



# TPS 54

Edition 2 | July 2010

## UKAS Policy on Traceability of Calibration Gas Standards used in Stack Emission Monitoring

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### CHANGES SINCE LAST EDITION

- Section 1.5 removal of expiry date
- Section 3.4 removed
- Section 3.5 removed
- Section 4 revised text to clarify traceability requirements.

## 1 PURPOSE

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- 1.1 The general requirements for the traceability of measurement are defined in Paragraph 5.6 of ISO/IEC 17025:2005.
- 1.2 In addition the general principles and means by which traceability may be achieved and demonstrated are explained in UKAS publication TPS 41 (Edition 3 June 2005).
- 1.3 This document sets out the background of the application of these policies to the field of calibration of continuous gas analysers/detectors used for manual stack emission monitoring. The historical position is also explained together with the reasoning behind the formal introduction of the full requirements for traceability in this field of accreditation.
- 1.4 This Statement has been prepared in conjunction with the UK Environment Agency.

## 2 POLICY

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- 2.1 UKAS will apply the principles of ILAC P10:2002, ILAC Policy on Traceability of Measurement Results (which may be viewed at [www.ilac.org](http://www.ilac.org)) in the assessment and accreditation of laboratories.

## 3 BACKGROUND

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- 3.1 Laboratories engaged in the manual measurement of gas species from emission sources are commonly involved in the use of a variety of instrumental techniques to measure a number of different gas species (e.g. O<sub>2</sub>, CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>x</sub> etc). These measurements may be made to enable correction of other measured parameters to standard conditions or be used for direct comparison with applicable emission limit values.
- 3.2 The calibration and initial validation of the instruments used for such measurements requires the use of in-service field checks using appropriate span and zero gases, together with full validation/calibration checks performed at defined intervals. These later checks are normally performed on receipt of instruments, following repair/service and at annual intervals.
- 3.3 To comply fully with the requirements set out above each of the gas species used in this process would have direct or first tier, traceability meeting the requirements of ILAC P10:2002.

## 4 TRACEABILITY REQUIREMENTS

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- 4.1 The full traceability requirements of ILAC P10:2002 will be applied by UKAS in the assessment process of all laboratories engaged in manual stack emission monitoring of gaseous species as detailed below.

- 4.2 The traceability of the first tier gas can be demonstrated by ensuring it is supplied by a reference material producer accredited to ISO Guide 34 or has been calibrated by a calibration laboratory accredited to ISO/IEC 17025 for the gas mixture/concentration of interest. The UKAS policy on selection and use of reference materials is further explained in UKAS publication TPS 57. The UKAS Policy on Traceability of measurement is described in UKAS publication TPS 41.
- 4.3 The full traceability requirements will be applied to the internal first tier gases held by the laboratory and used to perform full internal validations for all gaseous species for which accreditation is either held or sought.
- 4.4 For the purpose of this document the term “second tier gas” refers to working gas cylinders that a laboratory may use routinely in the field. This second tier gas is checked against the reference first tier cylinders in accordance to this policy statement in order that traceability is maintained.
- 4.5 Traceability for oxygen measurement is also required. The use of ambient oxygen (20.9%) as a field check gas is only suitable when the expected oxygen concentration is greater than 15%. Below this concentration a suitable traceable first or second tier gas, relevant to the expected concentration should be used.
- 4.6 All second tier gas must be checked against the first tier gas before it can be used in the system. This should be done by direct comparison using a suitable gas analyser that has been directly calibrated/checked with a relevant first tier gas before the comparison. The associated measurement uncertainty for second tier gas value must be determined.
- 4.7 All second tier gas values obtained must meet the uncertainty requirements as laid down in the relevant reference standards.

## 5 INTERNAL CALIBRATION PROCEDURES

- 5.1 Laboratories performing such calibrations, referred to as standardisations in UKAS publication TPS 52 (Edition 1 June 2005), will be expected to comply with the requirements of ISO/IEC 17025 for such calibrations as summarised in Section 3 of TPS 52.
- 5.2 In order to meet the requirements of section 4 of this publication it should be noted that the use of gas dividers or dilution systems provides the preferred route. The use of such systems ensures that traceability is maintained across the full range of the instrument without the need for multiple cylinders of traceable gases for each species.

## 6 ADDITIONAL INFORMATION

- 6.1 Several guidance documents on the application of ISO/IEC 17025 equipment calibration and the evaluation of the uncertainty of measurement are available from the UKAS website, [www.ukas.com](http://www.ukas.com) (see Publications List).
- 6.2 For further information about this statement, please contact the Assessment Manager for your organisation or the UKAS Information Helpdesk (Tel: +44 (0)20 8917 8400 or email [info@ukas.com](mailto:info@ukas.com)).