

Monitoring Quick Guide 1

V2.4 Issued August 2017

RM-QG-01 Selecting continuous emission monitoring systems (CEMs) and the validity of MCERTS certificates

1. Scope

This note describes the requirements for selecting new continuous emission monitoring (CEMs) systems for industrial installations regulated by the Environment Agency, and how we apply our Monitoring Certification Scheme (MCERTS).

2. Practical Guidance

2.1 Basic rules for selecting CEMs

The following guidelines apply when selecting CEMs:

Determinands	The CEM is to be MCERTS certified for the determinands specified in the permit, where continuous monitoring is required.
Ranges	The CEM is to be certified for a range that is suitable for the application.
Stack gas conditions	The operator should ensure that specific site conditions do not negate the performance of the CEM to below required standards.
Proven suitability	The operator is recommended to ensure that the intended CEM is proven on comparable installations.
Particulate monitors	Generally, particulate monitors might be sensitive to changes in flow rate, particle size distribution and changes in particle shape. Therefore the operator should determine whether specific stack conditions could potentially undermine the integrity of the monitoring data.

The reference materials used in the automatic or manual zero and span check procedures (as required for QAL3 in EN 14181) should be documented by the manufacturer and should have been assessed as part of the MCERTS certification process.

2.2 Suitable ranges

When CEMs are tested and certified, the MCERTS certificate states the certified range. In some cases a CEM may have more than one range.

In general, the lower the certified range, the better the performance of the CEM is likely to be. This is because the majority of performance standards are expressed as a percentage of the certified range. For example, if the performance requirement for cross-sensitivity is $\pm 4\%$ of the range and a CEM has a certified range of 0 to 75 mg.m^{-3} , then the cross-sensitivity will not be more than $\pm 4\%$ of 75 mg.m^{-3} , which is 3 mg.m^{-3} . A CEM with a certified range of 0 to 200 mg.m^{-3} will have a maximum cross-sensitivity of $\pm 4\%$ of 200 mg.m^{-3} , or 8 mg.m^{-3} .

The main performance characteristic that is not range-dependent is linearity (or lack of fit). Therefore as an extra assurance, if a CEM is to be used for higher ranges than those certified, CEMs manufacturers should ideally have had the linearity evaluated over the higher ranges during type-testing. If this is not the case, then the linearity over the higher ranges should be evaluated either before installation or immediately afterwards.

The converse to the above may also be true i.e. CEMs are less likely to perform as well at ranges which are lower than those at which they have been certified. If there is any doubt, reference should be made to the MCERTS test results.

Key Point

- **Generally, CEMs with lower certified baseline ranges will perform satisfactorily at higher ranges, since the lower the certified range, the better the performance.**

The Environment Agency's approach to selecting suitable CEMs is to apply range multipliers. The lowest certified is not to be more than 1.5x the daily average (DA) ELV for waste incineration processes as specified under Chapter IV of the Industrial Emissions Directive (IED) and 2.5x the DA-ELV for large combustion-plant (as specified under Chapter III of the IED) and other types of process. As there is a linear relationship between certified ranges and uncertainties, these multipliers provide assurance that CEMs with appropriate ranges will meet the uncertainty requirements specified in the incineration and large combustion plant Directives. This approach is the same as that employed in Germany and now within BS EN 15267-3.

Key Points

When selecting a new CEM operators should select a CEM with a certification range no more than:

- **1.5x the daily average ELV for waste incineration installations**

- **2.5x the daily average/48h ELV for large combustion plant and other types of installations.**

2.3 Systems integration

Extractive CEMs comprise the analyser(s) and additional devices for obtaining a measurement result. As well as the analyser(s), this includes the sampling system. It is the complete system, including the sampling system that has been tested and certified.

There are several types of sampling system, such as:

- Simple heated lines coupled to heated analysers that measure gases in a hot, wet form.
- Heated lines and chiller-driers, delivering the sampled gases to the analyser in cooled, dry form.
- Heated lines and permeation-driers, delivering the sampled gases to the analyser in cooled, dry form.
- The stack-mounted probe is coupled directly to a permeation drier, which then passes the cooled, dry sample gas via an unheated line to an analyser.

There are also many variations of these basic forms and as analysers are typically designed for use with specific types of sampling system, testing and subsequent approvals will certify a CEM with a stated type of sampling system and this will be stated on the MCERTS certificate.

As most industrial processes differ in their requirements, some pragmatic flexibility is allowed in the selection of the sampling system used with the certified CEM. However, any alternative sampling system must not deviate from the type of system specified on the MCERTS certificate.

Allowable variations could include:

1. A different brand or model of sampling system of the same type, so long as there is evidence from third-party test laboratories that the alternative system works with similar types of CEM.
2. Additional manifolds and heated valves used to allow more than one analyser to share a sampling system.

Any installation using an alternative sampling system must show it meets the requirements of QAL2 and QAL3 of EN 14181. See TGN M20 for further details.

Key Point

- **MCERTS has provisions for systems integration. Evidence is required from third-party test laboratories that the alternative sampling system works with similar types of CEM. In addition, on installation the CEM and alternative sampling system must meet the requirements of QAL2 and QAL3 of EN 14181. Refer to M20 for further details.**

2.4 MCERTS certificates and validity

2.4.1 *Expired certificates and installed measuring systems*

Sira Certification Service maintains the list of MCERTS certificates. The list is available via www.mcerts.net. Some of the certificates include a statement that the certification is only valid for CEMs manufactured before a specified date. For example, the statement could be:

‘MCERTS certification only valid for products manufactured before 28 February 2008’.

CEMs manufactured before the date stated are MCERTS certified and can continue to be used. CEMs manufactured after that date are not MCERTS certified. Installed systems are not affected by MCERTS expiry until they need to be replaced, at which point a MCERTS certified instrument must be installed.

2.4.2 *The recertification process*

To recertify an instrument, the manufacturer must contact Sira to discuss the specific requirements for recertification. The recertification must be to the latest version of the standard and it is the responsibility of the manufacturer, in consultation with Sira, to determine and arrange any necessary testing to meet the current requirements. This would normally be a formality unless there have been significant changes to the performance standards or the certified system since the last certificate was issued.

Once the manufacturer and Sira have a contract in place for the recertification, a note can be added to the Sira website to that effect:

‘MCERTS certification in place for products already installed, in use or in the supply chain. For products manufactured after (expiry date), recertification pending’.

2.4.3 *Certificate validity during recertification*

When the recertification process is underway and the note is added to the certificate list, the certificate validity is extended. Currently, the manufacturer has 12 months from the expiry date of the original certificate to complete the recertification¹. If recertification is successful, the certificate will be extended for five years² from the expiry date of the original certificate. Please note, if recertification is unsuccessful then the original expiry date of the certificate will apply.

Note 1: When a product is due for recertification, manufacturers must meet the requirements of the latest MCERTS standard and complete the recertification before the expiry of the certificate. No grace period will apply and the certification validity will lapse according to the expiry date on the certificate.

Note 2: If EN15267-3 has not changed, the certificate can be reissued for a further 5 years, which would be included in the annual audit fee. If EN15267-3 has changed, the manufacturer will need to meet the new requirements before a new certificate is issued.

3. Further information

3.1 Quick Guides

- RM-QG-02 – Continuous Monitoring Requirements – Chapter IV of the Industrial Emissions Directive (2010/75/EU)
- RM-QG-03 – Application of EN 14181

3.2 Technical Guidance Notes

- TGN M1 – Sampling requirements for monitoring stack emissions to air from industrial installations
- TGN M2 – Monitoring of stack emissions to air
- TGN M20 – Quality assurance of continuous emissions monitoring systems - application of EN 14181 and BS EN 13284-2

3.3 MCERTS Method Implementation Documents (MIDs)

- MID EN 14181
- MID EN 13284-2

4. Feedback

If you have any comments or suggested improvements to this note please contact our National Customer Contact Centre at:

Email: enquiries@environment-agency.gov.uk