



CERTIFICATE OF CALIBRATION

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Approved Signatories:

- | | |
|-----------------------------------|--|
| ☐ S. Eaton | ☐ B Stacey |
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| ☐ A Nash | |

Signed:

Date of issue:

04 September 2025

Certificate Number:

7605

Customer Name and Address:

Scottish Government
Water, Air, Soils and Flooding Division
Environmental Quality Directorate
Scottish Government
Victoria Quay
Edinburgh
EH6 6QQ

Description:

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

Ricardo Energy & Environment ID:

ED19050 /7605

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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Falkirk 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	Converter uncertainty (%)
Falkirk Bainsford	17 June 2025	NOx	7576	1.7	2.5	1.0775	3.50	100.5 (274 nmol/mol)	1.0
		NO		0.0	2.5	1.0802	3.50	102 (135 nmol/mol)	1.0
Falkirk Grangemouth MC	18 June 2025	NOx	7568	-2.4	2.5	0.9815	3.50	99.5 (259 nmol/mol)	0.6
		NO		-2.0	2.5	0.9795	3.50	99.4 (128 nmol/mol)	0.6
Falkirk Haggs	16 June 2025	NOx	4793	1.3	2.6	1.0908	3.50	99.6 (264 nmol/mol)	0.3
		NO		0.8	2.6	1.0971	3.50	99.7 (136 nmol/mol)	0.3
Falkirk Hope Street	19 June 2025	NOx	7564	-1.9	2.5	1.0760	3.50	100 (253 nmol/mol)	0.8
		NO		0.9	2.6	1.0885	3.50	98.4 (132 nmol/mol)	0.8
Falkirk West Bridge Street	17 June 2025	NOx	57	0.8	2.5	1.0234	3.50	98.1 (256 nmol/mol)	1.0
		NO		-0.7	2.5	1.0654	3.50	99 (119 nmol/mol)	1.0

Fidas analysers

Station	Date of audit	Analyser Serial no	Zero (µg/m³)	Caldust channel deviation	Total flow ⁴	Uncertainty %	Deviation %
Falkirk Bainsford	17 June 2025	13696	0	0.19	4.83	2.25	0.54
Falkirk Grangemouth MC	18 June 2025	11616	0	0.43	4.80	2.25	0.05
Falkirk Haggs	16 June 2025	6179	0	0.85	4.82	2.25	0.50
Falkirk West Bridge Street	17 June 2025	7661	0	1.37	4.74	2.25	-1.32
Falkirk Zetland Park	24 July 2025	13554	0	0.11	4.71	2.25	-1.86



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SO2 analysers

Station	Date of Audit	Analyser Serial no	Zero Response ¹	Zero uncertainty nmol/mol	Calibration Factor ²	Factor uncertainty %
Falkirk Bo'ness	18 June 2025	6853	-0.1	2.5	0.9624	3.1181
Falkirk Grangemouth MC	18 June 2025	6854	-0.1	2.5	0.9164	3.1176
Falkirk Hope Street	19 June 2025	6226	-1.1	2.5	0.8526	3.3169
Falkirk Zetland Park	19 June 2025	6227	4.6	2.5	0.9239	3.2088
Grangemouth Moray Scot Gov	22 July 2025	6855	4.0	2.4	0.7237	3.3078



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The gaseous ambient analysers listed above have been tested for zero response, calibration factor, linearity and converter efficiency (NO_x 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 k₀ (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 µmol/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, NO_x, SO₂, O₃ and µmol/mol for CO). It should be used in conjunction with the zero response. A corrected concentration is calculated using the following equation:

Concentration = F(Output - 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 k₀ value (specifically for TEOM analysers) is the calculated k₀ 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 k₀.

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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