Minimum requirements for self-monitoring of flow: MCERTS performance standard (SMoF) - ***Management System Requirements Guidance***

Amendment History

Issue	Date	Amendment
18	February 2022	Document structure revised to align with "Minimum requirements for self-monitoring of flow: MCERTS performance standard" Published 3 February 2022".
18	February 2022	Front page revised
18	February 2022	Amendment history: details of changes made to previous versions of "The MCERTS Standard" removed; details of revisions to guidance previously provided in version 17 retained.
18	February 2022	Forward: summary of permit conditions which may indicate the need for MCERTS compliance added.
18	February 2022	Throughout: "flow measurement structure" replaced by "flowmeter installation"; references to Sira replaced by CSA; "ensure" replaced by "make sure" (with corresponding sentence restructuring where necessary).
18	February 2022	Where appropriate: "regulator" used in place of "Environment Agency(EA) and Cyfoeth Naturiol Cymru Natural Resources Wales (NRW)"
18	February 2022	Section 4.2: references to the six key areas removed
18	February 2022	Section 4.11: "When commissioning new flow monitoring installations, operators should make sure they are configured so that inspection, cleaning, verification, repair and replacement of key components is practicable (see section 3 above)." Added.
18	February 2022	Section 4.12: reference to clauses 6-9 of "The MCERTS Standard" added.
18	February 2022	Section 4.14 reference to clause 5 of "The MCERTS Standard" added.
18	February 2022	Section 4.17 added
18	February 2022	Sections 5-9 added
18	February 2022	Sections 10.7 & 10.8 added; previously identified as section 5.
18	February 2022	Section 11: additional subsections created; text reformatted; previously identified as section 6.
18	February 2022	Section 12.1 contact details revised; previously identified as section 7.1.
18	February 2022	Section 12.2 list of site inspection companies replaced by hyperlink to CSA website; previously identified as section 7.2.
18	February 2022	Section 12.4 list of consultants revised; previously identified as section 7.4.
18	February 2022	Section 13 added
18	February 2022	Appendix 3 List of changes made to MCERTS Std v4.0 added
18	February 2022	Appendix 4 List of current MCERTS Bulletins added

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Forward

The effective environmental protection and management of water bodies requires knowledge about the mass release rate of pollutants. This is achieved by combining flow-measurement data (volume/time) with pollutant concentration (mass/volume).

The Environment Agency's document "Minimum requirements for self-monitoring of flow: MCERTS performance standard"– *"the MCERTS standard" (available from gov.uk - www.mcerts.net)* specifies the Environment Agency's minimum requirements for the self-monitoring of flow. The standard covers:

performance requirements for flow-metering installations in terms of a target measurement uncertainty

management system requirements to maintain the ongoing performance of flow metering installations

conformance with this MCERTS standard is based on assessment of the flow-monitoring arrangements by MCERTS Inspectors and assessment of the supporting management system.

The total daily volume of the discharge as specified in the consent/permit shall be measured with a target uncertainty of better than ±8% of total daily volume.

MCERTS Inspection Certificates and Management System Certificates for Group Management Systems are issued to Operators following satisfactory assessment against the MCERTS standard.

N.B It is the responsibility of Operators to make sure that CSA Group Testing UK Ltd (CSA Group), MCERTS Inspectors and management system auditors are provided with up-to-date consent/permit information – consent/permit number, operator name, site address, details of defined liquid discharge points and applicable monitoring conditions (daily volume limits, dry weather flows, maximum discharge flow rates, requirements for continuous monitoring etc.) – to make sure that compliance is accurately assessed and for accurate MCERTS Inspection Certificates to be issued.

This guidance has been developed by CSA Group Testing UK Ltd (part of CSA Group) to assist Operators of regulated processes and auditors of management systems **and should be read in conjunction with the MCERTS standard.** It is to be used by management systems auditors when undertaking audits to allow the audit to be conducted in an objective manner. It will also allow Operators to develop an improved understanding of MCERTS requirements.

Revisions made to v4.0 of the MCERTS standard by the Environment Agency during the preparation of the MCERTS standard issued on 03 February 2022 are summarised in Appendix 3 of this guidance.

Permits issued by the Environment Agency(EA) and Cyfoeth Naturiol Cymru Natural Resources Wales (NRW) for the monitoring of liquid waste flows include requirements for compliance with MCERTS which remains the standard for the specification and operation of liquid flowmeter installations.

Amendment History

The amendment history now covers details of changes made to this document to support the introduction of the MCERTS Standard published 3 February 2022.

Information about changes made in earlier versions of this document is available from CSA on request.

1 Installations this standard applies to

Conditions documented within a permit indicating the need for MCERTS compliance may include one or more of the following:

- A daily volume discharge limit
- A dry weather flow limit
- A discharge flow rate limit
- A requirement for continuous flow monitoring
- A requirement to report absolute quantities of controlled substances such as heavy metals or radioactivity
- An explicit clause such as
  "Monitoring equipment, techniques, personnel and organisations employed for the emissions monitoring programme and the environmental or other monitoring specified in condition 3.5.1 shall have either MCERTS certification or MCERTS accreditation (as appropriate), where available, unless otherwise agreed in writing by the EA/NRW"

2 How this MCERTS standard operates

On behalf of the EA and NRW, CSA provide the following services:

- Certification of instrumentation (https://www.csagroup.org/en-gb/services/mcerts/mcerts-product-certification)
- Assessment and certification of personnel
- Arrangement and completion of management system audits
- Issue of MCERTS Inspection Certificates and Management System Certificates
- A "one-stop-shop" service, providing site inspection, management system audit and certificate on satisfactory completion.

2.1 Site inspection and management system audit

Evidence required to demonstrate that a flowmeter installation satisfies MCERTS requirements comprises:

- A site inspection report which confirms that the flow measurement structure(s) are capable of delivering data to the level of accuracy required by the scheme;

- An audit report which indicates the management system overseeing flow measurement activities satisfies scheme requirements.

Copies of both reports must be presented to CSA before an MCERTS Inspection Certificate is issued to an operator.

2.2 Applying for certification

Applications for MCERTS Inspection Certificates may be made by the operator, on their behalf by a Site Inspector or through the CSA “one-stop-shop” service.

2.3 Review and certificate issue

The MCERTS Inspection Certificate issued to an operator remains the property of CSA and may be cancelled if the operator does not continue to comply with scheme requirements (see section 10.6 below).

2.4 Management system surveillance and reassessment

CSA support the operator’s responsibility to make sure that surveillance and reassessment audits of their management system are conducted in accordance with scheme requirements (see section 10 below).

2.5 Flowmeter installations that fail requirements

Requirements for flow meter installations are detailed in clause 3 of the MCERTS standard.

In accordance with the “MCERTS Code of Conduct”:

Site inspector “feedback shall be generic, for example, identifying the areas requiring attention but not necessarily providing a detailed design solution.”

“Under no circumstances shall the Inspector suggest or recommend a single company to carry out remedial work to the detriment of potential competitors.”

2.6 Management systems that fail requirements

Criteria for the acceptance or rejection of a management system following initial assessment are defined within this document (see section 10.4 below).

Provision of evidence of corrective action taken by the operator after the management system has been deemed to fail MCERTS requirement does not change the recommendation made by the auditor or obviate the requirement for a further initial assessment.

2.7 Dispensations

Involvement of the “regulator” in requests for dispensations takes place in two ways:

- Through regulation team members who possess specific knowledge about the site and the surrounding environment.

- Through the regulator's technical advisors who possess expert knowledge of the MCERTS standard.

When applying to CSA for a dispensation certificate, the operator must supply the evidence detailed within clause 2.7.5 of the MCERTS standard.

Operation of a flow meter installation granted an MCERTS dispensation certificate must be supported by periodic audits of the supporting management system.

2.8 Recertification

The operator is responsible for maintaining continuity of certification of flowmeter installations required to comply with the MCERTS standard.

Where an operator allows an MCERTS inspection certificate to lapse, the criteria for acceptance of the management system may revert to those used for an initial assessment (see section 10.4 below).

3 Flow monitoring installations

Purchase of an MCERTS-certified product for flow monitoring does not guarantee that scheme performance requirements will be achieved once it has been installed.

Operators may find information contained within clauses 6-9 of the MCERTS standard useful when making preparations to install flow monitoring equipment.

3.1 Performance requirements for effluent flow monitoring (volume)

Operators with permits containing more than one liquid discharge point required to comply with the requirement of the MCERTS standard may evidence this by requesting a single MCERTS inspection certificate. Under these circumstances, operators should endeavour to have site inspections of the associated flowmeters conducted within as short a time as possible to avoid reducing the period over which the MCERTS inspection certificate is valid.

3.2 Performance requirements for instantaneous flow monitoring

When the permit conditions for a liquid discharge point include a requirement for "continuous" flow monitoring or specify a numeric flow rate limit, records of instantaneous flow measurements must be retained by the operator.

The data must comply with the requirements in clause 3.2.1 of the MCERTS standard irrespective of the units used to define the flow rate limit or the reporting period stipulated by the regulator within the permit.

3.3 The role of MCERTS inspectors and assistant inspectors

At the time of publication of this guidance document, all MCERTS inspectors and assistant inspectors were associated with the companies listed on the CSA website (see section 12.2).

Operators approached by individuals or other companies purporting to offer MCERTS site inspection services should verify their certification credentials with CSA before engagement.

3.4 Conformance assessment

MCERTS bulletin 6 provides information on site inspection report contents and format.

Appendix 4 of this guidance contains a list of current MCERTS bulletins.

4 Management system

4.1 Establish and maintain a management system

This guidance is based on section 4 of the MCERTS standard.

Operators may choose to maintain an ISO 14001 Environmental Management System (EMS) or an ISO 9001 Quality Management System (QMS), or both. Maintaining an EMS and/or a QMS will not adequately demonstrate compliance with MCERTS requirements. **An MCERTS management system audit will still need to be carried out**.

4.2 Contents of the management System

The focus of the Management System should make sure that the required measurement uncertainty and confidence level is maintained. "Quality" in this context is concerned with the accuracy and completeness of the flow data provided to the Environment Agency.

The Management System shall include statements, information and/or documented procedures, as appropriate, covering the following elements:

- quality/environmental policy – cl. 4.4
- management responsibilities – cl. 4.5
- documentation – cl. 4.6
- operating procedures – cl. 4.7
- document control – cl. 4.8
- equipment inventory – cl. 4.9
- maintenance – cl. 4.10
- commissioning – cl. 4.11
- site changes – cl. 4.12
- verification – cl. 4.13
- data treatment – cl. 4.14
- corrective actions – cl. 4.15
- internal audits – cl. 4.16

Integrating the MCERTS Management System requirements into a wider quality or environmental management system may have some advantages such as common auditing and document control arrangements. However, it could be difficult, for example, to have a policy statement that addresses both the quality of product and MCERTS requirements and therefore some areas may be best kept separate.

In developing the management system, it is important to make sure that the system is explicit, effective and as easy as possible to understand and implement. Whilst all of the requirements need to be considered, any unnecessary complication will inevitably cause problems.

Assessment of the management system involves an audit to make sure that the requirements have been fully established, implemented, understood and adequately address the requirements of the clauses of the MCERTS standard. The management system shall make sure that flow data is consistently accurate and correctly captured and communicated. The management system shall make sure that continued flow measurement accuracy is maintained between the five-yearly inspections of site arrangements. This will be verified during periodic surveillance of the management system.

An organisation with more than one site where liquid flow monitoring arrangements are regulated by EA permit may choose to maintain a “Group Management System” covering all discharge locations. The Operator of a Group Management System will be issued with a “Management System Certificate” valid for five years from the date of the successful initial assessment Maintenance of a Management System Certificate is through periodic assessment in accordance with section 5 of this guidance.

If necessary, local operating procedures may also be in place which allow any variations in operating practice necessary for specific discharge sites. Auditing of a Group Management System will include random sampling of information and records associated with the individual locations based on an appropriate sample size. This is generally based on the square root of the number of sites rounded up to the nearest whole number. If an organisation wishes to have a Group Management System audit, it must be possible to conduct the assessment of all site procedures and records from one location within the time allotted for the visit (e.g. an Operator with 64 sites (square root 8) the sample size will be 8. An Operator with 5 sites (square root 2.24) the sample size will be 3 – the nearest whole number above the square root value).

Operators responsible for Group Management Systems must maintain their Management System Certificate through periodic surveillance and reassessment (see section 5).

MCERTS Inspection Certificates issued to the Operator of a Group Management System are valid for five years from the date of the initial site inspection report and conditional on the maintenance of a valid Management System Certificate.

4.3 Possible extension of MCERTS

In future the MCERTS scheme may be extended to cover water abstraction metering, and pass forward (PFF) measurement structures.

4.4 Quality and environmental policy

The commitment of senior management is important if the Operator is to effectively implement and operate the required management system. A documented statement of this commitment is a fundamental requirement, and it needs to be communicated and understood so that all relevant employees appreciate the significance of MCERTS.

The policy should state senior management's commitment in simple, unambiguous terms. It does not need to include the responsibilities indicated as long as these are defined elsewhere within the system.

An Environmental Policy which includes a commitment to comply with environmental regulations or legislation will satisfy this requirement.

4.5 Management responsibilities

Somebody needs to be responsible for understanding the requirements of MCERTS and for maintaining the management system. This could be a Quality/Environmental Manager or other person with management system experience. It is important that responsibilities are clearly defined, assigned and where necessary documented. An organisation chart plus notes will be required in most circumstances. The person responsible for MCERTS (the MCERTS Responsible Person) needs to have an adequate understanding of flow measurement, MCERTS requirements, the treatment process and sufficient authority to make sure the system operates effectively.

It is not necessary to create specific job functions/titles for a responsible person. The responsibility can be undertaken by existing personnel.

The management system auditor shall record the name(s) of the responsible person(s) in the audit report.

Organisation charts should show the person(s) with principle responsibility for the management system and their relationship to senior management.

Job descriptions should include MCERTS responsibilities but do not need to be over complex. For example, those involved in the cleaning of flow monitoring equipment do not need to have a detailed understanding of MCERTS requirements, they just need to know the extent of their responsibilities and that it is important for flow monitoring accuracy.

Training records should demonstrate that appropriate MCERTS training has been provided. This does not necessarily mean external training courses. Adequate understanding for Quality Managers could be obtained by a literature study and in such cases it would be adequate for training records to simply detail the information source(s) and date when studied. Training for operatives could be provided internally by Quality Managers with an appropriate entry in each recipients training records.

It is the Operator's responsibility to make sure that CSA Group are made aware of any changes in the identity or contact information for the MCERTS Responsible Person.

4.6 Documentation

The Manual or Documentation will normally provide a simple overview of the system and include the policy statement, organisation structure with respect to MCERTS, and principle responsibilities.

4.7 Operating procedures

Operating procedures normally fall into two broad types, those that address the **management** system (such as internal auditing) and those that address day to day **operational** issues (such as maintenance). Therefore, it is common to have separate sets of procedures for, say Managers and Operatives. Alternatively, management procedures could be incorporated in the Quality Manual and operational procedures could be in a separate "Work Instruction". A small organisation may wish to have all procedures and work instructions in one manual.

Operating procedures must be clear and easy to understand and should be available where the work is carried out. It is quite appropriate for routine requirements such as channel cleaning to be displayed using signs or similar at the work location and this would satisfy the requirement for the procedure to be documented.

The "Competent Person" responsible for the issue of operating procedures could be the Quality Manager. It is important that responsibilities are clearly defined and assigned to an appropriate person or persons.

4.8 Document control

Operating procedures (and subsequent revisions) need to be approved by an appropriate person (For example, the MCERTS Responsible Person), with a simple record to confirm this has taken place. Procedures also need to be distributed appropriately and out of date versions withdrawn to prevent inadvertent use. These constitute the necessary controls. They need to be defined in a simple "document control" procedure.

4.9 Equipment Inventory

Major items of equipment will typically include the ultrasonic level transducer (for open channel flow systems) or the electromagnetic flowmeter and any associated recording equipment. The equipment could be included in an organisation's existing maintenance system or separate records can be maintained.

The auditor shall inspect the list of major items of equipment and record the description, serial No. and location of major items of flow measurement equipment. Major items of equipment shall normally be included on a list, database, record sheet or card. ***The flow measurement equipment listed in the MCERTS Site Inspection report shall appear on the list together with its unique identifying code (e.g. serial number)***. The equipment inventory and maintenance schedule may be combined into one list.

Key elements of the data path should also be included. See Figure 1 in section 4. of the MCERTS standard.

4.10 Maintenance

An appropriate maintenance schedule needs to be established and maintained. The nature of maintenance activities required will depend on the type of flow monitoring measurement system. Open channel measurement structures: inspection and cleaning of flume, weir tank and plate; sensor verification; instrument checks; loop calibration; visual

inspection for leaks, damage or flooding of the measurement structure. Closed channel measurement structures: internal inspection and cleaning; sensor verification; loop calibration; visual inspection for leaks or damage.

Maintenance frequencies should be based on operational experience, and supported by maintenance/inspection records. For example, if the records of a monthly cleaning activity regularly report "heavy fouling" the frequency of cleaning needs to be increased. Maintenance activities may be separated into tasks which are performed "daily", "weekly", "monthly", "annually", "5 yearly" (recertification) or "as required".

Note the requirement to detect any deterioration in performance, and other problems. Problems could include seasonal or production variations that cause deviations in accuracy. Therefore, records need to show that regular functional checks are carried out.

Maintenance functions could be divided into tasks conducted weekly, monthly and annually and records kept. This can be in the form of a simple "tick-sheet" which indicates when maintenance activities were performed and who performed them. Records should be retained for a period at least equal to, and not less than, the validity period of the MCERTS Inspection Certificate (5 years).

If the equipment has specific periodic maintenance requirements these should be entered into the schedule where appropriate. If there are specific seasonal requirements for maintenance these should be entered into the schedule as appropriate. If Total Daily Volume is recorded manually the appropriate frequency should be included in the schedule.

The auditor shall describe the maintenance arrangements in place on site, the frequency of scheduled maintenance and record the location of maintenance records in the audit report.

4.11 Commissioning

This procedure needs to make sure that new installations and any modifications to the flowmeter installations result in an MCERTS inspection, unless a documented justification can be developed, see 4.12 site changes.

As per cl. 3. of the MCERTS standard, at the time of purchase new equipment must be on the list of MCERTS – certified devices maintained by CSA Group (www.csagroupuk.org/services/mcerts/mcerts-product-certification/mcerts-certified-products/mcerts-certified-products-continuous-water-monitoring-system-part-3-water-flowmeters/).

When commissioning new flow monitoring installations, operators should make sure they are configured so that inspection, cleaning, verification, repair and replacement of key components is practicable (see section 3 above).

4.12 Site changes

Any site changes that could influence measurement uncertainty need to be captured, recorded, assessed for their significance by the MCERTS Responsible Person, and suitable action taken to make sure measurement uncertainty is maintained. A documented procedure will be required to demonstrate that the above process has been followed and also to confirm completion of any action necessary.

The key factor is whether any site change affects the validity of the MCERTS Inspection Certificate e.g. previously stated measurement performance is no longer being achieved, or the flow monitoring arrangements are no longer as described in the inspection report.

One example of a “significant change “would be a change to the process which significantly reduces the daily volume measured. This could result in the 8% uncertainty target being exceeded.

Another example would be the abstraction of wash water downstream of the flowmeter resulting in “double counting” of significant flows.

The auditor shall examine the procedure for the assessment of site changes and comment on its suitability.

A single procedure could address the requirements of 4.11 and 4.12. It needs to describe how changes that could influence measurement uncertainty are captured, recorded, assessed for their significance, and suitable action taken to make sure accuracy is maintained. Records need to show that the above process has been followed and also confirm completion of any action necessary.

Information on factors affecting the accuracy of installed flowmeter installations is contained within the following clauses of the MCERTS standard:

Clause 6. - Open channel flow measurement system concessions
Clause 7. - Electromagnetic flowmeters for flow in pipes
Clause 8. - Installing and using air firing ultrasonic level sensors for open channel flow Measurement
Clause 9. - Installing and using area-velocity flowmeters in free surface flows

4.13 Verification

Verification procedures may take the form of regular checks using a calibration reference plate (for open channel flowmeters) or a simple comparison of “indicated flow” against “expected flow”. Records of the actual measurements taken shall be maintained. Equipment used for verification checks should be subject to periodic maintenance and calibration.

The uses and limitation of electronic verification are documented within clause 7.10. Please note as per clause 7.10.3 assessing an electromagnetic flowmeter installation for MCERTS compliance by electronic verification alone is not acceptable.

Consideration should also be given to data path elements.

The frequency of such checks will depend upon such things as how well equipment is protected from damage or tampering, and would normally be carried out every 6 or 12 months.

By recording and plotting daily values of totalised flow, a visual inspection of the graph will give an early warning of any possible errors in the flow measurement. Deposition or silting will invariably result in increasing flow readings.

The auditor shall examine the procedure and the records of the actual measurements taken and comment on their suitability.

4.14 Data treatment

The management system is required to describe how flow measurement data is collected and processed and thus demonstrate how the stated measurement uncertainty is maintained.

Where flow measurement data is transmitted to a monitoring station using telemetry, the maximum acceptable data treatment/telemetry error shall be recorded.

Where appropriate, the auditor will expect to see appropriate records covering the activities listed in 4.14.2 of the MCERTS standard.

An MCERTS Inspector will often use a local display to set-up and configure a flowmeter. If flow data is transmitted to and stored on a data archive of some sort (and subsequently sent to the Environment Agency), it is important to make sure that the flow data appearing on the data archive matches the flow data indicated on the local display. A simple check can be carried out during routine verification (Sect 4.13).

Methods for recalculating the overall assessment of the total measurement uncertainty are outlined in clause 5 of the MCERTS standard.

4.15 Corrective actions

Incidents that indicate a failure of the management system or which could threaten the integrity of flow measurement data need to be captured, investigated, and appropriate action put in place. If the organisation operates an ISO 9001 QMS or an ISO 14001 EMS, the MCERTS system could utilise the same procedure and records. Incidents need to be assessed by someone with appropriate experience, hence the reference to a “competent person”. Completion of actions, however, could be by any suitable person, with appropriate follow-up by a competent person to make sure they are complete and effective.

4.16 Internal audits

The MCERTS audit programme could be incorporated into an organisation’s existing QMS/EMS audit programme and use the same procedures and records, or it could be separate. In either case it is necessary to demonstrate that audits are carried out annually and that they cover all areas of the MCERTS standard in a twelve-month period.

Checks by suitably qualified individuals should make sure that the MCERTS management system continues to be operated effectively and remains compliant with the latest version of the MCERTS standard.

4.17 Conformance assessment – management system

Guidance on how CSA perform conformance assessments and administer MCERTS Inspection Certificates is contained in section 10 of this guidance.

Competence requirements for MCERTS QMS Auditors is contained in section 11 of this guidance.

5 Estimating uncertainty

This clause of the MCERTS standard explains, with examples, how to estimate the uncertainty of the total daily volume for effluent flow monitoring, for instantaneous flow monitoring and for pumped or batch flows.

6 Open channel flow measurement system concessions

This clause of the MCERTS standard explains how site inspectors account for deviations from international standards when assessing open channel flowmeter installations.

7 Electromagnetic flowmeters for flow in pipes

This clause of the MCERTS standard explains how site inspectors account for installation and operating conditions when assessing electromagnetic flowmeters installed on closed pipes.

Information within this clause may be of assistance to operators when assessments of site changes which affect reverse flow, air entrapment and internal fouling are conducted.

8 Installing and using air firing ultrasonic level sensors for open channel flow measurement

This clause of the MCERTS standard explains how site inspectors account for installation and operating conditions when assessing a single air firing ultrasonic level transducer mounted above an open channel flowmeter installation.

Information within this clause may be of assistance to operators when assessing site changes which identify a different operating range for an open channel flowmeter installation.

9 Installing and using area-velocity flowmeters in free surface flows

This clause of the MCERTS standard provides information which may help operators decide whether an area-velocity flowmeter is an appropriate method for flow measurement in site-specific conditions.

10 Management system conformance assessment

The Certification Body conducting the management system audit shall be a UKAS accredited Certification Body or a Certification Body that is an International Accreditation Forum signatory. The management system auditor shall work on behalf of an accredited Certification Body. The Certification Body should have *the MCERTS standard* Self-Monitoring of Flow included in their scope of accreditation.

Management System auditors shall meet the competence criteria defined in Section 6 of this guidance.

10.1 Auditing

In order to maintain certification throughout the certification period, the Operator's management system shall be subjected to periodic surveillance. The first surveillance visit will be conducted approximately 12 months after the initial assessment. Thereafter, the audit frequency of surveillance will be agreed with the Operator, based on the audit findings (see section 5.5) with a maximum timeframe between surveillance of one year. Reassessment of the management system is conducted every five years in line with the recertification process.

The auditor shall assess the Operator's management system to make sure that the requirements have been satisfactorily met in relation to the flow monitoring arrangements.

The auditor shall assess whether the Operator's systems are in accordance with good practice and shall make sure maintenance of the flow monitoring system's performance takes place over the certification period. The auditor shall obtain objective evidence from Operator's documented records that the systems are satisfactorily implemented in a timely manner.

The auditor shall complete the current version of a "Consent/Permit Holder Audit Report" (available from CSA Group). A copy of an example report is shown in Appendix 2. The report shall include a recommendation from the auditor to 'accept' or 'refuse' acceptance of the Operator's management system.

There are four types of audit:

Initial Assessment – first review of the Operator's EA permit(s) and any consent(s) to discharge to sewer, flowmeter installation site inspection report(s) and management system(MS) documentation - designed to comply with sections 4.4 to 4.16 of the MCERTS standard- culminating in a recommendation to 'accept or 'reject' the MS.

Surveillance – a periodic review (annual, or as appropriate) of the Operator's MS and records covering at least the key areas of the MCERTS standard - sections 4.5, 4.9, 4.10, 4.12, 4.13 and 4.14 - to support on-going MCERTS compliance.

Reassessment – review of the Operator's permit(s), consent(s), site inspection report(s) and management system(MS) documentation designed to comply with sections 4.4 to 4.16 of the MCERTS standard needed to support the reissue of certification.

Pre-assessment – a gap analysis report offered to the Operator when there are too many issues identified during an Initial Assessment to make a recommendation for acceptance of the MS.

10.2 Audit Detail report (ADR)

Audit findings are recorded on an Audit Detail Report (ADR) form. A separate ADR is raised for each clause of the standard in which a non-conformance is identified. Depending on the number and nature of nonconformity found, more than one ADR may be raised for each

clause. ADR reports are agreed between the auditor and the Operator during (or shortly after) the audit. Each ADR is given a category (**major**, **minor** or **observation**) depending on the severity of the finding.

A **major** finding is one where there is an absence of a required procedure, the total breakdown of a procedure or where there may be a risk of an adverse effect on the performance of the flow measurement.

A **minor** finding is one which would not have such a direct effect on the performance of flow measurement.

An **observation** is raised for information only in which a corrective action is not necessarily required.

10.3 Proposed Corrective action

Completion of the "Proposed Corrective Action" section is required for all non-conformances categorised as "Major" or "Minor". Proposed Corrective Actions agreed during the audit will be documented by the MS auditor. Corrective actions will be reviewed at the next audit.

Failure to respond to corrective action requests may result in the categorization of the non-conformance being escalated (e.g. from **minor** to **major**). Where the Operator repeatedly fails to initiate corrective action, the MCERTS Inspection Certificate may be cancelled and the Environment Agency informed.

10.4 Auditor recommendations (initial assessment audits)

Following the initial assessment audit, the auditor will make a recommendation to:

- **accept** the management system, or
- **refuse** acceptance of the management system (i.e. reassessment of the management system will be required)

The recommendation is based on the objective evidence collected during the audit and on the following criteria.

Audit detail report(s) raised	Recommendation	Action required
Up to 4 "minor"	**accept** the management system	Schedule first surveillance visit within 12 months
• One or more "major" and/or • Five or more "minor"	**refuse** acceptance of the management system	Schedule reassessment visit within 6 months

Auditor recommendations are subject to review by the Director(s) of CSA Group or their nominees who have veto power regarding all certification decisions.

10.5 Auditor recommendations (surveillance/reassessment audits)

The auditor will agree with the Operator the frequency of future surveillance/reassessment audits based on the following guidance.

Audit detail report(s) raised	Recommendation
• Four or fewer "minor"	1 year
• One or more "major" and/or • Five or more "minor"	Six months or less (to be agreed with auditor)

Auditor recommendations are subject to review by the Director(s) of CSA Group or their nominees who have veto power regarding all certification decisions.

Reassessment of the management system is conducted at least once within each five-year period and should take place within 6 months of the site re-inspection taking place regardless of the auditor's/CSA Group's recommendation from previous audit report unless the site inspection report is submitted as evidence of a site change review. Reassessment relating to Group Management certificates shall be reviewed on the fifth anniversary of the previous certificate.

For first time (initial) certifications (i.e. following a successful site inspection and initial assessment) the next audit due date for the MS surveillance visit shall default to 1 year. Subsequent surveillance audit due dates for each year shall continue to default to the same day and month associated with the date of initial certification. This cycle will continue until recertification is confirmed where by the next cycle of annual surveillance audit due dates shall follow the auditor's recommendation for the interval from reassessment to subsequent surveillance visit.

Delays in completing surveillance and reassessment visits in accordance with previous visit recommendations will result in a corresponding reduction in interval to the next visit.

E.g. next surveillance audit due date 01/07/19 - actual date of surveillance audit 23/08/19 – next surveillance audit due date 01/07/20(subject to guidance in section 5.5)

10.6 Cancellation of certificates

Where significant deficiencies are identified in the Operator's Management System or where an Operator repeatedly fails to co-operate with CSA Group in the planning and execution of audits, or in the completion of agreed corrective actions, the MCERTS Inspection Certificate may be cancelled and the Environment Agency informed.

Following cancellation, an MCERTS Inspection Certificate can only be reinstated once a reassessment of the management system has taken place. If significant changes have been made to the site flow monitoring arrangements a further site inspection will also need to take place.

10.7 Remote Auditing

Remote audits of operator management systems will be permitted under the following circumstances:

- All initial or pre- assessment audits shall be conducted on-site unless otherwise due to exceptional circumstances and agreed by CSA.
- For surveillance assessments, Operators who have less than four minors and zero majors at their latest audit may have a remote audit unless they specifically request an on-site audit.
- Operators who have more than four minors or at least one major shall be audited on-site.
- All reassessment audits shall be conducted on-site unless otherwise due to exceptional circumstances and agreed by CSA.
- CSA reserve the right to schedule an on-site audit in the event of a change to the MCERTS responsible person(s).
- Remote methods may be used for all audits if required by law or the policies of CSA, the EA or NRW.

Audits will be conducted using video-conferencing software, screen-sharing and electronic submission of documented information on the date of the assessment or within two working days.

The time allotted for the remote audit will be identical to the time permitted for a face-to-face audit.

Face-to-face, or “on-site”, surveillance audits will be arranged at the discretion of CSA.

10.8 Electronic report signatures

Where required, audit report sign-off by the consent/permit holder’s representative will be completed electronically.

Reports will be submitted to the consent/permit holder’s representative as .pdf files.

Approval of the report is signified by the application of a signature by the consent/permit holder’s representative in one of the following ways:

- Typed initials
- Typed name
- Insertion of an image of a “wet” signature
- Digitally signature e.g. Adobe Sign

Where the consent/permit holder’s representative does not have the facility to apply a signature to a .pdf file, this may be performed on their behalf the auditor provided this is accompanied by evidence of their approval of the report in a covering email.

11 Auditor competence

11.1 Standard Management System Auditor Competence

The following guidance describes the competence requirements of MCERTS EMS auditors to conduct MCERTS management system audits in accordance with Section 4.2 of the MCERTS standard.

11.2 Knowledge

MCERTS management system auditors shall:

- be aware of and understand the content and application of Section 4 of the MCERTS standard and the MCERTS bulletins
- be aware of and understand the published guidance for MCERTS auditors
- be aware of the procedures for calculating measurement uncertainty

11.3 Skills

MCERTS management system auditors shall:

- be qualified to carry out ISO 9001/ISO 14001 audits according to the Certification Body's auditor competence requirements
- be able to read, interpret and apply the requirements of the scheme documentation (Environment Agency standards and MCERTS bulletins)

11.4 Technical Understanding

MCERTS management system auditors shall possess:

- an understanding of the principles of flow measurement
- an understanding of wastewater treatment processes
- an understanding of the potential effect of management system deficiencies on flow measurement accuracy/uncertainty

One mechanism to demonstrate that an auditor has the necessary technical understanding is by attending an "MCERTS Awareness Seminar" provided by the MCERTS certification body.

Certification Bodies shall have records to show how they have determined that their auditors can demonstrate the above requirements.

12 Contact details

12.1 Environment Agency/CSA Group

Environment Agency
Monitoring and Assessment Team
Site Based Regulation
Kings Meadow House
Kings Meadow Road
Reading
RG1 8DQ

Tel: 0118 953 5332
email: andrew.chappell@environment-agency.gov.uk
web: www.mcerts.net

CSA Group
CSA Group Testing UK Ltd
Unit 6
Hawarden Industrial Park
Hawarden
Deeside
CH5 3US

Tel: 01244 670900
email: mcerts@csagroup.org
web: www.csagroup.org

12.2 MCERTS Inspectors

The current list of companies which have been appointed by CSA Group to deliver the MCERTS site inspection service for self-monitoring of flow can be found here:

https://www.csagroup.org/en-gb/services/mcerts/mcerts-self-monitoring-of-flow/approved-inspection-providers/

12.3 MCERTS Management System Auditors

Contact CSA Group.

12.4 MCERTS Management System Consultants

Eco-Smart Consultancy
Tel: 01234 273567
Email: info@eco-smartconsultancy.co.uk

13 Status of this document

This guidance document may be subject to review and amendment following publication. The latest version is available on the CSA website (hyperlink required).

Should you wish to be informed of any changes to relevant parts of the MCERTS schemes then you can subscribe for updates at the link below through the 'MCERTS Messenger': https://www.csagroup.org/en-gb/services/mcerts/

Should you wish to be informed of any changes to the bulletins then you can subscribe for updates at the link below:
https://www.csagroup.org/en-gb/services/mcerts/mcerts-self-monitoring-of-flow/mcerts-bulletins/

Appendix 1 MCERTS INSPECTION CERTIFICATE

MCERTS Inspection Certificate

This is to certify that the effluent flow monitoring arrangements at:

Consent/Permit holder: **The Effluent Company**
Site: **The Pond**
Emission point ref: **The site has a single emission point**

Site reference or postcode: **100592**
Grid reference: **SU 5650 0330**
Consent/Permit ref: **EP4444TY**

have been inspected and found to comply with the Environment Agency's MCERTS standard:
Guidance - Minimum requirements for self-monitoring of flow: MCERTS performance standard - Published 3 February 2022
clause 3.1. - Performance requirements for effluent flow monitoring (volume)

The results of the inspection of the flow measurement system are given in the following report:
CSA 123

The Consent/Permit holder's management system has been audited and found to comply with the above MCERTS requirements.

This certificate is issued subject to the Consent/Permit holder maintaining its management system to the required standard, which will be subjected to periodic surveillance. The use of this certificate is subject to the Regulations Applicable to Holders of CSA Group certificates.

Certificate No: ***Sira ME22 1486 rev4***
Date of initial certification: ***3-Feb-22***
Date of site inspection (valid from): ***26-Jan-22***
This certificate issued: ***3-Feb-22***
Renewal date: ***2-Feb-27***

Andrew Young
Environmental Team Manager

MCERTS is operated on behalf of the Environment Agency by

CSA Group Testing UK Ltd
Unit 6, Hawarden Industrial Park,
Hawarden, Deeside, CH5 3US
Tel: +44 (0)1244 670 900

SCS/SF/242, Issue 14, February 2022

Appendix 2 CONSENT/PERMIT HOLDER AUDIT REPORT

AUDIT REPORT *Minimum requirements for self-monitoring of flow: MCERTS performance standard* **CONFIDENTIAL**	
Audit Report Ref:	
Consent/Permit No.	
Date of Assessment	

Operator (auditee)	
Operator representative	
Name:	*Tel:*
Title:	*email:*
Operator Site/Address	

Scope of audit						
Minimum requirements for self-monitoring of flow: MCERTS performance standard					*3 February 2022*	
Pre-assessment	Initial assessment		Surveillance		Re-assessment	
Site Inspection Service Provider	**Inspector**	**Survey Date**	**Report No.**	**Pass / Fail**	**Certificate No.**	**Expiry Date**

Recommendations *[delete where applicable]*	**Next audit frequency** *[indicate where applicable]*
accept MS (management system)	***12 months, Other (specify)***
maintain acceptance of MS	***12 months, Other (specify)***
Refuse acceptance/withdraw acceptance	***Cancel certificate and notify Environment Agency***
Date of next Audit/Type: *Auditor recommendations are subject to review by CSA Group Testing UK Ltd(CSA Group) who has veto power regarding all recommendations*	

Auditor	**Operator**	**CSA Group**
Signed	Signed to accept recommendations	Signed

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AUDIT REPORT *Minimum requirements for self-monitoring of flow: MCERTS performance standard* **CONFIDENTIAL**	
Audit Report Ref:	
Consent/Permit No.	
Date of Assessment	

Impartiality Declaration

I confirm that neither I nor my organisation has had any consultancy or other relationship that could result in a conflict of interest with the above company within the last two years, other than activities conducted under the direction of CSA Group, and will notify CSA Group if this situation should change.			
Signature		Date	

1 SUMMARY REPORT

Summary *an overview of compliance of the management system with the MCERTS requirements*

Operator background:

Site Description:

Details of permit/consent:

Description of flow measurement structures:

Outcome of most recent Site inspection visit:

Site changes since previous visit(if applicable):

Result of the review of any ADRs documented on previous visit:

Summary of ADRs(no.):
Major:
Minor:
Observation:

Recommendation:
Initial Assessment(delete where applicable): ***accept the management system/refuse acceptance of the management system***
Surveillance/Reassessment(delete where applicable): ***maintain acceptance of MS/withdraw acceptance***

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AUDIT REPORT *Minimum requirements for self-monitoring of flow: MCERTS performance standard* **CONFIDENTIAL**	
Audit Report Ref:	
Consent/Permit No.	
Date of Assessment	

2 AUDIT DATA

Audit team members

Interviewed Operator representative(s) (auditee)

Area	*Name*	*Title / Job Function*

Areas sampled

*Indicate the areas sampled during the audit(**S**-Sampled, **NS**- Not sampled) and the **ADR ref.** associated with each section(4.4-4.16) where applicable*

Requirement		*Ref.(S,NS, "ADR ref")*
4.4	Quality/Environmental policy	
4.5	**Management responsibilities**	
4.6	Documentation	
4.7	Operating procedures	
4.8	Document control	
4.9	**Equipment inventory**	
4.10	**Maintenance**	
4.11	Commissioning	
4.12	**Site changes**	
4.13	**Verification**	
4.14	**Data treatment**	
4.15	Corrective actions	
4.16	Internal audits	

AUDIT REPORT *Minimum requirements for self-monitoring of flow: MCERTS performance standard* **CONFIDENTIAL**	
Audit Report Ref:	
Consent/Permit No.	
Date of Assessment	

3 AUDIT DETAIL REPORT		**ADR Ref:**	
Indicate Para No. of Standard for each ADR 4.4 4.5 4.6 4.7 4.8 4.9 4.10 4.11 4.12 4.13 4.14 4.15 4.16			
Description		**Category**	Major Minor Observation
Auditor *sign*	**Operator** *sign*		
PROPOSED CORRECTIVE ACTION *(to be entered if agreed after discussion during audit)*			
Auditor *sign*	**Operator** *sign*		

AUDIT REPORT *Minimum requirements for self-monitoring of flow: MCERTS performance standard* **CONFIDENTIAL**	
Audit Report Ref:	
Consent/Permit No.	
Date of Assessment	

4 AUDIT NARRATIVE

Information relevant to the audit which is not already included herein
Colour Code: Non-conformance (major) (minor) Observation Satisfactory

4.4 Quality/Environmental policy	
4.5 Management responsibilities	
4.6 Documentation	
4.7 Operating procedures	
4.8 Document control	
4.9 Equipment inventory	
4.10 Maintenance	
4.11 Commissioning	
4.12 Site changes	
4.13 Verification	
4.14 Data treatment	
4.15 Corrective actions	
4.16 Internal audits	

5 CORRECTIVE ACTION REVIEW

a review of corrective action resulting from previous Audit Detail Reports raised where applicable , delete as appropriate ;
APPLICABLE/NOT APPLICABLE

ADR Ref	Cat	Ref	Finding	Response	Evidence	Status
		4.4				
		4.5				
		4.6				
		4.7				
		4.8				
		4.9				
		4.10				
		4.11				
		4.12				
		4.13				
		4.14				
		4.15				
		4.16				

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AUDIT REPORT *Minimum requirements for self-monitoring of flow: MCERTS performance standard* **CONFIDENTIAL**	
Audit Report Ref:	
Consent/Permit No.	
Date of Assessment	

6 Random Sampling of Multiple Discharge Sites/ Locations

For Water Utility sites complete table a), for industrial sites complete table b).

a) Water Utility Site

Site/Location	Permit/Consent	DWF (m^3)	Type/Serial no.	Site Inspection Report/Date	Certificate Expiry date	Flow data	Maintenance/Training Records

b) Industrial Site

Site/Location	Permit/Consent	DWF (m^3)	Type/Serial no.	Site Inspection Report/Date	Certificate Expiry date	Flow data	Maintenance/Training Records

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Appendix 3 List of changes made from MCERTS Std v4.0

V4.0 clause no.	Revisions	03/02/22 clause no.
	"Record of amendments table" deleted	
Forward	Replaced by untitled section at the start of the MCERTS standard	
1	See below for details.	1
2 & 5	Clauses combined; see below for details.	2
3	See below for details.	3
4	See below for details.	4
Appendices 1-4	Transferred to new clauses within the MCERTS standard	5-8
	New clause: "Installing and using area-velocity flowmeters in free surface flows".	9
6	Transferred to new clause within the MCERTS standard	10
Forward	Text reworded without loss of meaning; New sentences providing additional detail added; Reference to NRW permits added; (from section 1.1) General scope of MCERTS scheme replaced with scope of self-monitoring of flow standard; Duplicate text deleted; (from Footnote to section 3.1.2) Separate definition of flowmeter added.	Untitled
1.2	Section deleted.	
1.3	Bullet point "which require MCERTS certified measurement systems" added.	1.1
	Additional requirement.	1.2
1.4	Minor changes to wording without altering meaning.	1.3
2.1.1, 2.1.2, 2.1.3, 2.1.4, 4.17.1	Text relocated under section 2; "Sira" replaced by "CSA (CSA Group Testing UK Limited)";All subsequent references to "Sira" replaced by "CSA"; "and Natural Resources Wales" added; Some sentences re-ordered without change in meaning; Hyperlink to document revised.	2
2.2	Title revised to "Site inspection and management system audit"; One additional sentence.	2.1
2.2.1	Text relocated under section 2.1.1.	2.1.1
2.2.1	Text relocated under section 2.1.2; Sentences reworded without change in meaning.	2.1.2
2.2.1	Text relocated under section 2.1.3; Sentences reworded without change in meaning.	2.1.3
2.2.1	Text relocated under section 2.1.4; Sentence reworded without change in meaning.	2.1.4
2.2.2	Title revised to "Applying for certification".	2.2
2.2.2	First two sentences relocated under section 2.2.1; Sentence reworded without change in meaning.	2.2.1
2.2.2	Remaining sentence unchanged.	2.2.2
2.2.3	Title unchanged.	2.3
2.2.3	Text relocated under section 2.3.1; Minor changes to wording without altering meaning.	2.3.1
2.2.4	Title revised to" Management system surveillance and reassessment".	2.4
2.2.4	Unchanged text relocated under section 2.4.1.	2.4.1
2.3	Title revised to "Flowmeter installations that fail requirements".	2.5
2.3.1	First sentence revised to use active voice.	2.5.1
2.3.2	Minor changes to wording without altering meaning.	2.5.2

V4.0 clause no.	Revisions	03/02/22 clause no.
2.3.3	Minor changes to wording without altering meaning.	2.5.3
2.3.4	Unchanged.	2.5.4
2.4	Title changed to “Management systems that fail requirements”.	2.6
2.4.1	Unchanged.	2.6.1
2.4.2	Minor changes to wording without altering meaning.	2.6.2
2.4.3	Unchanged.	2.6.3
2.5	Title unchanged.	2.7
2.5.1	First two sentences separated from remainder of section which has been transferred to section 2.7.2; Sentences subject to minor changes to wording without altering meaning.	2.7.1
2.5.1	New section created from sentences 3-5 transferred from section 2.5.1; Dispensation requirements converted to bullet point list; additional consideration added “the impact on the permit requirements and local environment other relevant information”; “Environment Agency” replaced by “Regulator” (first instance).	2.7.2
2.5.2	Third sentence from section 2.5.2 used to create new section 2.7.3 “Environment Agency” replaced by “Regulator”	2.7.3
	Additional requirement	2.7.4
2.5.3	Sentences subject to minor changes to wording without altering meaning; Application requirements converted to bullet point list; “Environment Agency” replaced by “Regulator”.	2.7.5
2.5.4	Sentences subject to minor changes to wording without altering meaning; “Environment Agency” replaced by “Regulator”.	2.7.6
2.5.6	Sentences subject to minor changes to wording without altering meaning; “Environment Agency” replaced by “Regulator”.	2.7.7
2.5.5	Sentences subject to minor changes to wording without altering meaning.	2.7.8
5	Title Unchanged	2.8
5.1	Section renumbered; “sites” replaced by *flowmeter installations”; “within a period of five years from” replaced by “within 5 years of”	2.8.1
5.2	Section renumbered; “sites” replaced by *flowmeter installations”; Sentences 3-5 transferred to new section 2.8.3.	2.8.2
5.2	New section.	2.8.3
5.3	Section renumbered; content unchanged	2.8.4
3.1.1, 3.1.2, 3.1.3	Reworded without change in meaning; Relocated under section 3; “Environment Agency” replaced by “Regulator”.	3
3.2.1	First sentence: wording unchanged; Relocated under section 3.1.1	3.1.1
	Second sentence: wording unchanged; Relocated under section 3.1.2.	3.1.2
	Third sentence: wording unchanged; Relocated under section 3.1.3	3.1.3
	Sentences 4-8: wording unchanged; Relocated under section 3.1.4	3.1.4
	Sentence 9: wording unchanged; Relocated under section 3.1.5	3.1.5
	Sentences 10-11: wording unchanged; Relocated under section 3.1.6	3.1.6
	Sentence 12: wording unchanged; Relocated under section 3.1.7	3.1.7
3.2.2	Title revised to “Performance requirements for instantaneous flow monitoring”; Relocated to section 3.2.	3.2
	Sentence 1 split into two; reformatted as a bullet point list; Meaning unchanged; Relocated to section 3.2.1.	3.2.1
	Sentence 2 revised to include reference to “flow passed forward and abbreviations “FPF” and “FFT”; Minor rewording; “Environment Agency” replaced by “Regulator”; Relocated to section 3.2.2	3.2.2

V4.0 clause no.	Revisions	03/02/22 clause no.
	Sentences 3-4: Minor rewording; Meaning unchanged; “Environment Agency” replaced by “Regulator”; Relocated to section 3.2.3.	3.2.3
	Sentences 5-8: Minor rewording; Meaning unchanged; “Environment Agency” replaced by “Regulator”; Relocated to section 3.2.4.	3.2.4
3.3	Unchanged	3.3
3.3.1	Unchanged	3.3.1
3.3.2	Minor rewording; Meaning unchanged; Revised hyperlink to competence standard; Bullet point list of requirements; Additional reference to the Code of Conduct .	3.3.2
3.3.3	Minor rewording; Meaning unchanged.	3.3.3
3.3.4	Unchanged.	3.3.4
3.3.5	Minor rewording; Meaning unchanged.	3.3.5
3.4.1	Hyperlink to standard added; Treatment of flowmeters holding class 4 certification added.	3.4.1
3.4.2	References to Appendices 2,3 & 4 replaced by new section numbers 6, 7 & 8; References to new section 9 added.	3.4.2
3.4.3	Minor rewording; Meaning unchanged.	3.4.3
3.4.4	Unchanged	3.4.4
3.4.5	Minor rewording; Meaning unchanged.	3.4.4
3.4.6	Minor rewording; Bullet point list of requirements; Meaning unchanged.	3.4.6
3.4.7	Unchanged.	3.4.7
	New section.	3.4.8
3.4.8	Section number revised to 3.4.9; Minor rewording; Meaning unchanged.	3.4.9
3.4.9	Section number revised to 3.4.10; Minor rewording; Meaning unchanged; Reference to Appendix 1 revised to new section 5.	3.4.10
3.4.10	Section number revised to 3.4.11; Minor rewording; Meaning unchanged.	3.4.11
4.1.2	Text relocated under section 4; Sentences reworded without change in meaning.	4
4.1.2	Diagram relocated under section 4; diagram unchanged.	4
	New section title	4.1
4.1.1	Text relocated under section 4; Sentences reworded without change in meaning; Hyperlink to website revised.	4
4.2	Title changed to “Contents of the management System”.	4.2
4.2.1	Unchanged.	4.2.1
4.3	Title unchanged	4.3
4.3.1	“as MCERTS is extended,” replaced by “this MCERTS standard may be extended and”.	4.3.1
4.4.1	Unchanged.	4.4.1
4.4.2	Unchanged.	4.4.2
4.5.1	Sentences revised to use “active” voice without change in meaning.	4.5.1
4.5.2	Sentences revised to use “active” voice without change in meaning.	4.5.2
4.5.3	Job description contents converted to bullet point list.	4.5.3
4.6.1	Text removed: “referred to in 4.4.1”.	4.6.1
4.6.2	Text added: “to all relevant personnel”.	4.6.2
4.7.1	Long second sentence converted to two short sentences without change in meaning.	4.7.1

V4.0 clause no.	Revisions	03/02/22 clause no.
4.8.1	Unchanged	4.8.1
4.8.2	Unchanged	4.8.2
4.9.1	Phrase in brackets converted to separate sentence without change in meaning.	4.9.1
4.9.2	Sentence revised to use “active” voice without change in meaning.	4.9.2
4.10.1	Sentence revised to use “active” voice without change in meaning;	4.10.1
4.10.1	Sentences 3-5 transferred to new section 4.10.2	4.10.2
4.11.1	Sentence reworded without change in meaning.	4.11.1
4.12.1	Sentence revised to use “active” voice without change in meaning.	4.12.1
4.12.2	Unchanged.	4.12.2
4.12.3	Sentence revised to use “active” voice without change in meaning.	4.12.3
4.13.1	Unchanged.	4.13.1
4.13.2	Third bullet point reworded to include “or level and velocity checks for area-velocity (AV) meters”	4.13.2
4.13.3	Second sentence reworded without change in meaning; Third sentence added “Section 7 includes further guidance on the verification of electromagnetic flowmeters.”.	4.13.3
4.14.1	First sentence revised to use “active” voice without change in meaning.	4.14.1
4.14.2	Unchanged.	4.14.2
4.15.1	Sentences restructured and reworded without change in meaning.	4.15.1
4.16.1	Unchanged.	4.16.1
4.16.2	Sentences revised to use “active” voice without change in meaning.	4.16.2
4.17.1	Minor rewording of sentences without change in meaning.	4.17.1
4.17.2	Unchanged	4.17.2
Appendix 1	Title changed to “Estimating Uncertainty”	5
	New text outlining scope of section.	5
Part 1	Title changed to “Estimating uncertainty of the total daily volume for effluent flow monitoring”.	5.1
A1.1.1	Section renumbered; Minor rewording of sentences without change in meaning.	5.1.1
A1.1.2	Section renumbered; Wording unchanged.	5.1.2
A1.1.3	Section renumbered; Minor rewording of sentences without change in meaning; One sentence added to replace title “Calculation of total daily volume uncertainty”.	5.1.3
A1.1.4	Section renumbered; Minor rewording of sentences without change in meaning.	5.1.4
A1.1.5	Section renumbered; Minor rewording of sentences without change in meaning.	5.1.5
A1.1.6	Section renumbered; Minor rewording of sentences without change in meaning.	5.1.6
A1.1.7	Section renumbered; Minor rewording of sentence without change in meaning.	5.1.7
A1.1.8	Section renumbered; Minor rewording of sentences without change in meaning.	5.1.8
A1.1.9	Added to preceding section.	5.1.8
A1.1.10	Section renumbered; Minor rewording of sentences without change in meaning.	5.1.9
A1.1.11	Section renumbered;	5.1.10
Figure 1.1	Title unchanged; renumbered.	Figure 2
A1.1.12	Section renumbered;	5.1.11
A1.1.13	Section renumbered;	5.1.12

V4.0 clause no.	Revisions	03/02/22 clause no.
Table 1.1	Table renumbered; content unchanged.	Table 1
Part 2	Clause renumbered; content unchanged.	5.2
A1.2.1	Clause renumbered; content unchanged.	5.2.1
A1.2.2	Clause renumbered; content unchanged.	5.2.2
Part 3	Clause renumbered.	5.3
A1.3.1	Clause renumbered; bullet point list introduced; meaning unchanged.	5.3.1
Figure 3.1	Title unchanged; renumbered; content unchanged.	Figure 4
Figure 3.2	Title unchanged; renumbered; content unchanged.	Figure 5
Table 3.1	Table renumbered; content unchanged.	Table 2
A1.3.2	Clause renumbered; change from passive to active sentences; meaning unchanged.	5.3.2
Appendix 2	Title unchanged; renumbered.	6
A2.1	Clause renumbered; content unchanged.	6.1
A2.2	Clause renumbered; change from passive to active sentences; meaning unchanged.	6.2
A2.3	Clause renumbered; content unchanged.	6.3
A2.4	Clause renumbered; minor rewording; meaning unchanged.	6.4
A2.5	Clause renumbered; content unchanged.	6.5
A2.6	Clause renumbered; content unchanged.	6.6
A2.7	Clause renumbered; minor rewording; meaning unchanged.	6.7
A2.8	Clause renumbered; minor rewording; meaning unchanged.	6.8
Table 1.1 Thin-plate Weirs – ISO 1438	Tabular format converted to standard text with embedded diagrams beneath clause text; no change to concessions.	6.8
Table 1.2 Long-throated, critical depth flumes – BS ISO 4359	Tabular format converted to standard text with embedded diagrams beneath clause text; no change to concessions.	6.8
Secondary Device Table	Tabular format converted to standard text with embedded diagrams beneath clause text; no change to concessions.	6.8
Appendix 3, A3.1, A3.2, A3.3,	Title revised; sub-clauses combined into new clause 7; minor rewording; meaning unchanged.	7
A3.4	Clause renumbered; minor rewording; meaning unchanged.	7.1.1
A3.5	Clause renumbered; minor rewording; meaning unchanged.	7.1.2
A3.6	Clause renumbered; minor rewording; meaning unchanged; bullet point list introduced.	7.1.3
A3.7	Clause renumbered; minor rewording; meaning unchanged.	7.1.4
	Title unchanged	7.2
A3.8	Clause renumbered; minor rewording; meaning unchanged.	7.2.1
A3.9	Clause renumbered.	7.2.2
A3.10	Clause renumbered; sentence order changed; minor rewording; meaning unchanged.	7.2.3
A3.11	Clause renumbered; minor rewording; meaning unchanged; references to other parts of the MCERTS standard updated.	7.2.4
	Title Revised	7.3
A3.12	Clause renumbered; minor rewording; meaning unchanged; references to other parts of the MCERTS standard updated.	7.3
	New sub-clause and title	7.3.1

V4.0 clause no.	Revisions	03/02/22 clause no.
Table 1 Appendix 3	Table number and title revised; no change to table text or footnote.	Table 3
Table 2 Appendix 3	Table rows and footnote converted to text; minor rewording; meaning unchanged.	7.3.2
	Title unchanged	7.4
A3.13	Clause renumbered.	7.4.1
A3.14	Clause renumbered.	7.4.2
A3.15	Clause renumbered.	7.4.3
A3.16	Clause renumbered.	7.4.4
A3.17	Clause renumbered.	7.4.5
A3.18	Clause renumbered; minor rewording; meaning unchanged.	7.4.6
A3.19	Clause renumbered; minor rewording; meaning unchanged.	7.4.7
	Title unchanged	7.5
A3.20	Clause renumbered.	7.5.1
A3.21	Clause renumbered.	7.5.2
	Title unchanged	7.6
A3.22	Clause renumbered.	7.6.1
A3.23	Clause renumbered.	7.6.2
A3.24	Clause renumbered.	7.6.3
A3.25	Clause renumbered; minor rewording; meaning unchanged.	7.6.3
Table 4 Appendix 3	Table renumbered; title and contents unchanged.	Table 4
	Title unchanged	7.7
A3.26	Clause renumbered; additional information incorporated	7.7.1
	New clause; additional information.	7.7.2
	New clause; additional information.	7.7.3
	Title unchanged	7.8
A3.27	Clause renumbered; minor rewording; meaning unchanged.	7.8.1
A3.28	Clause renumbered; reference to table revised.	7.8.2
A3.29	Clause renumbered.	7.8.3
A3.30	Clause renumbered; reference to table revised; minor rewording; meaning unchanged.	7.8.4
	Title unchanged	7.9
A3.31	Clause renumbered.	7.9.1
A3.32	Clause renumbered.	7.9.2
A3.33	Clause renumbered.	7.9.3
A3.34	Clause renumbered; minor rewording; meaning unchanged.	7.9.2
	Title unchanged	7.10
A3.35	Clause renumbered; minor rewording; meaning unchanged.	7.10.1
A3.36	Clause renumbered; minor rewording; meaning unchanged; bullet point list introduced.	7.10.2
A3.37	Clause renumbered.	7.10.3
A3.38	Clause renumbered.	7.10.4
A3.38	New clause based on second two sentences	7.10.5
	New clause title	7.11
	New clause	7.11.1
	Modified clause title	8
A4.1, A4.2, A4.3, A4.4.	Clause text amalgamated; minor rewording; meaning unchanged	8
	Title unchanged	8.1
A4.5	Clause renumbered; change from passive to active sentences; meaning unchanged.	8.1.1
A4.6	Clause renumbered; minor rewording; meaning unchanged.	8.1.2

V4.0 clause no.	Revisions	03/02/22 clause no.
A4.7	Clause renumbered.	8.1.3
A4.8	Clause renumbered; minor rewording; meaning unchanged.	8.1.4
A4.9	Clause renumbered.	8.1.5
A4.10	Clause renumbered.	8.1.6
A4.11	Clause renumbered.	8.1.7
A4.12	Clause renumbered; change from passive to active sentences; meaning unchanged.	8.1.8
A4.13	Clause renumbered; change from passive to active sentences; meaning unchanged.	8.1.9
A4.14	Clause renumbered; change from passive to active sentences; minor rewording; meaning unchanged.	8.1.10
A4.15	Clause renumbered; change from passive to active sentences; meaning unchanged.	8.1.11
A4.16	Clause renumbered.	8.1.12
A4.17	Clause renumbered.	8.1.13
A4.18	Clause renumbered; minor rewording; meaning unchanged.	8.1.14
A4.19	Clause renumbered; minor rewording; meaning unchanged; footnote incorporated in text..	8.1.15
A4.20	Clause renumbered; footnote incorporated in text..	8.1.16
A4.21	Clause renumbered; minor rewording; meaning unchanged; note incorporated in text..	8.1.17
A4.22	Clause renumbered.	8.1.18
A4.23	Clause renumbered; minor rewording; meaning unchanged	8.1.19
	Title unchanged	8.1
A4.24	Clause renumbered.	8.2.1
A4.25	Clause renumbered.	8.2.2
A4.26	Clause renumbered; footnote incorporated (second instance)..	8.2.3
A4.27	Clause renumbered.	8.2.4
A4.28	Clause renumbered.	8.2.5
A4.29	Clause renumbered.	8.2.6
	New clause	9
6.1	Text relocated under section 10; Hyperlink to document revised; New Text added.	10

Appendix 4 List of current MCERTS Bulletins

This list was correct at the date of publication of this guidance.
Copies of current bulletins are available at:
https://www.csagroup.org/en-gb/services/mcerts/mcerts-self-monitoring-of-flow/mcerts-bulletins/

Bulletin No.	Title	Version/ date
6	Inspection Report Format	Issue 9 April 2020
8	Data treatment/telemetry error	Issue 3 Oct 2017
12	MCERTS Inspectors – attendance on site	Issue 6 Oct 2013
14	Random versus Systematic uncertainty	Issue 2 Oct 2013
17	Flow monitoring for EA regulated sites. What do Operators need to do?	Issue 6 Oct 2013
18	Sites with multiple discharges	Issue 2 Oct 2013
20	BS 3680 Status	Issue 4 Oct 2016
22	MCERTS Code of Conduct	Issue 3 Oct 2013
23	MCERTS Certified Flowmeters	Issue 2 Oct 2013
24	Flow measurement using the pump running hours methodology	Issue 1 March 2010
25	Calculation of Uncertainty of discharge coefficient for flumes	Issue 1 Feb 2015
26	List of abbreviations used in MCERTS site inspection reports	Issue1 July 2015
27	Installation and use of Area-Velocity flowmeters in free surface flows	Issue 1 May 2018
28	Certification of meters installed for Instantaneous flow Measurement	Issue 2 Aug 2021