



CERTIFICATE OF ANALYSIS

Work Order	: PR2510058	Issue Date	: 12-Feb-2025
Customer	: ALS Laboratory Services doo	Laboratory	: ALS Czech Republic, s.r.o.
Contact	: Milica Bozovic	Contact	: Client Service
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Project	: Dioxin emission analyses	Page	: 1 of 3
Order number	: ----	Date Samples	: 30-Jan-2025
		Received	
		Quote number	: PR2023ALSLA-RS0001 (CZ-251-23-0421)
Site	: Serbia	Date of test	: 30-Jan-2025 - 12-Feb-2025
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 PR2510058/001-002 - 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: EMISSIONS				Client sample ID		11 (7.10. - 15.11.2024)		12 (15.11. - 18.12.2024)		----	
				Laboratory sample ID		PR2510058001		PR2510058002		----	
				Client sampling date / time		[30-Jan-2025]		[30-Jan-2025]		----	
Parameter	Method	LOR	Unit	Result	MU	Result	MU	Result	MU		
PCDDs and PCDFs (Dioxins and Furans)											
2378-TCDD	A-DFHMS02	-	ng/m³	0.00058	----	<0.000014	----	----	----		
12378-PeCDD	A-DFHMS02	-	ng/m³	0.0036	----	0.00024	----	----	----		
123478-HxCDD	A-DFHMS02	-	ng/m³	0.0021	----	0.001	----	----	----		
123678-HxCDD	A-DFHMS02	-	ng/m³	0.0058	----	0.0019	----	----	----		
123789-HxCDD	A-DFHMS02	-	ng/m³	0.0027	----	0.00092	----	----	----		
1234678-HpCDD	A-DFHMS02	-	ng/m³	0.014	----	0.013	----	----	----		
OCDD	A-DFHMS02	-	ng/m³	0.0069	----	0.011	----	----	----		
2378-TCDF	A-DFHMS02	-	ng/m³	0.007	----	0.00029	----	----	----		
12378-PeCDF	A-DFHMS02	-	ng/m³	0.0045	----	0.00027	----	----	----		
23478-PeCDF	A-DFHMS02	-	ng/m³	0.0082	----	0.00064	----	----	----		
123478-HxCDF	A-DFHMS02	-	ng/m³	0.0039	----	0.00077	----	----	----		
123678-HxCDF	A-DFHMS02	-	ng/m³	0.0031	----	0.0011	----	----	----		
123789-HxCDF	A-DFHMS02	-	ng/m³	0.00064	----	0.000055	----	----	----		
234678-HxCDF	A-DFHMS02	-	ng/m³	0.0053	----	0.0013	----	----	----		
1234678-HpCDF	A-DFHMS02	-	ng/m³	0.006	----	0.0026	----	----	----		
1234789-HpCDF	A-DFHMS02	-	ng/m³	0.0015	----	0.00023	----	----	----		
OCDF	A-DFHMS02	-	ng/m³	0.0012	----	0.00034	----	----	----		
TEQ-Lowerbound	A-DFHMS02	-	ng/m³	0.01	----	0.0013	----	----	----		
TEQ-Upperbound	A-DFHMS02	-	ng/m³	0.01	----	0.0013	----	----	----		
PCB dioxin-like HRMS											
PCB 77	A-PCBHMS03	-	ng/m³	0.00870	± 30.0%	<0.0011	----	----	----		
PCB 81	A-PCBHMS03	-	ng/m³	0.00370	± 30.0%	0.00030	± 30.0%	----	----		
PCB 105	A-PCBHMS03	-	ng/m³	0.00630	± 30.0%	<0.0017	----	----	----		
PCB 114	A-PCBHMS03	-	ng/m³	0.00200	± 30.0%	<0.00025	----	----	----		
PCB 118	A-PCBHMS03	-	ng/m³	0.00820	± 30.0%	<0.0036	----	----	----		
PCB 123	A-PCBHMS03	-	ng/m³	0.00220	± 30.0%	<0.00021	----	----	----		
PCB 126	A-PCBHMS03	-	ng/m³	0.00490	± 30.0%	0.00044	± 30.0%	----	----		
PCB 156	A-PCBHMS03	-	ng/m³	0.00360	± 30.0%	<0.00092	----	----	----		
PCB 157	A-PCBHMS03	-	ng/m³	0.00320	± 30.0%	<0.00041	----	----	----		
PCB 167	A-PCBHMS03	-	ng/m³	0.00190	± 30.0%	<0.00043	----	----	----		
PCB 169	A-PCBHMS03	-	ng/m³	0.00110	± 30.0%	<0.00033	----	----	----		
PCB 170	A-PCBHMS03	-	ng/m³	0.00550	± 30.0%	<0.0023	----	----	----		
PCB 180	A-PCBHMS03	-	ng/m³	0.00580	± 30.0%	<0.004	----	----	----		
PCB 189	A-PCBHMS03	-	ng/m³	0.00210	± 30.0%	<0.00046	----	----	----		
TEQ (dl-PCB) - lower	A-PCBHMS03	-	ng/m³	0.00052	----	0.000044	----	----	----		
TEQ (dl-PCB) - upper	A-PCBHMS03	-	ng/m³	0.00052	----	0.000055	----	----	----		

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 PR2510058

Sample:

11 (7.10. - 15.11.2024)

ALS SAMPLE ID: PR2510058/ 001

Measurement results PCDD/Fs:

Sample: 11 (7.10. - 15.11.2024)			Final extract [µl]: 60		
			Injection volume [µl]: 4		
			Acquisition date [d.m.y h:m]: 6.2.25 16:01		
2,3,7,8-PCDD/Fs	Result [ng/sample]	Limit of Detection [ng/sample]	Limit of Quantification [ng/sample]	¹ WHO-TEFs	WHO-TEQ Upperbound [ng/sample]
2,3,7,8-TCDD	0.24	0.0085	0.017	1	0.24
1,2,3,7,8-PeCDD	1.5	0.0092	0.018	1	1.5
1,2,3,4,7,8-HxCDD	0.9	0.013	0.025	0.1	0.09
1,2,3,6,7,8-HxCDD	2.4	0.013	0.025	0.1	0.24
1,2,3,7,8,9-HxCDD	1.1	0.013	0.025	0.1	0.11
1,2,3,4,6,7,8-HpCDD	5.8	0.013	0.026	0.01	0.058
OCDD	2.9	0.015	0.03	0.0003	0.00087
2,3,7,8-TCDF	2.9	0.0068	0.014	0.1	0.29
1,2,3,7,8-PeCDF	1.9	0.0072	0.014	0.03	0.057
2,3,4,7,8-PeCDF	3.4	0.0072	0.014	0.3	1
1,2,3,4,7,8-HxCDF	1.6	0.0086	0.017	0.1	0.16
1,2,3,6,7,8-HxCDF	1.3	0.0086	0.017	0.1	0.13
1,2,3,7,8,9-HxCDF	0.27	0.0086	0.017	0.1	0.027
2,3,4,6,7,8-HxCDF	2.2	0.0086	0.017	0.1	0.22
1,2,3,4,6,7,8-HpCDF	2.5	0.012	0.024	0.01	0.025
1,2,3,4,7,8,9-HpCDF	0.64	0.012	0.024	0.01	0.0064
OCDF	0.51	0.015	0.03	0.0003	0.00015
WHO-TEQ from quantified 2,3,7,8-PCDD/Fs -"Lowerbound"					4.2
WHO-TEQ from 2,3,7,8-PCDD/Fs -,"Mediumbound"					4.2
Maximum possible WHO-TEQ -"Upperbound"					4.2
PCDDs	Result [ng/sample]		PCDFs	Result [ng/sample]	
Tetra-CDDs	180		Tetra-CDFs	140	
Penta-CDDs	110		Penta-CDFs	63	
Hexa-CDDs	67		Hexa-CDFs	20	
Hepta-CDDs	14		Hepta-CDFs	6.3	
OCDD	2.9		OCDF	0.51	

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 PR2510058

Sample:

11 (7.10. - 15.11.2024)

Standards recovery:

Sample: 11 (7.10. - 15.11.2024)					
				Final extract [μl]:	60
				Injection volume [μl]:	4
				Acquisition date [d.m.y h:m]:	6.2.25 16:01
Extraction standard	Recovery	Acceptable range [%]		Accept. rec. with respect to	
PCDDs	[%]	Basic	Extended	basic range	extended range
13C12 - 2,3,7,8-TCDD	92	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,7,8-PeCDD	91	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDD	96	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDD	81	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDD	90	40 - 130	20 - 150	YES	-
13C12 - OCDD	89	40 - 130	20 - 150	YES	-
PCDFs					
13C12 - 2,3,7,8-TCDF	72	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,7,8-PeCDF	79	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDF	78	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	84	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDF	79	40 - 130	20 - 150	YES	-
13C12 - OCDF	86	40 - 130	20 - 150	YES	-
Sampling standard	Recovery	Acceptable range		Rec. in range?	
	[%]	[%]			
13C12-1,2,3,7,8-PeCDF	95	> 50		YES	
13C12-1,2,3,7,8,9-HxCDF	78	> 50		YES	
13C12-1,2,3,4,7,8,9-HpCDF	85	> 50		YES	

Attachment no. 1 to the Certificate of Analysis for work order PR2510058

Sample:

11 (7.10. - 15.11.2024)

Measurement results PCDD/Fs:

Sample: 11 (7.10. - 15.11.2024)			Final extract [µl]: 60		
Sampled volume [m³]: 418.35			Injection volume [µl]: 4		
			Acquisition date [d.m.y h:m]: 6.2.25 16:01		
2,3,7,8-PCDD/F	Result [ng/m³]	Limit of Detection [ng/m³]	Limit of Quantification [ng/m³]	¹ WHO-TEFs	WHO-TEQ Upperbound [ng/m³]
2,3,7,8-TCDD	0.00058	0.00002	0.00004	1	0.00058
1,2,3,7,8-PeCDD	0.0036	0.000022	0.000044	1	0.0036
1,2,3,4,7,8-HxCDD	0.0021	0.00003	0.00006	0.1	0.00021
1,2,3,6,7,8-HxCDD	0.0058	0.00003	0.00006	0.1	0.00058
1,2,3,7,8,9-HxCDD	0.0027	0.00003	0.00006	0.1	0.00027
1,2,3,4,6,7,8-HpCDD	0.014	0.000031	0.000062	0.01	0.00014
OCDD	0.0069	0.000035	0.000071	0.0003	0.0000021
2,3,7,8-TCDF	0.007	0.000016	0.000033	0.1	0.0007
1,2,3,7,8-PeCDF	0.0045	0.000017	0.000034	0.03	0.00014
2,3,4,7,8-PeCDF	0.0082	0.000017	0.000034	0.3	0.0025
1,2,3,4,7,8-HxCDF	0.0039	0.000021	0.000041	0.1	0.00039
1,2,3,6,7,8-HxCDF	0.0031	0.000021	0.000041	0.1	0.00031
1,2,3,7,8,9-HxCDF	0.00064	0.000021	0.000041	0.1	0.000064
2,3,4,6,7,8-HxCDF	0.0053	0.000021	0.000041	0.1	0.00053
1,2,3,4,6,7,8-HpCDF	0.006	0.000029	0.000058	0.01	0.00006
1,2,3,4,7,8,9-HpCDF	0.0015	0.000029	0.000058	0.01	0.000015
OCDF	0.0012	0.000036	0.000073	0.0003	0.00000037
WHO-TEQ from quantified 2,3,7,8-PCDD/Fs -"Lowerbound"					0.01
WHO-TEQ from 2,3,7,8-PCDD/Fs -,"Mediumbound"					0.01
Maximum possible WHO-TEQ -"Upperbound"					0.01
PCDD	Result [ng/m³]		PCDF	Result [ng/m³]	
Tetra-CDD	0.44		Tetra-CDF	0.34	
Penta-CDD	0.26		Penta-CDF	0.15	
Hexa-CDD	0.16		Hexa-CDF	0.048	
Hepta-CDD	0.033		Hepta-CDF	0.015	
OCDD	0.0069		OCDF	0.0012	

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. 2 to the Certificate of Analysis for work order PR2510058

Sample:

12 (15.11. - 18.12.2024)

ALS SAMPLE ID: PR2510058/ 002

Measurement results PCDD/Fs:

Sample: 12 (15.11. - 18.12.2024)			Final extract [µl]: 60		
			Injection volume [µl]: 4		
			Acquisition date [d.m.y h:m]: 6.2.25 16:52		
2,3,7,8-PCDD/Fs	Result [ng/sample]	Limit of Detection [ng/sample]	Limit of Quantification [ng/sample]	¹ WHO-TEFs	WHO-TEQ Upperbound [ng/sample]
2,3,7,8-TCDD	< 0.0056	0.0056	0.011	1	0.0056
1,2,3,7,8-PeCDD	0.096	0.01	0.02	1	0.096
1,2,3,4,7,8-HxCDD	0.39	0.011	0.022	0.1	0.039
1,2,3,6,7,8-HxCDD	0.73	0.011	0.022	0.1	0.073
1,2,3,7,8,9-HxCDD	0.36	0.011	0.022	0.1	0.036
1,2,3,4,6,7,8-HpCDD	5.1	0.015	0.03	0.01	0.051
OCDD	4.5	0.019	0.039	0.0003	0.0013
2,3,7,8-TCDF	0.11	0.0045	0.0091	0.1	0.011
1,2,3,7,8-PeCDF	0.11	0.0077	0.015	0.03	0.0032
2,3,4,7,8-PeCDF	0.25	0.0077	0.015	0.3	0.075
1,2,3,4,7,8-HxCDF	0.3	0.0096	0.019	0.1	0.03
1,2,3,6,7,8-HxCDF	0.42	0.0096	0.019	0.1	0.042
1,2,3,7,8,9-HxCDF	0.022	0.0096	0.019	0.1	0.0022
2,3,4,6,7,8-HxCDF	0.49	0.0096	0.019	0.1	0.049
1,2,3,4,6,7,8-HpCDF	1	0.011	0.021	0.01	0.01
1,2,3,4,7,8,9-HpCDF	0.089	0.011	0.021	0.01	0.00089
OCDF	0.13	0.018	0.037	0.0003	0.00004
WHO-TEQ from quantified 2,3,7,8-PCDD/Fs -"Lowerbound"					0.52
WHO-TEQ from 2,3,7,8-PCDD/Fs -,"Mediumbound"					0.52
Maximum possible WHO-TEQ -"Upperbound"					0.52
PCDDs	Result [ng/sample]		PCDFs	Result [ng/sample]	
Tetra-CDDs	7.6		Tetra-CDFs	5.1	
Penta-CDDs	15		Penta-CDFs	4.1	
Hexa-CDDs	18		Hexa-CDFs	4	
Hepta-CDDs	11		Hepta-CDFs	1.1	
OCDD	4.5		OCDF	0.13	

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 $S/N \geq 3$.

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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. 2 to the Certificate of Analysis for work order PR2510058

Sample:

12 (15.11. - 18.12.2024)

Standards recovery:

Sample:					
12 (15.11. - 18.12.2024)					
				Final extract [μl]:	60
				Injection volume [μl]:	4
				Acquisition date [d.m.y h:m]:	6.2.25 16:52
Extraction standard	Recovery	Acceptable range [%]		Accept. rec. with respect to	
PCDDs	[%]	Basic	Extended	basic range	extended range
13C12 - 2,3,7,8-TCDD	98	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,7,8-PeCDD	90	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDD	61	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDD	77	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDD	66	40 - 130	20 - 150	YES	-
13C12 - OCDD	56	40 - 130	20 - 150	YES	-
PCDFs					
13C12 - 2,3,7,8-TCDF	100	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,7,8-PeCDF	81	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDF	77	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDF	66	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,6,7,8-HxCDF	69	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDF	75	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	100	> 50		YES	
13C12-1,2,3,4,7,8,9-HpCDF	85	> 50		YES	

Attachment no. 2 to the Certificate of Analysis for work order PR2510058

Sample:

12 (15.11. - 18.12.2024)

Measurement results PCDD/Fs:

Sample: 12 (15.11. - 18.12.2024)			Final extract [µl]: 60		
Sampled volume [m³]: 389.95			Injection volume [µl]: 4		
			Acquisition date [d.m.y h:m]: 6.2.25 16:52		
2,3,7,8-PCDD/F	Result [ng/m³]	Limit of Detection [ng/m³]	Limit of Quantification [ng/m³]	¹ WHO-TEFs	WHO-TEQ Upperbound [ng/m³]
2,3,7,8-TCDD	< 0.000014	0.000014	0.000029	1	0.000014
1,2,3,7,8-PeCDD	0.00024	0.000026	0.000052	1	0.00024
1,2,3,4,7,8-HxCDD	0.001	0.000028	0.000057	0.1	0.0001
1,2,3,6,7,8-HxCDD	0.0019	0.000028	0.000057	0.1	0.00019
1,2,3,7,8,9-HxCDD	0.00092	0.000028	0.000057	0.1	0.000092
1,2,3,4,6,7,8-HpCDD	0.013	0.000038	0.000076	0.01	0.00013
OCDD	0.011	0.00005	0.0001	0.0003	0.0000034
2,3,7,8-TCDF	0.00029	0.000012	0.000023	0.1	0.000029
1,2,3,7,8-PeCDF	0.00027	0.00002	0.00004	0.03	0.0000082
2,3,4,7,8-PeCDF	0.00064	0.00002	0.00004	0.3	0.00019
1,2,3,4,7,8-HxCDF	0.00077	0.000025	0.000049	0.1	0.000077
1,2,3,6,7,8-HxCDF	0.0011	0.000025	0.000049	0.1	0.00011
1,2,3,7,8,9-HxCDF	0.000055	0.000025	0.000049	0.1	0.0000055
2,3,4,6,7,8-HxCDF	0.0013	0.000025	0.000049	0.1	0.00013
1,2,3,4,6,7,8-HpCDF	0.0026	0.000027	0.000055	0.01	0.000026
1,2,3,4,7,8,9-HpCDF	0.00023	0.000027	0.000055	0.01	0.0000023
OCDF	0.00034	0.000047	0.000094	0.0003	0.0000001
WHO-TEQ from quantified 2,3,7,8-PCDD/Fs -"Lowerbound"					0.0013
WHO-TEQ from 2,3,7,8-PCDD/Fs -",Mediumbound"					0.0013
Maximum possible WHO-TEQ -"Upperbound"					0.0013
PCDD	Result [ng/m³]		PCDF	Result [ng/m³]	
Tetra-CDD	0.02		Tetra-CDF	0.013	
Penta-CDD	0.039		Penta-CDF	0.011	
Hexa-CDD	0.047		Hexa-CDF	0.01	
Hepta-CDD	0.028		Hepta-CDF	0.0028	
OCDD	0.011		OCDF	0.00034	

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 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 PR2510058

Sample:

11 (7.10. - 15.11.2024)

ALS SAMPLE ID: PR2510058/ 001

Measurement results PCBs:

Sample:		11 (7.10. - 15.11.2024)			
		Final extract [μl]:		250	
Sampled volume [Nm3]		418.35		Injection volume [μl]:	
				4	
				Acquisition date [d.m.y]:	
				07.02.2025	
PCBs	Result [ng/m³]	Limit of Detection [ng/m³]	Limit of Quantification [ng/m³]	¹ WHO-TEFs	WHO-TEQ Upperbound [ng/m³]
PCB #77	0.0087	0.00014	0.001	0.0001	0.00000087
PCB #81	0.0037	0.00013	0.00043	0.0003	0.0000011
PCB #126	0.0049	0.00011	0.00036	0.1	0.00049
PCB #169	0.0011	0.00019	0.00062	0.03	0.000032
PCB #105	0.0063	0.000097	0.0028	0.00003	0.00000019
PCB #114	0.002	0.00011	0.00036	0.00003	0.00000061
PCB #118	0.0082	0.00011	0.0057	0.00003	0.00000025
PCB #123	0.0022	0.00013	0.00043	0.00003	0.00000066
PCB #156	0.0036	0.00017	0.00086	0.00003	0.00000011
PCB #157	0.0032	0.00016	0.00054	0.00003	0.000000095
PCB #167	0.0019	0.00008	0.0004	0.00003	0.000000057
PCB #170	0.0055	0.00018	0.0025	-	0
PCB #180	0.0058	0.00018	0.0057	-	0
PCB #189	0.0021	0.00017	0.00057	0.00003	0.000000064
WHO-TEQ from quantified PCBs -"Lowerbound"					0.00052
WHO-TEQ from PCBs -,"Mediumbound"					0.00052
Maximum possible WHO-TEQ -"Upperbound"					0.00052

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≥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:		11 (7.10. - 15.11.2024)		Final extract [μl]:	250
				Injection volume [μl]:	4
				Acquisition date [d.m.y h:m]:	6.2.25 17:35
Sampling standard	Recovery [%]	Acceptable range [%]		Rec. in range?	
13C12-2,3,4,4'-tetraCB (60)	97	> 50		YES	
13C12-2,3,3',4,5,5'-hexaCB (159)	70	> 50		YES	

Attachment no. 4 to the Certificate of Analysis for work order PR2510058

Sample:

12 (15.11. - 18.12.2024)

ALS SAMPLE ID: PR2510058/ 002

Measurement results PCBs:

Sample:		12 (15.11. - 18.12.2024)			
		Final extract [μl]:		250	
Sampled volume [Nm3]		389.95		Injection volume [μl]:	
				4	
				Acquisition date [d.m.y]:	
				07.02.2025	
PCBs	Result [ng/m³]	Limit of Detection [ng/m³]	Limit of Quantification [ng/m³]	¹ WHO-TEFs	WHO-TEQ Upperbound [ng/m³]
PCB #77	< 0.0011	0.000019	0.0011	0.0001	0.00000011
PCB #81	0.0003	0.000018	0.00006	0.0003	0.000000091
PCB #126	0.00044	0.000048	0.00016	0.1	0.000044
PCB #169	< 0.00033	0.000099	0.00033	0.03	0.0000099
PCB #105	< 0.0017	0.000052	0.0017	0.00003	0.000000052
PCB #114	< 0.00025	0.000046	0.00025	0.00003	7.4E-09
PCB #118	< 0.0036	0.000049	0.0036	0.00003	0.00000011
PCB #123	< 0.00021	0.000063	0.00021	0.00003	6.3E-09
PCB #156	< 0.00092	0.00008	0.00092	0.00003	0.000000028
PCB #157	< 0.00041	0.00008	0.00041	0.00003	0.000000012
PCB #167	< 0.00043	0.000037	0.00043	0.00003	0.000000013
PCB #170	< 0.0023	0.000082	0.0023	-	0
PCB #180	< 0.004	0.000082	0.004	-	0
PCB #189	< 0.00046	0.0001	0.00046	0.00003	0.000000014
WHO-TEQ from quantified PCBs -"Lowerbound"					0.000044
WHO-TEQ from PCBs -,"Mediumbound"					0.000049
Maximum possible WHO-TEQ -"Upperbound"					0.000055

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≥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:		12 (15.11. - 18.12.2024)		Final extract [μl]:	250
				Injection volume [μl]:	4
				Acquisition date [d.m.y h:m]:	6.2.25 18:17
Sampling standard	Recovery [%]	Acceptable range [%]		Rec. in range?	
13C12-2,3,4,4'-tetraCB (60)	94	> 50		YES	
13C12-2,3,3',4,5,5'-hexaCB (159)	71	> 50		YES	

Attachment no. 5 to the Certificate of Analysis for work order PR2510058

Sample:

11 (7.10. - 15.11.2024)

Measurement results PCDD/Fs:

Sample:		11 (7.10. - 15.11.2024)		Final extract [μl]:		60	
Sampled volume [m³]:		418.35		Injection volume [μl]:		4	
				Acquisition date [d.m.y h:m]:		6.2.25 16:01	
2,3,7,8-PCDD/F	Result [ng/m³]	Limit of Detection [ng/m³]	Limit of Quantification [ng/m³]	¹ I-TEFs	I-TEQ Upperbound [ng/m³]		
2,3,7,8-TCDD	0.00058	0.00002	0.00004	1	0.00058		
1,2,3,7,8-PeCDD	0.0036	0.000022	0.000044	0.5	0.0018		
1,2,3,4,7,8-HxCDD	0.0021	0.00003	0.00006	0.1	0.00021		
1,2,3,6,7,8-HxCDD	0.0058	0.00003	0.00006	0.1	0.00058		
1,2,3,7,8,9-HxCDD	0.0027	0.00003	0.00006	0.1	0.00027		
1,2,3,4,6,7,8-HpCDD	0.014	0.000031	0.000062	0.01	0.00014		
OCDD	0.0069	0.000035	0.000071	0.001	0.0000069		
2,3,7,8-TCDF	0.007	0.000016	0.000033	0.1	0.0007		
1,2,3,7,8-PeCDF	0.0045	0.000017	0.000034	0.05	0.00023		
2,3,4,7,8-PeCDF	0.0082	0.000017	0.000034	0.5	0.0041		
1,2,3,4,7,8-HxCDF	0.0039	0.000021	0.000041	0.1	0.00039		
1,2,3,6,7,8-HxCDF	0.0031	0.000021	0.000041	0.1	0.00031		
1,2,3,7,8,9-HxCDF	0.00064	0.000021	0.000041	0.1	0.000064		
2,3,4,6,7,8-HxCDF	0.0053	0.000021	0.000041	0.1	0.00053		
1,2,3,4,6,7,8-HpCDF	0.006	0.000029	0.000058	0.01	0.00006		
1,2,3,4,7,8,9-HpCDF	0.0015	0.000029	0.000058	0.01	0.000015		
OCDF	0.0012	0.000036	0.000073	0.001	0.0000012		
I-TEQ from quantified 2,3,7,8-PCDD/Fs - "Lowerbound"						0.01	
I-TEQ from 2,3,7,8-PCDD/Fs -, "Mediumbound"						0.01	
Maximum possible I-TEQ - "Upperbound"						0.01	
PCDD	Result [ng/m³]		PCDF	Result [ng/m³]			
Tetra-CDD	0.44		Tetra-CDF	0.34			
Penta-CDD	0.26		Penta-CDF	0.15			
Hexa-CDD	0.16		Hexa-CDF	0.048			
Hepta-CDD	0.033		Hepta-CDF	0.015			
OCDD	0.0069		OCDF	0.0012			

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. 6 to the Certificate of Analysis for work order PR2510058

Sample:

12 (15.11. - 18.12.2024)

Measurement results PCDD/Fs:

Sample: 12 (15.11. - 18.12.2024)			Final extract [µl]: 60		
Sampled volume [m³]: 389.95			Injection volume [µl]: 4		
			Acquisition date [d.m.y h:m]: 6.2.25 16:52		
2,3,7,8-PCDD/F	Result	Limit of Detection	Limit of Quantification	¹ I-TEFs	I-TEQ
	[ng/m³]	[ng/m³]	[ng/m³]		Upperbound
					[ng/m³]
2,3,7,8-TCDD	< 0.000014	0.000014	0.000029	1	0.000014
1,2,3,7,8-PeCDD	0.00024	0.000026	0.000052	0.5	0.00012
1,2,3,4,7,8-HxCDD	0.001	0.000028	0.000057	0.1	0.0001
1,2,3,6,7,8-HxCDD	0.0019	0.000028	0.000057	0.1	0.00019
1,2,3,7,8,9-HxCDD	0.00092	0.000028	0.000057	0.1	0.000092
1,2,3,4,6,7,8-HpCDD	0.013	0.000038	0.000076	0.01	0.00013
OCDD	0.011	0.00005	0.0001	0.001	0.000011
2,3,7,8-TCDF	0.00029	0.000012	0.000023	0.1	0.000029
1,2,3,7,8-PeCDF	0.00027	0.00002	0.00004	0.05	0.000014
2,3,4,7,8-PeCDF	0.00064	0.00002	0.00004	0.5	0.00032
1,2,3,4,7,8-HxCDF	0.00077	0.000025	0.000049	0.1	0.000077
1,2,3,6,7,8-HxCDF	0.0011	0.000025	0.000049	0.1	0.00011
1,2,3,7,8,9-HxCDF	0.000055	0.000025	0.000049	0.1	0.0000055
2,3,4,6,7,8-HxCDF	0.0013	0.000025	0.000049	0.1	0.00013
1,2,3,4,6,7,8-HpCDF	0.0026	0.000027	0.000055	0.01	0.000026
1,2,3,4,7,8,9-HpCDF	0.00023	0.000027	0.000055	0.01	0.0000023
OCDF	0.00034	0.000047	0.000094	0.001	0.00000034
I-TEQ from quantified 2,3,7,8-PCDD/Fs -"Lowerbound"					0.0014
I-TEQ from 2,3,7,8-PCDD/Fs -,"Mediumbound"					0.0014
Maximum possible I-TEQ -"Upperbound"					0.0014
PCDD	Result [ng/m³]		PCDF	Result [ng/m³]	
Tetra-CDD	0.02		Tetra-CDF	0.013	
Penta-CDD	0.039		Penta-CDF	0.011	
Hexa-CDD	0.047		Hexa-CDF	0.01	
Hepta-CDD	0.028		Hepta-CDF	0.0028	
OCDD	0.011		OCDF	0.00034	

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.