



ANNUAL GUIDE 2009



Welcome



It is my pleasure, as chairman of the STA for the coming year, to introduce this 2009 Annual Guide. As always, the guide aims to provide information on current issues and forthcoming developments in addition to information on the monitoring and testing services available from our members. The year 2008 was a successful year for the STA with various seminars being held which covered such things as our old friend BS EN14181. Our membership now stands at 220 corporate members.

The role and standing of the STA continues to expand and increase. By working closely with the Environment Agency and the United Kingdom Accreditation Service (UKAS) we are able to assist in driving up standards and through our representation on various committees responsible for drawing up new CEN or BS Standards, influence the contents of those standards.

The various standing committees (task groups) within the STA provide a valuable forum for members' views and also a means by which information on a variety of topics can be assimilated and distributed. For example the Health and Safety task group has issued twenty Health and Safety Guidance Notes to members. It is only by the active involvement of its members that the STA continues to grow and flourish. A key aspect of the role of the STA is the provision of advice, guidance and technical information to its members. The STA is also at the forefront of the provi-

sion of training courses, which are continuously being developed and updated to meet the needs of our changing world.

We all recognise that the credibility of our stack testing work is dependent on having properly trained, qualified and experienced staff who are able to provide a professional, reliable and consistent service to our clients. This credibility is further enhanced by having a professional body, which is not only recognised in the UK but also by our international members.

The coming year, 2009, may be a difficult year for industry so the need for working together allied with possible retraining will very important.

I wish you well.

Dave Slack

STA Chairman

Director of CES Environmental Instruments

The Source Testing Association is committed to the advancement of the science and practice of emission monitoring and to develop and maintain a high quality of service to customers. The association was formed in 1995 and has a membership of more than 220 companies. Each year, the membership elects officers who become the governing body and directors of the association. The association is a non-profit-making organisation and all proceeds are used to enhance membership services. The association's headquarters are in Hitchin, Hertfordshire with meeting rooms, library and administration offices.

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How the Source Testing Association came to be

Here we take a look at how the Source Testing Association has evolved over the past 14 years into the committed body of more than 220 member companies that it is today

The Source Testing Association (STA) was established in 1995 and was set up as a non-profit making organisation serving the emission monitoring industry. Over the years it has built up to a corporate membership of over 220 companies, drawn from process operators, regulators, equipment suppliers and test laboratories with increasing interest from overseas companies.

Membership is open to any company that has an interest in emission monitoring. The membership covers all employees within the company.

The STA is committed to the advancement of the science and practice of emission monitoring and to develop and maintain a high quality of service to customers. Its aims and objectives are to:

- Contribute to the development of industry standards, codes, safety procedures and operating principles
- Encourage the personal and professional development of practicing source testers and students
- Maintain a body of current sampling knowledge
- Assist in maintenance of a high level of ethical conduct
- Seek co-operative endeavours with other professional organisations, institutions and regulatory bodies, nationally and internationally, that are engaged in source emissions testing

The Association offers a package of benefits to its members which includes:

- Technical advice relating to emission monitoring
- Conference and exhibition opportunities
- Seminars and training on a variety of related activities
- Representation on national, European and international standards organisations
- Training in relation to many aspects of emission monitoring
- Liaison with regulators, UK and International, many of whom are members.

Meanwhile, clients can be assured that members will offer:

- The most appropriate protocols and methods
- Sampling and analysis equipment that is fit for purpose
- Qualified and suitably experienced personnel

Structure

The STA membership elects, every two years, officers that take responsibility of the various task groups within the STA. The current task groups and officers are as follows:

- Stack Emission Monitoring (quality and technical) — chairman, Rod Robinson, NPL (quality)/ Ray Pullen, Envirocare (technical)
- Process Operators' Task Group — chairman, David Graham, EON UK
- Health and Safety Task Group — chairman, Alan Lloyd, Industrial Air Monitoring Consultants
- Equipment Suppliers and EN14181 Task Groups — chairman, William



STA membership is open to any firm with an interest in emission monitoring

Averdieck, PCME

- Training Task Group — chairman, Simon Medhurst, Smedstock Environmental
- Small Business Task Group — chairman, Paul Mudway, Mudway Health, Safety & Environment

Each task group meets at various times during the year to discuss issues and provide guidance. The function of each group is as follows:

Stack Emission Monitoring

Technical task group

The Technical Task Group holds combined meetings with the Quality Task Group four times a year at the STA offices in Hitchin, Hertfordshire. Any member company can send as many representatives as they wish to these meetings and attendances continue to increase because of the continuing success the groups have in addressing and resolving issues raised by the membership. Stack sampling specialists from the Environment Agency and UKAS attend every meeting, enabling frank and fruitful discussions on a range of topics such as methodologies, standards, permitting and equipment.

Whenever it is requested by the membership, specific technical guidance is written and can be found in the members' area of the website. There are currently 37 documents covering topics such as testing incinerators, calculating delta H, chemical resistance data, and oxygen correction on WID related processes.

BSI consults the STA where new national or international standards for stack sampling are being developed and reviewed. At the very least the members of the Task Group are given the opportunity to comment at the draft stage. Often

the STA sends representatives to the meetings and sometimes organises and runs the committees.

Technical Transfer Seminars are organised on pertinent topics. They are always well attended.

Quality task group

The Quality Task Group holds combined meetings with the Technical Task Group four times a year at the STA offices. The joint meetings cover a wide range of topics of interest to the stack testing community and active participation is welcomed. The Quality Task Group specifically addresses those issues relating to improving the value and reliability of the results we provide to our customers as stack testers. The topics routinely discussed include proficiency testing (PT) schemes, relevant CEN standards and Environment Agency Method Implementation Documents (MIDs), EN 14181 guidance, calibration techniques and the availability of calibration gases. In addition to a large number of stack testing companies, UKAS, Environment Agency, process operators and gas supply companies also attend the meetings, enabling issues and topics raised by members to be addressed in the meetings.

The Quality Task Group is active in producing guidance for members, including the STA guide to the calculation of uncertainty, and the example uncertainty calculation spreadsheets. Members also have the opportunity to provide input to Environment Agency guidance and CEN and ISO standards. Technical Transfer Seminars are organised on specific topics, including the perennial favourite — uncertainty.

In addition, the Quality and Technical groups also undertake specific projects, often with Environment Agency or DIUS support, to investigate particular issues relating to stack testing methods. Recent examples have included studies into particulate monitoring at very low dust concentrations, which led to the publication of new Environment Agency guidance, and the validation of the Environment Agency's SO₂ instrument method (M21) as a potential alternative reference method to the CEN manual method. We also have an FTIR interest group, which is currently developing a method for FTIR measurements. This will become an Environment Agency guidance document and subsequently may be proposed as a CEN standard method.

Process Operators Task Group

The Process Operators' Task Group generally meets twice a year to review developments in legislation and standards and to share practical experience of continuous monitoring, quality assurance and related issues, such as permitting and reporting. Process operator representation within the STA is high and attendance at meetings is increasing as we combine these with site visits to members' premises.

In our forthcoming programme, we plan to have presentations on specific topics of relevance to operators, including: the provision of safe access

to sampling locations; demonstrating representativeness of the monitoring location and the Environment Agency's Operator Monitoring and Assessment scheme.

Health & Safety Task Group

The safety of those undertaking stack emission monitoring has always been a driving force within the Source Testing Association and the Health and Safety Task Group is the focus of this work. Since its inception those involved in this group have strived to produce guidance to the industry on safe working practices and the implementation of safety legislation.

One of the most recognised publications of this group is the *Risk Assessment Guide for Industrial Emission Monitoring*, commonly known as the *Yellow Book*. Its adoption as the safety guide for the industry has resulted in its inclusion in Environment Agency guidance and MCERTS scheme and it has remained a clear and concise guide to the potential hazards of the work we do. Its annual revisions have kept it up to date with the ever changing legislation whilst the group has strived to keep it as a simple and practical guide for those up the stack as well as a useful resource for managers, salesmen and process operators.

During the regular meetings, task group members review changes to existing legislation and proposed new legislation and where necessary advise STA members as to the potential implications of such legislation. Such advice is often provided as guidance notes published on the website. Accidents in the industry and in related industries are discussed and if lessons can be learnt then these are communicated through bulletins on the website or as e-mails.

Training of stack testers has become a fundamental role of the STA — none more so than through the long established safety training course. It has become a safety passport for stack testers incorporating the experiences and knowledge of many of the stack testers who have contributed to the health and safety task group. The task group will continue to feed into this essential training.

We have been fortunate in recent years that there have no serious accidents in the UK stack testing industry. This is a trend we all hope will continue but we must not be complacent. The work undertaken on stacks is ever more vital and demanding. The risks are always present and as new staff enter the industry the lessons learnt by more experienced staff must not be lost. The Health and Safety Task Group provides an invaluable resource to the industry to help keep our focus on the serious issue of the safety of those involved in this work.

Equipment Suppliers' Task Group

Representing the manufacturers and distributors of particulate and Gas CEMs, portable instrumentation, sampling equipment and calibration gas suppliers, the group focuses on being a focal point on regulatory, certification and standards issues relevant to emissions monitoring with particular focus on technical issues.

The equipment suppliers' group provides a technical input into UK regulatory consultations related to emissions monitoring, the MCERTS certification process, European and Environment Agency MIDs and is a forum for resolving issues common across equipment suppliers. The Equipment Suppliers' Group Meets four times a year.

EN14181 Task Group

This newly-formed group represents process operators, regulators, test houses, suppliers of CEMs and consultants, and is focused on developing additional practical guidance and work protocols which aid the implementation of EN-14181.

The intention is to build on the pragmatic UK approach to EN-14181. Key objectives are to:

- Develop consistent guidance of requirements around the QAL2 functionality test
- Develop standard work protocols, check lists and guidance assisting the implementation of EN-14181
- Provide input for any future revisions of Environment Agency Technical



Training of stack testers has become a fundamental role of the STA

Guidance Note M20

- Provide input to the committee BS- EH2/1 which feeds into any future revision by CEN of EN-14181

Training Task Group

The Training Task Group exists to develop, promote and deliver high quality training packages. These packages are aimed primarily at meeting the needs of STA members, but they are also open to non-members.

As regulatory requirements grow more stringent, the demands on STA members to comply with these regulations increases commensurately. The Training Task Group is committed to responding to members' needs by providing existing courses and developing new courses as appropriate. The full range of STA courses is given elsewhere in this guide. In the past year, in excess of 500 people have attended courses run by the STA. These courses have mainly been

held at the STA offices in Hitchin but, increasingly, courses are delivered to members at their own premises. In addition to providing this service to UK-based STA members, training courses were also delivered directly to STA members in Portugal and Turkey during 2008.

The majority of STA courses will continue to be held at Hitchin but it is the intention to offer scheduled training courses at alternative UK venues during 2009. Details will be posted on the STA website.

Small Business Task Group

Small businesses are innovative, enterprising and flexible. According to the Federation of Small Businesses, they account for 51% of private sector turnover, 59% of the private sector work force and 60% of all commercial innovations.

The STA Small Businesses Task Force (SBTF) was formed to monitor developments in our industry, and to represent the interests of smaller companies at meetings of the other STA Task Groups. Our principal objectives are:

- To promote the interests of members
- To protect members' business
- To identify the continuously changing needs of members

The cost of accreditation to EN ISO/IEC 17025 and the MCERTS Performance Standard is a significant burden for small businesses; however most have achieved certification to both standards and our members are to be commended for their efforts.

Administration

The Association's headquarters are based in Hitchin, Hertfordshire with meeting rooms, library and administration offices.

The Administration is operated by DRC Consultancy Services who provide the manpower and infrastructure for the day to day operation of the association and provide the membership support function.

STA offers its members telephone and email support on any questions relating to emission monitoring and aims to respond within four to eight hours. The website has a public area and also a dedicated members' only area where all the principal STA guidance notes and documentation are kept.

MCERTS schemes

The STA has worked closely with the Environment Agency to develop the MCERTS air schemes and now provides technical support on behalf of SIRA, who are the MCERTS scheme operator on behalf of the Environment Agency. MCERTS has become a mandatory requirement in recent PPC permits issued to process operators.

The Scheme benefits include:

- MCERTS delivers a certification scheme that is both accepted and formally recognised within the UK and internationally
- It provides assurance to regulatory authorities that equipment and services approved to MCERTS standards are suitable, and capable of producing results of the required quality and reliability
- It gives users of monitoring equipment confidence that equipment approved by MCERTS is robust and conforms to performance standards related to current international Standards
- It supports the delivery of accurate and reliable data to regulators and the public
- It provides a framework whereby further monitoring instrumentation and other aspects of compliance monitoring can be formally certified
- It meets the growing requirements of EU Directives, which increasingly specify that monitoring systems must meet minimum performance requirements.

The STA has a dedicated MCERTS support line (01462 450705) for advice and assistance on the MCERTS air schemes or email mcerts@s-ta.org.

Training solutions

The STA is committed to furthering the development of source testers and students. Its training capability has grown since the first course began in 1997, and thousands of people have since been involved. Here we outline the spectrum of courses on offer across the UK

The term training refers to the acquisition of knowledge, skills, and competencies as a result of the teaching of vocational or practical skills and knowledge that relate to specific useful competencies. It forms the core of apprenticeships and provides the backbone of content at technical colleges. In addition to the basic training required for a trade, occupation or profession, observers of the labour-market recognise today the need to continue training beyond initial qualifications: to maintain, upgrade and update skills throughout one's working life.

The STA is committed to encourage the personal and professional development of practising source testers and students and provide training courses on various aspects of emission monitoring.

The training capability has grown over the years following requests from its members to provide independent and impartial training courses. The first course, working at heights, started in 1997 after the unfortunate fatality of a stack tester. This course, which is based on the STA Risk Assessment Guide: Industrial-emission Monitoring, has been updated at regular intervals to take into account new health and safety legislation. More than 2,000 delegates have been on the course since its inception.

In 2009, the STA will be offering courses at three centres in the UK: Hitchin, Ripon and Edinburgh, and can also offer on-site training at members' premises. Current courses include:

Risk Assessment – Industrial Emission Monitoring

The course covers all aspects of the *Yellow Book* and includes case studies of recent H&S incidents, application of risk assessment procedures, COSHH, safe lifting, impact of weather conditions, electricity and correct use of Personal Protective Equipment (PPE). The course is presented in six modules:

1. The Principles of risk assessment
2. General site hazards
3. Physical hazards
4. Chemical hazards on site
5. Chemical hazards in the laboratory
6. Weather, Environment and Welfare

Regulatory Monitoring Requirements for Process Operators

The purpose of the course is to provide an understanding of the Environment Agency's MCERTS scheme as part of the requirement of the Environment Agency Operator Monitoring Assessment (OMA) scheme. This will increase process operators' awareness of their role in managing emissions monitoring and so improve their OMA audit score. Course content includes:

- Background to Environmental Regulations including IPPC
- Description of the OMA scheme
- The role of MCERTS schemes in stack-emission monitoring
- Introduction to major pollutants
- The nature of emission limits, including reference conditions and units of measurement
- An understanding of the principles of stack-emission monitoring
- An appreciation of the importance of correct sampling location for stack

emission monitoring

- The practicalities of planning and executing stack-emissions monitoring campaigns including the importance of risk assessments
- Quality checks to ensure robust monitoring data

On Site Auditing

A requirement of the OMA scheme is for process operators to carry out periodic auditing of stack-emission monitoring. On-site auditing refers specifically to checking that the personnel carrying out monitoring do so in accordance with the agreed site-specific protocol (SSP) and documented procedures. The aim of this one day training course is to provide a basic understanding of stack-emission monitoring to enable process operators, regulators and environmental consultants to audit stack sampling contractors. Course content includes:

- Ethical requirements for independence and environmental awareness
- Use of MCERTS certified personnel
- Selection of appropriate methods following international standards
- Method Implementation Documents
- Estimation of measurement uncertainty
- Use of appropriate equipment
- Description of standard reference methods
- Planning of a sampling measurement campaign: site review; risk assessment; site-specific protocol
- Reporting of results
- Participation in proficiency-testing schemes

Planning and Sampling in Emission Monitoring

This course is aimed primarily at application, service and commissioning engineers. The purpose of the course is to cover the requirements for Planning and Sampling in Stack-Emission Monitoring, particularly relating to the application of MCERTS-approved equipment. Course content includes:

- An understanding of the nature of the common pollutants, their properties and effects
- An appreciation of the legislative context within which industrial processes are required to operate; the nature of emission limits, reference conditions and units of measurement
- Knowledge of the principles of standard equipment and the practicalities of equipment operation
- An understanding of the principles of stack-emission monitoring using continuous systems and extractive techniques (including standard reference methods); the importance of sample handling and conditioning
- Awareness of Environment Agency Technical Guidance Notes, including M1 – Sampling Requirements for Stack-Emissions Monitoring; and M2 – Monitoring of Stack-Emissions to Air
- An appreciation of the importance of good sampling location for stack-emission monitoring and identification of appropriate locations
- The practicalities of planning and executing stack-emissions monitoring campaigns including the importance of Risk Assessments
- The role of the Environment Agency MCERTS schemes in stack-emission

monitoring

- An awareness of the parameters included in the MCERTS performance standard for Continuous Emissions Monitoring Systems

BS EN14181 quality assurance of an AMS

BS EN 14181—Stationary Source Emissions: Quality Assurance of Automated Measuring Systems (AMS) (CEM systems) is one of the most significant and demanding standards to be developed by CEN and it has far reaching consequences for regulators, equipment manufacturers, test houses and, most importantly, process operators.

In the implementation of the standard the Agency has developed a Method Implementation Document (MID) and a Technical Guidance Note. The purpose of the training is to provide guidance in the application of the various parts of the standard. There are practical examples of how to handle the data and establish the calibration function. Course content includes:

- Background: Directives, legislation and implementation
- QAL1 and MCERTS: Definition and understanding
- QAL2 and SRMs: Definition and scope of the Standard Reference Methods (SRM); importance of quality measurements
- Roles and responsibility: As required by QAL2 and the annual surveillance tests (AST)
- QAL3: How this is carried out and the audit requirements
- Practical examples: Using example data to establish a calibration function; meeting the reporting requirements of BS EN14181

Uncertainty in emission monitoring

There seems to be nothing more uncertain in the emission monitoring industry than calculating uncertainty. It is a requirement of accreditation to ISO17025. It is a requirement from the regulators in regard to the European Directives and it is a requirement from clients who want to know how good the numbers are.

The one day training course expels some of the myths around this very difficult topic and provides participants with the tools to understand and provide a consistent approach to uncertainty figures based on STA guidance. Course content includes:

- What is uncertainty?
- How does it arise?
- Why is it important?
- Expressing uncertainty of measurement
- Error versus uncertainty
- Basic statistics on sets of numbers: Average; spread – standard deviation; and exercise – calculation of standard deviation
- Where do errors and uncertainties come from?
- General kinds of uncertainty in measurement: Random or systematic; distribution, normal, uniform or rectangular distribution; what is not a measurement uncertainty?
- How to calculate uncertainty of measurement: Type A and Type B evaluations; calculation steps



In 2009, the STA will be offering courses at three centres in the UK: Hitchin, Ripon and Edinburgh, and can also offer on-site training at members' premises

MCERTS Personnel competency

When the MCERTS scheme for personnel was introduced in 2002 the membership requested that the STA provide a series of courses to assist personnel with the examination process. The first was a series of one-day revision courses designed to give the candidate an awareness of the knowledge that was required to enter into the examination process. These one-day courses are still being run and cover:

- level 1: Technician
- level 2: Team leader
- TE1: Particulate monitoring
- TE2: Trace element sampling
- TE3: Gaseous monitoring by manual methods
- TE4: Gaseous monitoring by instrumental methods

As new people entered the industry the development of full training courses became a requirement and the STA now offers a 2-day, level 1 training course and a 4-day, level 2 training course. The course contents are shown below:

Level 1: Technician

This course is for personnel with little or no experience in emission monitoring or who are at the trainee level of MCERTS and wish to progress to Level 1. This course is designed to provide an introduction in emission monitoring and to train the delegate to MCERTS Standard Level 1. The course duration is based on two days.

Course Syllabus

Introduction to major pollutants

Principal pollutants prescribed for monitoring and their properties. The following pollutants are included: CO, CO₂, O₂, SO_x, NO_x, HCl, TOC, particulate matter, dioxins, PCBs and PAHs.

- Typical sources; factors affecting formation; typical emission concentrations;

typical ambient concentrations; properties affecting sampling and analysis; and, environmental and health effects of air pollution

Principles of emissions monitoring

Principles of stack-emission monitoring and the reasons it is carried out. This includes:

- Purpose of monitoring for regulatory compliance; an overview of legislation on emissions to air, IPC, PPC, European directives and the MCERTS scheme; the nature and use of emissions limits; monitoring requirements, including sampling protocols, standard methods, MCERTS Method Implementation Documents, instrument specification and approval, principles of quality assurance and control; and, the importance of representative sampling

Units and reference conditions

- Temperature, pressure, velocity, mass, volume; concentration and mass-based units; inter-conversion of ppm and mg/m³; reference conditions and normalisation; conversion of wet gas composition to dry gas; conversion to standard temperature and pressure; and, conversion to reference levels of O₂

Operation of equipment

General requirements for correct operation of measurement equipment and have an understanding of common faults and their effects. This includes:

- Use of CEMs
- Instrument theory, including flow measurement theory of pitots, orifice plates, dry gas meters, rotameters, differential pressure devices; temperature measurement, theory of measurement including thermocouple and other devices; pressure measurements devices and theory of operation; and, heater technology
- Practical knowledge, including handling of basic technical equipment; training in the handling of instruments; and, practical demonstration of the different applications of sampling

Introduction to extractive manual sampling

The candidate should demonstrate general knowledge of the equipment used for sampling particulates, multi-phase emissions and gases/vapours. This includes:

- Principle of operation
- General arrangement of the sample train, including: sample (hot) box or oven; cold box or ice bath; umbilical cord; and, control unit
- General methodology for determination of substances, including: particulates; dioxins and PCBs; PAHs; trace metals including mercury; gases/vapours using manual and instrumental techniques; and, water vapour and presence of droplets
- Preparation of sampling equipment, including: filter preparation; polymeric resin trap preparation; glassware preparation; probe liner preparation; nozzle preparation; preparation of sampling train and leak check; and, example arrangements of sampling trains

Principles of manual stack-emission monitoring

- Special characteristics of particulates
- The need for and principle of isokinetic sampling
- Effects of water droplets
- Sampling plane and sampling points
- Measurement of stack gas velocity and pressure
- Calculation of flow rate (orifice plate, manometer)
- Calibration of instrumental techniques
- Sample conditioning and sample integrity

Level 2: Team leader

This course is designed to provide training for the progression from level 1 to level 2. The course duration is based on four days which includes a visit to an industrial site.

Course syllabus

Monitoring legislation, standards and methods

Legislation relevant to monitoring, the applicable standards, and the different monitoring techniques for gaseous pollutants. This includes:

- Knowledge of appropriate methods for emission monitoring
- What to do if no standard method is available
- Deviation/modification of methods
- Hierarchy of methods (CEN, BSI, ISO, and other methods such as ASTM, AFNOR, DIN, USEPA and VDI)
- Current standards
- Future standards
- Types of sampling systems

Analytical techniques and limits of detection

Analytical techniques used to support pollutant measurements in the field. This includes:

- Definitions and units
- Implications of analytical sensitivity for sample amounts and sampling times
- Limits of detection
- Sample handling
- Liaison with analysis laboratories
- Proficiency-testing schemes

Abatement systems and their effects on monitoring

Abatement systems used for the control of the principal pollutants from industrial processes and their impact on emission levels. Systems include:

- Centrifugal separators (cyclones)
- Electrical gas cleaning (for example, electrostatic precipitation)
- Fabric filters
- Scrubbers
- Flue gas desulphurisation

Choice of sampling location and timing

Plant configurations, their impact on monitoring results, and where to carry out sampling. This includes:

- Achieving representative sampling
- Positional requirements for particulate matter and gaseous species
- Criteria for locating sample plane
- Surveying the sample plane
- Number of sampling points

Undertaking a measurement campaign

Factors to be addressed when undertaking a measurement campaign. These include:

- Determining the objectives of the sampling exercise
- Deciding on the parameters to be measured
- Reviewing process parameters
- Selecting sampling and analysis techniques
- Batch sampling
- Continuous direct reading instruments
- Arranging sample positions, safe access and essential services
- Liaison with plant operators
- Safety on site
- Transport of samples to laboratory
- Analysis
- Evaluating results
- Report writing



STA courses can be arranged on site, and tailored to individual needs

Choice of sampling method, technique and equipment

Monitoring approaches, techniques, published methods, equipment and which factors influence their selection. This includes:

- Monitoring approach: periodic monitoring methods; and, continuous emission monitoring methods
- Choice of monitoring technique: manual; and, instrumental
- Choice of monitoring method and equipment

Types of process operation and process details

Types of process operation and relevant process details. These include:

- Types of operation: continuous (steady state, variable or cyclic); and, batch process
- Process details: timescale of operation; awareness of inputs, outputs and mass flows; fuel composition; and, stack gas conditions

Developing site-specific protocols

The candidate must demonstrate knowledge of the requirements to be considered when undertaking a measurement campaign at a specific site. These include:

- Site review
- Process knowledge
- Sampling-site details
- Risk assessments
- Regulatory permits
- Method validation
- Site-specific issues
- Quality management

Processing measurement results, calculation procedures

Procedures used for processing measurement data leading to monitoring results. These include procedures for processing:

- Analytical reports
- Report components
- Measurement traceability

- Precision
- Internal variability/repeatability
- External variability/reproducibility

Principles of calculating uncertainty

Principles of calculating uncertainty. This includes:

- Basic terminology
- Agency approach to compliance assessment
- Rules for combining uncertainties
- Confidence limits and statistically defined uncertainties
- Tests using certified reference materials
- Repeat measurements using paired instruments and comparison with certified reference method
- Building an uncertainty budget from estimates of component uncertainties
- Assessing deviations from a standard method
- Effect of number and duration of samples on accuracy

Quality assurance techniques, UKAS, auditing and MCERTS

The candidate must demonstrate knowledge of the systems for quality assurance and quality control in stack-emission monitoring and the implications for data accuracy. These include:

- Quality management for emissions monitoring
- Organisation and management
- Quality systems
- The MCERTS performance standard for organisations
- Staff
- Equipment
- Measurement traceability and calibration
- Sample storage and transport
- Quality audits and reviews
- Horizontal audits
- Spot-check audits
- System audits
- Vertical audits
- Reports
- Calculations
- Original observations
- Equipment
- Monitoring results file
- Personnel

Health and safety requirements

Risk-management approach to minimising hazards at work. This includes the use of:

- Risk-assessment and risk-management principles
- COSHH assessments
- Permanent platforms and scaffolding
- Lifting and slinging
- Personnel protective equipment assessments
- Permits to work

Other courses are available to members which include on-site operation of equipment. All one-day courses described above can be arranged on site and the other more complex courses are arranged where practical. Bespoke courses can also be provided to members on request.

For full details of all STA training, visit www.s-t-a.org.

Standards and methods for monitoring in the UK

The verification of emissions monitoring data depends on standard reference methods, which are developed at a national, European or global level

With the increasing requirement for the installation of continuous emission monitoring systems (CEMS) it is important that capital investment is protected and that instrumentation gives reliable, meaningful and repeatable data. Fitting MCERTS-approved equipment is one element but it is extremely important that the system is verified. The verification process requires the use of standard reference methods to underpin the data.

Standard reference methods are essential for the effective measurement and control of air pollution. Such standards are developed at a national, European and global level. The robustness and fitness for purpose of these standards is a function of the accumulated expertise and experience of the people who work together in committee to produce them. Where internationally-derived standards are binding on the UK, as European (CEN) standards are, it is particularly important that they should recognise UK interests and sensitivities. BSI manages the UK input to new standards via its technical committees and the UK experts that they nominate to CEN and ISO working groups.

ISO standards are accepted on a case by case principle, it is not mandatory for a member country to adopt a standard.

CEN standards are mandatory and must be adopted by member states of the European Union. If a conflicting standard is in existence then this must be withdrawn.

BSI technical committee EH/2 is responsible for air quality issues. The sub group EH/2/1 is specifically charged with stationary source emission measurement standardisation. BSI EH/2/1 nominates experts to the technical committees of CEN/TC 264 (air quality) and ISO TC 146 (air quality). BSI EH/2/1 also oversees a portfolio of existing BSI, CEN and ISO standards to ensure that they are regularly reviewed for technical relevance and continued suitability for purpose. In order that existing and developing standards reflect the full range of UK interests, it is imperative that BSI EH/2/1, like other BSI committees, reflects the widest possible range of users.

Standards developed and published by CEN are generally accepted as being the most robust. However, other standards are still important, as there are substances that are not, as yet, covered by CEN Standards. The choice of the method is often dictated by the requirements of a relevant EU Directive, where, for example, the use of CEN standards is mandatory. If the standard is not dictated by mandatory requirements then monitoring standards should be used in the following order of priority as given in the European IPPC Bureau's Reference Document on the General Principles of Monitoring:

- Comité Européen de Normalisation (CEN)
- International Standardisation Organisation (ISO)

If the substance cannot be monitored using standards covered by the above then a method can be selected from any one of the following:

- American Society for Testing and Materials (ASTM)
- Association Française de Normalisation (AFNOR)



BSI manages the UK input to new standards via its technical committees and the UK experts that they nominate to CEN and ISO working groups

- British Standards Institution (BSI)
- Deutsches Institute für Normung (DIN)
- United States Environmental Protection Agency (US EPA)
- Verein Deutscher Ingenieure (VDI)

If the substance cannot be monitored using standards covered by the above then the following occupational methods may be developed, following the requirements of ISO 17025, for stack-emission monitoring:

- Method for the Determination of Hazardous Substances (MDHS) series published by the Health and Safety Executive (HSE)
- National Institute of Occupational Safety and Health (NIOSH)
- Occupational Safety and Health Administration (OSHA)

The intended application of the standard method must always be taken into account. For example, a CEN method may be less suitable than another less-rig-

orously validated standard method if the application is not one for which the CEN method was developed. The Environment Agency produces, wherever required, Method Implementation Documents (MIDs) which detail the applicability of methods. The methods detailed in Environment Agency Technical Guidance Note (Monitoring) M2 'Monitoring of Stack Emissions to Air' should be used unless it can be demonstrated that they are not fit for purpose for a particular application.

Further guidance and advice

The Source Testing Association provides guidance to its membership and their clients. This includes methodology advice, guidance on equipment selection and training. Visit the STA website for details www.s-t-a.org or for any technical question contact airanswers@s-t-a.org or telephone +44(0) 1462 457535.

Selection of standards for emission monitoring:

COMPOUND	STANDARD NUMBER	DESCRIPTION	MID NUMBER
Alternate reference method procedure	DD CEN/TS 14793:2005	Intralaboratory validation procedure for an alternative method compared to a reference method	
Asbestos	BS 6069-4.2:1991	Method for the determination of asbestos plant emissions by fibre count measurement	
Calibration of CEMS	BS EN 14181:2004	Quality assurance of an AMS	14181
Carbon monoxide (CO)	BS EN 15058:2006	Determination of the mass concentration of carbon monoxide (CO). Reference method: non-dispersive infrared spectrometry	
CEMS sampling	BS ISO 10396:2007	Sampling for the automated determination of gas emission concentrations for permanently-installed monitoring systems	
Dioxin 1 sampling	BS EN 1948-1:2006	Determination of the mass concentration of PCDDs/PCDFs and dioxin-like PCBs. Sampling of PCDDs/PCDFs	1948
Dioxin 2 extraction	BS EN 1948-2:2006	Determination of the mass concentration of PCDDs/PCDFs and dioxin-like PCBs. Extraction and clean-up of PCDDs/PCDFs	1948
Dioxin 3 quantification	BS EN 1948-3:2006	Determination of the mass concentration of PCDDs/PCDFs and dioxin-like PCBs. Identification and quantification of PCDDs/PCDFs	1948
Dioxin 4 PCB sampling and analysis	DD CEN/TS 1948-4:2007	Determination of the mass concentration of PCDDs/PCDFs and dioxin-like PCBs. Sampling and analysis of dioxin-like PCBs	
Flow automatic	BS ISO 14164:1999	Determination of the volume flow rate of gas streams in ducts. Automated method	
HCl 1 sampling	BS EN 1911-1:1998	Manual method of determination of HCl. Sampling of gases	
HCl 2 absorption	BS EN 1911-2:1998	Manual method of determination of HCl. Gaseous compounds absorption	
HCl 3 analysis	BS EN 1911-3:1998	Manual method of determination of HCl. Absorption solutions analysis and calculation	
Hydrogen Fluoride	BS ISO 15713:2006	Sampling and determination of gaseous fluoride content	15713
Instrument certification	BS EN 15267-3:2007	Air quality – Certification of automated measuring systems – Part 3: Performance specifications and test procedures for automated measuring systems for monitoring emissions from stationary sources	
ISO 17025 elaboration	DD CEN/TS 15675- 2007	Elaboration of ISO17025 for stack emission monitoring	
Mercury	BS EN 13211:2001	Manual method of determination of the concentration of total mercury	
Mercury calibration	BS EN 14884:2005	Determination of total mercury: automated measuring systems	
Metals	BS EN 14385:2004	Determination of the total emission of As, Cd, Cr, Co, Cu, Mn, Ni, Pb, Sb, Ti and V	14385
Moisture / water vapour	BS EN 14790:2005	Determination of the water vapour in ducts	
Nitrogen Oxide (NOx)	BS EN 14792:2005	Determination of mass concentration of nitrogen oxides (NOx). Reference method: Chemiluminescence	
Odour	BS EN 13725:2003	Determination of odour concentration by dynamic olfactometry	
Oxygen	BS EN 14789:2005	Determination of volume concentration of oxygen (O2). Reference method. Paramagnetism	
PAH analysis	BS ISO 11338-2:2003	Determination of gas and particle-phase polycyclic aromatic hydrocarbons. Sample preparation, clean-up and determination	
PAH sampling	BS ISO 11338-1:2003	Determination of gas and particle-phase polycyclic aromatic hydrocarbons. Sampling	
Particulate	BS ISO 12141:2002	Determination of mass concentration of particulate matter (dust) at low concentrations. Manual gravimetric method	
Particulate / Dust	BS EN 13284-1:2002	Determination of low range mass concentration of dust. Manual gravimetric method	13284
Particulate calibration	BS ISO 10155:1995	Automated monitoring of mass concentrations of particles. Performance characteristics, test methods and specifications	
Particulate calibration	BS EN 13284-2:2004	Determination of low range mass concentration of dust. Automated measuring systems	
Particulate high range	BS ISO 9096:2003	Manual determination of mass concentration of particulate matter	
Planning	BS EN 15259:2007	Air Quality – Measurement of stationary source emissions – Requirements for measurement sections and sites and for the measurement objective, plan and report	
Smoke	BS 2742:1969	Notes on the use of the Ringelmann and miniature smoke charts	
Sulphur Dioxide (SO2)	BS EN 14791:2005	Determination of mass concentration of sulphur dioxide. Reference method	
TOC high range	BS EN 13526:2002	Determination of the mass concentration of total gaseous organic carbon in flue gases from solvent using processes. Continuous flame ionisation detector method	
TOC low range	BS EN 12619:1999	Determination of the mass concentration of total gaseous organic carbon at low concentrations in flue gases. Continuous flame ionisation detector method	
VOC speciation	BS EN 13649:2002	Determination of the mass concentration of individual gaseous organic compounds. Activated carbon and solvent desorption method	

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AES Kilroot Power Station

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AGL Airtesting

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Air Monitors

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Akcros Chemicals

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Anchem Laboratories

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A-Plus Consulting

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Aspen Environmental

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Asociacion de Investigacion de las Industrias

Campus Universitario Riu Sec, Castellon, 12006 / www.itc.uji.es

AstraZeneca

Avlon Works, Severn Road, Hallen, Bristol BS10 7ZE / www.astrazeneca.com

Augean

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Aughinish Alumina

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Axis Environmental Services

Unit 5, Caherdavin Business Centre, Limerick, Ireland / www.axisenv.ie

Aylesford Newsprint

Newsprint House, Bellingham Way, Aylesford, Kent ME20 7DL / www.aylesford-newsprint.co.uk

Barking Power

Barking Power Station, Chequers Lane, Dagenham, Essex RM9 6PF / www.barkingx.info

Baxenden (a Chemtura Company)

Paragon Works, Baxenden, Accrington, Lancashire BB5 2SL

Becker Acroma

Rookwood Way, Haverhill, Suffolk CB9 8PB / www.becker-acroma.com

Biffa Waste Services

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BIP (Oldbury)

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BOC

The Priestley Centre, Surrey Research Park, Guildford GU2 7XY / www.bocscientific.co.uk

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c/o Al Futtaim Bodycote Testing LLC, Dubai Investment Park, PO Box 34924, Dubai, UAE / middleeast.bodycote.com

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Castle Environmental

Treatment Centre, Crompton Road, Ilkeston, Derby DE7 4BG / www.castle-environmental.co.uk

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CBISS

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Cemex UK Cement

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Centrica Energy Hydrocarbon Resources

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Centrica PB

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City Analysts

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Cleveland Potash

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Corus Strip Products

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CryoService

Prescott Drive, Warndon Business Park, Worcester WR4 9RH / www.cryoservice.co.uk

CTI Environmental

7 East Bank Road, Sheffield S2 3PT / www.castingstechnology.com

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Dow Haltermann

All Saints Refinery, Cargo Fleet Road, Middlesbrough, Cleveland TS3 6AF / www.dow.com

Dow Hyperlast

Station Road, Birch Vale, High Peak, Derbyshire SK22 1BR / www.dow.com

Drax Power

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EnviroDat

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Environmental Efficiency

Parnell House, 19 Quinsboro Road, Bray, Co Wicklow, Ireland / www.enviro-consult.com

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Environmental Project Management

32 Cornmill Lane, Bardsey, Leeds LS17 9EQ / www.epm.uk.com



Environmental Protection Agency (EPA)

McCumiskey House, Clonskeagh Road, Dublin 14, Ireland / www.epa.ie

Environmental Technology Publications

Oak Court, Porters Wood, St Albans, Herts AL3 6PH / www.envirotech-online.com

EPA Limited

Union Street, Hetton-Le-Hole, Tyne & Wear DH5 9HU / www.epa-services.co.uk

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Healthy Buildings International

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Hong Kong Productivity Council

HKPC Building, 78 Tat Chee Avenue, Kowloon Tong, Hong Kong / www.hkpc.org

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Industrial Air Monitoring Consultants

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Mobil North Sea

SAGE Gas Terminal, St Fergus, Peterhead, Aberdeenshire AB42 3EP / www.mobil.co.uk

Mudway Health, Safety & Environment

The Paddocks, Corner Farm Drive, Honeybourne, Evesham, Worcestershire WR11 7RA / www.mudway.com

National Physical Laboratory

Hampton Road, Teddington, Middlesex TW11 0LW / www.npl.co.uk/environment

netcen, AEA Technology

Gemini Building, Fermi Road, Harwell, Didcot, Oxon OX11 0QR / www.netcen.co.uk

New Environmental Quality Pty

PO Box 119, Coopers Plains, Queensland 4108, Australia / www.neweq.com.au

NIFES Consulting Group

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Novartis Grimsby Ltd

Pyewipe, Grimsby, North East Lincs DN31 2SR / www.novartis.co.uk

Nufarm UK

Crabtree Manorway North, Belvedere, Kent DA17 6BQ / www.nufarm.com

Oakwood Environmental Services

5 Alfred Road, Feltham, Middlesex TW13 5DQ / www.oakwood-environmental.co.uk

Odour Monitoring Ireland

32 De Granville Court, Dublin Road, Trim, Co Meath, Ireland / www.odourireland.com

OdourNet UK

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Operational (UK)

7 Berkeley Court, Manor Park, Runcorn, Cheshire WA7 1TQ / www.operational.net



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P&J Dust Extraction

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Parsons Brinckerhoff

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PCME

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Pfizer

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PRA Coatings Technology Centre

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Protea

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Rhodia UK

Trinity Street, Oldbury, West Midlands B69 4LN / www.rhodia.co.uk

Robinson Brothers

Phoenix Street, West Bromwich B70 0AH / www.robinsonbrothers.ltd.uk

Rockwood Pigments UK

Mary Avenue, Birtley, Co Durham DH3 1QX / www.rpigments.com

Rod Hughes & Associates

19 Gressenhall Road, London SW18 1PQ

Rolls Royce Energy CSB

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Roplex Engineering

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RWE npower

8 Mallard Way, Strathclyde Business Park, Bellshill, North Lanarkshire ML4 3BF / www.rwepi.com

Saltend Cogeneration Company

Saltend Power Station, Saltend, Hedon Road, Hull HU12 8GA / www.saltend.co.uk

Scientific Analysis Laboratories

Hadfield House, 9 Hadfield Street, Old Trafford, Manchester M16 9FE / www.salltd.co.uk

Scientifics

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Scottish & Southern Energy / Slough Heat & Power

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Scottish Power Generation UK

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SembCorp Utilities (UK)

Analytical Services Building, Wilton International, Middlesbrough TS90 8WS / www.sembutilities.co.uk

Servomex Group

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Severn Trent Water

Coleshill Sewage Sludge Incinerator, Lichfield Road, Coleshill, Warwickshire B46 1NX / www.severntrent.co.uk

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Shanks Waste Management

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12, Acorn Industrial Park, Crayford Road, Crayford, Kent DA1 4AL / www.sira.co.uk

SITA Tees Valley

Teeside Energy from Waste Plant, Haverton Hill Road, Billingham, Cleveland TS23 1PY / www.sita.co.uk

SiteRight Environmental

Ballybrew, Enniskerry, Co Wicklow, Ireland / www.siteright.ie

SLR Consulting

Mytton Mill, Forton Heath, Montford Bridge, Shrewsbury, Shropshire SY4 1HA / www.srlconsulting.com

Smedstack Environmental

16 Cotswold View, Woodmancote, Cheltenham GL52 9UE / www.smedstack.com

Source Testing Association

Unit 11, Theobald Business Centre, Knowl Piece, Wilbury Way, Hitchin SG4 0TY / www.s-t-a.org

SRCL

PO Box 63, Leeds LS9 0XH / www.whiteroseenvironmental.com

Star Energy

Humbly Grove Oilfield, The Avenue, Lasham, Alton, Hampshire GU34 5SY / www.starenergy.co.uk

Steetley Dolomite

Southfield Lane, Whitwell, Worksop, Notts S80 3LJ / www.steetleydolomite.com

Syngenta

PO Box A38, Leeds Road, Huddersfield HD2 1FF / www.syngenta.com

TC Power

Stanley House, Falkland Way, Barton-upon-Humber, Lincolnshire DN18 5RL / www.tcpower.co.uk

TCMB Council for Quality & Environment

Cyberpark, Cyberplaza, C-Blok, Kat-1, Bilkent, Ankara, Turkey / www.k-c-k.org

TCR Tecora

Via Alessandro Volta 22, Corsico 20094, Italy / www.tecora.it

TEAMS

39-41 Victoria Road, Widnes, Cheshire WA8 7RP / www.teamsnorth.co.uk

Testo

Newman Lane, Alton, Hampshire GU34 2QJ / www.testo.co.uk

Thermo Fisher Scientific - Air Quality Instruments

Bath Road, Beenham, Reading RG7 5PR / www.thermo.com

ThermoFisher
SCIENTIFIC

Thermotec Systems

3 Lincoln Hatch Lane, Burnham, Buckinghamshire SL1 7HA / www.thermotecsystems.co.uk

TMS Environment

53 Broomhill Drive, Tallaght, Dublin 24, Ireland

Torbar Flowmeters

Suite 3, Oakfield Barn, The Brows, Farnham Road, Liss, Hampshire GU33 6JG / www.torbarflowmeters.com

TTS Environmental

Thornhouse Business Centre, 30 Ballot Road, Irvine, Ayrshire KA12 0HW

Türkiye Sise ve Cam Fabrikaları

İs Kuleleri Kule 3 Kat:22, 4 Levent, Beşiktaş, İstanbul, Turkey / www.sisecam.com

Turnkey Instruments

1 & 2 Dalby Court, Gadbrook Business Centre, Northwick, Cheshire CW9 7TN / www.turnkey-instruments.com

TUV NEL

Scottish Enterprise Technology Park, East Kilbride, Lanarkshire G75 0QU / www.tuvnel.com

Vector Environmental Services

5a, CIDO, Carn Drive, Carn Industrial Area, Craigavon, Co Armagh BT63 5WH / www.vector-es.com

Veolia Environmental Services

Airborne Close, Arterial Road, Leigh-on-Sea, Essex SS9 4EL / www.veolia.co.uk

Viridor Waste Management

Derriford Incinerator, Plymouth, Devon PL6 8DH / www.viridor-waste.co.uk

Westech Instrument Services

Unit 10, Rectory Farm Business Park, Upper Standon, Bedfordshire SG16 6LJ / www.westechinstruments.com

William Blythe

Bridge Street, Church, Accrington, Lancashire BB5 4PD / www.wm-blythe.co.uk

EMISSIONS TESTING

Accredited to ISO 17025
 Accreditation applied for
 Only personnel are MCERTs accredited
 Non-accredited



MCERTS ACCREDITATION CERTIFICATION					PARTICULATE					TRACE ELEMENTS		GASES (WET CHEMISTRY)			GASES INSTRUMENTAL													
UKAS accreditation for organisation	PERSONNEL CERTIFICATION			Calibration to EN14181	Non-MCERTS ISO 17025 accreditation	Low dust BS EN3284-1	Dust above 20mg/m³ BS ISO 9096:2003	Particulate sizing USA EPA method 201	Calibration to BS EN13284-2	Other	Dioxins BS EN1948	Metals EN14385	Mercury BS EN13211	HCl BS EN1911	HF ISO 15713	SO₂ BS EN14791	VOC speciation BS EN13649	TOC low range BS EN12619	TOC high range BS EN13526	SO₂	NOx	CO, CO₂	O₂	Electrochemical cell technology	Infra red, chemiluminescence	FTIR	On-line GC/MS	Odour / offactory determination
	MCERTS Level 2 with all endorsements	MCERTS Level 2 with 1-3 endorsements	MCERTS Level 1 staff																									
█					█	█	█																					
█	13	2	4																									
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	1	1	2																									
	6		3																									
	2	1	2																									
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	3	1	1																									
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Accredited to ISO 17025
 Accreditation applied for
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 Non-accredited



MCERTS ACCREDITATION CERTIFICATION					PARTICULATE					TRACE ELEMENTS			GASES (WET CHEMISTRY)				GASES INSTRUMENTAL												Odour / olfactory determination
UKAS accreditation for organisation	PERSONNEL CERTIFICATION			Calibration to EN14181	Non-MCERTS ISO 17025 accreditation	Low dust BS EN13284-1	Dust above 20mg/m³ BS ISO 9096:2003	Particulate sizing USA EPA method 201	Calibration to BS EN13284-2	Other	Dioxins BS EN1948	Metals EN14385	Mercury BS EN13211	HCl BS EN1911	HF ISO 15713	SO₂ BS EN14791	VOC speciation BS EN13649	TOC low range BS EN12619	TOC high range BS EN13526	SO₂	NOx	CO, CO₂	O₂	Electrochemical cell technology	Infra red, chemiluminescence	FTIR	On-line GC/MS		
	MCERTS Level 2 with all endorsements	MCERTS Level 2 with 1-3 endorsements	MCERTS Level 1 staff																										
ESTIA Consulting & Engineering		1	1	1																									
Euro Environmental Services		3		1																									
Glass Technology Services																													
Hong Kong Productivity Council																													
Industrial Air Monitoring Consultants		1																											
Ineos ChlorVinyls			1	3																									
Johnson Matthey			1	2																									
Kan Developments																													
LEV Systems																													
Littlebrook Power Services																													
Lucite International UK																													
Lucite International UK																													
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EQUIPMENT SUPPLIERS

Equipment supplier ■
MCERTS-approved supplier ■

Equipment supplier MCERTS-approved supplier	MANUAL SAMPLING SYSTEMS (STACK)								CONTINUOUS MEASUREMENT SYSTEMS (STACK)										GAS SAMPLING & CONDITIONING			CALIBRATION GASES											
	Particulate	Metals	Mercury	Dioxins	VOC Specification	HCl/HF	Gases (SO ₂ , O ₂ , etc)	Other	Particulate	NOx	SOx	Oxygen	Mercury	Dioxins	HCl/HF	TOC	VOC specification	Portable landfill-gas analysers	Surface emission monitoring	Other	Probes	Heater sample transfer lines	Sample conditioning systems	Ambient air quality monitoring	General mixtures (SO ₂ , NOx , CO)	TOC control gas to BS EN12619	Special mixtures (HCl, mercury)	UKAS accreditation	Environmental reporting software	Predictive emission monitoring	Rental equipment	Flow	
ABB Analytical & Advanced Solutions									■	■	■	■	■			■	■	■			■	■	■						■	■		■	
AGL Airtesting	■	■	■	■	■	■	■	■								■		■	■	■				■									
Air Liquide UK																									■	■	■	■					
Air Monitors																													■			■	
Air Products																								■	■	■	■	■					
Ashtead Technology Rentals			■		■		■	■		■	■	■				■	■	■		■	■	■	■	■								■	
Augean																																	
BOC																									■	■	■	■					
Cascade Technologies							■			■	■			■								■		■	■								
Casella Monitor	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■	■	■		■	■	■	■						■		■	
CBISS									■	■	■	■	■	■	■	■	■	■	■		■	■	■							■		■	■
CES Environmental Instruments	■								■															■						■			
Codel International									■	■	■	■			■	■	■			■				■						■			
Cogsys																													■	■			
Cryoservice																									■			■					
Ekotest	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■	■				■	■		■					■	■			■
EMACCS									■	■	■	■			■	■				■	■	■	■	■	■	■	■			■		■	■
EMCo Air Quality	■	■	■	■	■	■	■	■													■												
Emerald Environmental Services	■						■		■	■	■							■						■									
ENOTEC UK												■																					
Enviro Technology Services	■	■	■	■	■	■	■	■	■	■	■	■	■		■	■	■			■	■			■						■		■	
Environmental Project Management					■			■								■	■			■											■		■
Etr-Unidata								■																						■		■	
Goyen Controls								■																						■			■
Horiba Instruments							■																	■									
JS Holdings	■	■		■		■		■														■	■		■							■	■
Kan Developments									■	■	■	■	■			■	■		■		■	■	■						■	■		■	■
Land Instruments									■	■	■	■									■	■	■	■									
Lowe Engineering									■	■	■	■			■	■					■	■	■							■		■	
M&C TechGroup							■	■				■								■	■	■	■										
Oakwood Environmental Services	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■								■
OdourNet UK								■													■			■							■	■	
Operational UK					■		■	■		■	■	■				■	■			■				■							■		■
Opsis AB									■	■	■	■	■		■	■	■		■	■	■	■	■	■				■			■		
Orbital Gas Systems									■	■	■	■	■		■	■	■			■	■	■	■	■	■								
PCME									■												■												
Procal										■	■		■								■									■			
Protea					■	■	■	■		■	■	■			■	■	■	■		■	■	■	■	■	■								■
PS Analytical			■										■											■									■
Quantitech	■	■	■	■	■	■	■	■		■	■	■	■	■	■	■	■				■	■	■	■	■							■	
Redwing Environmental	■	■	■	■		■		■													■			■									
Servomex							■			■	■	■				■				■	■	■	■										
SICK (UK)	■								■	■	■	■	■		■	■				■	■	■	■										■
Signal Group										■	■	■					■				■	■	■	■									
TCR Tecora	■	■	■	■		■	■															■	■	■	■								
Testo							■																										
Thermo Fisher Scientific - Air Quality Inst.									■	■	■		■		■	■	■			■	■	■	■	■								■	
Thermotec Systems									■	■		■	■				■			■	■	■											
Torbar Flowmeters																																	■
Turnkey Instruments	■							■																									
Westech Instrument Services	■	■	■	■		■		■					■	■						■	■	■	■	■								■	■

ANALYTICAL LABORATORIES

Accredited to ISO 17025
Accreditation applied for
Only personnel are MCERTs accredited
Non-accredited



	UKAS accreditation	Metals	Metals to EN 14385	Dioxins	PCBs	PAHs	Other VOCs	Isocyanates	CO ₂	HCl	HF	H ₂ S	Ambient air	Soils	Water	Landfill gas	Odour/Olfactometry
AEA Energy & Environment	■												■				
AES	■	■	■	■	■	■	■			■	■	■	■	■	■		
AGL Airtesting							■		■				■			■	
Air Products	■						■			■	■		■				
ALcontrol On-Site Services-Air	■																
Anchem Laboratories	■	■	■				■			■	■	■	■	■	■	■	■
Artek Çevre Ölçüm Laboratuvarı		■	■		■	■	■	■	■	■	■	■	■	■	■	■	
ASEP School of Chemistry	■	■		■	■	■	■	■		■	■		■	■	■	■	
Augean	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Bodycote Testing Middle East	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Bord na Mona Environmental		■					■	■		■	■	■		■	■		
Bureau Veritas	■	■	■		■	■	■			■	■	■	■	■	■	■	■
Cascade Technologies									■			■	■			■	
Ceramic Technology Institute		■	■						■	■	■		■	■	■		
Ciba UK	■						■									■	
City Analysts		■														■	
Corus Research, Development & Technology	■			■	■	■	■										
CPL Laboratories	■	■							■	■	■		■			■	
Dow Haltermann								■									
Ekotest		■	■	■		■	■		■	■	■		■				
EMCo Air Quality	■																
Emerald Environmental Services												■	■		■	■	
Envirocare Technical Consultancy	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Envirodat																■	
Envirolab	■	■		■	■	■	■						■	■	■	■	
Environmental & Management Services	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Environmental Compliance	■																
Environmental Efficiency		■								■	■	■	■		■	■	
Environmental Protection Agency (EPA)		■					■			■	■		■		■	■	
Euro Environmental Services	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Hong Kong Productivity Council	■	■			■	■	■			■	■		■	■	■		
Ineos ChlorVinyls	■	■		■			■		■	■							
Lucite International	■						■										
National Physical Laboratory	■	■											■				
Oakwood Environmental Services	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
OdourNet UK	■						■		■	■	■	■	■			■	■
Robinson Brothers	■	■					■			■	■				■		
RPS Laboratories	■	■	■			■	■	■		■	■		■		■		
RWE npower	■									■	■				■		
Scientific Analysis Laboratories	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Scientifics	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Scottish Environment Protection Agency	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
SembCorp Utilities (UK)							■								■		
Simtars		■				■	■		■	■	■	■	■	■	■	■	
Sira Environmental	■								■			■	■		■	■	
TMS Environment	■	■	■			■	■	■	■	■	■	■	■	■	■	■	■
Veolia Environmental Services	■														■	■	

SPECIALITY SERVICES

	Dispersion modelling	Stack height calculations	Process monitoring / optimisation	Personnel exposure monitoring	Platform inspection / structural survey
ABB			■		
AEA Energy & Environment	■	■	■		
AES	■	■		■	
ALcontrol On-Site Services	■	■	■	■	■
Anchem Laboratories			■	■	
Artek Çevre Ölçüm Laboratuvarı	■	■		■	■
Ashtead Technology Rentals				■	
Aspen Environmental	■	■		■	
Axis Environmental Services	■	■	■	■	
Bodycote Testing Middle East				■	
Bord Na Mona Environmental	■	■	■	■	
Bureau Veritas	■	■	■	■	■
Cascade Technologies			■	■	
Casella Monitor				■	
Catalyst Environmental	■	■	■	■	■
Ceramic Technology Institute	■		■	■	
Cirrus Environmental Solutions			■	■	
CPL Laboratories			■	■	
Cronin Environmental				■	
CTI Environmental	■	■	■	■	
E.ON Engineering	■		■		
Ekotest	■	■	■	■	■
EMACCS			■		
Emerald Environmental Services	■				
EMSAS		■		■	
Envirocare Technical Consultancy		■	■	■	
Envirodat		■		■	
Environmental & Management Services	■	■	■		
Environmental Compliance	■	■	■	■	
Environmental Efficiency	■	■	■	■	
Environmental Evaluation				■	
Environmental Monitoring Consultants	■	■		■	
Environmental Project Management		■	■	■	
Environmental Protection Agency (EPA)			■		■
ESTIA Consulting & Engineering	■		■		
Euro Environmental Services	■	■	■	■	■
Glass Technology Services		■	■	■	
Industrial Air Monitoring Consultants	■	■			
Kan Developments	■				
MIS Environmental				■	
National Physical Laboratory	■	■	■	■	
Oakwood Environmental Services	■	■	■	■	
Odour Monitoring Ireland	■	■	■	■	
OdourNet UK	■	■	■	■	
Operational UK	■	■	■	■	
Opsis AB	■		■		
Parsons Brinckerhoff	■	■	■	■	
PRA Coatings Technology Centre		■		■	
Protea	■	■	■		
REC	■	■		■	
Redwing Environmental	■	■		■	
Rod Hughes & Associates	■	■	■	■	
RWE npower	■	■	■	■	
Scientifics	■	■	■	■	■
Simtars	■	■		■	
Thermotec Systems		■	■	■	
TCMB Council for Quality & Environment	■	■			■
TUV NEL	■	■	■		
Westech Instrument Services			■		

TRAINING PROVIDERS

	Stack emission monitoring	Ambient emission monitoring	MCERTS revision courses	MCERTS specific training	Health & Safety for MCERTS	OMA	Auditing
A-Plus Consulting	■						
AEA Energy & Environment		■					
Aerosol Industrial Research Group	■	■					
AGL Airtesting	■	■					
Air Monitors		■					
ALcontrol On-site Services						■	
Axis Environmental Services	■	■					
Bureau Veritas	■	■	■	■			
Cascade Technologies	■	■					
Casella Monitor		■					
Ceramic Technology Institute	■	■					■
CES Environmental Instruments	■						
E.ON Engineering						■	
Ekotest	■	■					
EMCo Air Quality	■						
Enviro Technology Services	■	■	■	■			
Environmental & Management Services	■	■					
Environmental Compliance	■	■	■	■		■	■
Evans Environmental Consultancy					■		
Industrial Air Monitoring Consultants	■	■				■	■
Kan Developments	■						
Martin Cranfield Associates	■						
Mudway Health, Safety & Environment	■	■	■	■			■
National Physical Laboratory	■	■					
Oakwood Environmental Services	■	■	■	■	■		■
OdourNet UK	■	■					■
Opsis AB	■	■					
Orbital Gas Systems	■						
Protea	■	■	■	■			
PS Analytical	■	■					
Quantitech	■						
Scientifics	■	■	■	■	■	■	■
Signal Group	■	■				■	
SiteRight Environmental	■					■	
Smedstack Environmental	■			■	■	■	■
Source Testing Association	■		■	■	■		
TCMB Council for Quality & Environment	■	■					■
Thermo Fisher Scientific - Air Quality Instruments		■					
TUV NEL						■	
Westech Instrument Services	■	■		■	■	■	