



Approved Signatories:

- | | |
|-----------------------------------|--|
| <input type="checkbox"/> S. Eaton | <input type="checkbox"/> B Stacey |
| <input type="checkbox"/> N Rand | <input type="checkbox"/> S Stratton |
| <input type="checkbox"/> B Davies | <input checked="" type="checkbox"/> S Telfer |
| | <input type="checkbox"/> S Gray |

Signed:

Date of issue: 17 August 2023

Certificate Number: 6423

Customer Name and Address:

North Lanarkshire Council
Municipal Buildings
Kildonan Street
Coatbridge
ML5 3LF

Description:

Calibration factors for the air monitoring station(s) at
North Lanarkshire Council

Ricardo Energy & Environment ID:

ED15141/6423

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor $k=2$ providing a level of confidence of approximately 95% The uncertainty evaluation has been carried out in accordance with UKAS requirements.

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Ricardo Energy & Environment
18 Blythswood Square (2nd Floor),
Glasgow,
G2 4BG
Tel: 01235 753205

Registered office
Shoreham Technical Centre
Shoreham-by-Sea
West Sussex
BN43 5FG

Registered in England No.
08229264

VAT Registration No.
GB 212 6365 24



CERTIFICATE OF CALIBRATION



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North Lanarkshire Council
 NOx analysers

Station	Date of Audit	Species	Analyser Serial no	Zero Response ¹	Zero uncertainty nmol/mol	Calibration Factor ²	Factor uncertainty %	Converter eff. (%) ³
N Lanarkshire Coatbridge Whifflet A725	04 July 2023	NOx	21-1547	0.1	2.6	1.2039	3.50	100 (257nmol/mol)
		NO		0.0	2.6	1.2045	3.50	99.8 (120nmol/mol)
N Lanarkshire Airdrie Kenilworth Drive	04 July 2023	NOx	23-0151	0.3	2.5	1.0125	3.50	99.9 (257nmol/mol)
		NO		0.1	2.5	1.0103	3.50	98.9 (122nmol/mol)
N Lanarkshire Motherwell Adele Street	05 July 2023	NOx	21-0951	-0.6	2.5	0.9996	3.50	100 (256nmol/mol)
		NO		-0.7	2.5	1.0061	3.50	98.9 (120nmol/mol)
N Lanarkshire Motherwell	05 July 2023	NOx	23-0167	0.1	2.5	1.0592	3.50	99.2 (263nmol/mol)
		NO		1.2	2.5	1.0526	3.50	99.4 (122nmol/mol)
N Lanarkshire Ravenscraig Plantation Road	05 July 2023	NOx	23-0552	-1.1	2.5	0.9863	3.50	99.8 (264nmol/mol)
		NO		0.5	2.5	0.9873	3.50	100.3 (126nmol/mol)
N Lanarkshire Uddingston New Edinburgh Road	06 July 2023	NOx	22-2130	-0.5	2.5	1.0050	3.50	100.7 (266nmol/mol)
		NO		-0.3	2.5	1.0020	3.50	99.4 (119nmol/mol)

FIDAS analysers

Station	Date of audit	Analyser Serial no	Calculated ko ⁵	Uncertainty %	Total flow ⁴	Uncertainty %	Main flow	Uncertainty %
N Lanarkshire Coatbridge Whifflet A725	04 July 2023	14213			5.05	2.2		2.2
N Lanarkshire Motherwell Adele Street	05 July 2023	9553			4.97	2.2		2.2
N Lanarkshire Ravenscraig Plantation Road	05 July 2023	12143			4.87	2.2		2.2
N Lanarkshire Uddingston New Edinburgh Road	06 July 2023	15863			4.94	2.2		2.2





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The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NOx analysers) by documented methods. The factors have been calculated using certified gas standards. The particulate analysers listed above have been tested for sample flow rates and k_0 (where appropriate) by documented methods. Note that the test results are valid on the day of test only, as analyser drift over time cannot be quantified. All results for gaseous species are reported in concentration units of nmol/mol or $\mu\text{mol/mol}$.

¹ The zero response is the zero reading on the data logging system of the analyser when audit zero gas was introduced to the analysers under test.

² The calibration factor is the multiplying factor required to scale the reading on the data logging system of the analyser into reported concentration units (nmol/mol for NO, NOx, SO₂, O₃ and $\mu\text{mol/mol}$ for CO). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

$$\text{Concentration} = F(\text{Output} - \text{Zero Response})$$

Where F = Calibration Factor provided on this certificate

Output = Reading on the data logging system of the analyser

Zero Response = Zero Response provided on this certificate

³ Converter eff. is the measured efficiency of the NO₂ to NO converter within the oxides of nitrogen analyser under test.

⁴ The measured main flow rate (where this is applicable) is the flow rate through the sensor unit of the TEOM particulate analyser under test. The measured aux flow rate (where this is applicable) is the flow rate through the bypass tubing of the TEOM particulate analyser under test. The measured total flow rate is the total flow rate through the particulate analyser under test. Units of flow are l.min⁻¹, reported at prevailing ambient conditions unless otherwise specified. Where flow rates are highlighted in bold, it indicates that measurements were not made at the analyser sample inlet. These measurements therefore may not accurately reflect analyser performance in normal operation.

⁵ The calculated k_0 value (specifically for TEOM analysers) is the calculated k_0 spring constant based on tests undertaken with filters of known weight. The % deviation indicates the closeness of the calculated result to the manufacturer's specified value of k_0 .

The calibration results shaded are those that fall within our scope of accreditation, all other results on this certificate are not UKAS accredited, but have been included for completeness.

End of certificate

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