

Be prepared for when the inspector calls

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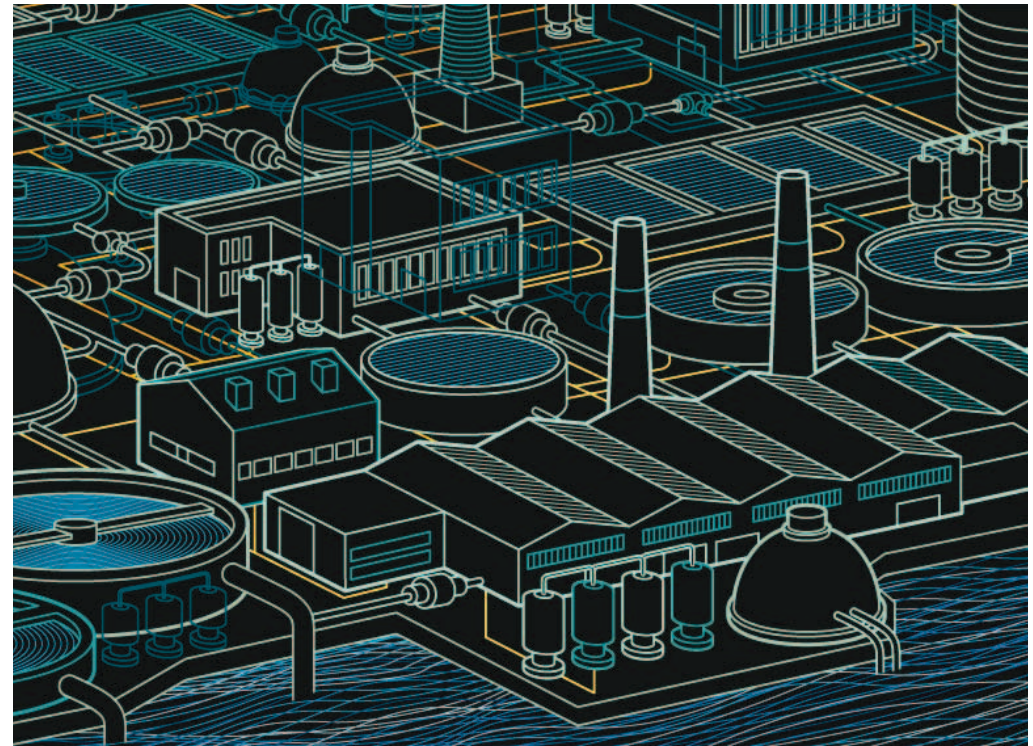
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MCERTS & EPR

A guide to environmental EPR legislation
and monitoring systems and services



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What is MCERTS?

MCERTS is the Monitoring Certification Scheme of the Environment Agency (EA), which has been established to improve quality and consistency of environmental data and as a foundation for regulatory monitoring under Environmental Permitting Regulations (EPR) permits to operate.

To support MCERTS, instrument manufacturers, test houses, laboratories, monitoring contractors and other third parties are developing a comprehensive selection of certified instruments, methods and services. These will form the basis of the Best Available Techniques (BAT), which must be adopted by enterprises requiring a permit to operate for all their regulated processes. A list of equipment that has been tested and MCERTified can be found on the Environment Agency website.

Currently MCERTS covers the following:

- Continuous Emissions Monitoring Systems (CEMS) i.e. instruments used to monitor emissions to the environment from chimney stacks.
- Continuous Ambient Monitoring Systems (CAMS) i.e. instruments used to monitor the air quality in the vicinity of regulated sites.
- Manual Stack Emission Monitoring i.e. organisations and personnel undertaking periodic monitoring of chimney stacks.
- Chemical Testing of Soil i.e. laboratories undertaking chemical analysis of soil when the results are to be used by the Agency.
- Continuous Water Monitoring Systems (CWMS) i.e. continuous sampling equipment and instruments used to monitor water/liquids/effluent.
- Self Monitoring of Effluent Flow i.e. where permit/consent holders' self-monitoring of effluent flow arrangements are inspected by independent MCERTS Inspectors to ensure reliable flow data is being provided.



MCERTS recognition across the globe

MCERTS applications for air monitoring equipment have been in existence for over ten years. In the European Union, MCERTS is applied implicitly through EN 15267 as an Anglo German scheme. Italy recognises MCERTS, and other countries such as Poland and Portugal have specified MCERTS. Contract documents have included MCERTS requirements in China, Hong Kong, Australia, South Africa, Malaysia and Turkey.

MCERTS water monitoring equipment standards are relatively new but they are increasingly being specified across Europe and beyond. The European Union environmental technology verification scheme (ETV) proposes to include MCERTS and water monitoring systems in the initial scope. Work is also progressing with CEN/ISO committees to use MCERTS as the benchmark standard.

There is already extensive co-operation between the EA, European and overseas bodies, including the German Federal Environment Agency (UBA), CEN who is tasking a working committee with the development of a European-wide scheme for CEMS and CAMS based largely on MCERTS, and CESI (an Italian certification body). Interest has also been expressed from Canada, USA, Australia, Poland, China and Hong Kong. In the UK, Sira Certification Services, UK Accreditation Service (UKAS) and the Source Testing Association assist the Agency in the operation of MCERTS.

Organisations such as the Water Research Centre have also been involved in drafting specifications, such as the MCERTS Standards relating to continuous water monitoring equipment.

Why is MCERTS needed and how is it being applied?

MCERTS has been introduced to ensure minimum quality standards across regulated processes, and as part of the implementation of EPR (formally PPC).

International regulations and EC Directives are becoming stricter, and MCERTS will assure users of certified instruments, equipment, packages and services that they meet these new requirements, wherever they originate, and represent BAT.

The level of interest shown across Europe, and from other major industrial nations and producers of instrumentation, demonstrates the importance of MCERTS.

MCERTS has been particularly devised to improve the accountability of self-monitoring by operators of regulated processes under the appropriate EC Directives (e.g. Large Combustion Plants and Waste Incineration Directives), ensuring that they take full responsibility for their processes.

By adopting MCERTS, organisations that have an interest in operating regulated processes, and in monitoring how the quality of the environment is affected, will be assured that they are starting from the same quality basis in equipment, techniques and personnel, with the highest degree of confidence in the data.

Since the MCERTS scheme was established, over 2500 inspection certificates, 140 product conformity certificates and 500 certificates of personnel competence have been awarded. Over seventy laboratories maintain MCERTS accreditation. Full details can be found at www.mcerts.net including a link to all certified products and services.

Verification, certification and recording data

Environment Agency Flow Policy under Self Monitoring of Effluent Flow for EPR installations states that aqueous emissions should be monitored with an uncertainty factor of better than +/- 8% of total daily volume. An accredited electromagnetic flowmeter such as WaterMaster or existing MagMaster provide +/- 0.5% or better. If the meter has been ordered fingerprint enabled, then electronic verification utilising CalMaster2/VeriMaster tools can easily be carried out on site keeping the meter's verification uncertainty at +/- 1%. If no verification is available, meter verification uncertainty is increased by up to 3%.

MCERTS Inspectors will view the initial flow monitoring installation and at 5-year intervals, awarding Site Conformity Inspection Certificates to sites that comply. Although companies may opt to have their next inspection carried out up to 12 months before their last certificate runs out. Having the right kit is just the start, metering systems need to be installed and maintained correctly and measurement accuracy needs to be properly verified. It is essential that flowmeters are regularly verified by the manufacturers' competent engineers, using calibrated verification equipment such as VeriMaster or CalMaster2 IRIS, in order to actively demonstrate Best Available Techniques (BAT) including keeping records for MS auditor visits.



Maintaining compliance

Flow Measurement Technologies

ABB Electromagnetic flowmeters have a typical calibrated accuracy of +/- 0.2% at factory rig.

Due to verification uncertainty inspectors follow guidance to add:

- 1% for fingerprinted and verified flowmeters
- 2% for non-fingerprinted flowmeters
- 3% for non verified flowmeters

Other uncertainties need to be added to overall installation, based on site conditions (+/-8% overall limit). Flow readings also need to be checked against another means such as ABB AquaProbe.

Existing equipment

As long as existing equipment meets the measurement standards, for example Calmaster verification and MagMaster, it need not be replaced. When the time comes to replace equipment it will need to be with MCERTified instrumentation, such as ABB's WaterMaster which boasts the world's first easily accessible on-board and in-situ verification capability and will replace the industry standard MagMaster.

ABB WaterMaster flowmeter

ABB's electromagnetic WaterMaster flowmeter, designed specifically for the water, wastewater and effluent sewage markets, now has an in-situ flowmeter verification capability. WaterMaster's rugged and robust sensors provide a long, productive and maintenance-free asset life. The addition of the VeriMaster software tool enables ABB Service Engineers to produce a printed verification certificate for regulatory compliance.

Providing on the spot insitu verification certification is easy using ABB's 'through-the-glass' control technology. This provides a local operator interface for inputting short, quick data for all user specific parameters without removing the transmitter cover.



WaterMaster using through the glass technology

Built-in verification and diagnostics

ABB VeriMaster

ABB's VeriMaster system is based on over twelve years of verification experience within the water industry and takes advantage of WaterMaster's innovative and versatile attributes. Verification diagnostics monitor and validate across an impressive performance-wide matrix. It is fast and easy to use and issues and prints self-certification reports. Accuracy of the flowmeter is to within +/- 1% of original factory calibration, where applicable. It issues warning statuses based on WaterMaster's history records, when a no longer present diagnostic alert may have affected meter accuracy users are alerted. There is no loss of measurement during testing or additional increase on totalizers.

The importance of providing reports

As part of Operating Permit conditions, records must be kept for at least 6 years. Screenmaster enables you to store historical data, so you can maintain and provide accurate and comprehensive records. Although not presently envisaged as part of the certificated framework, there is no doubt that confidence in the reliability and credibility of collected data will enhance the case for continued operation.

ScreenMaster videographic recorder for on the spot monitoring

ABB SM500F is a process recorder, data logger, field indicator and energy meter in a single package. It provides the convenience of a videographic recorder with the efficiency of process data at the point of measurement. No panels or enclosures, no pens or paper, and, with the benefit of network connectivity, valid information when and where you need it.



Who has to comply?

Industries and sites that are required to meet MCERTS regulations include:

- Power generation
- Petrochemical
- Paper
- Food processes
- Breweries
- Landfill
- Sand and gravel
- MOD
- Private industry
- Local council
- Metal fabricators
- Leisure
- Waste incineration
- Fish farms

How does MCERTS apply to me?

If you are an operator of an Agency regulated process, for instance operating a boiler plant burning fossil fuel, under EPR legislation the use of appropriate MCERTS equipment and services to meet BAT requirements is mandatory unless agreement in writing has been obtained from the Agency.

If you are regulated under the Water Resources Act (from WRA 1991), and monitor your effluent flow arrangements, MCERTS is mandatory – initially targeted for Water Utilities.

If you submit chemical analysis of soil/contaminated land to the Agency, then MCERTS is mandatory.

As the MCERTS scheme evolves, then it could apply to most Agency regulated sites that have emissions or discharges in order to minimise damage to air, soil or water environments.

Your monitoring systems, equipment, laboratory and quality assurance systems will need to conform to appropriate and relevant standards laid down, this includes:

- **ISO 17025 for monitoring and equipment testing**
- **EN 45004 for inspection of effluent flow monitoring arrangements**
- **EN 45011 for product certification**
- **EN 45013 for personnel competency**

For further information on these standards, please see the British Standards website (Relevant website addresses are provided towards the back of this booklet).

To ensure that self-assessment or third-party assessment provides the necessary quality and consistency of data, the personnel performing the monitoring and measurements will (if relevant to the scheme) have to comply with the MCERTS competency standards.

For example, for stack emission monitoring there is an Entry Level, Level 1 and Level 2 with a series of additional technical endorsements for specific techniques. For inspection of flow there are MCERTS Inspectors and Assistant Inspectors.

MCERTS for continuous water monitors

On-line analysers

The MCERTS performance standard for continuous water monitors (CWM) is based on relevant sections of a number of international ISO and CEN standards, as well as taking into account other relevant national standards.

The determinands covered by MCERTS are ammonia, COD, conductivity, dissolved oxygen, free cyanide, nitrates, orthophosphate, pH, temperature, TOC, total arsenic, total cadmium, total chlorine, total copper, total lead, total mercury, total nickel, total oxidised nitrogen, total phosphorus, and turbidity.

These are some of the most important parameters when monitoring discharges from wastewater treatment works, industrial processes and the aquatic environment.

MCERTS for CWM provides a formal scheme for the product certification of continuous monitoring systems. EA have appointed Sira Certification Service (the certification body) to operate MCERTS on our behalf.

Product certification comprises three parts, these are:

Laboratory testing

Used to determine performance characteristics, where such testing requires a highly controlled environment.

Field testing

Carried out on processes representative of the intended industrial sectors and applications.

Auditing

The manufacturing process is audited to confirm manufacturing reproducibility and that any design changes are controlled so they do not degrade performance below the MCERTS standard. Test organisations have to demonstrate that they comply with the relevant requirements of ISO/IEC17025.

Operator Monitoring Assessment

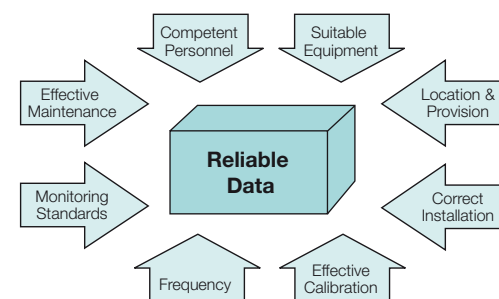
To strengthen the auditing of operators' self-monitoring arrangements, the EA has introduced a scheme known as Operator Monitoring Assessment (OMA).

This will be used by Agency Auditors to assess self and third party monitoring using a consistent and transparent approach to drive necessary improvements and provide feedback to the EA for its own ongoing programmes.

Operators wishing to use an OMA Audit as guidance for their own internal assessments may access it from the EA website. As well as allowing a better understanding of the EA's requirements, it demonstrates the OMA scoring system. A company's Operating Monitoring Assessment score will increase with use of MCERTS approved products, services and organisations. In future, more and more organisations will require MCERTS to gain or award contracts in these processes.



Good building blocks = good monitoring



Courtesy of EA P. Wiggins

Maintaining Compliance

- An OMA is required at least every 4 years. More frequent assessments could be required by the EA
- OMA1– Management, training and competence of personnel
- OMA2 – Fitness of purpose of the monitoring method
- OMA3 – Maintenance and calibration of monitoring equipment – effective maintenance routines, calibration certificates, regular verification certificates held
- OMA4 – Quality Assurance of monitoring
- Management System (MS) this could be subject to surveillance audit (BSI)
- 5 year MCERTS Inspectors visit to assess effluent flow



Calmaster 2 Verification Service

The frequency of Operator Monitoring Assessments is dependent on significant changes in processes, if operators request it, or if the EA require it. Management systems include quality management systems and environmental management systems.

The importance of records

For MCERTS inspections and MS surveillance audits, records must be maintained of monitoring instrument calibration certificates. High-quality recorders will be required, such as the SM 500F videographic recorder, which can easily be mounted in the field.

What are the deadlines and timescales?

MCERTS was introduced in 1998 as a product certification scheme for Continuous Emission Monitoring Systems (CEMS) on boilers and stacks. The scheme was extended in 2000 to include Continuous Ambient Monitoring Systems (CAMS) and in 2002 to manual monitoring of stack emissions (i.e. not continuous).

What does OMA cover?

Currently OMA covers EPR 'process industries' and water utilities effluent. Possible future implementations could include landfill operations, abstraction and water treatment plants.

CEMS

There are more than 104 instruments made in the UK, and imported, which have already been certified with applications for many more.

CAMS

Nearly 29 instruments have been certified.

Manual Stack Emissions Monitoring

More than 200 people hold personal certification and about 85 laboratories hold accreditation to the MCERTS Standard.

Chemical Testing of Soil

This applies to water companies and industrial discharges operating under EPR and has been extended to Nuclear Operators. Over 71 laboratories now have accreditation.

Self-monitoring of Effluent Flow by Water Utilities

Mandatory inspection by appointed MCERTS inspectors was introduced in January 2004, and many companies now provide MCERTS inspection services. All EPR regulated sites with an effluent flow measurement requirement in their EPR permit will have to be inspected under the MCERTS Scheme and awarded an MCERTS Site Conformity Inspection Certificate.

Product certification is required for open channel level, ultrasonic closed pipe meter, TOC, turbidity and pH, magmeter products. The original deadline for EPR inspection contracts was December 2008, but due to demand for qualified MCERTS inspectors this has been extended as long as companies booked an inspection before the deadline and have then carried them out in a 'reasonable time'. Under self-monitoring of effluent flow, 2600 water company sites were inspected between 2005 and 2009, and re-certifications are soon due. By November 2010, around 220 EPR site inspections had been completed.

Continuous Water Monitoring Systems (CWMS)

Performance standards and testing procedures have been published, for flowmeters, turbidity on-line, dissolved oxygen, pH, ammonia etc. MCERTS certification is progressing and a small number of products already certified are detailed

on www.mcerts.net. Also electromagnetic flowmeters for closed pipe, full-bore flow will complete testing imminently and, in addition, electromagnetic flowmeter in-situ calibration and verification testing techniques are being formalised for purposes of accreditation.

Performance standards and test procedures for environmental data management software

Computers are now an integral part of how environmental data is generated, stored, manipulated and reported. MCERTS for environmental data management software provides a formal scheme for the product certification of data management applications conforming to these standards. EA have appointed Sira Certification Service (the Certification Body) to operate this scheme on their behalf.

Who can advise me?

Initially ABB Engineering Services EPR Consultants at Belasis 01642 372 000, the EA and Defra, but also there are now many other organisations e.g. certified laboratories, WRc and the Sensors for Water Interest Group (www.SWIG.net) offer a programme of MCERTS awareness workshops.

Websites for further information include:

www.environment-agency.gov.uk;
www.mcerts.net; www.defra.gov.uk/environment;
www.sira.co.uk/mcerts; www.wrcapproved.com;
www.npl.co.uk; www.ukas.org; www.abb.com

Within its own unequalled range of instrumentation, ABB is a strong supporter of MCERTS and sound environmental legislation, and is mirroring the progress of MCERTS implementation phases within the monitoring of regulated processes.

ABB and MCERTS

CEMS

ABB's MCERTS Certified instruments for stack emissions monitoring include:

MODEL	CERTIFICATE RANGE	CERTIFICATE NO.
Zirconia Oxygen Monitor ZFG2/ZDT*	O2 0-25% by vol.	Sira MC 9900001/03
AO2000 Multi-FID 14 Flame ionisation detector	TOC 0-15mg C/m3	Sira MC 030015/02
Advance CEMAS FTIR-NT, infrared spectrometer	SO2 0-75 mg/m3 CO 0 to 300 mg/m3 NO 0 to 200 mg/m3 NO 0 to 400 mg/m3 SO2 0 to 75 mg/m3 SO2 0 to 300 mg/m3 HCl 0 to 15 mg/m3 NH3 0 to 15 mg/m3 H2O 0 to 40 %vol HF 0 to 5 mg/m3 HF 0 to 10 mg/m3 O2 0 to 25 %vol O2 0 to 12 %vol O2 0 to 6 %vol TOC 0 to 15 mg/m3	Sira MC 030016/004
AO2000 LIMAS UV, UV process photometer	SO2 0-75 mg/m3 NO 0 to 33.5 mg/m3 NO 0 to 200 mg/m3 NOx 0 to 50 mg/m3 NOx 0 to 300 mg/m3 NOx 0 to 125 mg/m3 O2 0 to 10 %vol O2 0 to 25 %vol (NOx expressed as NO2)	Sira MC 030017/06
AO2000 URAS 14, infrared photometer	SO2 0 to 75 mg/m3 NO 0 to 200 mg/m3 NOx 0 to 300 mg/m3 CO 0 to 75 mg/m3 O2 0 to 25 %vol (NOx expressed as NO2)	Sira MC 030018/02
AO2000 Series Multigas Analysers	CO 0 to 75 mg/m3 0 to 4000 mg/m3 0 to 4000 mg/m3 NO 0 to 100 mg/m3 0 to 5000 mg/m3 NOx 0 to 150 mg/m3 0 to 7500 mg/m3 SO2 0 to 75 mg/m3 0 to 8000 mg/m3 N2O 0 to 100 mg/m3 0 to 6700 mg/m3 CO2 0 to 20%vol O2 0 to 10%vol 0 to 25%vol	Sira MC 180121/05
EL 3000 Series Multigas Analysers	CO 0 to 150 mg/m3 0 to 4000 mg/m3 NO 0 to 100 mg/m3 0 to 5000 mg/m3 NOx 0 to 150 mg/m3 0 to 7500 mg/m3 SO2 0 to 300 mg/m3 0 to 8000 mg/m3 N2O 0 to 100 mg/m3 0 to 6700 mg/m3 CO2 0 to 20%vol O2 0 to 10%vol 0 to 25%vol	Sira MC 08122/05

Other ABB equipment such as electromagnetic flowmeters and Calmaster2 verification systems are being considered for the process of accreditation. *The ABB Zirconia ZFDG2/ZDT was the first instrument to be certified by Sira under MCERTS.

CAMS

ABB's MCERTS Certified instruments for the monitoring of ambient air quality include:

MODEL	CERTIFICATE RANGE	CERTIFICATE NO.
Serinus 10 O3 Analyser	O3 0 to 250 ppb	Sira MC 100172/01
Serinus 30 CO Analyser	CO 0 to 100 ppm	Sira MC 100173/01
Serinus 40 NOx Analyser	NO 0 to 1000 ppb NO2 0 to 260 ppb	Sira MC 100174/01
Serinus 50 SO2 Analyser	SO2 0 to 400 ppb	Sira MC 100175/01

CWMS

ABB's MCERTS Certified instruments for water quality and effluent monitoring

MODEL	CERTIFICATE RANGE	CERTIFICATE NO.
WaterMaster Electromagnetic flowmeter	Class 1 Accuracy*	Sira MC 080138/01

*Please see certificate for WaterMaster sizes certified

The MCERTS CWMS scheme is already certifying flowmeters and other monitoring equipment. For processes discharging waste water/effluent, inspection services are offered by MCERTS Inspectors for each individual installation.

It will involve assessment of the site process configuration, the flow monitoring arrangements and the quality management system. This is applicable only to that installation and is not transferable. Details of companies employing MCERTS Inspectors are available from Sira.



ABB currently offers a wide range of analytical, flow, level and recording instrumentation and software to BAT standards, which includes:

Conductivity, pH and Redox (ORP)	AX400 Series single or dual-input analysers
Turbidity monitoring	4670 Series for clean and foul water
Fluoride, Ammonia, Nitrate, Chloride	8230 Series analysers
Nitrates	7330 UV analyser, 8236 ion-selective analyser
Phosphate	8242 Analyser
Organic carbon and coagulation control	7230 Series
Flow metering – clean water, waste water	WaterMaster, AquaMaster, AquaProbe, MagMaster, Parti-Mag Flowmeters from the world's most comprehensive range
Flowmeter verification	CalMaster2* and VeriMaster* for WaterMaster
Videographic paperless, IP66 rated field-mounted recording	SM500F

*ABB Services to support electronic verification of electromagnetic flowmeters

GLOSSARY

MCERTS	Monitoring Certification Scheme
EPR	Environmental Permitting Regulations
Sira	Sira Certification Services are accredited by UKAS for the certification of products and personal that fall under MCERTS
OMA	Operator Monitoring Assessment
IPPC	Integrated Pollution Prevention and Control Directive
PPC	Pollution Prevention Control
WRA	Water Resources Act
RSA	Restoring Sustainable Abstraction
CEMS	Continuous Emissions Monitoring Systems
CAMS	Continuous Ambient Monitoring Systems
CWMS	Continuous Water Monitoring System
UKAS	The United Kingdom Accreditation Service
BAT	Best Available Technique
QMS	Quality Management System
SWIG	Sensors for Water Interest Group
WMA	Water Monitoring Association

