



MCERTS performance standard for manual stack emission monitoring organisations

May 2024

LIT 5901

We are the Environment Agency. We protect and improve the environment.

We help people and wildlife adapt to climate change and reduce its impacts, including flooding, drought, sea level rise and coastal erosion.

We improve the quality of our water, land, and air by tackling pollution. We work with businesses to help them comply with environmental regulations. A healthy and diverse environment enhances people's lives and contributes to economic growth.

We cannot do this alone. We work as part of the Defra group (Department for Environment, Food & Rural Affairs), with the rest of government, local councils, businesses, civil society groups and local communities to create a better place for people and wildlife.

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Introduction

We set up our Monitoring Certification Scheme (MCERTS) to make sure of good quality environmental measurements. We based the scheme on international standards and provides for the product certification of instruments, the competency certification of personnel and the accreditation of laboratories.

This document sets out what you must do if you want to get accreditation to monitor pollution released from chimney stacks.

In the United Kingdom, the United Kingdom Accreditation Service (UKAS) accredits organisations to show they have reached the standard set out in this document. The standard focuses on how you should plan, carry out and report on the monitoring you do.

Planning involves reviewing the site where you want to do the work. This review includes a risk assessment to make sure the work can be done safely.

Skilled people must carry out the work using internationally recognised methods.

You must report on the work you have done, using the format we ask you to.

If you have any questions about the accreditation process, or would like further information on how to apply, please contact:

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Find more information on MCERTS and copies of the performance standards and further guidance, on our [MCERTS page on GOV.UK](#).

Contact us

You can contact the Environment Agency if you need any help.

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Monday to Friday, 8am to 6pm.

1 Scope

The International Standard EN ISO/IEC 17025 describes the general requirements for the competence of testing laboratories. It contains all the requirements laboratories must meet if they wish to demonstrate that they operate a quality system, are technically competent, and are able to generate technically valid results.

Note: We refer to laboratories as stack emission monitoring organisations (organisations) throughout this performance standard. This covers both independent monitoring organisations and those that have in-house monitoring teams.

This MCERTS performance standard provides criteria for the application of EN ISO/IEC 17025 to the monitoring of stack gas emissions.

The structure of this document follows the structure of EN ISO/IEC 17025. This standard does not re-state the provisions of EN ISO/IEC 17025. Monitoring organisations must comply with all the relevant criteria detailed in EN ISO/IEC 17025.

Accreditation of organisations to this performance standard will demonstrate that they meet our MCERTS requirements for regulatory monitoring of stack emissions from stationary sources.

The MCERTS standard contains both technical and health and safety requirements. Compliance with regulatory and safety requirements on the operation of laboratories is not covered by EN ISO/IEC 17025. However, carrying out stack emission monitoring is hazardous (for example, working at heights, lifting equipment, and exposure to chemicals); and, if correct health and safety practices are not adhered to, the quality of the monitoring is often compromised.

The health and safety requirements are set out to make sure that organisations have a health and safety management system and are following safe systems of work (for example, undertaking risk assessments). UKAS will audit whether these systems are in place – it is not auditing the adequacy of the systems. However, if UKAS assessors observe poor health and safety practice, they will inform us.

We have an agreement with UKAS regarding the operation of MCERTS for manual stack emission monitoring. This agreement allows us to use information supplied by UKAS, as part of our regulatory duties.

We may carry out our own inspections and investigations and act upon their findings for organisations accredited to ISO/IEC17025 for the MCERTS performance standard.

2 Normative references

We refer to the following documents in the text in such a way that some or all their content constitutes requirements of this document:

- [MCERTS personnel competency standard, Environment Agency](#)
- [MCERTS for stack emissions monitoring equipment at industrial installations, Environment Agency](#)
- [MCERTS standard for laboratories testing samples from stack emissions monitoring, Environment Agency](#)
- [Monitoring stack gas emissions: measurement locations, Environment Agency](#)
- [Monitoring stack emissions: techniques and standards for periodic monitoring, Environment Agency](#)
- [Risk assessment guide: industrial emission monitoring, Source Testing Association](#)
- EN ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories
- EN 15259: Air quality. Measurement of stationary source emissions. Requirements for measurement sections and sites and for the measurement objective, plan, and reports
- EN ISO 14956 Evaluation of the suitability of a measurement method by comparison with a stated measurement uncertainty

3 Terms and definitions

In the context of this performance standard, the following terms and definitions apply:

Emission limit value (ELV) – the numerical limit on an emission, which must not be exceeded during one or more periods of time.

Field blank – a measurement sample taken at the plant site in an identical manner to the normal samples in the series, without sampling gas.

Job file – file in which contains details of the stack emission measurement campaign for an individual site.

Measurement campaign (measurement objective) – scope of work required on a particular site for a specific time.

Measurement series – one or several measurements of the same measurand carried out at the same sampling plane, and at the same process operating conditions.

Method Implementation Document (MID) – document published by the Environment Agency outlining its interpretation of a method.

Periodic measurement (manual measurement) – determination of a measurand at specified time intervals (for example once every 6 months).

Reference method – measurement method taken as a reference by convention, which gives, or is presumed to give, the accepted reference value of the measurand.

Risk assessment – an assessment of the health and safety hazards and associated risks involved in stack emissions measurement at a specific work location.

Sampling location – a suitable position on the plant where representative samples can be obtained.

Site specific protocol (measurement plan) – an installation specific application of an organisation's technical procedures.

Site records – records of the laboratory's on-site measurement data and operations recorded at the time they are made.

Site review – a review conducted by the organisation before undertaking stack emission measurements to make sure they fully understand the physical and logistical situation before arriving on-site to conduct work.

Stack – structure through which sites release waste gas to atmosphere.

Stack emission monitoring organisations – organisations that measure emissions to air from stacks.

Technical procedure (operating procedure) – the organisation's detailed written procedures on how to perform a method in line with its quality system.

UKAS – the United Kingdom Accreditation Service, the body appointed by the government to assess and accredit organisations that provide testing services to international standards, for example EN ISO/IEC 17025.

4 General requirements

4.1 Impartiality

No additional requirements to EN ISO/IEC 17025.

4.2 Confidentiality

No additional requirements to EN ISO/IEC 17025.

5 Structural requirements

An organisation shall implement a health and safety policy addressing the hazards and associated risks to health and safety in the activities associated with stack emissions monitoring.

Some laboratory and site-based audits will be done on an unannounced basis. Stack emission monitoring organisations shall co-operate, when required, in planning these audits. When requested to, organisations shall provide information to UKAS in advance of the MCERTS accredited work they plan to carry out.

6 Resource requirements

6.1 General

No additional requirements to EN ISO/IEC 17025.

6.2 Personnel

6.2.1 Monitoring organisations shall use personnel with appropriate MCERTS certification to carry out stack emission measurements.

Note: The MCERTS personnel competency standard defines 3 levels - an entry level (trainee), Level 1 (technician) and Level 2 (team leader).

6.2.2 Trainees shall only carry out stack emission monitoring under the direct supervision of a MCERTS Level 2 person.

6.2.3 Trainees shall not carry out or approve site reviews and risk assessments even under direct supervision.

Note: Site reviews, risk assessments, site specific protocols (SSPs) and monitoring reports are defined in section 7.3.

6.2.4 Trainees shall not write or approve SSPs or monitoring reports.

6.2.5 Personnel who have obtained Level 1 shall carry out stack emission monitoring under the general supervision of a MCERTS Level 2 person. To provide general supervision the Level 2 shall be actively involved in the practical work of monitoring on site. However, they do not have to check all the work carried out by the team they are supervising.

6.2.6 Level 1 personnel may carry out site reviews and risk assessments under the direct supervision of a MCERTS Level 2 person. Level 1 personnel are not permitted to approve site reviews, risk assessments, SSPs or monitoring reports. Direct

supervision means that a Level 2 shall accompany the Level 1 while carrying out risk assessments and site reviews. To authorise SSPs and reports produced by a Level 1 the Level 2 shall check the completed documents in detail.

- 6.2.7 Personnel with Level 2 certification, shall lead a stack emission monitoring team, approve site reviews, risk assessments, site-specific protocols, and monitoring reports.
- 6.2.8 Level 2 personnel are responsible for the direct supervision of trainees. Direct supervision of a trainee requires the Level 2 to check the site work activities they carry out.
- 6.2.9 The Level 2 person shall be actively involved in the practical work of monitoring on site and is responsible for the work undertaken by the team.
- 6.2.10 Personnel with Level 2 certification shall be available on site throughout the monitoring campaign.
- 6.2.11 When there is more than one Level 2 person on site, the person taking overall responsibility for the work shall be clearly nominated.

Note: Use the SSP to record role responsibilities of personnel.
- 6.2.12 To lead on-site monitoring work and to approve site reviews, site specific protocols and reports the Level 2 certification shall include technical endorsements relevant to the substances being measured.
- 6.2.13 Annex A is a summary of the certification and supervision required to carry out different stack emission monitoring activities.

6.3 Facilities and environmental conditions

- 6.3.1 Monitoring organisations shall, wherever possible, use sampling facilities and platforms that comply with the requirements of 'Monitoring stack gas emissions: measurement locations' and EN 15259.
- 6.3.2 Organisations shall record any deviations from a method caused by stack sampling facilities not conforming to the method requirements (for example, access restricted to one port).
- 6.3.3 Portable lighting shall be used when appropriate.
- 6.3.4 Lifts and hoists shall be used where appropriate.
- 6.3.5 Consider service requirements, such as electricity supply.

- 6.3.6 The organisation shall identify and assess the risk of contamination and a clean area shall be available for setting up equipment and samples, recovering samples, and storing equipment and samples.
- 6.3.7 Access to and use of areas affecting the quality of the monitoring shall be controlled. The area for equipment set up and the work area shall be cordoned off, so that access to the sampling equipment and monitoring operation is restricted.
- 6.3.8 The work area shall be cleared of trip hazards and obstacles. Work areas used for sample equipment set up, disassembly and storage shall be kept clean and free from sources of contamination.

6.4 Equipment

- 6.4.1 Procedures shall be in place to make sure that equipment is appropriate to the process-specific environment where it is to be used.
- 6.4.2 In methods where detailed material specifications are not given, the materials shall satisfy the following requirements:
- be non-reactive to the pollutant being measured
 - not cause any significant interference to the measurement process
 - have sufficient strength to withstand the environmental conditions (for example, vibration, heat, shear forces, flex, and abrasion) associated with the process being measured and the measurement environment
- 6.4.3 The identification of equipment shall be in an accessible location for viewing and it shall be etched, stamped, or otherwise permanently fixed to the component.
- 6.4.4 The history of equipment use shall be traceable, so that possible causes of problems can be determined.
- 6.4.5 A record of equipment use shall be kept. It shall enable potential problems, maintenance requirements and sources of contamination to be identified.
- 6.4.6 Safe handling and transportation procedures shall be developed to make sure equipment that has been calibrated shall not be affected during transportation.
- 6.4.7 In methods where detailed sample equipment leak check procedures are not given, the leak flow shall be below 2% of the normal flow rate during sampling.
- 6.4.8 In methods where detailed procedures are not given for dealing with contamination the following practices shall be followed. Components and equipment exposed to the sample gas shall be cleaned and dried, including the sample media area, prior to conducting sampling. If performing multiple runs with the same equipment, the sample equipment shall be cleaned between runs. Cleaning shall be performed using appropriate methods, tools, and solvents to make sure that residue is

removed and to prevent contaminating or otherwise affecting the sample. The organisation's technical procedure shall specify the cleaning procedure.

6.5 Metrological traceability

6.5.1 The organisation shall identify the calibration aspects of its methods that can contribute significantly to the total uncertainty of the measurement result. Where appropriate the calibration of reference material and equipment shall be traceable to a laboratory accredited under EN ISO/IEC 17025. If this is not possible, the organisation shall satisfy itself of the quality of the reference material and equipment.

6.5.2 Some items of measurement equipment shall be calibrated periodically, such as pitot tubes, manometers, thermocouples, and balances.

6.5.3 Calibration gases shall be traceable, where possible, to EN ISO/IEC 17025 for calibration by third party accreditation from a nationally recognised accreditation body that is a member of the International Laboratory Accreditation Cooperation. The calibration gases shall be labelled with the relevant accreditation logo and number.

Note: It may not be possible to obtain EN ISO/IEC ISO 17025 traceable gases for all calibration gases.

6.5.4 Organisations may use calibration gases to prove that working gases (that is those used on site for span check verification) meet the uncertainty budgets specified for span gases in the relevant standards. These working gases shall be traceable, through EN ISO/IEC 17025 accreditation, to the accredited calibration gases.

6.5.5 When monitoring requires the analysis of samples, field blanks shall also be analysed and reported. A field blank shall be carried out near the sample location, in an identical manner to the normal samples in the measurement series, except the sample probe does not have to be inserted in the stack and no gas is drawn through the sample equipment.

6.5.6 The following applies to field blanks:

- field blanks for metals, dioxins and furans (including dioxin like PCBs), and PAHS shall be done as a minimum of once per location per measurement campaign (a location can apply to multiple stacks if they are close to each other, for example are on the same platform)
- field blanks for individual VOCs shall be done as a minimum of once per day at each stack location, 2 field blanks shall be done if taking more than 6 samples in one day, 3 field blanks shall be done if taking more that than 10 samples in one day
- field blanks shall be done every day at each stack sample location for all other measurands

6.5.7 Where a method does not specify a minimum criterion for the field blank value, the field blank shall be less than 10% of the ELV.

6.5.8 When measuring gas concentrations using a manual technique, an absorber efficiency check shall be carried out for at least one test at each stack location per sampling campaign. The absorber efficiency check is passed if less than 5% of the measured pollutant is in the last impinger of the sample train.

The absorber efficiency check becomes less effective as the concentration of the pollutant in a stack gas decreases. Therefore, passing the absorber efficiency test shall only be required if the final measurement result is greater than 30% of the ELV.

6.6 Externally provided products and services

No additional requirements to EN ISO/IEC 17025.

7 Process requirements

7.1 Review of requests, tenders, and contracts

7.1.1 Organisations are permitted to subcontract monitoring activities to another organisation accredited to MCERTS for that work. It is the responsibility of the organisation to make sure that the subcontracted organisation is accredited to MCERTS for the scope of work. When analytical work is subcontracted, it shall be to an organisation that has accreditation to EN ISO/IEC 17025 and MCERTS for the scope of work.

Where individuals are employed on a subcontracted basis by an organisation, the organisation shall make sure that the individual is certified under the MCERTS personnel competency scheme to the required level.

7.2 Selection, verification, and validation of methods

a) Selection of sampling methods

7.2.1 Monitoring shall be carried out in accordance with monitoring methods selected from [Monitoring stack emissions: techniques and standards for periodic monitoring](#).

7.2.2 MCERTS accreditation is only applicable to methods in [Monitoring stack emissions: techniques and standards for periodic monitoring](#).

Note 1: Even though a measurand may not be listed specifically in [Monitoring stack emissions: techniques and standards for periodic monitoring](#), a general method maybe applicable, such as speciated VOCs. Under these

circumstances MCERTS accreditation can be obtained to the procedural framework of the applicable general standard.

- 7.2.3 [Monitoring stack emissions: techniques and standards for periodic monitoring](#) includes both manual and automated methods. Annex B provides the framework for the use of automated methods.
- 7.2.4 If an operator's permit refers to a method that is not in [Monitoring stack emissions: techniques and standards for periodic monitoring](#), the monitoring contractor shall bring this to the attention of the client before carrying out the monitoring work.
- 7.2.5 Environment Agency MIDs provide details on how some methods shall be used for regulatory monitoring. MIDS, shall be used, where available.
- 7.2.6 Organisations shall use written technical procedures. Written procedures shall meet the requirements of the method and the MID, where available.
- 7.2.7 The monitoring organisation shall obtain accreditation for each method they wish to use.
- 7.2.8 When supplementary parameters (such as velocity, temperature, pressure, oxygen, and water vapour) are used in the calculation of a measurement result, the measurement of these parameters shall be MCERTS accredited. If they are not MCERTS accredited, MCERTS accreditation cannot be claimed for the reported measurements.

b) Analysis methods

- 7.2.9 Samples collected on-site may need analysis at a laboratory. The monitoring organisation shall use a method with accreditation to EN ISO/IEC 17025 for the [MCERTS standard for laboratories carrying out testing of samples from stack emissions monitoring](#). Alternatively, they can subcontract to another laboratory whose method has accreditation to that standard.
- 7.2.10 If the analysis method is not accredited, the overall monitoring result is not MCERTS accredited. A statement explaining that the result is not accredited shall be included in the monitoring report.
- 7.2.11 A monitoring organisation with MCERTS accreditation for odour sampling, can claim MCERTS accreditation for the overall result of a measurement for odour, if the analysis is accredited to EN ISO/IEC 17025.

c) Unusual measurands

- 7.2.12 Occasionally a monitoring organisation may be required to measure an unusual measurand (that is one that is not listed in or covered by a general method in [Monitoring stack emissions: techniques and standards for periodic monitoring](#)). To measure an unusual measurand the monitoring organisation may select a national method. If a national method is not available, they may adapt an

occupational method, such as those produced by the following:

- Method for the Determination of Hazardous Substances series published by the Health and Safety Executive
- National Institute of Occupational Safety and Health
- Occupational Safety and Health Administration

If a relevant method cannot be found, the monitoring organisation may adapt general monitoring principles based on the chemical and physical characteristics of the measurand.

MCERTS accreditation cannot be granted for these methods. However, the inclusion of quality assurance and quality control procedures helps make sure the methods are being used properly.

7.2.13 In some circumstances it is not possible to follow all the sample strategy requirements of EN 15259 because of the following factors related to the sample location:

- limited access to the required number of sample lines
- limited access to sample points, which may restrict the number of points that can be used
- poor positioning of the sample plane, which may result in the flow criteria not being met

The effect of a non-compliant sample location on the measurement uncertainty shall not be considered when reporting the uncertainty. Qualifying remarks explaining the deviations from the standard shall be included in the monitoring report.

7.2.14 Where a method is used, which does not have a stated uncertainty, organisations shall estimate the uncertainty of the measurement using the approach specified in EN ISO 14956.

7.3 Sampling

a) Site review

7.3.1 A site review shall be carried out prior to producing an SSP. The review is carried out so that the stack emissions monitoring personnel understand the physical and logistical situation on-site. The site review would normally be carried out once only. However, if the monitoring arrangements at the site change significantly it may need repeating. The review provides essential information for determining an SSP.

7.3.2 A person certified to MCERTS Level 2 with the appropriate technical endorsements shall be responsible for doing the site review. This person does not have to be a member of the monitoring team that carries out the actual stack emissions monitoring.

7.3.3 Where possible, the site review shall be done well in advance of the monitoring, so that there is time for the client to carry out any remedial actions before the monitoring takes place.

7.3.4 Site reviews shall be documented.

b) Risk assessment

7.3.5 The organisation shall do an assessment of the hazards and associated risks involved in stack emission monitoring and document it during a site review and before every measurement campaign. The risk assessment shall be reviewed before starting work each day.

7.3.6 The risk assessment shall contain, as a minimum, the information included in Annex C.

c) Site-specific protocol (measurement plan)

7.3.7 Following a site review an SSP shall be produced to detail the application of the technical procedures to a specific site. The SSP shall be documented.

7.3.8 Where available, organisations shall use information from previous SSPs when developing a new SSP. Agreement shall be sought from the client if technical changes are made to a previous SSP.

7.3.9 A person certified to MCERTS Level 2 with the appropriate technical endorsements shall approve the SSP.

7.3.10 Agreement shall be sought from the client if a standard method in an organisation's technical procedure requires modifying because of site specific conditions. Any deviations from your monitoring methods because of site specific conditions shall be recorded in the SSP.

7.3.11 The monitoring organisation should make sure the client agrees to the SSP prior to commencement of the measurement, and shall retain documentary evidence that the client has agreed to the SSP.

7.3.12 The stack emission monitoring organisation shall, where required and available, use the operator's permit to prepare the SSP.

7.3.13 The SSP shall contain, as a minimum, the information included in Annex D.

7.3.14 The SSP shall be updated, when required.

It may be necessary to update the SSP following changes to the operator's permit or to the monitoring contractor's procedures. Depending on the significance of these changes it may be necessary to repeat a site review before updating the SSP.

d) Job file

7.3.15 A file shall be used to record details of the stack emission measurement campaign.

7.3.16 A file shall contain, as a minimum, the following:

- site-specific protocol
- risk assessment
- list of equipment used
- reference to equipment history for the measurement campaign
- reagents and sample media used
- record of deviations from site-specific protocol
- site record forms

e) Site record forms

7.3.17 The organisation shall have procedures for recording monitoring data and operations relating to stack emission monitoring. Site record forms shall be used to record this information.

7.3.18 Site record forms shall include, as a minimum, the following:

- date
- name of the monitoring team members making the records
- measurement procedure used
- identification of the equipment
- sampling location
- environmental conditions, for example, atmospheric pressure
- details of measurement start and finish times
- for manual methods, details of sampling, for example, dry gas meter readings, solution volumes, pressure, and temperature readings
- for automated methods, the output or indicated readings of the analyser
- for manual methods, the sample details, for example, sample bottle or sorbent tube identification label

7.4 Handling of test or calibration items

7.4.1 A chain of custody record shall be maintained from sample collection to storage to analysis. The record shall state the person who has possession of the samples and the location of the item.

7.4.2 The stack shall be identifiable by a specific reference number or description.

7.4.3 to 7.4.4 No additional requirements to EN ISO/IEC 17025.

7.5 Technical records

7.5.1 The laboratory shall retain records for a minimum of 6 years. This period shall consider the need of the client (user of the testing services) and the need to submit these records to the Environment Agency, if requested.

7.6 Evaluation of measurement uncertainty

No additional requirements to EN ISO/IEC 17025.

7.7 Ensuring the validity of results

Information on participation in proficiency testing is provided in Annex E.

7.8 Reporting of results

7.8.1 The results of all monitoring shall be reported. This requirement includes results showing non-compliance as well as compliance with ELVs.

7.8.2 Any deviations from the SSP or the monitoring method shall be included in the report.

7.8.3 The report shall contain, as a minimum, the information included in Annex F. The report shall also contain information specified in individual monitoring methods.

7.8.4 Reports detailing results of regulatory compliance monitoring shall not contain opinions or interpretations:

- about the effect monitoring deviations have on the application of the method
- on whether the results demonstrate compliance or not with ELVs

7.8.5 If requested, a copy of the report shall be provided to the competent authority. The report shall be available in an electronic format.

7.9 Complaints

No additional requirements to EN ISO/IEC 17025.

7.10 Non conforming work

No additional requirements to EN ISO/IEC 17025.

7.11 Control of data – information management

No additional requirements to EN ISO/IEC 17025.

8 Management system requirements

No additional requirements to EN ISO/IEC 17025.

Annex A (normative): Certification and supervision

These are the certification and supervision requirements to carry out different stack emission monitoring activities under MCERTS accreditation.

MCERTS trainee

Can carry out site work under the **direct** supervision of a Level 2.

Direct supervision of a trainee requires the Level 2 to check the site work activities they carry out.

MCERTS Level 1

A Level 1 may:

- carry out risk assessments under **direct** supervision of a Level 2
- carry out site reviews under **direct** supervision of a Level 2
- produce SSPs but a Level 2 shall authorise the SSP
- carry out site work under general supervision of a Level 2
- produce monitoring reports but a Level 2 shall authorise the monitoring report

MCERTS Level 2

A level 2 may, without supervision, but complying with MCERTS accreditation:

- carry out and approve risk assessments
- carry out and approve site reviews
- produce and approve SSPs
- carry out site work
- supervise site work
- produce and approve monitoring reports

Direct supervision means that a Level 2 shall accompany the Level 1 while carrying out risk assessments and site reviews.

General supervision means the Level 2 shall be actively involved in the practical work of monitoring on site. However, they do not have to check all the work carried out by the team they are supervising.

The Level 2 shall hold Technical Endorsements relevant to the monitoring required. This applies to carrying out the risk assessment, planning the work, carrying out the site work and producing the report.

To authorise SSPs and reports produced by a Level 1 the Level 2 shall check the completed documents in detail.

Annex B (normative): Use of transportable emissions monitoring systems

B.1 Application to EN 14181 – Quality assurance of automated measuring system

Automated methods used to carry out quality assurance level 2 and annual surveillance test parallel reference measurements shall use MCERTS certified transportable-CEMS (T-CEMS) that are certified for the appropriate measurand and certification range.

B.2 Use of automated methods for compliance monitoring

1) Use of MCERTS certified T-CEMS

An MCERTS certified T-CEMS certified for the appropriate measurand and certification range, is suitable for compliance monitoring.

If an MCERTS certified T-CEMS does not have a suitably low certification range, it is acceptable to lower the certified range by proving it meets the performance criteria, specified in the reference method, over the lower range. This shall be done using an ISO 17025 accredited laboratory that has demonstrated to UKAS that it has suitable procedures in place to do this type of work.

The laboratory performance tests only need to be carried out on one instrument, as the MCERTS product certification verifies that each T-CEMS is manufactured to the same standard.

2) Use of T-CEMS that are not MCERTS certified

A T-CEMS that is not MCERTS certified may be used, provided it is proven to meet the performance criteria of the reference method. This shall be done using an ISO 17025 accredited laboratory that has demonstrated to UKAS that it has suitable procedures in place to do this type of work. The user shall also demonstrate that the instrument works on the intended process. This shall be achieved in one of the following ways:

- carrying out field tests, under ISO 17025 accreditation, to compare the instrument against the reference method
- carrying out tests, using an appropriate stack simulator test rig, under ISO 17025 accreditation, to compare the instrument against the reference method

The test rig and field tests shall meet the requirements of CEN TS 14793 Stationary source emissions - Demonstration of equivalence of an alternative method with a reference method.

The accredited method shall specify the types of process the T-CEMS may be used on.

Once the test rig and field tests have been completed satisfactorily, they can be applied to all T-CEMS of the specific model tested.

Once the technique is proven in the field, organisations shall demonstrate that each instrument used meets the laboratory performance criteria specified by the reference method.

B.3 Lack of fit

For annual performance checks of T-CEMS a minimum of 5 gas concentrations, including zero shall be used.

Annex C (normative): Health and Safety

1. Safety guidance is in the [Source Testing Association: Risk assessment guide: industrial emission monitoring](#).
2. The monitoring organisation shall implement procedures to minimise health and safety risks during site work. The procedures shall include:
 - using a risk-management approach to site work
 - compliance with care of substances Control of Substances Hazardous to Health (COSHH)
 - site-safety induction training
 - safe systems for lone and remote working
3. Equipment used on-site by the organisation shall meet all the necessary safety standards required. Monitoring personnel shall use appropriate lifting equipment. Monitoring personnel shall wear suitable personnel protective equipment.
4. Appropriate control measures (for example, safe working procedures, local exhaust ventilation and personal protective equipment) shall be detailed in the organisation's technical procedure for the relevant methods.
5. The monitoring organisation shall undertake and document a risk assessment specific to the required work and sampling location. This shall be undertaken in 3 stages:
 - as part of a site review
 - before pre-sampling preparation in the laboratory
 - before on-site monitoring

6. The site review risk assessment shall include a section that shall be completed before entering the area of work. This shall be used by the monitoring organisation to find out standard site safety information such as:

- fire alarms and procedures
- chemical hazard alarms and procedures
- intrinsically safe working areas
- hygiene regulations
- emergency rescue plans

This information may be covered in a formal site induction or a permit to work system. On sites where these are not available, it is the responsibility of the person certified to MCERTS Level 2 (team leader) to obtain the information.

7. The monitoring organisation's risk assessment shall confirm that the operator has the following elements in place before undertaking stack emission monitoring work:

- a safety policy covering work on site in accordance with the requirements of the Management of Health and Safety at Work Regulations
- a safe sample platform and work area

8. Monitoring personnel visiting or working on a site for the first time shall attend a site induction if provided by the site operator. Attendance at an induction shall be recorded on the risk assessment for each member of the monitoring team.

9. The risk assessment shall include an assessment of the level of risk from each of the various hazards present and as a minimum shall include:

- general site hazards – site traffic, fire and emergency, mechanical operations, chemical operations
- physical hazards at the stack – lifting, falling, burns, electricity, compressed gases
- chemical hazards at the stack – exposure to substances from flue gases, exposure to substances used in monitoring tests
- weather and environment – temperature extremes, wind, rain, lightning, snow and ice, sunburn
- chemical hazards at the laboratory – exposure to chemicals used for equipment and sample preparation

10. The risk assessment shall also include:

- a COSHH assessment of exposure to workplace substances (both laboratory and on-site)
- information on the composition and pressure of the gas in the stack to be monitored and the process characteristics
- identification of the control measures are required to reduce exposure to an acceptable level

11. Organisations that undertake lone working on-site shall incorporate safety procedures into the risk assessment (for example, use of personal alarm, regular contact with site personnel).
12. The risk assessment shall clearly show the hazards for each area of work.
13. The risk assessment shall quantify the risk. The level of risk shall be that recorded at the time of assessment, not the level that would be the case if control measures were put in place.
14. The operator shall be shown the risk assessment and be given the opportunity to comment on it.
15. Work shall not commence until the organisation's risk assessment confirms that the risks are acceptable, or control measures are in place (including those that are the responsibility of the operator) to reduce the risk to an acceptable level.
16. Before work commences, the risk assessment shall be communicated by the Level 2 person (team leader) to other members of the monitoring team. All team members shall sign the risk assessment to confirm they have seen and understood its content.

Annex D (normative): Site specific protocol

An SSP shall contain the following in the same section order specified below:

Part 1

Contact details, monitoring dates and personnel

- operator name
- operators address and contact information
- permit number (including permit variation number, if applicable)
- installation name
- name of operator's contact
- date and report number of previous monitoring campaign
- planned date of monitoring campaign
- name and address of the monitoring organisation
- name, role during monitoring campaign, MCERTS registration number, certification level and technical endorsements held of the persons who will be involved in the monitoring campaign (include the date when the certificates expire)

Part 1 shall be updated before each monitoring visit.

Part 2

Monitoring objectives

- the overall aim of the monitoring campaign
- for the substances to be monitored at each emission point:
 - ELV reference conditions at which the results are expressed
 - details of monitoring method(s) to be used for each substance
- the overall uncertainty of the method(s)

Process conditions

- the type of process
- a description of the process
- if a batch process, whether the whole of the batch is to be sampled or the details of the part of the batch sampled
- the fuel type and feedstock
- the normal load, throughput, or continuous rating of the plant
- any unusual occurrences that take place during the process
- what type of abatement system is fitted (if applicable)
- what type of CEMS is installed and details of the data information system (if applicable)
- the process details that need to be collected over the monitoring period

Sample location

- dimensions of the stack(s) and monitoring facilities
- a description of the location of the sampling plane for each release point
- for each sampling plane, a description of the type of sampling port (accessibility, correct size, sufficient number, properly located)
- for each sampling plane, a summary of the number, arrangement and orientation of the sample line(s), and the number of sampling points per line
- access to the stack
- adequate work area at the sampling positions
- availability of required utilities (electrical, lighting, water)
- expected velocity profile*
- expected temperature and moisture of the stack gas*
- homogeneity test (where required)*
- restrictions on using equipment, for example intrinsically safe areas
- physical restrictions to using required apparatus
- appropriate measurement equipment for the application
- for each sampling location, a summary of compliance with EN 15259 (that is the flow criteria, homogeneity, access to sample lines and sample points)

*Historical information from previous measurement reports may be used. A note of the reports date and identification number shall be included in the site review.

Details of monitoring

- expected ELV
- the equipment used for each substance monitored
- the sampling duration and number of samples for each measurement, including blanks
- for manual methods, the proposed sample flow-rate, volume and minimum sampling times
- for instrumental methods, the proposed span-gas concentration
- the measurement concentration range and lower detection limit
- for manual methods requiring a separate chemical analysis stage, details of the analytical method, the laboratory carrying out the analysis
- any modifications to the technical procedure, with justifications
- an explanation why any substance(s) in the monitoring objectives will not be monitored
- an explanation why any substance(s) will not be monitored in accordance with the monitoring method

Annex E (normative): Participation in proficiency testing

1. Monitoring organisations shall take part in available and appropriate proficiency-testing (PT) that is accredited to ISO/IEC 17043 – General requirements for the competency of proficiency testing providers. This shall apply to measurands that are appropriate to the monitoring organisation's schedule of accreditation.
2. Where available and appropriate, organisations shall participate in an accredited PT scheme based on the use of a stack gas simulator or a real stack facility. The participation rate shall meet the following:
 - be at least once in every 4-year accreditation cycle, for each permanent location that carries out activities related to the accreditation of the stack emissions monitoring organisation
 - at least 20% of staff, who do stack emissions monitoring, shall participate in every 4-year accreditation cycle for each permanent location

Note: The National Physical Laboratory run a PT scheme that is based on the use of a stack gas simulator facility.

3. Where available and appropriate to the monitoring organisation's schedule of accreditation, appropriate accredited PT schemes, which are run by sending artefacts (for example a gas cylinder delivery programme) to a permanent location, shall be participated in, each year that a permanent location does not take part in a PT scheme based on the use of a stack gas simulator or real stack facility.
4. Each monitoring organisation shall have a proficiency testing plan that shall document the proposed participation of Level 2 personnel and monitoring equipment from each occasion to the next, to prevent, where possible, duplication of participation of personnel and equipment.
5. For monitoring organisations with multiple permanent locations, attendance of a PT scheme that is based on a stack gas simulator or real stack facility, shall be spread evenly across a 4-year accreditation cycle. This shall be included in their PT plan.
6. Monitoring organisations shall spread the attendance of their staff evenly across the 4-year accreditation cycle. They shall include this in their PT plan.

Annex F (normative): Stack emission monitoring report

A stack emission monitoring report shall include the following information on each page:

- a unique reference in the following format:
 - permit number (including permit variation number, if applicable)
 - operator and installation name
 - year of the monitoring visit
 - sequential numbering system, if applicable
- a version number
- a page number, which shall be written as 'page x of y'

The report shall contain the following information in the same section order specified below:

Part 1: Executive Summary

Cover sheet

- MCERTS logo, UKAS accreditation symbol and registration number of the monitoring organisation
- title
- permit number (including permit variation number, if applicable)
- operator name
- installation name
- dates of the monitoring visit
- contract number or reference
- name and address of the client organisation (if applicable)
- name and address of the monitoring organisation
- date of the report
- name, MCERTS registration number, certification level and technical endorsements held of the person approving the report for the monitoring organisation and
- the signature of the person approving the report

Contents

The content sheet shall describe the contents of both parts of the report.

Monitoring objectives

- the overall aim of the monitoring campaign
- the substances to be monitored at each emission point
- any special requirements

Monitoring results

- emission point
- substances to be monitored
- ELV expressed in the terms and units defined in the permit
- periodic monitoring result in the same terms as the ELV
- uncertainty associated with the result at a 95% confidence level
- units for the ELV, the periodic monitoring result and the uncertainty
- reference conditions at which the results are expressed
- date of monitoring
- start and end times for the monitoring
- name and reference number of monitoring method used
- accreditation for use of the method, such as MCERTS, UKAS
- process status at the time of monitoring, such as load and feedstock

Operating information

Include all the following, where applicable

- whether process was continuous or batch process
- whether the whole of the batch was sampled or the details of the part of the batch sampled
- what fuel was used during monitoring
- what feedstock was used during monitoring (if applicable)
- the normal load, throughput, or continuous rating of the plant
- what type of abatement system, whether operating and dosage rates
- the results obtained by the operator's CEMS during monitoring
- additionally for waste incineration:
 - the normal operating range of maximum continuous rating
 - confirm no deliberate selection of waste types burned during test
 - activated carbon and lime injection rates

Monitoring deviations

- an explanation why any substances in the monitoring objectives were not monitored
- an explanation why any substances were not monitored in accordance with the monitoring method
- any other issues relevant to the monitoring results

Part 2: Supporting information

Appendix 1

- name, role during monitoring campaign, MCERTS registration number, certification level and technical endorsements held of the persons who carried out the monitoring campaign

- the substance(s) monitored, the reference number of the standard method used and the reference to the Technical Procedure used by the monitoring organisation
- a reference to the equipment check list used on the monitoring campaign

Further appendices (for each emission point):

- diagrams showing the dimensions of the stack and the monitoring facilities
- flow criteria measurements, such as measurements for temperature, pressure, and stack gas velocity
- gas homogeneity test results, where applicable
- gas measurements, such as oxygen
- water vapour measurements
- sampling measurements, such as stack gas temperature and velocity during sampling
- instrumental gas analyser site calibration measurements including zero and span gas concentrations
- instrumental gas analyser results
- information on sample analysis, including the name of the analytical laboratory, the accreditation for the use of the analytical method, the date of the analysis and any specific analytical requirements specified by the reference method
- the manual monitoring method results calculations, including concentrations and mass emissions (if required)
- quality assurance checks, such as leak checks, blanks, and isokinetic rate
- uncertainty calculations for each reported result, including:
 - a list of parameters that affect the measurement uncertainty
 - uncertainty sources (in order of significance)
 - combined uncertainty for sources
 - expanded total uncertainty as a percentage of the total measurement
 - expanded total uncertainty in units of measurement
 - expanded total uncertainty as a percentage of the ELV (expressed at a 95% confidence interval)