.8.2024)		----	
				Laboratory sample ID		PR24B1931001		PR24B1931002		----	
				Client sampling date / time		[16-Sep-2024]		[16-Sep-2024]		----	
Parameter	Method	LOR	Unit	Result	MU	Result	MU	Result	MU	Result	MU
PCDDs and PCDFs (Dioxins and Furans)											
2378-TCDD	A-DFHMS02	-	ng/m³	<0.000027	----	0.00028	----	----	----	----	----
12378-PeCDD	A-DFHMS02	-	ng/m³	0.0003	----	0.00036	----	----	----	----	----
123478-HxCDD	A-DFHMS02	-	ng/m³	0.0012	----	0.0032	----	----	----	----	----
123678-HxCDD	A-DFHMS02	-	ng/m³	0.0031	----	0.0054	----	----	----	----	----
123789-HxCDD	A-DFHMS02	-	ng/m³	0.0015	----	0.0026	----	----	----	----	----
1234678-HpCDD	A-DFHMS02	-	ng/m³	0.0160	± 30.0%	0.0290	± 30.0%	----	----	----	----
OCDD	A-DFHMS02	-	ng/m³	0.0120	± 30.0%	0.0230	± 30.0%	----	----	----	----
2378-TCDF	A-DFHMS02	-	ng/m³	0.00038	----	0.0054	----	----	----	----	----
12378-PeCDF	A-DFHMS02	-	ng/m³	0.0011	----	0.0038	----	----	----	----	----
23478-PeCDF	A-DFHMS02	-	ng/m³	0.00370	± 30.0%	0.00770	± 30.0%	----	----	----	----
123478-HxCDF	A-DFHMS02	-	ng/m³	0.0024	----	0.0033	----	----	----	----	----
123678-HxCDF	A-DFHMS02	-	ng/m³	0.0027	----	0.0038	----	----	----	----	----
123789-HxCDF	A-DFHMS02	-	ng/m³	0.00011	----	0.0002	----	----	----	----	----
234678-HxCDF	A-DFHMS02	-	ng/m³	0.0051	----	0.0059	----	----	----	----	----
1234678-HpCDF	A-DFHMS02	-	ng/m³	0.00710	± 30.0%	0.00660	± 30.0%	----	----	----	----
1234789-HpCDF	A-DFHMS02	-	ng/m³	0.00087	----	0.00047	----	----	----	----	----
OCDF	A-DFHMS02	-	ng/m³	0.00110	± 30.0%	0.00094	± 30.0%	----	----	----	----
TEQ-Lowerbound	A-DFHMS02	-	ng/m³	0.0033	----	0.0064	----	----	----	----	----
TEQ-Upperbound	A-DFHMS02	-	ng/m³	0.0033	----	0.0064	----	----	----	----	----
PCB dioxin-like HRMS											
PCB 77	A-PCBHMS03	-	ng/m³	0.00140	± 30.0%	0.0210	± 30.0%	----	----	----	----
PCB 81	A-PCBHMS03	-	ng/m³	0.00044	± 30.0%	0.00740	± 30.0%	----	----	----	----
PCB 105	A-PCBHMS03	-	ng/m³	0.00330	± 30.0%	0.0150	± 30.0%	----	----	----	----
PCB 114	A-PCBHMS03	-	ng/m³	<0.000076	----	0.00051	± 30.0%	----	----	----	----
PCB 118	A-PCBHMS03	-	ng/m³	0.0110	± 30.0%	0.0170	± 30.0%	----	----	----	----
PCB 123	A-PCBHMS03	-	ng/m³	0.00530	± 30.0%	0.00240	± 30.0%	----	----	----	----
PCB 126	A-PCBHMS03	-	ng/m³	0.00290	± 30.0%	0.0170	± 30.0%	----	----	----	----
PCB 156	A-PCBHMS03	-	ng/m³	0.00260	± 30.0%	0.00640	± 30.0%	----	----	----	----
PCB 157	A-PCBHMS03	-	ng/m³	0.00089	± 30.0%	0.00400	± 30.0%	----	----	----	----
PCB 167	A-PCBHMS03	-	ng/m³	0.00320	± 30.0%	0.00630	± 30.0%	----	----	----	----
PCB 169	A-PCBHMS03	-	ng/m³	0.00140	± 30.0%	0.00440	± 30.0%	----	----	----	----
PCB 170	A-PCBHMS03	-	ng/m³	0.00540	± 30.0%	0.0110	± 30.0%	----	----	----	----
PCB 180	A-PCBHMS03	-	ng/m³	0.0100	± 30.0%	0.0110	± 30.0%	----	----	----	----
PCB 189	A-PCBHMS03	-	ng/m³	0.00130	± 30.0%	0.00370	± 30.0%	----	----	----	----
TEQ (dl-PCB) - lower	A-PCBHMS03	-	ng/m³	0.00034	----	0.0018	----	----	----	----	----
TEQ (dl-PCB) - upper	A-PCBHMS03	-	ng/m³	0.00034	----	0.0018	----	----	----	----	----

When sampling date is not provided by the client, the laboratory determines it for procedural reasons, then it is equal to the date of receipt of the sample to the laboratory and is displayed in brackets. Measurement uncertainty is expressed as expanded measurement uncertainty with coverage factor k = 2, representing 95% confidence level.

Key: LOR = Limit of reporting; MU = Measurement Uncertainty. The MU does not include sampling uncertainty.

Brief Method Summaries

Analytical Methods	Method Descriptions
Location of test performance: V Raji 906 Pardubice - Zelene Predmesti Czech Republic 530 02	
A-DFHMS02	CZ_SOP_D06_06_174 (CSN EN 1948-2, CSN EN 1948-3): Determination of polychlorinated dibenzo-p-dioxins and dibenzofuranes in emission samples by isotope dilution method using HRGC-HRMS and calculation of TEQ parameters from measured values. The samples were stored in laboratory in the darkness and under temperature <4°C. Actual LOQ are noticed in the attachment.

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<i>Analytical Methods</i>	<i>Method Descriptions</i>
A-PCBHMS03	CZ_SOP_D06_06_179 (ČSN EN 1948-4, US EPA Method TO-4A) Determination of PCB by isotope dilution method using HRGC-HRMS and calculation of PCB sums from measured values. The samples were stored in laboratory in the darkness and under temperature <4°C. Actual LOQ are noticed in the annex.
<i>Preparation Methods</i>	<i>Method Descriptions</i>
<i>Location of test performance: V Raji 906 Pardubice - Zelene Predmesti Czech Republic 530 02</i>	
*A-PP-XAD	Preparation of cleaned XAD-2 sorbent dose for emission sampling

The symbol "*" for the method indicates a test outside the scope of accreditation of the laboratory or subcontractor. If the UNICO-SUB code is stated in the method table, this only informs that the tests have been performed by a subcontractor and the results are given in an annex to the test report, including information on test accreditation. If the lab used for matrix outside the scope of accreditation or non-standard sample matrix procedure specified in the accredited method and issues non-accredited results, this fact is stated on the title page of this protocol in the section "Notes". If the test report shows the results of subcontracting, the place of performance of the test is outside the laboratories of ALS Czech Republic, s.r.o.

The method for calculating of the summation parameters is available on request in the customer service.

The end of the certificate of analysis

Attachment no. 1 to the Certificate of Analysis for work order PR24B1931

Sample:

7 (21.5. - 1.7.2024)

Measurement results PCDD/Fs:

Sample: 7 (21.5. - 1.7.2024)			Final extract [µl]: 60		
Sampled volume [Nm³]: 550.07			Injection volume [µl]: 4		
			Acquisition date [d.m.y h:m]: 26.9.24 11:15		
2,3,7,8-PCDD/F	Result	Limit of Detection	Limit of Quantification	¹ WHO-TEFs	WHO-TEQ
	[ng/Nm³]	[ng/Nm³]	[ng/Nm³]		Upperbound
					[ng/Nm³]
2,3,7,8-TCDD	< 0.000027	0.000013	0.000027	1	0.000027
1,2,3,7,8-PeCDD	0.0003	0.000019	0.000039	1	0.0003
1,2,3,4,7,8-HxCDD	0.0012	0.000023	0.000046	0.1	0.00012
1,2,3,6,7,8-HxCDD	0.0031	0.000023	0.000046	0.1	0.00031
1,2,3,7,8,9-HxCDD	0.0015	0.000023	0.000046	0.1	0.00015
1,2,3,4,6,7,8-HpCDD	0.016	0.000033	0.000065	0.01	0.00016
OCDD	0.012	0.000086	0.00017	0.0003	0.0000035
2,3,7,8-TCDF	0.00038	0.00001	0.000021	0.1	0.000038
1,2,3,7,8-PeCDF	0.0011	0.000012	0.000024	0.03	0.000033
2,3,4,7,8-PeCDF	0.0037	0.000012	0.000024	0.3	0.0011
1,2,3,4,7,8-HxCDF	0.0024	0.000014	0.000028	0.1	0.00024
1,2,3,6,7,8-HxCDF	0.0027	0.000014	0.000028	0.1	0.00027
1,2,3,7,8,9-HxCDF	0.00011	0.000014	0.000028	0.1	0.000011
2,3,4,6,7,8-HxCDF	0.0051	0.000014	0.000028	0.1	0.00051
1,2,3,4,6,7,8-HpCDF	0.0071	0.000022	0.000045	0.01	0.000071
1,2,3,4,7,8,9-HpCDF	0.00087	0.000022	0.000045	0.01	0.0000087
OCDF	0.0011	0.000048	0.000096	0.0003	0.00000034
WHO-TEQ from quantified 2,3,7,8-PCDD/Fs -"Lowerbound"					0.0033
WHO-TEQ from 2,3,7,8-PCDD/Fs -,"Mediumbound"					0.0033
Maximum possible WHO-TEQ -"Upperbound"					0.0033
PCDD	Result [ng/Nm³]		PCDF	Result [ng/Nm³]	
Tetra-CDD	0.013		Tetra-CDF	0.026	
Penta-CDD	0.04		Penta-CDF	0.041	
Hexa-CDD	0.059		Hexa-CDF	0.031	
Hepta-CDD	0.036		Hepta-CDF	0.018	
OCDD	0.012		OCDF	0.0011	

¹WHO 2005 TEF according to Van den Berg et al: Toxicological Sciences Advance Acces, 7 July 2006)

Limits of quantification are defined as double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% confidence interval.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total WHO-TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility.

Results marked with "<" are bellow limit of detection or quantification.

"Lowerbound" and "Upperbound" are levels defined in Regulation 2017/644 and EN 1948-4.

"Mediumbound" is levels defined in Regulation 2017/644.

Attachment no. 1 to the Certificate of Analysis for work order PR24B1931

Sample: 7 (21.5. - 1.7.2024)

Standards recovery:

Sample: 7 (21.5. - 1.7.2024)					
				Final extract [μl]:	60
				Injection volume [μl]:	4
				Acquisition date [d.m.y h:m]:	26.9.24 11:15
Extraction standard	Recovery	Acceptable range [%]		Accept. rec. with respect to	
PCDDs	[%]	Basic	Extended	basic range	extended range
13C12 - 2,3,7,8-TCDD	93	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,7,8-PeCDD	84	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDD	92	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDD	99	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDD	66	40 - 130	20 - 150	YES	-
13C12 - OCDD	45	40 - 130	20 - 150	YES	-
PCDFs					
13C12 - 2,3,7,8-TCDF	87	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,7,8-PeCDF	98	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDF	98	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDF	90	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,6,7,8-HxCDF	86	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDF	73	40 - 130	20 - 150	YES	-
13C12 - OCDF	45	40 - 130	20 - 150	YES	-
Sampling standard	Recovery	Acceptable range		Rec. in range?	
	[%]	[%]			
13C12-1,2,3,7,8-PeCDF	96	> 50		YES	
13C12-1,2,3,7,8,9-HxCDF	98	> 50		YES	
13C12-1,2,3,4,7,8,9-HpCDF	95	> 50		YES	

Attachment no. 2 to the Certificate of Analysis for work order PR24B1931

Sample:

7 (21.5. - 1.7.2024)

Measurement results PCDD/Fs:

Sample: 7 (21.5. - 1.7.2024)			Final extract [µl]: 60		
Sampled volume [Nm³]: 550.07			Injection volume [µl]: 4		
			Acquisition date [d.m.y h:m]: 26.9.24 11:15		
2,3,7,8-PCDD/F	Result	Limit of Detection	Limit of Quantification	¹ I-TEFs	I-TEQ
	[ng/Nm³]	[ng/Nm³]	[ng/Nm³]		Upperbound
					[ng/Nm³]
2,3,7,8-TCDD	< 0.000027	0.000013	0.000027	1	0.000027
1,2,3,7,8-PeCDD	0.0003	0.000019	0.000039	0.5	0.00015
1,2,3,4,7,8-HxCDD	0.0012	0.000023	0.000046	0.1	0.00012
1,2,3,6,7,8-HxCDD	0.0031	0.000023	0.000046	0.1	0.00031
1,2,3,7,8,9-HxCDD	0.0015	0.000023	0.000046	0.1	0.00015
1,2,3,4,6,7,8-HpCDD	0.016	0.000033	0.000065	0.01	0.00016
OCDD	0.012	0.000086	0.00017	0.001	0.000012
2,3,7,8-TCDF	0.00038	0.00001	0.000021	0.1	0.000038
1,2,3,7,8-PeCDF	0.0011	0.000012	0.000024	0.05	0.000055
2,3,4,7,8-PeCDF	0.0037	0.000012	0.000024	0.5	0.0018
1,2,3,4,7,8-HxCDF	0.0024	0.000014	0.000028	0.1	0.00024
1,2,3,6,7,8-HxCDF	0.0027	0.000014	0.000028	0.1	0.00027
1,2,3,7,8,9-HxCDF	0.00011	0.000014	0.000028	0.1	0.000011
2,3,4,6,7,8-HxCDF	0.0051	0.000014	0.000028	0.1	0.00051
1,2,3,4,6,7,8-HpCDF	0.0071	0.000022	0.000045	0.01	0.000071
1,2,3,4,7,8,9-HpCDF	0.00087	0.000022	0.000045	0.01	0.000087
OCDF	0.0011	0.000048	0.000096	0.001	0.000011
I-TEQ from quantified 2,3,7,8-PCDD/Fs -"Lowerbound"					0.0039
I-TEQ from 2,3,7,8-PCDD/Fs -,"Mediumbound"					0.0039
Maximum possible I-TEQ -"Upperbound"					0.004
PCDD	Result [ng/Nm³]		PCDF	Result [ng/Nm³]	
Tetra-CDD	0.013		Tetra-CDF	0.026	
Penta-CDD	0.04		Penta-CDF	0.041	
Hexa-CDD	0.059		Hexa-CDF	0.031	
Hepta-CDD	0.036		Hepta-CDF	0.018	
OCDD	0.012		OCDF	0.0011	

¹I-TEF according to NATO.

Limits of quantification are defined as double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with $S/N \geq 3$.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double ($k=2$) relative standard deviation (RSD%), and corresponds to 95% confidence interval.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total I-TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility.

Results marked with "<" are below limit of detection or quantification.

"Lowerbound" and "Upperbound" are levels defined in Regulation 2017/644 and EN 1948-4.

"Mediumbound" is levels defined in Regulation 2017/644.

Attachment no. 3 to the Certificate of Analysis for work order PR24B1931

Sample:

7 (21.5. - 1.7.2024)

ALS SAMPLE ID: PR24B1931/ 001

Measurement results PCBs:

Sample: 7 (21.5. - 1.7.2024)					
			Final extract [μl]:	250	
Sampled volume [Nm3] 550.1			Injection volume [μl]:	4	
			Acquisition date [d.m.y]:	28.09.2024	
	Result	Limit of Detection	Limit of Quantification	¹ WHO-TEFs	WHO-TEQ Upperbound
PCBs	[ng/Nm3]	[ng/Nm3]	[ng/Nm3]		[ng/Nm3]
PCB #77	0.0014	0.000083	0.0008	0.0001	0.00000014
PCB #81	0.00044	0.000081	0.00027	0.0003	0.00000013
PCB #126	0.0029	0.000081	0.00027	0.1	0.00029
PCB #169	0.0014	0.000093	0.00031	0.03	0.000041
PCB #105	0.0033	0.000094	0.0021	0.00003	0.000000098
PCB #114	< 0.000076	0.000076	0.00025	0.00003	2.3E-09
PCB #118	0.011	0.00008	0.0043	0.00003	0.00000034
PCB #123	0.0053	0.000096	0.00032	0.00003	0.00000016
PCB #156	0.0026	0.000093	0.00065	0.00003	0.000000078
PCB #157	0.00089	0.000092	0.00031	0.00003	0.000000027
PCB #167	0.0032	0.000094	0.00031	0.00003	0.000000097
PCB #170	0.0054	0.00013	0.0019	-	0
PCB #180	0.01	0.00012	0.0043	-	0
PCB #189	0.0013	0.000099	0.00033	0.00003	0.00000004
WHO-TEQ from quantified PCBs -"Lowerbound"					0.00034
WHO-TEQ from PCBs -,Mediumbound"					0.00034
Maximum possible WHO-TEQ -"Upperbound"					0.00034

¹WHO 2005 TEF according to Van den Berg et al: Toxicological Sciences Advance Acces, 7 July 2006

Limits of quantification are defined on the base of blank level.

The limit of detection is defined as the amount of analyte producing a signal with $S/N \geq 3$.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double ($k=2$) relative standard deviation (RSD%), and corresponds to 95% confidence interval.

Estimation of uncertainty of each PCB congener is 30% , total WHO-TEQ and PCB6/PCB7 is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility.

Results marked "<" are lower than the limit of detection or quantification.

"Lowerbound" and "Upperbound" are levels defined in Regulation 2017/644 and EN 1948-4.

"Mediumbound" is level defined in Regulation 2017/644.

Sample: 7 (21.5. - 1.7.2024)		Final extract [μl]:	250
		Injection volume [μl]:	4
		Acquisition date [d.m.y h:m]:	27.9.24 11:53
Sampling standard	Recovery [%]	Acceptable range [%]	Rec. in range?
13C12-2,3,4,4'-tetraCB (60)	76	> 50	YES
13C12-2,3,3',4,5,5'-hexaCB (159)	100	> 50	YES

Attachment no. 4 to the Certificate of Analysis for work order PR24B1931

Sample:

8 (1.7. - 1.8.2024)

Measurement results PCDD/Fs:

Sample: 8 (1.7. - 1.8.2024)			Final extract [µl]: 60		
Sampled volume [Nm³]: 798.54			Injection volume [µl]: 4		
			Acquisition date [d.m.y h:m]: 27.9.24 8:33		
2,3,7,8-PCDD/F	Result [ng/Nm³]	Limit of Detection [ng/Nm³]	Limit of Quantification [ng/Nm³]	¹ WHO-TEFs	WHO-TEQ Upperbound [ng/Nm³]
2,3,7,8-TCDD	0.00028	0.000009	0.000018	1	0.00028
1,2,3,7,8-PeCDD	0.00036	0.00001	0.00002	1	0.00036
1,2,3,4,7,8-HxCDD	0.0032	0.000012	0.000024	0.1	0.00032
1,2,3,6,7,8-HxCDD	0.0054	0.000012	0.000024	0.1	0.00054
1,2,3,7,8,9-HxCDD	0.0026	0.000012	0.000024	0.1	0.00026
1,2,3,4,6,7,8-HpCDD	0.029	0.000014	0.000027	0.01	0.00029
OCDD	0.023	0.000023	0.000046	0.0003	0.000007
2,3,7,8-TCDF	0.0054	0.0000084	0.000017	0.1	0.00054
1,2,3,7,8-PeCDF	0.0038	0.0000093	0.000019	0.03	0.00011
2,3,4,7,8-PeCDF	0.0077	0.0000093	0.000019	0.3	0.0023
1,2,3,4,7,8-HxCDF	0.0033	0.00001	0.00002	0.1	0.00033
1,2,3,6,7,8-HxCDF	0.0038	0.00001	0.00002	0.1	0.00038
1,2,3,7,8,9-HxCDF	0.0002	0.00001	0.00002	0.1	0.00002
2,3,4,6,7,8-HxCDF	0.0059	0.00001	0.00002	0.1	0.00059
1,2,3,4,6,7,8-HpCDF	0.0066	0.00001	0.000021	0.01	0.000066
1,2,3,4,7,8,9-HpCDF	0.00047	0.00001	0.000021	0.01	0.0000047
OCDF	0.00094	0.000018	0.000035	0.0003	0.00000028
WHO-TEQ from quantified 2,3,7,8-PCDD/Fs -"Lowerbound"					0.0064
WHO-TEQ from 2,3,7,8-PCDD/Fs -,"Mediumbound"					0.0064
Maximum possible WHO-TEQ -"Upperbound"					0.0064
PCDD	Result [ng/Nm³]		PCDF	Result [ng/Nm³]	
Tetra-CDD	0.092		Tetra-CDF	0.2	
Penta-CDD	0.18		Penta-CDF	0.13	
Hexa-CDD	0.13		Hexa-CDF	0.045	
Hepta-CDD	0.063		Hepta-CDF	0.0098	
OCDD	0.023		OCDF	0.00094	

¹WHO 2005 TEF according to Van den Berg et al: Toxicological Sciences Advance Acces, 7 July 2006)

Limits of quantification are defined as double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with $S/N \geq 3$.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double ($k=2$) relative standard deviation (RSD%), and corresponds to 95% confidence interval.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total WHO-TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility.

Results marked with "<" are below limit of detection or quantification.

"Lowerbound" and "Upperbound" are levels defined in Regulation 2017/644 and EN 1948-4.

"Mediumbound" is levels defined in Regulation 2017/644.

Attachment no. 4 to the Certificate of Analysis for work order PR24B1931

Sample:

8 (1.7. - 1.8.2024)

Standards recovery:

Sample: 8 (1.7. - 1.8.2024)					
Final extract [μl]:				60	
Injection volume [μl]:				4	
Acquisition date [d.m.y h:m]:				27.9.24 8:33	
Extraction standard	Recovery	Acceptable range [%]		Accept. rec. with respect to	
PCDDs	[%]	Basic	Extended	basic range	extended range
13C12 - 2,3,7,8-TCDD	94	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,7,8-PeCDD	87	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDD	76	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDD	95	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDD	78	40 - 130	20 - 150	YES	-
13C12 - OCDD	54	40 - 130	20 - 150	YES	-
PCDFs					
13C12 - 2,3,7,8-TCDF	77	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,7,8-PeCDF	98	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDF	82	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDF	84	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,6,7,8-HxCDF	76	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDF	76	40 - 130	20 - 150	YES	-
13C12 - OCDF	60	40 - 130	20 - 150	YES	-
Sampling standard	Recovery	Acceptable range		Rec. in range?	
	[%]	[%]			
13C12-1,2,3,7,8-PeCDF	94	> 50		YES	
13C12-1,2,3,7,8,9-HxCDF	91	> 50		YES	
13C12-1,2,3,4,7,8,9-HpCDF	91	> 50		YES	

Attachment no. 5 to the Certificate of Analysis for work order PR24B1931

Sample:

8 (1.7. - 1.8.2024)

Measurement results PCDD/Fs:

Sample: 8 (1.7. - 1.8.2024)			Final extract [µl]: 60		
Sampled volume [Nm³]: 798.54			Injection volume [µl]: 4		
			Acquisition date [d.m.y h:m]: 27.9.24 8:33		
2,3,7,8-PCDD/F	Result [ng/Nm³]	Limit of Detection [ng/Nm³]	Limit of Quantification [ng/Nm³]	¹ I-TEFs	I-TEQ Upperbound [ng/Nm³]
2,3,7,8-TCDD	0.00028	0.000009	0.000018	1	0.00028
1,2,3,7,8-PeCDD	0.00036	0.00001	0.00002	0.5	0.00018
1,2,3,4,7,8-HxCDD	0.0032	0.000012	0.000024	0.1	0.00032
1,2,3,6,7,8-HxCDD	0.0054	0.000012	0.000024	0.1	0.00054
1,2,3,7,8,9-HxCDD	0.0026	0.000012	0.000024	0.1	0.00026
1,2,3,4,6,7,8-HpCDD	0.029	0.000014	0.000027	0.01	0.00029
OCDD	0.023	0.000023	0.000046	0.001	0.000023
2,3,7,8-TCDF	0.0054	0.0000084	0.000017	0.1	0.00054
1,2,3,7,8-PeCDF	0.0038	0.0000093	0.000019	0.05	0.00019
2,3,4,7,8-PeCDF	0.0077	0.0000093	0.000019	0.5	0.0039
1,2,3,4,7,8-HxCDF	0.0033	0.00001	0.00002	0.1	0.00033
1,2,3,6,7,8-HxCDF	0.0038	0.00001	0.00002	0.1	0.00038
1,2,3,7,8,9-HxCDF	0.0002	0.00001	0.00002	0.1	0.00002
2,3,4,6,7,8-HxCDF	0.0059	0.00001	0.00002	0.1	0.00059
1,2,3,4,6,7,8-HpCDF	0.0066	0.00001	0.000021	0.01	0.000066
1,2,3,4,7,8,9-HpCDF	0.00047	0.00001	0.000021	0.01	0.000047
OCDF	0.00094	0.000018	0.000035	0.001	0.0000094
I-TEQ from quantified 2,3,7,8-PCDD/Fs - "Lowerbound"					0.0079
I-TEQ from 2,3,7,8-PCDD/Fs -, "Mediumbound"					0.0079
Maximum possible I-TEQ - "Upperbound"					0.0079
PCDD	Result [ng/Nm³]		PCDF	Result [ng/Nm³]	
Tetra-CDD	0.092		Tetra-CDF	0.2	
Penta-CDD	0.18		Penta-CDF	0.13	
Hexa-CDD	0.13		Hexa-CDF	0.045	
Hepta-CDD	0.063		Hepta-CDF	0.0098	
OCDD	0.023		OCDF	0.00094	

¹I-TEF according to NATO.

Limits of quantification are defined as double of the detection limits.

The limit of detection is defined as the amount of analyte producing a signal with $S/N \geq 3$.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double ($k=2$) relative standard deviation (RSD%), and corresponds to 95% confidence interval.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total I-TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility.

Results marked with "<" are below limit of detection or quantification.

"Lowerbound" and "Upperbound" are levels defined in Regulation 2017/644 and EN 1948-4.

"Mediumbound" is levels defined in Regulation 2017/644.

Attachment no. 5 to the Certificate of Analysis for work order PR24B1931

Sample:

8 (1.7. - 1.8.2024)

Standards recovery:

Sample: 8 (1.7. - 1.8.2024)					
Final extract [μl]:				60	
Injection volume [μl]:				4	
Acquisition date [d.m.y h:m]:				27.9.24 8:33	
Extraction standard	Recovery	Acceptable range [%]		Accept. rec. with respect to	
PCDDs	[%]	Basic	Extended	basic range	extended range
13C12 - 2,3,7,8-TCDD	94	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,7,8-PeCDD	87	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDD	76	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDD	95	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDD	78	40 - 130	20 - 150	YES	-
13C12 - OCDD	54	40 - 130	20 - 150	YES	-
PCDFs					
13C12 - 2,3,7,8-TCDF	77	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,7,8-PeCDF	98	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDF	82	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDF	84	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,6,7,8-HxCDF	76	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDF	76	40 - 130	20 - 150	YES	-
13C12 - OCDF	60	40 - 130	20 - 150	YES	-
Sampling standard	Recovery	Acceptable range		Rec. in range?	
	[%]	[%]			
13C12-1,2,3,7,8-PeCDF	94	> 50		YES	
13C12-1,2,3,7,8,9-HxCDF	91	> 50		YES	
13C12-1,2,3,4,7,8,9-HpCDF	91	> 50		YES	

Attachment no. 6 to the Certificate of Analysis for work order PR24B1931

Sample:

8 (1.7. - 1.8.2024)

ALS SAMPLE ID: PR24B1931/ 002

Measurement results PCBs:

Sample:		8 (1.7. - 1.8.2024)			
		Final extract [μl]:		250	
Sampled volume [Nm3] 798.54		Injection volume [μl]:		4	
		Acquisition date [d.m.y]:		27.09.2024	
PCBs	Result [ng/Nm3]	Limit of Detection [ng/Nm3]	Limit of Quantification [ng/Nm3]	¹ WHO-TEFs	WHO-TEQ Upperbound [ng/Nm3]
PCB #77	0.021	0.000038	0.00055	0.0001	0.0000021
PCB #81	0.0074	0.000034	0.00011	0.0003	0.0000022
PCB #126	0.017	0.00004	0.00013	0.1	0.0017
PCB #169	0.0044	0.000039	0.00013	0.03	0.00013
PCB #105	0.015	0.000041	0.0014	0.00003	0.00000045
PCB #114	0.00051	0.000037	0.00012	0.00003	0.00000015
PCB #118	0.017	0.000038	0.003	0.00003	0.00000051
PCB #123	0.0024	0.000047	0.00016	0.00003	0.00000072
PCB #156	0.0064	0.000043	0.00045	0.00003	0.00000019
PCB #157	0.004	0.000045	0.00015	0.00003	0.00000012
PCB #167	0.0063	0.000046	0.00021	0.00003	0.00000019
PCB #170	0.011	0.000061	0.0013	-	0
PCB #180	0.011	0.000056	0.003	-	0
PCB #189	0.0037	0.000044	0.00015	0.00003	0.00000011
WHO-TEQ from quantified PCBs -"Lowerbound"					0.0018
WHO-TEQ from PCBs -,Mediumbound"					0.0018
Maximum possible WHO-TEQ -"Upperbound"					0.0018

¹WHO 2005 TEF according to Van den Berg et al: Toxicological Sciences Advance Acces, 7 July 2006

Limits of quantification are defined on the base of blank level.

The limit of detection is defined as the amount of analyte producing a signal with $S/N \geq 3$.

The value of the detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double ($k=2$) relative standard deviation (RSD%), and corresponds to 95% confidence interval.

Estimation of uncertainty of each PCB congener is 30% , total WHO-TEQ and PCB6/PCB7 is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility.

Results marked "<" are lower than the limit of detection or quantification.

"Lowerbound" and "Upperbound" are levels defined in Regulation 2017/644 and EN 1948-4.

"Mediumbound" is level defined in Regulation 2017/644.

Sample:		8 (1.7. - 1.8.2024)		Final extract [μl]:	250
				Injection volume [μl]:	4
				Acquisition date [d.m.y h:m]:	27.9.24 13:31
Sampling standard	Recovery [%]	Acceptable range [%]		Rec. in range?	
13C12-2,3,4,4'-tetraCB (60)	103	> 50		YES	
13C12-2,3,3',4,5,5'-hexaCB (159)	92	> 50		YES	