



CERTIFICATE OF ANALYSIS

Work Order	: PR24D8224	Issue Date	: 09-Dec-2024
Customer	: ALS Laboratory Services doo	Laboratory	: ALS Czech Republic, s.r.o.
Contact	: Milica Bozovic	Contact	: Client Service
Address	: Nikole Kopernika bb 19210 Bor Serbia	Address	: Na Harfe 336/9 Prague 9 - Vysocany 190 00 Czech Republic
E-mail	: Milica.Bozovic@alsglobal.com	E-mail	: customer.support@alsglobal.com
Telephone	: ----	Telephone	: +420 226 226 228
Project	: Dioxin emission analyses	Page	: 1 of 3
Order number	: ----	Date Samples	: 08-Nov-2024
		Received	
		Quote number	: PR2023ALSLA-RS0001 (CZ-251-23-0421)
Site	: Serbia	Date of test	: 26-Nov-2024 - 09-Dec-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 PR24D8224/001 - 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

10 (9.9.2024 - 7.10.2024)

Laboratory sample ID

PR24D8224001

Client sampling date / time

[08-Nov-2024]

Parameter	Method	LOR	Unit	Result	MU	Result	MU	Result	MU
PCDDs and PCDFs (Dioxins and Furans)									
2378-TCDD	A-DFHMS02	-	ng/m³	<0.0000031	----	----	----	----	----
12378-PeCDD	A-DFHMS02	-	ng/m³	0.00002	----	----	----	----	----
123478-HxCDD	A-DFHMS02	-	ng/m³	0.0002	----	----	----	----	----
123678-HxCDD	A-DFHMS02	-	ng/m³	0.00035	----	----	----	----	----
123789-HxCDD	A-DFHMS02	-	ng/m³	0.00018	----	----	----	----	----
1234678-HpCDD	A-DFHMS02	-	ng/m³	0.0021	----	----	----	----	----
OCDD	A-DFHMS02	-	ng/m³	0.0017	----	----	----	----	----
2378-TCDF	A-DFHMS02	-	ng/m³	0.00006	----	----	----	----	----
12378-PeCDF	A-DFHMS02	-	ng/m³	0.000092	----	----	----	----	----
23478-PeCDF	A-DFHMS02	-	ng/m³	0.00022	----	----	----	----	----
123478-HxCDF	A-DFHMS02	-	ng/m³	0.00014	----	----	----	----	----
123678-HxCDF	A-DFHMS02	-	ng/m³	0.00017	----	----	----	----	----
123789-HxCDF	A-DFHMS02	-	ng/m³	0.000026	----	----	----	----	----
234678-HxCDF	A-DFHMS02	-	ng/m³	0.00027	----	----	----	----	----
1234678-HpCDF	A-DFHMS02	-	ng/m³	0.00037	----	----	----	----	----
1234789-HpCDF	A-DFHMS02	-	ng/m³	0.000035	----	----	----	----	----
OCDF	A-DFHMS02	-	ng/m³	0.000063	----	----	----	----	----
TEQ-Lowerbound	A-DFHMS02	-	ng/m³	0.00025	----	----	----	----	----
TEQ-Upperbound	A-DFHMS02	-	ng/m³	0.00026	----	----	----	----	----
PCB dioxin-like HRMS									
PCB 77	A-PCBHMS03	-	ng/m³	<0.000032	----	----	----	----	----
PCB 81	A-PCBHMS03	-	ng/m³	<0.000029	----	----	----	----	----
PCB 105	A-PCBHMS03	-	ng/m³	<0.00072	----	----	----	----	----
PCB 114	A-PCBHMS03	-	ng/m³	<0.000045	----	----	----	----	----
PCB 118	A-PCBHMS03	-	ng/m³	<0.0015	----	----	----	----	----
PCB 123	A-PCBHMS03	-	ng/m³	<0.000026	----	----	----	----	----
PCB 126	A-PCBHMS03	-	ng/m³	<0.00002	----	----	----	----	----
PCB 156	A-PCBHMS03	-	ng/m³	<0.00022	----	----	----	----	----
PCB 157	A-PCBHMS03	-	ng/m³	<0.0002	----	----	----	----	----
PCB 167	A-PCBHMS03	-	ng/m³	<0.00022	----	----	----	----	----
PCB 169	A-PCBHMS03	-	ng/m³	<0.000071	----	----	----	----	----
PCB 170	A-PCBHMS03	-	ng/m³	<0.00066	----	----	----	----	----
PCB 180	A-PCBHMS03	-	ng/m³	<0.0015	----	----	----	----	----
PCB 189	A-PCBHMS03	-	ng/m³	<0.00017	----	----	----	----	----
TEQ (dl-PCB) - lower	A-PCBHMS03	-	ng/m³	0	----	----	----	----	----
TEQ (dl-PCB) - upper	A-PCBHMS03	-	ng/m³	0.0000043	----	----	----	----	----

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.

Issue Date : 09-Dec-2024
Page : 3 of 3
Work Order : PR24D8224
Customer : ALS Laboratory Services doo



<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 PR24D8224

Sample:

10 (9.9.2024 - 7.10.2024)

ALS SAMPLE ID: PR24D8224/ 001

Measurement results PCDD/Fs:

Sample:		10 (9.9.2024 - 7.10.2024)		Final extract [µl]:		60	
				Injection volume [µl]:		4	
				Acquisition date [d.m.y h:m]:		5.12.24 2:54	
2,3,7,8-PCDD/Fs	Result	Limit of Detection	Limit of Quantification	¹ I-TEFs	I-TEQ	Upperbound	
	[ng/sample]	[ng/sample]	[ng/sample]			[ng/sample]	
2,3,7,8-TCDD	< 0.005	0.005	0.01	1		0.005	
1,2,3,7,8-PeCDD	0.033	0.0058	0.012	0.5		0.016	
1,2,3,4,7,8-HxCDD	0.31	0.0072	0.014	0.1		0.031	
1,2,3,6,7,8-HxCDD	0.56	0.0072	0.014	0.1		0.056	
1,2,3,7,8,9-HxCDD	0.28	0.0072	0.014	0.1		0.028	
1,2,3,4,6,7,8-HpCDD	3.4	0.012	0.023	0.01		0.034	
OCDD	2.7	0.015	0.03	0.001		0.0027	
2,3,7,8-TCDF	0.096	0.0051	0.01	0.1		0.0096	
1,2,3,7,8-PeCDF	0.15	0.0058	0.012	0.05		0.0074	
2,3,4,7,8-PeCDF	0.35	0.0058	0.012	0.5		0.17	
1,2,3,4,7,8-HxCDF	0.22	0.0078	0.016	0.1		0.022	
1,2,3,6,7,8-HxCDF	0.27	0.0078	0.016	0.1		0.027	
1,2,3,7,8,9-HxCDF	0.042	0.0078	0.016	0.1		0.0042	
2,3,4,6,7,8-HxCDF	0.43	0.0078	0.016	0.1		0.043	
1,2,3,4,6,7,8-HpCDF	0.6	0.0095	0.019	0.01		0.006	
1,2,3,4,7,8,9-HpCDF	0.056	0.0095	0.019	0.01		0.00056	
OCDF	0.1	0.011	0.021	0.001		0.0001	
I-TEQ from quantified 2,3,7,8-PCDD/Fs -"Lowerbound"						0.46	
I-TEQ from 2,3,7,8-PCDD/Fs -,Mediumbound"						0.46	
Maximum possible I-TEQ -"Upperbound"						0.47	
PCDDs	Result [ng/sample]		PCDFs	Result [ng/sample]			
Tetra-CDDs	5.9		Tetra-CDFs	4.8			
Penta-CDDs	8.3		Penta-CDFs	5.3			
Hexa-CDDs	13		Hexa-CDFs	4.4			
Hepta-CDDs	14		Hepta-CDFs	1.1			
OCDD	2.7		OCDF	0.1			

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≥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. 1 to the Certificate of Analysis for work order PR24D8224

Sample:

10 (9.9.2024 - 7.10.2024)

Standards recovery:

Sample: 10 (9.9.2024 - 7.10.2024)					
				Final extract [µl]:	60
				Injection volume [µl]:	4
				Acquisition date [d.m.y h:m]:	5.12.24 2:54
Extraction standard	Recovery	Acceptable range [%]		Accept. rec. with respect to	
PCDDs	[%]	Basic	Extended	basic range	extended range
13C12 - 2,3,7,8-TCDD	76	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,7,8-PeCDD	67	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDD	73	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDD	75	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDD	40	40 - 130	20 - 150	YES	-
13C12 - OCDD	45	40 - 130	20 - 150	YES	-
PCDFs					
13C12 - 2,3,7,8-TCDF	81	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,7,8-PeCDF	68	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDF	56	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDF	62	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,6,7,8-HxCDF	68	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDF	78	40 - 130	20 - 150	YES	-
13C12 - OCDF	49	40 - 130	20 - 150	YES	-
Sampling standard	Recovery	Acceptable range		Rec. in range?	
	[%]	[%]			
13C12-1,2,3,7,8-PeCDF	78	> 50		YES	
13C12-1,2,3,7,8,9-HxCDF	76	> 50		YES	
13C12-1,2,3,4,7,8,9-HpCDF	72	> 50		YES	

Attachment no. 1 to the Certificate of Analysis for work order PR24D8224

Sample:

10 (9.9.2024 - 7.10.2024)

Measurement results PCDD/Fs:

Sample:		10 (9.9.2024 - 7.10.2024)		Final extract [µl]:		60	
Sampled volume [Nm³]:		1600.5		Injection volume [µl]:		4	
				Acquisition date [d.m.y h:m]:		5.12.24 2:54	
2,3,7,8-PCDD/F	Result	Limit of Detection	Limit of Quantification	I-TEFs	I-TEQ	Upperbound	
	[ng/Nm³]	[ng/Nm³]	[ng/Nm³]			[ng/Nm³]	
2,3,7,8-TCDD	< 0.0000031	0.0000031	0.0000063	1		0.0000031	
1,2,3,7,8-PeCDD	0.00002	0.0000036	0.0000073	0.5		0.00001	
1,2,3,4,7,8-HxCDD	0.0002	0.0000045	0.0000089	0.1		0.00002	
1,2,3,6,7,8-HxCDD	0.00035	0.0000045	0.0000089	0.1		0.000035	
1,2,3,7,8,9-HxCDD	0.00018	0.0000045	0.0000089	0.1		0.000018	
1,2,3,4,6,7,8-HpCDD	0.0021	0.0000072	0.000014	0.01		0.000021	
OCDD	0.0017	0.0000094	0.000019	0.001		0.0000017	
2,3,7,8-TCDF	0.00006	0.0000032	0.0000064	0.1		0.000006	
1,2,3,7,8-PeCDF	0.000092	0.0000036	0.0000072	0.05		0.0000046	
2,3,4,7,8-PeCDF	0.00022	0.0000036	0.0000072	0.5		0.00011	
1,2,3,4,7,8-HxCDF	0.00014	0.0000049	0.0000098	0.1		0.000014	
1,2,3,6,7,8-HxCDF	0.00017	0.0000049	0.0000098	0.1		0.000017	
1,2,3,7,8,9-HxCDF	0.000026	0.0000049	0.0000098	0.1		0.0000026	
2,3,4,6,7,8-HxCDF	0.00027	0.0000049	0.0000098	0.1		0.000027	
1,2,3,4,6,7,8-HpCDF	0.00037	0.0000059	0.000012	0.01		0.0000037	
1,2,3,4,7,8,9-HpCDF	0.000035	0.0000059	0.000012	0.01		0.00000035	
OCDF	0.000063	0.0000067	0.000013	0.001		0.00000063	
I-TEQ from quantified 2,3,7,8-PCDD/Fs -"Lowerbound"						0.00029	
I-TEQ from 2,3,7,8-PCDD/Fs -,Mediumbound"						0.00029	
Maximum possible I-TEQ -"Upperbound"						0.00029	
PCDD	Result [ng/Nm³]		PCDF	Result [ng/Nm³]			
Tetra-CDD	0.0037		Tetra-CDF	0.003			
Penta-CDD	0.0052		Penta-CDF	0.0033			
Hexa-CDD	0.0083		Hexa-CDF	0.0028			
Hepta-CDD	0.0086		Hepta-CDF	0.00067			
OCDD	0.0017		OCDF	0.000063			

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. 2 to the Certificate of Analysis for work order PR24D8224

Sample:

10 (9.9.2024 - 7.10.2024)

ALS SAMPLE ID: PR24D8224/ 001

Measurement results PCBs:

Sample:		10 (9.9.2024 - 7.10.2024)			
		Final extract [μl]:		250	
Sampled volume [Nm3] 1600.5		Injection volume [μl]:		4	
		Acquisition date [d.m.y]:		05.12.2024	
	Result	Limit of Detection	Limit of Quantification	¹ WHO-TEFs	WHO-TEQ Upperbound
PCBs	[ng/Nm3]	[ng/Nm3]	[ng/Nm3]		[ng/Nm3]
PCB #77	< 0.000032	0.000032	0.00011	0.0001	0.0000000032
PCB #81	< 0.000029	0.000029	0.000095	0.0003	0.0000000086
PCB #126	< 0.00002	0.00002	0.000067	0.1	0.000002
PCB #169	< 0.000071	0.000071	0.00024	0.03	0.0000021
PCB #105	< 0.00072	0.00002	0.00072	0.00003	0.000000022
PCB #114	< 0.000045	0.000021	0.000045	0.00003	0.000000013
PCB #118	< 0.0015	0.00002	0.0015	0.00003	0.0000000450
PCB #123	< 0.000026	0.000026	0.000085	0.00003	0.0000000077
PCB #156	< 0.00022	0.000058	0.00022	0.00003	0.0000000067
PCB #157	< 0.0002	0.000057	0.0002	0.00003	0.000000006
PCB #167	< 0.00022	0.000064	0.00022	0.00003	0.0000000067
PCB #170	< 0.00066	0.000041	0.00066	-	0
PCB #180	< 0.0015	0.000041	0.0015	-	0
PCB #189	< 0.00017	0.000047	0.00017	0.00003	0.0000000051
WHO-TEQ from quantified PCBs -"Lowerbound"					0
WHO-TEQ from PCBs -,"Mediumbound"					0.0000021
Maximum possible WHO-TEQ -"Upperbound"					0.0000043

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:		10 (9.9.2024 - 7.10.2024)		Final extract [μl]:	250
				Injection volume [μl]:	4
				Acquisition date [d.m.y h:m]:	5.12.24 3:36
Sampling standard	Recovery [%]	Acceptable range [%]		Rec. in range?	
13C12-2,3,4,4'-tetraCB (60)	109	> 50		YES	
13C12-2,3,3',4,5,5'-hexaCB (159)	96	> 50		YES	

Attachment no. 3 to the Certificate of Analysis for work order PR24D8224

Sample:

10 (9.9.2024 - 7.10.2024)

ALS SAMPLE ID: PR24D8224/ 001

Measurement results PCDD/Fs:

Sample: 10 (9.9.2024 - 7.10.2024)			Final extract [µl]: 60		
			Injection volume [µl]: 4		
			Acquisition date [d.m.y h:m]: 5.12.24 2:54		
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	< 0.005	0.005	0.01	1	0.005
1,2,3,7,8-PeCDD	0.033	0.0058	0.012	1	0.033
1,2,3,4,7,8-HxCDD	0.31	0.0072	0.014	0.1	0.031
1,2,3,6,7,8-HxCDD	0.56	0.0072	0.014	0.1	0.056
1,2,3,7,8,9-HxCDD	0.28	0.0072	0.014	0.1	0.028
1,2,3,4,6,7,8-HpCDD	3.4	0.012	0.023	0.01	0.034
OCDD	2.7	0.015	0.03	0.0003	0.00081
2,3,7,8-TCDF	0.096	0.0051	0.01	0.1	0.0096
1,2,3,7,8-PeCDF	0.15	0.0058	0.012	0.03	0.0044
2,3,4,7,8-PeCDF	0.35	0.0058	0.012	0.3	0.1
1,2,3,4,7,8-HxCDF	0.22	0.0078	0.016	0.1	0.022
1,2,3,6,7,8-HxCDF	0.27	0.0078	0.016	0.1	0.027
1,2,3,7,8,9-HxCDF	0.042	0.0078	0.016	0.1	0.0042
2,3,4,6,7,8-HxCDF	0.43	0.0078	0.016	0.1	0.043
1,2,3,4,6,7,8-HpCDF	0.6	0.0095	0.019	0.01	0.006
1,2,3,4,7,8,9-HpCDF	0.056	0.0095	0.019	0.01	0.00056
OCDF	0.1	0.011	0.021	0.0003	0.00003
WHO-TEQ from quantified 2,3,7,8-PCDD/Fs -"Lowerbound"					0.4
WHO-TEQ from 2,3,7,8-PCDD/Fs -,"Mediumbound"					0.41
Maximum possible WHO-TEQ -"Upperbound"					0.41
PCDDs	Result [ng/sample]		PCDFs	Result [ng/sample]	
Tetra-CDDs	5.9		Tetra-CDFs	4.8	
Penta-CDDs	8.3		Penta-CDFs	5.3	
Hexa-CDDs	13		Hexa-CDFs	4.4	
Hepta-CDDs	14		Hepta-CDFs	1.1	
OCDD	2.7		OCDF	0.1	

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. 3 to the Certificate of Analysis for work order PR24D8224

Sample:

10 (9.9.2024 - 7.10.2024)

Standards recovery:

Sample: 10 (9.9.2024 - 7.10.2024)					
				Final extract [μl]:	60
				Injection volume [μl]:	4
				Acquisition date [d.m.y h:m]:	5.12.24 2:54
Extraction standard	Recovery	Acceptable range [%]		Accept. rec. with respect to	
PCDDs	[%]	Basic	Extended	basic range	extended range
13C12 - 2,3,7,8-TCDD	76	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,7,8-PeCDD	67	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDD	73	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDD	75	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDD	40	40 - 130	20 - 150	YES	-
13C12 - OCDD	45	40 - 130	20 - 150	YES	-
PCDFs					
13C12 - 2,3,7,8-TCDF	81	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,7,8-PeCDF	68	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,7,8-HxCDF	56	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,6,7,8-HxCDF	62	50 - 130	30 - 150	YES	-
13C12 - 2,3,4,6,7,8-HxCDF	68	50 - 130	30 - 150	YES	-
13C12 - 1,2,3,4,6,7,8-HpCDF	78	40 - 130	20 - 150	YES	-
13C12 - OCDF	49	40 - 130	20 - 150	YES	-
Sampling standard	Recovery	Acceptable range		Rec. in range?	
	[%]	[%]			
13C12-1,2,3,7,8-PeCDF	78	> 50		YES	
13C12-1,2,3,7,8,9-HxCDF	76	> 50		YES	
13C12-1,2,3,4,7,8,9-HpCDF	72	> 50		YES	

Attachment no. 3 to the Certificate of Analysis for work order PR24D8224

Sample:

10 (9.9.2024 - 7.10.2024)

Measurement results PCDD/Fs:

Sample: 10 (9.9.2024 - 7.10.2024)			Final extract [µl]: 60		
Sampled volume [Nm³]: 1600.5			Injection volume [µl]: 4		
			Acquisition date [d.m.y h:m]: 5.12.24 2:54		
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	< 0.0000031	0.0000031	0.0000063	1	0.0000031
1,2,3,7,8-PeCDD	0.00002	0.0000036	0.0000073	1	0.00002
1,2,3,4,7,8-HxCDD	0.0002	0.0000045	0.0000089	0.1	0.00002
1,2,3,6,7,8-HxCDD	0.00035	0.0000045	0.0000089	0.1	0.000035
1,2,3,7,8,9-HxCDD	0.00018	0.0000045	0.0000089	0.1	0.000018
1,2,3,4,6,7,8-HpCDD	0.0021	0.0000072	0.000014	0.01	0.000021
OCDD	0.0017	0.0000094	0.000019	0.0003	0.00000051
2,3,7,8-TCDF	0.00006	0.0000032	0.0000064	0.1	0.000006
1,2,3,7,8-PeCDF	0.000092	0.0000036	0.0000072	0.03	0.0000028
2,3,4,7,8-PeCDF	0.00022	0.0000036	0.0000072	0.3	0.000065
1,2,3,4,7,8-HxCDF	0.00014	0.0000049	0.0000098	0.1	0.000014
1,2,3,6,7,8-HxCDF	0.00017	0.0000049	0.0000098	0.1	0.000017
1,2,3,7,8,9-HxCDF	0.000026	0.0000049	0.0000098	0.1	0.0000026
2,3,4,6,7,8-HxCDF	0.00027	0.0000049	0.0000098	0.1	0.000027
1,2,3,4,6,7,8-HpCDF	0.00037	0.0000059	0.000012	0.01	0.0000037
1,2,3,4,7,8,9-HpCDF	0.000035	0.0000059	0.000012	0.01	0.00000035
OCDF	0.000063	0.0000067	0.000013	0.0003	0.000000019
WHO-TEQ from quantified 2,3,7,8-PCDD/Fs -"Lowerbound"					0.00025
WHO-TEQ from 2,3,7,8-PCDD/Fs -,"Mediumbound"					0.00025
Maximum possible WHO-TEQ -"Upperbound"					0.00026
PCDD	Result [ng/Nm³]		PCDF	Result [ng/Nm³]	
Tetra-CDD	0.0037		Tetra-CDF	0.003	
Penta-CDD	0.0052		Penta-CDF	0.0033	
Hexa-CDD	0.0083		Hexa-CDF	0.0028	
Hepta-CDD	0.0086		Hepta-CDF	0.00067	
OCDD	0.0017		OCDF	0.000063	

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.

