



PROFTECH
SPÓŁKA Z O.O.



AB 994

Research laboratory
accredited by PCA,
Nr AB 994

Scopes of accreditation:

- concentration and mass measurements of flow of fine particles
- measurements of concentration and mass flow of SO₂, NO_x, CO
- concentration measurements of CO₂, O₂
- concentration and mass flow measurements of OWO
- sampling for mass concentration determination of PCDD/PDF and dioxin type PCB
- sampling for concentration determination of (As; Cd; Cr; Co; Cu; Mn; Ni; Pb; Sb; Tl; V)
- sampling for concentration determination of Hg
- sampling and determination of concentration and mass flow of HCl
- sampling and determination of concentration and mass flow of HF
- sampling for determining the concentration of individual gaseous organic compounds
- calibration of Automated Monitoring systems,
- QAL2 procedure
- annual performance test of Automated Monitoring Systems, AST procedure
- noise measurement from machinery, installations and industrial plants

Chorzów, June 19th 2026
Our ref. No.: PW/43/06/26

Report No PW/43/06/26

on concentration measurements of heavy metals (As; Cd; Cr; Co; Cu; Mn; Ni; Pb; Sb; Tl; V) emitted into environment from flue gas channel located at UAB KAUNO KOGENERACINĖ JĖGAINĖ, Jėgainės g. 6, Biruliškių k., LT-54469 Kauno raj., Lithuania.

Client name and address:

**UAB KAUNO KOGENERACINĖ
JĖGAINĖ,**
Jėgainės g. 6, Biruliškių k.,
LT-54469 Kauno raj

Developed by:

mgr Grzegorz Bortel

Calculation and data transfer checked by:

inż. Dariusz Guja

Verified by:

Company manager - inż. Dariusz Guja

Copy number: 4./2

ul. Kurta Aldera 44
41-506 Chorzów
tel/fax: 0 32 247 37 24

www.proftech.com.pl
e-mail: proftech@proftech.com.pl

NIP: 627 252 46 31
KRS: 0000773369

bank account : PKO BANK POLSKI S.A. O/Katowice : IBAN PL62 1440 1172 0000 0000 0353 4332

Test Report No PW/43/06/26

List of contents:

- 1. PURPOSE AND SCOPE OF THE REPORT**
- 2. BASIS OF MEASUREMENTS EXECUTION**
- 3. MEASUREMENT TEAM**
- 4. MEASUREMENT RESULTS SUMMARY**
- 5. DESCRIPTION OF THE MEASUREMENT METHOD**
- 6. MEASUREMENT RESULTS**
- 7. MEASUREMENT DEVICES**
- 8. CERTIFICATE OF ACCREDITATION**
- 9. MEASUREMENT PLANE SCHEME**

Test Report No PW/43/06/26

1. PURPOSE AND SCOPE OF THE REPORT

Purpose of executed measurements was to determine the concentration of heavy metals (As; Cd; Cr; Co; Cu; Mn; Ni; Pb; Sb; Tl; V) emitted to environment from flue gas channel located at UAB KAUNO KOGENERACINĖ JĖGAINĖ, Jėgainės g. 6, Biruliškių k., LT-54469 Kauno raj., Lithuania

Measurements range:

- Heavy metals (As; Cd; Cr; Co; Cu; Mn; Ni; Pb; Sb; Tl; V) concentration,

The measurements were carried out in accordance with the sampling plan and the described sampling methods.

Operating parameters of the technological installation was obtained from the customer's representative.

2. BASIS OF MEASUREMENTS EXECUTION

The measurements were taken according to the contract No 2025-KKJ-63 dated April 25th 2025.

3. MEASUREMENT TEAM

The measurements taken on May 14th 2026 were executed by the following team:

- | | |
|--------------------|---------------------------------------|
| – Grzegorz Bortel | specialist - measurement team leader, |
| – Karol Sodo | specialist, |
| – Przemysław Zubel | specialist. |

Test Report No PW/43/06/26**4. MEASUREMENT RESULTS SUMMARY**

Below are presented measurement results summary, full measurement results are presented in chapter No 6, at page 8 and 9

Stationary emission source	Concentration of the substance in the gas in the reference conditions O2 ref. 11%	Cd*+Tl*	mg/m3 ref.	0,011
		Sb*+As*+Cr*+Co*+Mn*+Cu*+Ni*+Pb*+V*	mg/m3 ref.	0,069
	Emission limits	Cd+Tl	mg/m3 ref.	0,02
		Sb+As+Cr+Co+Mn+Cu+Ni+Pb+V	mg/m3 ref.	0,3
	Transgression	Cd+Tl	mg/m3 ref.	-
		Hg	mg/m3 ref.	-
		Sb+As+Cr+Co+Mn+Cu+Ni+Pb+V	mg/m3 ref.	-

*- the results obtained from the subcontractor (accredited)

Test Report No PW/43/06/26

5. DESCRIPTION OF THE MEASUREMENT METHOD**Measurement of the gas volumetric flow**

The flow rate and density of flue gases were determined according to Polish Standard PN-Z-04030-7:1994 „Testing of particulate content. The gravimetric method measurement of concentration and particulate mass flow in flue gases" / ISO Standard PN-EN ISO 16911-1:2013 „Stationary source emissions - Manual and automatic determination of velocity and volume flow rate in ducts - Part 1: Manual reference method". Gravimetric dust monitor type MEGASYSTEM X-1 APIS and type "S" Pitot tube were used for the measurements. Measurement is accredited.

Accreditation range: differential pressure: > 10 Pa

Measurement O₂ content

The concentration of O₂ was determined using gas analyzer HORIBA PG-350E-EU equipped with testing probe 1500 mm long. The measurements were taken according to the procedure described in measurement unit as well as to EN Standard PN-EN 14789:2017 "Stationary source emissions - Determination of volume concentration of oxygen O₂ - Reference method - Paramagnetism". Measurement is accredited.

Accreditation range: O₂ content: 1,5-21%

Measurement CO₂ content

The concentration of CO₂ was determined using gas analyzer HORIBA PG-350E-EU equipped with testing probe 1500 mm long. The measurements were taken according to the procedure described in measurement unit as well as to ISO Standard ISO 10396:2007 "Stationary Source Emissions - Sampling For The Automated Determination Of Gas Concentrations ". Measurement is accredited.

Accreditation range: CO₂ content: 0,1-20%

Test Report No PW/43/06/26

Measurement of heavy metals content

Sampling for the determination of concentrations and emissions of heavy metals (Cd, Tl, Sb , As, Cr, Co, Cu , Mn , Ni , Pb, V) was performed according to PN -EN 14385 : 2025. Analysis of metals (Cd , Tl , Sb , As, Cr, Co, Cu , Mn , Ni , Pb, V) was performed in the laboratory of ALS Czech Republic s.r.o., specifically accredited for the test by the Český Institut Pro Akreditaci, o.p.s. , Nr L 1163.

Test Report No PW/43/06/26

6. MEASUREMENT RESULTS

Test Report No PW/43/06/26

- 1) Plant or unit name¹⁾: **Combined Heat and Power Plant**
 2) Flue gases cleaning unit¹⁾: **Bag filters, activate carbon, hydrated lime, scrubber**
 3) Emission source load during measurements¹⁾: **Boiler load ~87,4 MW ~105,1%**
 4) Fuel type or material mass flow in process¹⁾: **Municipal waste (69%) and industrial waste (31%)**
 5) Location of sampling and measurements: **In duct, after flue gases cleaning unit**

Measurement reference number			14-05-01						
Date of measurement			14.05.2026						
Measurement time range			08:39-09:28	09:32-10:21	10:26-11:15				
Scope of test		Unit	Results			Average	Uncertainty +/-	Method	
Meteorological conditions	Atmospheric pressure	hPa	992,1	992,2	992,3	992,2	0,9	PN-Z-04030-7:1994 PN-EN ISO 16911-1:2013	
	Air temperature	oC	13	13	13	13			
Measurement plane	Diameter	m	2,33						
	Area	m2	4,2617						
Stack gas parameters	Temperature	oC	48,4	50,0	49,5	49,3	1,0		
	Static pressure	Pa	157,6	136,0	128,7	140,8	2,0		
	Dynamic pressure	Pa	112,4	105,5	91,0	103,0	1,2		
	Gas moistness grade X	kg/kg	0,097	0,094	0,099	0,097	0,0025	PN-EN 14790:2017	
	Average velocity	m/s	11,1	10,8	10,0	10,6	0,3	PN-Z-04030-7:1994 PN-EN ISO 16911-1:2013	
	Chemical composition	O2	%	9,00	8,30	8,10	8,47	0,23	PN-EN 14789:2017
		CO2	%	9,90	10,50	10,60	10,33	0,42	ISO 10396:2007
	Wet gas density during testing	kg/m3	1,052	1,050	1,050	1,051		PN-Z-04030-7:1994 PN-EN ISO 16911-1:2013	
	Gas density in normal conditions	kg/m3 N	1,263	1,267	1,264	1,265			
	Gas density in standard conditions	kg/m3 U	1,337	1,340	1,340	1,339			
Concentration of the substance in the gas in reference conditions O2 ref. 11%	As gaseus*	mg/m ³ _{ref}	< 0,008803	< 0,009752	< 0,009272	< 0,009276	0,001160	PN-EN 14385:2025	
	As dust*	mg/m ³ _{ref}	< 0,000342	< 0,000331	< 0,000393	< 0,000355	0,000077	PN-EN 14385:2025	
	As*	mg/m ³ _{ref}	< 0,009145	< 0,010083	< 0,009665	< 0,009631	0,001162	PN-EN 14385:2025	
	Sb gaseus*	mg/m ³ _{ref}	< 0,008803	< 0,009752	< 0,009272	< 0,009276	0,001160	PN-EN 14385:2025	
	Sb dust*	mg/m ³ _{ref}	< 0,000342	< 0,000331	< 0,000393	< 0,000355	0,000077	PN-EN 14385:2025	
	Sb*	mg/m ³ _{ref}	< 0,009145	< 0,010083	< 0,009665	< 0,009631	0,001162	PN-EN 14385:2025	
	Cd gaseus*	mg/m ³ _{ref}	< 0,000880	< 0,000975	< 0,000927	< 0,000928	0,000116	PN-EN 14385:2025	
	Cd dust*	mg/m ³ _{ref}	< 0,000034	< 0,000033	< 0,000039	< 0,000036	0,000008	PN-EN 14385:2025	
	Cd*	mg/m ³ _{ref}	< 0,000914	< 0,001008	< 0,000967	< 0,000963	0,000116	PN-EN 14385:2025	
	Co gaseus*	mg/m ³ _{ref}	< 0,001741	< 0,001941	< 0,001874	< 0,001852	0,000232	PN-EN 14385:2025	
	Co dust*	mg/m ³ _{ref}	< 0,000068	< 0,000066	< 0,000079	< 0,000071	0,000015	PN-EN 14385:2025	
	Co*	mg/m ³ _{ref}	< 0,001809	< 0,002007	< 0,001953	< 0,001923	0,000232	PN-EN 14385:2025	
	Mn gaseus*	mg/m ³ _{ref}	0,026708	0,005046	0,002663	0,011472	0,001424	PN-EN 14385:2025	
	Mn dust*	mg/m ³ _{ref}	0,000055	< 0,000066	< 0,000079	0,000066	0,000015	PN-EN 14385:2025	
	Mn*	mg/m ³ _{ref}	0,026763	0,005112	0,002742	0,011539	0,001424	PN-EN 14385:2025	
	Cu gaseus*	mg/m ³ _{ref}	0,002934	0,003057	0,002811	0,002934	0,000368	PN-EN 14385:2025	
	Cu dust*	mg/m ³ _{ref}	< 0,000068	< 0,000066	< 0,000079	< 0,000071	0,000015	PN-EN 14385:2025	
	Cu*	mg/m ³ _{ref}	0,003003	0,003123	0,002890	0,003005	0,000368	PN-EN 14385:2025	
	Ni gaseus*	mg/m ³ _{ref}	< 0,008803	< 0,009752	< 0,009272	< 0,009276	0,001160	PN-EN 14385:2025	
	Ni dust*	mg/m ³ _{ref}	< 0,000342	< 0,000331	< 0,000393	< 0,000355	0,000077	PN-EN 14385:2025	
	Ni*	mg/m ³ _{ref}	< 0,009145	< 0,010083	< 0,009665	< 0,009631	0,001162	PN-EN 14385:2025	
	Pb gaseus*	mg/m ³ _{ref}	< 0,008803	< 0,009752	< 0,009272	< 0,009276	0,001160	PN-EN 14385:2025	
	Pb dust*	mg/m ³ _{ref}	< 0,000342	< 0,000331	< 0,000393	< 0,000355	0,000077	PN-EN 14385:2025	
	Pb*	mg/m ³ _{ref}	< 0,009145	< 0,010083	< 0,009665	< 0,009631	0,001162	PN-EN 14385:2025	

Test Report No PW/43/06/26

	V gaseus*	mg/m ³ _{ref}	< 0,008803	< 0,009752	< 0,009272	< 0,009276	0,001160	PN-EN 14385:2025
	V dust*	mg/m ³ _{ref}	< 0,000342	< 0,000331	< 0,000393	< 0,000355	0,000077	PN-EN 14385:2025
	V*	mg/m ³ _{ref}	< 0,009145	< 0,010083	< 0,009665	< 0,009631	0,001162	PN-EN 14385:2025
	Cr gaseus*	mg/m ³ _{ref}	0,004377	0,004900	< 0,004636	0,004638	0,000580	PN-EN 14385:2025
	Cr dust*	mg/m ³ _{ref}	< 0,000171	< 0,000165	< 0,000196	< 0,000178	0,000039	PN-EN 14385:2025
	Cr*	mg/m ³ _{ref}	0,004548	0,005066	< 0,004833	0,004815	0,000581	PN-EN 14385:2025
	Ti gaseus*	mg/m ³ _{ref}	< 0,008803	< 0,009752	< 0,009272	< 0,009276	0,001160	PN-EN 14385:2025
	Ti dust*	mg/m ³ _{ref}	< 0,000342	< 0,000331	< 0,000393	< 0,000355	0,000077	PN-EN 14385:2025
	Ti*	mg/m ³ _{ref}	< 0,009145	< 0,010083	< 0,009665	< 0,009631	0,001162	PN-EN 14385:2025
Gas volume flow	measurement conditions	m ³ /h	170451	165235	153575	163087	4835	PN-Z-04030-7:1994 PN-EN ISO 16911-1:2013
	normal conditions	m ³ _n /h	142013	136976	127517	135502	4017	
	standard conditions	m ³ _u /h	122271	118355	109422	116683	3459	
	reference conditions O2 ref. 11%	m ³ _{ref} /h	146726	150311	141154	146064	5332	
Emission limits	Cd*+Ti*	mg/m ³ _{ref}	0,02					
	Sb*+As*+Cr*+Co*+Mn*+Cu*+Ni*+Pb*+V*	mg/m ³ _{ref}	0,3					
Concentration of the substance in the gas in reference conditions O2 ref. 11%	Cd*+Ti*	mg/m ³ _{ref}	0,011					
	Sb*+As*+Cr*+Co*+Mn*+Cu*+Ni*+Pb*+V*	mg/m ³ _{ref}	0,069					

* - the results obtained from the subcontractor (accredited)

1)-information obtained from the client

The notation "< or > y" where y=the value of the mesurand corresponding to the lower/upper limit of the measurement range of the method) means - a test result/result below or above the measurement range of the method. The lower/upper limit of the method's measurement range is assumed for the calculation, respectively. The expanded uncertainty shown is the measurement uncertainty for the value of the lower/upper limit of the measurement range of the method. In the case of converted test results/results obtained from a third-party provider of laboratory services, the measurement range limit of that provider's method is assumed for the calculation.

The measurement range limit for: Cr<0,25 ug / As<0,50 ug / Cd<0,050 ug / Co<0,10 ug / Mn<0,10 ug/ Cu<0,10 ug / Ni<0,50 ug / Pb<0,50 ug / Ti<0,50 ug / V<0,50 ug / Sb<0,50 ug / in sample

Notes:

Normal conditions designate the temperature of 273 K and pressure of 101,3kPa, defining normal cubic meter m³N. The standard conditions designate the temperature of 273K, pressure of 101,3 kPa and dry gases (steam contents less than 5 g/kg of flue gas), defining standard cubic meter, m³U

The specified expanded uncertainty comes from standard uncertainty multiplied by expansion coefficient k = 2, which provides 95% level of confidence for normal distribution. Uncertainty takes into account the sampling and analysis.

Registry of samples delivered to the laboratory:

P/183/05/26 - P/192/05/26

Date of delivery to the laboratory:

14.05.2026

Date of analysis:

14.05.2026 - 02.06.2026

Test Report No PW/43/06/26**Field blanks:**

ID/ number of sample	Type of substance	The criterion of the blank [mg/m ³] 11%O ₂	The value of the blank [mg/m ³] 11% O ₂	Result [+/-]
P/189/05/26	Cd+Tl	0,002	p.o.	+
P/189/05/26	Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V	0,03	p.o.	+

p.o. – below the limit of quantification.

Work parameters of measurement system:**Heavy metals (PN-EN 14385:2025)**

Sampling plane: 2 measurement axis
Sampling: isokinetic [x]
nonisokinetic []
Isokinetic ratio: 105,1 % / 105,9 % / 95,0 %
Sampling time: 48,1 min / 48,1 min / 48,1 min
Sampled volume: 0,132 / 0,135 / 0,123 m³
Filter parameters: FT-50: Ø 0,50 mm, efficiency: 99,990 %, quartz (QMA)
Impingers: impingers set No. 2 (absorption efficiency 98,1 %)
Absorption solution: HNO₃/H₂O₂

H₂O (PN-EN 14790:2017)

Sampling plane: 2 measurement axis
Sampling equipment: titanium sampling line
heated probe 1,5 m
sampling pump: PT-O1
Cartridge No: H₂O content set No 2
Sampling No: 3
Sampling time: 48,1 min
Sampling speed: ~3,0 l/min
H₂O maas: 13,5 / 14,2 / 12,8 g
absorption efficiency: 98,1 %

Test Report No PW/43/06/26**7. MEASUREMENT DEVICES**

Name of measuring device		X1- Apis
Type of measuring device		Isokinetic sampler S/N 0185
Certificate	Calibration No	94/54/LA/P/2023 G-73/23-46/23 65/1/T/23
Issued by		ZAP BESTWINKA LABOSERWIS SP. Z O.O. KATOWICE PLUM SP. Z O.O. KLEOSIN
Date of issue the certificate of calibration		27.02.2023 23.02.2023 02.03.2023
Expiration date of the certificate of calibration		-

Name of measuring device		HORIBA
Type of measuring device		PG-350E-EU
Certificate	Calibration No	106/1/AW/25
Issued by		LABOSERWIS SP. Z O.O. KATOWICE
Date of issue the certificate of calibration		10.04.2025
Expiration date of the certificate of calibration		-

Name of measuring device		Sampler
Type of measuring device		PT-01
Certificate	Calibration No	G-354/22-208/22 1189/436/LA/T/2022 786/281/LA/P/2022
Issued by		ZAP BESTWINKA PLUM SP. Z O.O. KLEOSIN
Date of issue the certificate of calibration		30.08.2022 06.09.2022 09.09.2022
Expiration date of the certificate of calibration		-

Test Report No PW/43/06/26

8. CERTIFICATE OF ACCREDITATION

POLSKIE CENTRUM AKREDYTACJI
POLISH CENTRE FOR ACCREDITATIONSygnatariusz EA MLA
EA MLA SignatoryCERTYFIKAT AKREDYTACJI
LABORATORIUM BADAWCZEGO
ACCREDITATION CERTIFICATE OF TESTING LABORATORY
Nr AB 994

Potwierdza się, że / This is to confirm that:

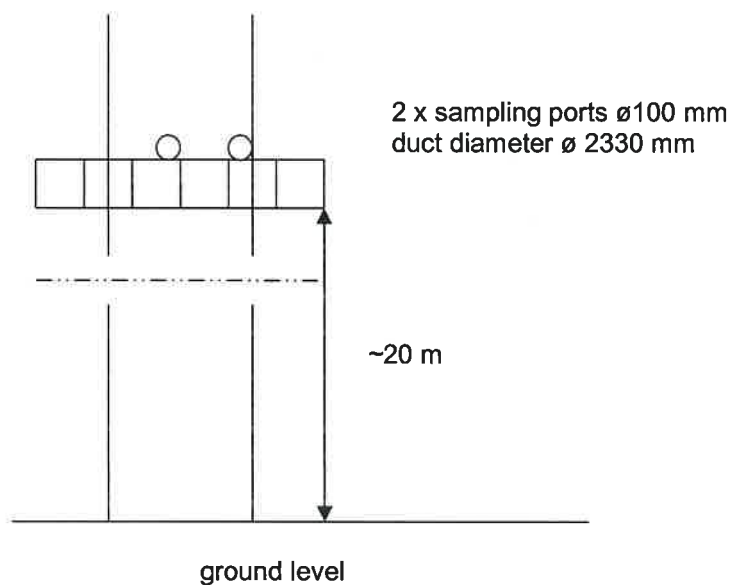
„PROFTECH” Sp. z o.o.
ul. Kurta Aldera 44, 41-506 Chorzówspełnia wymagania normy PN-EN ISO/IEC 17025:2018-02
meets requirements of the PN-EN ISO/IEC 17025:2018-02 standardAkredytowana działalność jest określona w Zakresie Akredytacji Nr AB 994
Accredited activity is defined in the Scope of Accreditation No AB 994Akredytacja pozostaje w mocy pod warunkiem przestrzegania
wymagań jednostki akredytującej określonych w kontrakcie Nr AB 994
This accreditation remains in force provided the Laboratory observes
the requirements of Accreditation Body defined in the Contract No AB 994Akredytacji udzielono dnia 30.01.2009 r.
Accreditation was granted on 30.01.2009DYREKTOR
POLSKIEGO CENTRUM AKREDYTACJI

LUCYNA OLSBORSKA

Warszawa, dnia 9 grudnia 2019 roku

Scope of accreditation issued 11.12.2025, No 25

Test Report No PW/43/06/26

9. MEASUREMENT PLANE SCHEME

Approved by
DYREKTOR
Name and Signature
inż. Dariusz Guja

END OF REPORT