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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex **(e.g. 3.1)**	Paragraph/ Figure/Table/Note	**Type of comment**	**Commend (justification for change) by the MB**	**Proposed change by the MB**	**Secretariat observations on each comment submitted**
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 18069

January 2025

ICS 13.060.45

English Version

Water quality - Minimum requirements for the selection, installation, validation, and operation of continuous measuring devices

Qualité de l'eau - Exigences minimales pour le choix, l'installation, la validation et l'exploitation de dispositifs de mesure en continu

Wasserbeschaffenheit - Mindestanforderungen für die Auswahl, Installation, Validierung und den Betrieb von kontinuierlichen Messgeräten

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 230.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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Introduction

The continuous monitoring of water quality parameters can provide real time information on temporal variability compared with sampling campaigns conducted at fixed intervals which can miss significant events such as a concentration peak during a flood or rainfall episode.

Moreover, in the event of pollution due to industrial accidents or transport on inland waterways for example, it is vital to be able to detect these events as early as possible and react rapidly to limit their impacts on the environment and possible drinking water resource.

Consequently, the choice of having recourse to continuous measuring devices (CMDs) is directly linked to the advantages of obtaining a rapid measurement (a few seconds to a few minutes) at short time intervals (from a few seconds to a few hours) and in most cases in real time. Furthermore, it is possible to use the resulting measurements to automatically trigger actions, such as taking a sample for further analysis and/or stopping pumping of a drinking water resource.

In order to obtain representative and reliable measurements when using CMDs to monitor water quality, this document specifies minimum requirements for the following four steps:

1) Selection: defining the user requirements, the purposes of the required measurements, associated data quality requirements, and choice of CMDs.

2) Installation: verifying a complete and correct delivery of the procured CMD and verifying a correctly functioning on-site installation, operation and communication of the CMD.

3) Validation: verifying that the correctly installed CMD meets all of the original defined requirements.

4) Operation: implementing operating and maintenance procedures, processing of data and document traceability.

This document is associated with EN 17075 which specifies general requirements and performance test procedures for portable and fixed position continuous measuring devices that are used in an in-line or online operating position to measure physical and chemical measurands in water.

Continuous measuring devices are widely used for compliance monitoring purposes under national and European regulations.

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1 Scope

This document specifies requirements for the selection, installation, qualification, and operation of continuous measuring devices (CMDs). The overall objective is to obtain representative and reliable measurements when using CMDs to monitor water quality.

This document applies to continuous measuring devices for monitoring physical and chemical parameters in different types of water.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 17075:2018+A1:2023, *Water quality - General requirements and performance test procedures for water monitoring equipment - Continuous measuring devices*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
continuous measuring device (CMD)
component or a group of components, used in an in-line or on-line operating position, which continuously (or at a given frequency) gives an output signal proportional to the value of one or more measurands in waters which it measures

Note 1 to entry: The device can be portable or fixed in position.

[SOURCE: EN 17075]

3.2
sensor
electronic device that senses a physical condition or chemical compound and delivers an electronic signal proportional to the observed characteristic

[SOURCE: EN 17075]

3.3
in-line continuous measuring device
in-situ continuous measuring device
system of automatic measurement which at least the sensor is sited in the body of water

[SOURCE: EN 17075]

3.4
on-line continuous measuring device
system of automatic measurement in which the sample is taken from the body of water by means of an appropriate conduit to the CMD

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Note 1 to entry: Sometimes referred to as an extractive continuous measuring device.

[SOURCE: Adapted from EN 17075]

3.5
measuring point
geographical location of the site at which the measurement is taken

3.6
outlier
member of a set of values which is inconsistent with the other members of that set

[SOURCE: ISO 5725-1]

3.7
reference method
method, material or device to be used to obtain the measurand value of the test waters, against which the readings from the CMD used can be compared

[SOURCE: adaptated from EN 17075]

3.8
calibration
operation that, under specified conditions, in a first step, establishes a relation between the quantity values with measurement uncertainties provided by measurement standards and corresponding indications with associated measurement uncertainties and, in a second step, uses this information to establish a relation for obtaining a measurement result from an indication

Note 1 to entry: A calibration may be expressed by a statement, calibration function, calibration diagram, calibration curve, or calibration table. In some cases, it may consist of an additive or multiplicative correction of the indication with associated measurement uncertainty.

Note 2 to entry: Calibration should not be confused with adjustment of a measuring system, often mistakenly called "self-calibration", nor with verification of calibration.

[SOURCE: VIM 2012, 2.39]

3.9
adjustment of a measuring system
set of operations carried out on a measuring system so that it provides prescribed indications corresponding to given values of a quantity to be measured

Note 1 to entry: Types of adjustment of a measuring system include zero adjustment of a measuring system, offset adjustment, and span adjustment (sometimes called gain adjustment).

Note 2 to entry: Adjustment of a measuring system should not be confused with calibration, which is a prerequisite for adjustment.

Note 3 to entry: After an adjustment of a measuring system, the measuring system must usually be recalibrated. Series of operations performed on a measuring system so that it delivers prescribed indications corresponding to given values of the quantities to measure

[SOURCE: VIM 2012, 3.11]

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3.10
verification
provision of objective evidence that a given item fulfils specified requirements

Note 1 to entry: When applicable, measurement uncertainty should be taken into consideration.

Note 2 to entry: The item may be, e.g. a process, measurement procedure, material, compound, or measuring system.

Note 3 to entry: The specified requirements may be, e.g. that a manufacturer's specifications are met.

Note 4 to entry: Verification in legal metrology, as defined in VIML [53], and in conformity assessment in general, pertains to the examination and marking and/or issuing of a verification certificate for a measuring system.

Note 5 to entry: Verification should not be confused with calibration. Not every verification is a validation.

[SOURCE: VIM 2012, 2.44]

3.11
validation
verification, where the specified requirements are adequate for an intended use

[SOURCE: VIM 2012, 2.45]

3.12
measurement standard
realization of the definition of a given quantity, with stated quantity value and associated measurement uncertainty, used as a reference verification, where the specified requirements are adequate for an intended use

[SOURCE: VIM 2012, 5.1]

3.13
primary measurement standard
primary standard
measurement standard established using a primary measuring procedure or created as an object by convention

[SOURCE: VIM 2012, 5.4]

3.14
secondary measurement standard
secondary standard
measurement standard established through calibration with respect to a primary measurement standard of a quantity of the same kind

[SOURCE: VIM 2012, 5.5]

3.15
working measurement standard
working standard
measurement standard that is used routinely to calibrate or verify measuring instruments or measuring systems

[SOURCE: VIM 2012, 5.7]

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3.16
measurement accuracy
accuracy of measurement
accuracy
closeness of agreement between a measured quantity value and a true quantity value of a measurand

Note 1 to entry: The concept 'measurement accuracy' is not a quantity and is not given a numerical quantity value. A measurement is said to be more accurate when it offers a smaller measurement error.

Note 2 to entry: The term "measurement accuracy" should not be used for measurement trueness and the term "measurement precision" should not be used for 'measurement accuracy', which, however, is related to both these concepts.

Note 3 to entry: 'Measurement accuracy' is sometimes understood as closeness of agreement between measured quantity values that are being attributed to the measurand.

[SOURCE: VIM 2012, 2.13]

3.17
measurement uncertainty
uncertainty of measurement
uncertainty
non-negative parameter characterizing the dispersion of the quantity values being attributed to a measurand, based on the information used

Note 1 to entry: Measurement uncertainty includes components arising from systematic effects, such as components associated with corrections and the assigned quantity values of measurement standards, as well as the definitional uncertainty. Sometimes estimated systematic effects are not corrected for but, instead, associated measurement uncertainty components are incorporated.

Note 2 to entry: The parameter may be, for example, a standard deviation called standard measurement uncertainty (or a specified multiple of it), or the half-width of an interval, having a stated coverage probability.

Note 3 to entry: Measurement uncertainty comprises, in general, many components. Some of these may be evaluated by Type A evaluation of measurement uncertainty from the statistical distribution of the quantity values from series of measurements and can be characterized by standard deviations. The other components, which may be evaluated by Type B evaluation of measurement uncertainty, can also be characterized by standard deviations, evaluated from probability density functions based on experience or other information.

Note 4 to entry: In general, for a given set of information, it is understood that the measurement uncertainty is associated with a stated quantity value attributed to the measurand. A modification of this value results in a modification of the associated uncertainty.

[SOURCE: VIM 2012, 2.26]

3.18
Laboratory Information Management System
LIMS
software that allows managing samples, test results and associated data e.g. to improve lab productivity

3.19
Supervisory Control and Data Acquisition
SCADA
industrial computer system that monitors and controls a process

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3.20
Computerized Maintenance Management System
CMMS
computer software system that supports maintenance management

3.21
Failure Mode and Effect Analysis
FMEA
systematic and proactive method for evaluating a process to identify where and how it might fail and how to mitigate the potential failures

Note 1 to entry: It is a common tool in engineering and Excel templates can be downloaded for free from the internet to follow the systematic approach of this tool.

3.22
calibration drift error
result of an electronic drift in CMD reading from the last time the CMD was calibrated

Note 1 to entry: It is determined by the difference between CMD readings using standard solutions or buffers taken after the CMD has been cleaned and the true, temperature-compensated, value of the standard solutions or buffers.

3.23
fouling error
error determined by the difference between CMD measurements in the environment before and after cleaning

Note 1 to entry: Biological fouling, siltation, and scaling are the principal causes of fouling error.

3.24
confidence index
accuracy classifications, based on data values recorded before any data corrections are made and after the record has been evaluated and data corrections applied

4 Selection, installation, validation and operation of continuous measuring devices

4.1 General

In order to obtain representative and reliable measurements when using CMDs, a procedure shall be followed to address the minimum requirements specified for the four main steps listed below:

1) Selection: defining the user requirements, the purposes of the required measurements, associated data quality requirements, and choice of CMDs.

2) Installation: verifying a complete and correct delivery of the procured CMD and verifying a correctly functioning on-site installation, operation and communication of the CMD.

3) Validation: verifying that the correctly installed CMD meets all of the original defined requirements.

4) Operation: implementation of operating and maintenance procedures, processing of data and document traceability.

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4.2 Selection

4.2.1 Scope of the user requirements (UR) document

The objectives of the measurement shall be defined and documented in detail before selecting and installing a continuous measuring device. The objectives should furthermore be expressed as quantifiable requirements (some examples are given in Annex A).

The following considerations should be addressed:

— general purpose;

— targeted parameter(s);

— targeted application and water characteristics to be measured:

  — water composition,

  — temperature variation,

  — presence of potential interfering factors (e.g. suspended matter, organic matter),

  — water pressure and temperature in pipe works,

— expected performances;

— type of installation (in-line and/or online, monitoring station);

— maximum measurement frequency;

— duration of operation;

— reagent consumption depending on measurement frequency;

— range of concentration of the parameters to be measured (based on monitoring records);

— any sample pre-treatment requirements (if necessary).

4.2.2 Normative references and regulatory requirements

Standards (national, international) relevant to method, quality assurance, verification, validation and data communication shall be identified.

Regulations (national or international) relevant to the application and final use of the monitoring data shall be identified.

4.2.3 Measuring point

The selection of the measuring point at which to install and deploy a continuous measuring device shall meet the measurement objectives and comply with the associated quality and safety requirements.

The following considerations should be addressed when selecting a measuring point:

— representativeness of water bodies to be measured;

— process and risk assessment requirements when installing a CMD in a plant or facility;

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