

Załącznik nr 2 do ogłoszenia o udzielanym zamówieniu nr ZZ/148/009/D/2025

Detailed description of the subject of the contract

The subject of the contract is the delivery of a photoacoustic gas analyzer for the "Hybrid diamond electrodes supporting dark fermentation for bioelectrochemical hydrogen production (SONATA BIS-14)" project, funded by the National Science Centre and implemented at the Faculty of Electronics, Telecommunications and Informatics of the Gdańsk University of Technology.

The subject of the contract includes delivery to the contracting authority's office: Gdańsk University of Technology, Faculty of Electronics, Telecommunications and Informatics, ul. Narutowicza 11/12, 80-233 Gdańsk, WETI A building (no. 41), room 116.

The contracting authority requires that the subject of the contract in each part of the procedure be brand new, complete, of a high standard in terms of both workmanship and functionality, free from material and construction defects, without prior use, and not subject to third-party rights.

CPV code 38432100-3 gas analysis equipment.

1. Photoacoustic gas analyzer – 1 piece.

Measurement principle	Cantilever-Enhanced Photoacoustic spectroscopy (CE-PAS) with patented technology
Spectral sources	Continuous high-power broadband infrared source with a mechanical chopper
Dynamic range	Up to 5 orders of magnitude ($>10^5 \times$ detection limit)
Repeatability	Better than 1% of reading
Accuracy	Typically 2–5% of calibration concentration
Optical filters	Possibility to implement up to 9 filters
Response time	$\leq 120\text{sec}$
Measurable gases	CO ₂ , CO, N ₂ O, CH ₄ , NH ₃ , Acetic acid and Ethanol
Optical filter center wavenumber for CO ₂ (cm ⁻¹)	2273
Optical filter center wavenumber for CO (cm ⁻¹)	2110
Optical filter center wavenumber for N ₂ O (cm ⁻¹)	2215
Optical filter center wavenumber for CH ₄ (cm ⁻¹)	3008
Optical filter center wavenumber for NH ₃ (cm ⁻¹)	943
Optical filter center wavenumber for acetic acid (cm ⁻¹)	1160

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Optical filter center wavenumber for ethanol (cm-1)	1055
Detection limit for CO ₂	≤1ppm
Detection limit for CO	≤ 0.15ppm
Detection limit for N ₂ O	≤ 0.03ppm
Detection limit for CH ₄	≤ 0.3ppm
Detection limit for NH ₃	≤ 0.2ppm
Detection limit for acetic acid	≤ 0.1ppm
Detection limit for ethanol	≤ 0.1ppm
Internal gas cell volume	Between 20 and 40 mL
Zero-gas calibration	Yes (in factory calibration)
Interface	Ethernet, USB, MODBUS, AK-protocol and serial interface, optional interface: analog output
Operating temperature	0 ... +40 °C
Ambient humidity	Non-condensing, < 90 % RH
Sample gas pressure	750–1050 mbar
Sample gas temperature	0 ... +49 °C
User interface	Built-in computer with a 7" WSVGA display
Gas prefilter	2 gas connection equipped with user changeable filters for dust and small particles
Gas tube connector	Swagelok connector for 6/4 mm tube
Compliance	CE marking, Low Voltage Directive 2014/35/EU, EMC Directive, RoHS 2011/65/EU
Software	The PAS software providing: <ul style="list-style-type: none"> - Interactive step-by-step help assistant - Measurement menu - Data preprocessing procedures - Real time results view - Results view from previous measurements
Additional requirements	<ul style="list-style-type: none"> - The device must be calibrated with analytical standards by the seller before shipping. - The device must have the possibility to be controlled remotely. - The device must connect to a computer via an Ethernet connection



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I INFORMATYKI



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	<ul style="list-style-type: none">- Brand new device- Minimum 12 months full warranty for the entire system (equipment)
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